

# **The Effect of Tuition Fees and Financial Stress on Academic Performance**

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## **I. Introduction**

The debate over tuition fees continues to be a contentious issue amongst the stakeholders in higher education. Policymakers and economists often argue that tuition fees are necessary to maintain a quality of education and ensure financial sustainability for institutions. Though, this is countered with the argument that higher tuition costs create a great financial burden upon students, thus increasing stress and worsening their academic performances. This issue varies regionally, as tuition fees are often subsidized in countries like Germany, though in the United States, student debt has become that of a lifelong burden. In this paper, we analyze the effect of tuition on students' performances in Vancouver, Canada at the University of British Columbia.

The relationship between tuition fees and academic performance is shaped by multiple variables, such as financial security, stress, part-time job participation, and other financial obligations. Fricke conducted an empirical study to see the effect of raised tuition on academic performance, and concluded that students rather just spent less to counteract the effect. Thus, he suggested that there were zero or insignificant impacts of higher tuition on academic performance (Fricke, 2017). However, Eisenberg et al. (2007) found that students experiencing financial strain are more likely to also suffer from various mental health issues, such as anxiety and depression. This is linked to lower academic performance in itself, but in this case is argued to be brought on by my financial burdens of high tuition fees.

Factors to consider are between international and domestic students, as the tuition between these two demographics vary significantly, and thus may also affect the other determinants of academic performance. This includes financial security, scholarships, part-time job participation, etc. For example, international students are obligated to pay for health insurance while in British Columbia, the baseline coverage is free for citizens. While some students are financially supported enough by their parents, many find themselves struggling to meet the demands of student and living costs. However, an alternative argument to this is that students with higher fees work harder in higher education, as this investment is more costly. Higher tuition costs for students, especially international students, have the additional pressure of doing well in school as their academic performance is justifying their high expenses. This raises the question: To what extent do tuition fees influence academic performance, and do they serve as a motivator or a financial burden that hinders success?

Thus, we decided to test the following two hypotheses:

1. Higher tuition fees will lead to better student performance
2. Scholarship/financial aid will lead to better performance

The findings are expected to show that tuition fees influence academic performance through multiple pathways, with factors like stress and financial aid being a key determinant. The report will likely conclude that while tuition fees may not directly impact academic outcomes in all cases, their indirect effects, such as increased stress and financial constraints, play a significant role in students' results.

The results from this report could inform policy discussions on financial aid accessibility, mental health support, and tuition fee structures, helping promote better academic outcomes for all socioeconomic backgrounds.

## **II. Data Description**

The data we used was collected from over 100 students in Economics courses at UBC, which includes honours, majors, combined majors, and minors students - also students not pursuing economics that chose to take the course. It was answered by multiple age groups, but more specifically those in 2nd and 3rd year. These students come from a wide range of backgrounds, such as domestic, international, and those on exchange. As the data was sent out to all students, we assume that the sample size that makes up the data was a random sample of students.

However, we found that some of the data was inconsistent. When the question asked to list tuition fee per course, some students (especially domestic) entered what we predict to be their full amount. Domestic students at UBC can not have a tuition fee per course above 1000, thus we systematically removed all entries in this case (University of British Columbia 2025).

Taking a random population sample with sample size greater than 25 allows us to apply the law of large numbers (LLN) and Central Limit Theorem (CLT) when analyzing our results. A random sample ensures that we encompass a wide range of the population within our class, including students both international and domestic, and those with varying financial backgrounds. When searching for a reputable data source, there are five categories or requirements that need to be satisfied: credibility, accuracy, relevance, timeliness, and unbiasedness. The data collected from our class is credible and relevant, as it is conducted by our professor and is on the topic of determinants of academic performance. Timeliness is satisfied as the survey was completed by students within the past two weeks. As for accuracy and unbiasedness, it is assumed that the students who completed the survey were being truthful to their answers. We can conclude there is no case of sampling or selection bias.

