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Too Connected to Feel Well? Student Engagement as a Moderator of Online Vigilance and Well-Being

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Abstract

Background: The digital age has fostered the manifestation of online vigilance.
Objective: Based on this, the present study seeks to analyze how online vigilance influences the psychological well-being (PWB) of Indonesian students and the influence of student engagement on the relationship between online vigilance and PWB.
Methods: This study employed a sample of 504 active undergraduate students in Greater Jakarta as the primary sample population. Prior to the main data collection, instrument adaptation was conducted with 104 pilot participants to assess item clarity and preliminary psychometric properties. Three adapted instruments were used: OVS (Online Vigilance Scale), SES (Student Engagement Scale), and PWB-PERMA (Positive Emotion, Engagement, Relationships, Meaning, Accomplishment).
Results: The results indicated that high online vigilance ($M = 3.45$, $\beta = -0.382$, $p < 0.001$) served as a significant negative predictor of well-being, whereas student engagement was a significant positive predictor of well-being ($\beta = 0.493$, $p < 0.001$). The interaction effect was not significant ($\beta = 0.012$, $p = 0.118$), but simple slope analysis suggested a trend whereby the negative effect of online vigilance was attenuated among students who were highly engaged. Results further indicated that online vigilance was a risk factor, whereas student engagement was a protective factor. Available online 11 October 2023.
Conclusion: The protective trend pointed to the need to increase youth literacy on academic engagement to maintain well-being in the digital age.

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INTRODUCTION

Digital technology is changing how students interact with each other, how they learn, and how their mental health is affected. Online vigilance—the psychological impulse to be perpetually on call and responsive to one's digital environment—has become more common among the digitized generation (Reinecke et al., 2017). While digital connectedness can provide easy access to information, excessive online vigilance is linked to harmful consequences such as digital stress, sleep disturbance, anxiety, and low academic engagement (Huang et al., 2023;Vanden Abeele, 2021).

Online vigilance is described as a cognitive proclivity toward perpetual psychological proximity to digital realms, distinguished by salience (cognitive preoccupation), reactivity (motivational drive), and monitoring (attentional inspection), and has been shown to have detrimental effects on affective well-being, especially via its salience component (Johannes et al., 2021). Prior evidence shows that the salience dimension of online vigilance—particularly the frequency of thoughts about digital interactions—correlates with lower levels of affective well-

being (Johannes et al., 2021). Online vigilance tends to be inversely related to well-being, but whether those digital thoughts are positive or negative makes a key difference—positive valence can reduce the harmful effects of online vigilance (Johannes et al., 2021).

Despite this, most studies continue to treat screen time as the primary basis of digital influence (Coyne et al., 2020). Furthermore, experimental research indicates that refraining from social media can result in reduced life satisfaction and heightened feelings of isolation Vally (2019), thus suggesting that the mere act of limiting social media use may not always yield favorable psychological outcomes. However, in a recent longitudinal study that examined adolescents' perceptions of digital well-being, Rosič (2025) found that, particularly in the emotional domain, self-esteem was significantly and strongly related to digital well-being. This suggests that it is not screen time itself, but rather how individuals perceive their digital behavior, that affects mental health. Thus, this research examines online vigilance as a cognitive–emotional, perception-based construct of the digital sphere.

In Indonesia, students are often faced with the demands of online learning, social media, and instant communication, making them susceptible to digital stress and psychological strain associated with higher education contexts. Such a scenario can potentially harm their mental health. In order to define well-being in this particular context, the present study uses Seligman's (2011) PERMA (Positive Emotion, Engagement, Relationships, Meaning, Accomplishment) model, which conceptualizes psychological well-being as multidimensional and as a representation of positive functioning (Ryff, 1989). It offers a broad framework not only for reducing pathology but also for increasing flourishing, which is better suited for measuring students' well-being in the digital age.

Based on positive psychology in education, PERMA-based interventions such as gratitude exercises and strengths identification have been found to positively impact student engagement and classroom community, even in online learning settings (Chu, 2022). A factor crucial to students' psychological well-being is student engagement, which is a foundational component of the PERMA model. Previous work has similarly shown that high engagement relates to greater psychological resources (a form of psychological capital) and serves as a buffer against academic stress (Saleem et al., 2022).