One of the inconsistencies with the data is that the survey was sent out via email. The students who were not able to complete it could be those with only internet access at school or with too many other commitments. Moreover, it is important to consider the location of the study. The University of British Columbia ranks 3rd in Canada and 38th in the world (University of British Columbia 20205), and has the 5th highest domestic tuition fee and highest international tuition fee in all of BC (Universities Canada 2025). Additionally, the Vancouver area in itself is an expensive area, and thus the residents of Vancouver are generally considered to have a higher income in

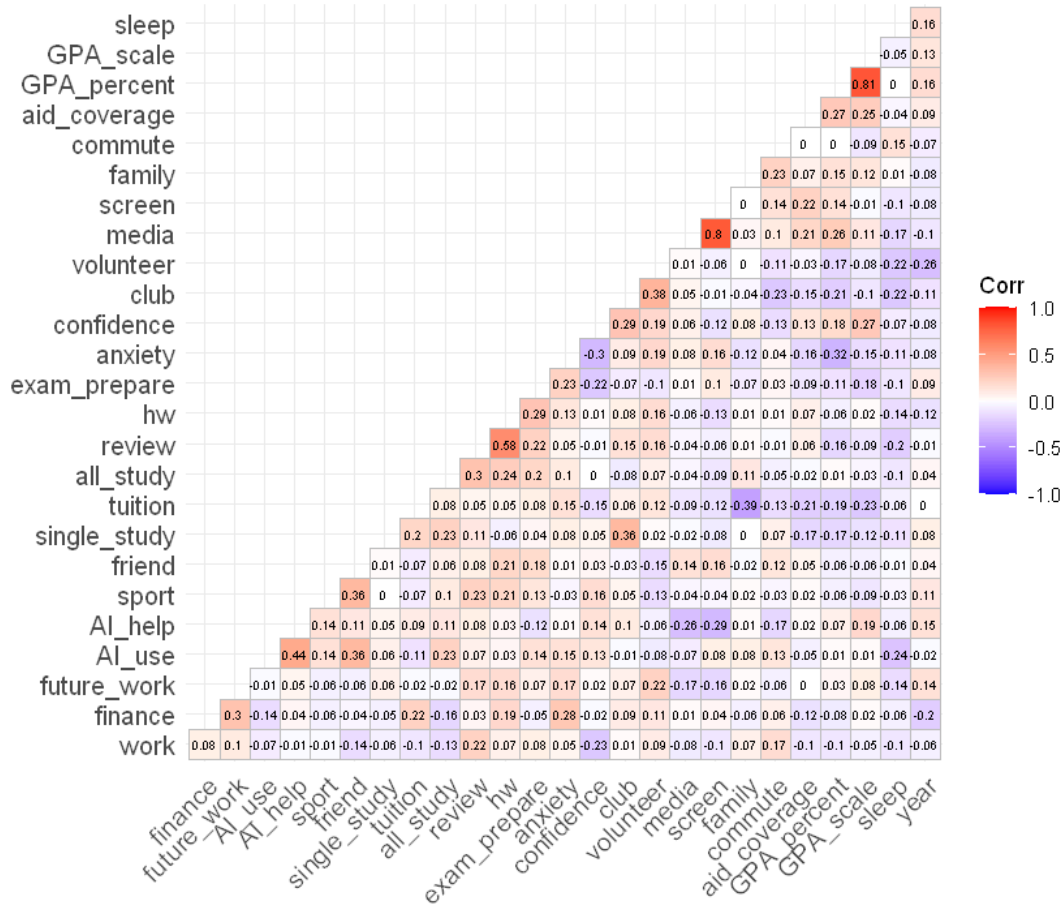
order to afford it (Aslam et al. 2024). Taking this into account in terms of our investigation, there is the possibility that our sample is not as randomized as we theorized.