Student engagement is an indirect, second-order construct in higher education Kahu (2013) and Tinto (2017), and is complex and multidimensional by nature. Kahu's (2013) wide-ranging review categorized perspectives into four groups and concluded that engagement is a psychosocial construct consisting of affective (attachment and interest), cognitive (psychological investment in learning), and behavioral (participation) dimensions. Engagement is a multifaceted measure that goes beyond behavior to include cognitive and emotional engagement, especially in technology-facilitated learning environments (Henrie et al., 2015).

As Fredricks (2004) defined, student engagement refers to students' academic, emotional, and social involvement in the educational environment; thus, it may function as a buffering variable for online vigilance. This indirect link can be theoretically explained by Hobfoll's (1989) Conservation of Resources (COR) theory, which maintains that the primary motivation of individuals is to obtain and retain valuable psychological resources such as attention, energy, and time. In this vein, online vigilance can be viewed as a resource-draining process that places sustained pressure on cognitive and emotional resources Vanden (2021), while student engagement can serve as a psychological resource that alleviates the psychological costs of maintaining well-being during times of adversity.

Drawing on COR theory, academic engagement may serve as a "resource caravan"—a bundle of mutually compatible resources such as intrinsic motivation, relational resources, and a sense of competence, which protect individuals from resource loss (Hobfoll, 2011). Supportive campus experiences, including well-designed learning environments and academic communities, could act as passageways for resource caravans, facilitating the acquisition and preservation of these resources. This view is also consistent with the Work–Home Resources (W–HR) Model Ten (2012), which describes how contextual demands may deplete personal resources while contextual resources enrich them.

Studies globally have explored the association between online vigilance and psychological well-being, as well as between student engagement and well-being. Nevertheless, studies

investigating the role of student engagement as a moderator in the relationship between online vigilance and psychological well-being are very rare, particularly in the Indonesian context. In Indonesia, most studies still examine the general impact of technology on mental health (e.g., internet addiction or cyberbullying) or on learning engagement without focusing on the construct of online vigilance and academic protective mechanisms. Studies that have examined the influence of online vigilance on the academic well-being of Indonesian students have generally been limited.

The uniqueness of this study lies in combining three variables—online vigilance, student engagement, and psychological well-being within the PERMA framework—in a single research model in Indonesia. Second, we examine the moderating role of student engagement in the relationship between online vigilance and psychological well-being among Indonesian university students. Given that the PERMA model is a positive and contextual approach to measuring well-being, it is anticipated that this study will generate both empirical and conceptual contributions to understanding the dynamics of well-being among students in the digital age.

Therefore, this study aims to: (1) examine the impact of online vigilance on the psychological well-being of university students in Greater Jakarta, Indonesia; (2) assess the relationship between student engagement and psychological well-being; and (3) investigate whether student engagement moderates the relationship between online vigilance and psychological well-being. Accordingly, three hypotheses were formulated: H1: Online vigilance significantly and negatively predicts psychological well-being in university students. H2: Student engagement significantly and positively predicts psychological well-being in university students. H3: Student engagement moderates the relationship between online vigilance and psychological well-being.

METHOD

Design and Participants

A quantitative correlational design was utilized in this study to investigate the relationships among a set of variables and the moderating role of student engagement. The participants were 504 active undergraduate students from public and private universities in Greater Jakarta, Indonesia. A convenience sampling method was adopted using an online questionnaire. Students are among the most digitally connected populations and therefore constitute a group of significant interest in studying online vigilance (Johannes et al., 2021).

Instruments

The OVS, SES, and PWB were the three instruments employed in this study, and each of the scales underwent rigorous adaptation procedures for the Indonesian context (International Test Commission, 2017). The adaptation process involved (1) forward and backward translation by a certified translator and a bilingual researcher, (2) cultural and conceptual validation by a panel of experts (three psychology lecturers), and (3) a pilot test with 104 university students who had similar characteristics to the main sample to assess item clarity and preliminary psychometric properties. Several items were slightly modified to improve clarity and cultural appropriateness based on the pilot results.