### III. Summary Statistics

Variables	Definition	Rationale
<b><i>Dependent variables</i></b>		
GPA	Calculating GPA from the data as a self-reported percentage, cumulative average.	
<b><i>Primary Independent Variables</i></b>		
Tuition Fee	Tuition fee is defined as the amount each student pays per course at UBC. This varies between international, domestic, and exchange students which prompts us to use a dummy variable to ensure that domestic and international students are accounted for.	We believe that higher tuition fees will cause students to work harder, and thus achieve a higher GPA.
Financial Aid/Scholarships	Financial aid and scholarships are defined as the amount of money students receive in total. The data collects it as a percentage of their total tuition covered.	We believe students with financial aid are less likely to worry about financial burdens, and as such are able to study better and achieve better grades. Additionally, students granted scholarships are more likely to achieve a higher academic performance.
Study Hours	Study hour is defined as the total amount of study hours per week across all your courses.	Zubair et al. (2024) researched that longer study hours would improve student grade performance.
<b><i>Control Variables</i></b>		

Social Media	Social media works as one of our control variables as more hours on social media is less hours studying. It is measured from the data as hours per week on social media.	Rosen et al. (2013) has linked high social media usage with lower academic performance.
Employment	Employment (whether full or part time) during school hours is measured by numbers of hours per week.	
Anxiety/Depression	Anxiety and Depression was measured on a scale from 1 to 5 to determine the frequency of days that students feel anxious and/or depressed.	Eisenberg et al. (2007) concluded there was a correlation between anxiety and depression and financial stress. Controlling for anxiety and depression will allow us to see the full effect of tuition costs and indirect effects of finances on students' academic performance.
<b>Dummy Variables</b>		
Course Taken	3,4,5	

GPA_percent	all_study	course_take	tuition	aid_coverage
Min. :60.00	Min. : 4.00	0 : 0	Min. : 350	Min. : 0.0
1st Qu.:72.00	1st Qu.:15.00	1 : 0	1st Qu.: 800	1st Qu.: 0.0
Median :76.25	Median :20.00	3 : 7	Median :4100	Median : 0.0
Mean :76.84	Mean :20.09	4 :50	Mean :3315	Mean : 8.5
3rd Qu.:80.30	3rd Qu.:25.00	5 :31	3rd Qu.:4719	3rd Qu.: 0.0
Max. :99.00	Max. :60.00	6 : 0	Max. :7200	Max. :100.0
		66: 0		
work	media	anxiety		
Min. : 0.000	Min. : 2.5	Min. :1.000		
1st Qu.: 0.000	1st Qu.: 90.0	1st Qu.:3.000		
Median : 0.000	Median :140.0	Median :4.000		
Mean : 2.364	Mean : 200.5	Mean :3.455		
3rd Qu.: 0.000	3rd Qu.: 240.0	3rd Qu.:4.000		
Max. :20.000	Max. :2520.0	Max. :5.000		



#### IV. Model Specifications

To examine our hypothesis, we developed a model centered on tuition as the main independent variable to assess its impact on students' GPA. Alongside tuition, we included financial aid and study hours to capture key factors that may influence academic performance. To reduce omitted variable bias, we carefully selected control variables that account for other relevant influences on GPA. We included the number of courses taken to reflect academic workload, which can directly affect GPA. Employment status was added to account for time and energy spent on extracurricular or job commitments that could reduce available study time. To capture variation in study effort, we used hours spent on social media as a proxy, assuming that more time on social media may reflect lower academic engagement. Finally, we included anxiety level as a measure of psychological stress, which can negatively impact academic performance. These controls were chosen to isolate the specific relationship between tuition and GPA while accounting for key academic, behavioral, and psychological factors. This leads to our final model:

$$GPAPercent = \beta_0 + \beta_1 \cdot tuition + \beta_2 \cdot aid\_coverage + \beta_3 \cdot all\_study + \beta_4 \cdot course\_take + \beta_5 \cdot work + \beta_6 \cdot media + \beta_7 \cdot anxiety + \varepsilon$$

As previous studies mentioned social media hours would affect study efficiency, alternative specifications may also include exam preparation hours, review hours and homework writing hours. Besides, other than work hours, other activities may also decrease study hours, like club participation, volunteer hours, family and friend socializing events.