Online Vigilance Scale (OVS)

The Online Vigilance Scale was adapted from Reinecke (2018) and measures three aspects of online vigilance: salience, reactivity, and monitoring. The scale comprised 18 items rated on a 5-point Likert scale (1 = Rarely, 5 = Almost Always). In this study, the Cronbach's alpha reliability coefficient was 0.87.

Student Engagement Scale (SES)

The Student Engagement Scale Schaufeli (2002) was adapted to assess engagement across three dimensions: vigor, dedication, and absorption. The scale included 23 items with response options on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The Cronbach's alpha reliability coefficient for this scale was 0.89.

Psychological Well-being Scale (PWB)

Psychological well-being was assessed based on the five dimensions of the PERMA model Seligman (2011) using a scale designed within the positive psychology framework. The measure was adapted from the PERMA-Profiler, a brief multidimensional measure of flourishing developed by (Butler et al. 2016). The scale comprised 15 items rated on a response scale ranging from 0 to 10. The Cronbach's alpha reliability coefficient for the total scale was 0.91, while subscale reliabilities ranged from 0.79 to 0.86.

Data Collection Procedure

After obtaining ethical approval from the UNJ Ethics Committee (No. 319/UN39.010/2025; 14/PT.01.05/IV/2025), data collection was conducted online from May to September 2025. The questionnaire was administered via Google Forms. Participants were presented with an informed consent form prior to completing the questionnaire and provided voluntary consent to participate. Data were collected anonymously, and confidentiality was ensured for all participants.

Data Analysis

Data were analyzed using JASP statistical software. Descriptive statistics and Pearson correlation analyses were conducted to examine relationships among the variables. The moderation hypothesis was tested using moderated regression analysis (Hayes, 2017). Prior to creating the interaction term, predictor variables were standardized (mean-centered) to reduce multicollinearity. The moderation effect was evaluated by examining the significance of the interaction coefficient, followed by simple slope analysis to interpret the interaction pattern.

Descriptive statistics were used to summarize sample characteristics and the distribution of study variables. Assumption testing for moderated regression included normality (Kolmogorov–Smirnov test and histogram inspection), linearity (scatterplots), homoscedasticity (Glejser test), multicollinearity (VIF < 5), and outlier detection. No assumption violations were identified, or deviations were considered acceptable given the large sample size. It is acknowledged that the use of convenience sampling limits the generalizability of the findings to the broader population of Indonesian university students. Furthermore, all variables were measured using self-report instruments, which may introduce common method bias.

A post-hoc power analysis was conducted using G*Power (Faul et al., 2007), confirming that the sample size of 504 was sufficient ($1 - \beta = 0.95$) to detect a small effect size ($f^2 = 0.05$) in the moderation model at $\alpha = .05$.

RESULTS AND DISCUSSION

Results

Participant Characteristics

The participants of this study (N = 504) were university students from Greater Jakarta, Indonesia (51% male; 49% female). The mean age of participants was 22.6 years (range = 20–43). The majority of respondents were undergraduate students (88.3%) and were enrolled in private universities (78.6%).

In terms of digital exposure, the most common amount of time spent online reported by participants was more than six hours per day (44.2%), followed by four to six hours per day (43.8%). These findings highlight the need to consider how students enrolled in metropolitan universities—who typically exhibit similar levels of digital connectedness—experience the psychological consequences of online vigilance.

Table 1. Participant Characteristics (N = 504)

Variable	Category	n	%
Gender	Male	257	51.0%
	Female	247	49.0%
University Status	Public	108	21.4%
	Private	396	78.6%
Education Level	Bachelor's Degree (S1)	445	88.3%

Variable	Category	n	%
	Master's Degree (S2)	35	6.9%
	Diploma	24	4.8%
Domicile	Jakarta	184	36.5%
	Tangerang	101	20.0%
	Depok	78	15.5%
	Bogor	74	14.7%
	Bekasi	67	13.3%
Average Online Time	More than 6 hours	223	44.2%
	4–6 hours	221	43.8%
	1–3 hours	48	9.5%
	Less than 1 hour	12	2.4%
Employment Status	Not working	242	48.0%
	Working part-time	241	47.8%
	Working full-time	21	4.2%
Residence	Living with family	353	70.0%
	Living in a boarding house/rented accommodation	144	28.6%
	Living in a dormitory	7	1.4%

Descriptive and Correlation Analysis

Descriptive statistical analysis of the distribution of scores for the three main study variables and their associated dimensions was conducted before testing the research hypotheses. Table 2 shows the results.

Table 2. Descriptive Statistics of Research Variables (N=504)

Variable	Mean	SD	Minimum Score	Maximum Score
Online Vigilance (OV)	3.45	0.78	1.20	5.00
Student Engagement (SE)	3.89	0.65	1.80	5.00
Psychological Well-Being (PWB)	3.67	0.71	1.60	5.00
PWB Dimensions:				
- Positive Emotion	3.52	0.82	1.25	5.00
- Engagement	3.41	0.79	1.40	5.00
- Relationships	3.95	0.68	2.00	5.00
- Meaning	3.63	0.75	1.60	5.00
- Accomplishment	3.84	0.72	1.80	5.00

Participants indicated relatively high online vigilance (M = 3.45, SD = 0.78; see Table 2), confirming that there is a culture of being always online (24/7) among university students in Greater Jakarta. The results showed that student engagement was above average (M = 3.89, SD = 0.65), and psychological well-being, as measured by the PERMA model, was moderate to high (M = 3.67, SD = 0.71).

The PERMA dimensions were analyzed, revealing some notable trends. The highest scores were found in the Relationships (M = 3.95, SD = 0.68) and Accomplishment (M = 3.84, SD = 0.72) dimensions, indicating that students still maintain strong social connections and a positive sense of achievement. On the other hand, the lowest scores were observed in the PERMA Engagement dimension (M = 3.41, SD = 0.79). This finding is especially intriguing because it could indicate that students are frequently engrossed in activities that are engaging and relevant, potentially as a byproduct of high levels of online attentional demands. This pattern is consistent with the digital paradox discussed previously, in which excessive attention to the online space may detract from the focus needed for deep learning and personal pursuits in the offline world.

Pearson correlation analysis showed a significant negative correlation between online vigilance and psychological well-being ($r = -0.39$, $p < .001$). In contrast, a positive and significant relationship was observed between student engagement and psychological well-being ($r = 0.49$, $p < .001$). Another negative correlation, albeit smaller but still meaningful, was also found

between online vigilance and student engagement (r = −0.21, p < .05). The results also suggest that uninterrupted connectedness to the digital environment could be detrimental to well-being, whereas engagement in academic activities serves as an important psychological resource.

Moderated Regression Analysis

Subsequently, moderated regression analysis was conducted to test the moderating effect of student engagement on the relationship between online vigilance and psychological well-being.

Table 3. Moderated regression analysis for the prediction of psychological well-being

Predictor	β	t	p
Constant	1.245	4.892	< .001
Online Vigilance (OV)	-0.382	-6.713	< .001
Student Engagement (SE)	0.493	8.451	< .001
OV × SE	0.012	1.561	.118

Note. R^2 =. 248, Adjusted R^2 =. 244, F(3, 500) = 54.89, p <. 001.

Findings showed that online vigilance displayed a considerable negative impact on psychological well-being (β = -0.382, p < .001), supporting Hypothesis 1. The results are in line with Conservation of Resources (COR) theory Hobfoll (1989), which posits that the accumulation of continuous digital demands can exhaust psychological resources, including attention and energy.

The effect of student engagement on psychological well-being was positive and statistically significant (β = 0.493, p < .001), supporting Hypothesis 2. The higher the student engagement in academic activities, the higher the student psychological well-being.

The interaction effect between online vigilance and student engagement was not significant (β = 0.012, p = .118), and thus Hypothesis 3 was not supported.

Moderation Trend

The interaction between online vigilance and student engagement was not statistically significant (β = 0.012, p = .118); therefore, Hypothesis 3 was not supported. However, analysis of simple slopes suggested a trend. The association between online vigilance and psychological well-being was weaker (β = -0.228, p < .05), and thus less detrimental among students with high engagement (+1 SD) than among those with low engagement (-1 SD; β = -0.421, p < .001).

This pattern did not meet the conventional threshold for statistical significance; therefore, caution should be exercised when interpreting these results. It would be premature to conclude that student engagement moderates the negative effect of online vigilance on psychological well-being based on these data alone.

While the numerical pattern of simple slopes is directionally consistent with the hypothesis that engagement may buffer the negative effects of online vigilance, this observation must be interpreted cautiously given that the overall moderation test was not statistically significant. Future studies with larger samples and more precise power calibration are needed to determine whether this non-significant trend reflects a genuine but small protective effect.

These findings should therefore be considered exploratory and preliminary. The lack of a statistically supported moderation effect is an important finding in itself, indicating that student engagement alone may not be a sufficient buffer against the psychological costs of online vigilance in this sample.

Exploratory Analysis: Changes in the PERMA Constructs

Building on the impact of online vigilance on well-being, further regression analyses were performed for each dimension of the PERMA constructs.

Table 4. Impact of Online Vigilant on PERMA Elements

PERMA Dimension	β	t	p	R^2
Positive Emotion	-0.325	-5.623	< .001	.106
Engagement	-0.418	-7.892	< .001	.175

PERMA Dimension	β	t	p	R^2
Relationships	-0.286	-4.892	< .001	.082
Meaning	-0.351	-6.124	< .001	.123
Accomplishment	-0.294	-5.123	< .001	.086

Specifically, these results show that online vigilance had a negative impact on every PERMA dimension. The Engagement dimension was found to be the most strongly affected, indicating that cognitive overconnectedness to globalized digital environments may play a particularly damaging role in students' engagement with their studies. This discovery points to a possible digital paradox: high ambitions in one context—namely digital—may diminish the ability to focus on more meaningful real-world practices, such as academic engagement.

Discussion

In a highly connected digital environment, the present study analysed the links between online vigilance, engagement, and psychological well-being among university students. The results indicated that online vigilance is a significant predictor of reduced psychological well-being, while student engagement is a positive predictor of well-being. The moderating effect of student engagement was not statistically significant, but the pattern was in the protective direction, whereby engaged students seemed to be less susceptible to the detrimental impact of online vigilance.

The negative relationship between online vigilance and psychological well-being is in line with previous literature that has found that near-constant psychological connectivity to digital spaces can cause attentional fragmentation and emotional exhaustion (Johannes et al., 2021). Over time, the constant scrutiny of digital stimuli and rapid responses to online interactions, a behavioural characteristic of online vigilance, may drain a person of cognitive and emotional energy. Fulfilling these kinds of demands can negatively affect mental health due to challenges associated with sustained focus and emotional regulation over time.

According to Conservation of Resources (COR) theory Hobfoll (1989), online vigilance can be viewed as a chronic contextual demand derived from the digital environment. COR theory suggests that people are motivated to obtain and retain resources; however, when demands exceed available resources or contribute to resource depletion, psychological strain occurs. The unrelenting spectre of messages, notifications, and interactions in digital life may siphon attentional and emotional resources that are needed for academic functioning and well-being.

The current results also provide evidence for perspectives on youth development in the digital age. For a growing number of young people, development occurs in settings steeped in digital technology, where online interaction comprises a large portion of daily life (Salmela-Aro, 2022). Although digital technologies can offer opportunities for learning and social connection, overabsorption of cognitive space in online settings may generate psychological pressures that are detrimental to health and well-being. In this setting, online vigilance is one possible way in which digital environments may impact students' psychological functioning.

However, student engagement emerged as one of the strongest positive predictors of psychological well-being, in contrast to the negative effects of online vigilance. Students who participated in more academic activities reported better psychological well-being. This is consistent with prior scholarship linking engagement in learning environments to increased positive affect, social connection, and a sense of purpose and efficacy in the learning process.

In line with COR theory, student engagement can be interpreted as a resource caravan comprised of mutually reinforcing psychological resources that can include intrinsic motivation, academic competence, and social support from peers and lecturers. These factors support students in remaining resilient when confronted with multiple academic and environmental challenges. Research on youth development in the digital era supports this perspective and suggests that educational environments with high levels of support are predictors of psychological well-being Salmela (2022), and participation in academically relevant activities is another protective factor for psychological well-being.

Although the moderation effect of student engagement failed to reach statistical significance, the slope of the simple interaction plots in the top panel indicated that the negative

association between online vigilance and psychological well-being was weaker for highly engaged students. This trend indicates that, despite the correlation between students' engagement in learning and well-being, engagement may still offer some psychological protection through organized academic activities, availability of social support, and opportunities to meaningfully participate in learning environments.

In conclusion, these results underline the intricate link between students' well-being and their digital behaviour. On the one hand, online vigilance and reduced self-regulatory capacity may operate as risk factors due to depleted mental reserves; on the other hand, involvement in academics and campus activities could be a critical developmental resource that may enhance students' mental well-being. With increasing digitalization in educational platforms, promoting effective student engagement may therefore contribute to psychological equilibrium as students face an ever-present digital climate.

Limitations and Future Research Directions

Several limitations of this study should be acknowledged. One limitation is the adoption of a cross-sectional design, which hinders the possibility of making causal inferences concerning the associations between online vigilance, student engagement, and psychological well-being. As noted by Saleem (2022), cross-sectional designs limit the ability to determine causal direction. It follows that future research should employ a longitudinal approach to investigate how online vigilance, engagement, and psychological well-being evolve and interact over time.

Second, convenience sampling was used in this study, making generalisation to larger populations of students difficult. While the sample included students from different universities within the Greater Jakarta area, future research should obtain a broader sample from other regions of Indonesia for a better insight into students' digital experiences and well-being.

Third, this study used self-report instruments for most measurements, which may be vulnerable to response bias and individual interpretation. The instruments showed moderate reliability; thus, future studies might include behavioural indicators of digital activity (e.g., smartphone logs of online interaction) to provide a more comprehensive picture of online vigilance.

Despite these limitations, the results of this study advance the literature on digital behaviour and student well-being. Previous research has suggested that constant digital alertness may deplete individuals' cognitive and emotional resources Johannes (2021), which may explain the finding that online vigilance negatively predicts psychological well-being. However, while Johannes (2021) highlighted the moderating role of thought valence, the present study extends this view by proposing student engagement as an additional protective factor that helps mitigate the adverse effects of online vigilance.

On a theoretical level, the combination of Conservation of Resources (COR) theory and the PERMA model provides a framework for understanding student well-being in the digital age. COR theory posits that people seek to retain, conserve, and protect their resources, and that resource loss and depletion triggered by environmental demands can lead to poorer well-being (Hobfoll, 2018). In the context of digital life, constant online vigilance may represent such a demand, depleting cognitive and emotional resources necessary for healthy functioning.

There are also important implications for higher education institutions. COR theory suggests that campus-based interventions should not only target reductions in digital demands (thereby minimising resource loss) but also enhance resource caravans through student engagement, social support, and academic competency development (Hobfoll, 2011;Hobfoll et al., 2018). Universities can develop well-being programmes that strengthen positive psychological resources among students. Positive education approaches focus on nurturing resilience, strengths, and supportive environments to foster well-being (Brunzell et al., 2016). Additionally, Kern (2015) and the PERMA model suggest that different PERMA domains can serve as intervention targets. Educational institutions can therefore design programmes that reduce excessive online vigilance while promoting Positive Emotions (e.g., positive campus activities), strengthening Relationships (supportive learning communities), and enhancing Accomplishment (constructive feedback and recognition of student achievements).

In conclusion, these findings indicate that online vigilance may function as a risk factor for

the psychological well-being of Indonesian university students, while student engagement may serve as an important protective factor. The integration of COR and PERMA theories provides a robust conceptual framework for understanding student well-being in the digital age and offers valuable insights for developing well-being-oriented interventions in higher education.

CONCLUSION

Although the moderating effect of student engagement on the relationship between online vigilance and psychological well-being was not statistically significant in the present study, the integration of Conservation of Resources (COR) theory and the PERMA model offers a robust theoretical foundation for studying the dynamics of student well-being in the digital era.

The extreme vigilance found in this study suggests that educational institutions need to assist students in learning how to adapt to digital environments that constantly demand attention. Strengthening psychological resources and supporting students as they pursue a healthy and balanced lifestyle is vital for their well-being, academic, and career success.

As shown in previous studies, the direct effects of online vigilance on well-being may be small, which may indicate the need to address moderating or mediating variables that can increase the variance explained in well-being outcomes. Hence, future studies could also investigate a variety of additional psychological and contextual factors that may moderate the relationship between digital behavior and student well-being.

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