## V. Table of Results

	Dependent variable:						
	(1)	(2)	(3)	GPA_percent (4)	(5)	(6)	(7)
tuition	-0.001* (0.0004)	-0.001 (0.0004)	-0.001 (0.0004)	-0.0005 (0.0004)	-0.001 (0.0004)	-0.0005 (0.0004)	-0.0004 (0.0004)
aid_coverage		0.075** (0.033)	0.075** (0.033)	0.072** (0.034)	0.067* (0.036)	0.056 (0.035)	0.043 (0.036)
all_study		0.016 (0.062)	0.016 (0.062)	0.005 (0.065)	-0.007 (0.067)	-0.0001 (0.068)	0.025 (0.070)
course_take4				-0.798 (3.561)	-1.306 (3.566)	-1.661 (3.579)	-1.926 (3.233)
course_take5				0.617 (3.591)	0.279 (3.475)	-0.355 (3.432)	-1.131 (3.169)
work					-0.135 (0.184)	-0.117 (0.186)	-0.086 (0.173)
media						0.005* (0.003)	0.006*** (0.002)
anxiety							-1.842*** (0.687)
Constant	79.232*** (1.513)	77.661*** (1.977)	77.661*** (1.977)	77.928*** (3.807)	79.047*** (4.172)	78.339*** (4.208)	84.042*** (4.653)
Observations	88	88	88	88	88	88	88
R2	0.038	0.091	0.091	0.100	0.110	0.148	0.228
Note:					*p<0.1; **p<0.05; ***p<0.01		

Model 7 is our final and best-fitting model, explaining approximately 22.8% of the variance in GPA\_percent ( $R^2 = 0.228$ ). While most predictors in this model are not statistically significant, the interaction term aid\_coverage:work (as seen below in our Specification check) was shown to be significant and adds meaningful explanatory power. Aid coverage, which was a consistently significant predictor in earlier models, becomes less so in Model 7, likely due to the inclusion of other factors such as anxiety. Tuition, all\_study time, course load, and work remain non-significant throughout. Media usage shows a small, positive, and weakly significant effect on GPA, while anxiety has a large negative coefficient but is not statistically significant. Despite the limited

significance of individual variables, something that we believe is due to lackluster data, Model 7 captures the best overall explanatory power and hence was our final model.

## **VI. Discussion**

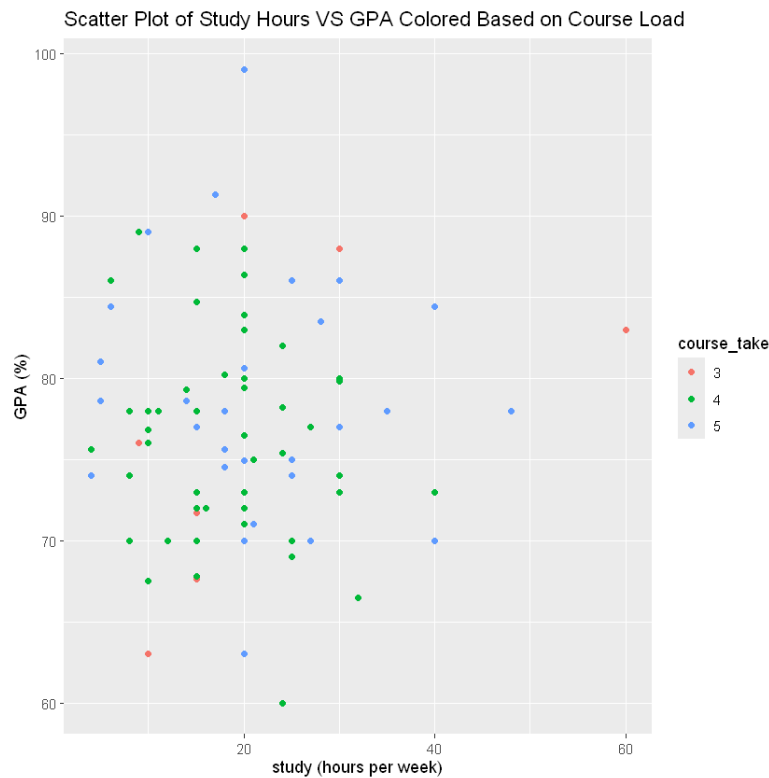
The analysis of our regression output allows us to gain more of an insight into the relationships between variables while providing empirical evidence on the correlation between these factors. The combined regression models above provide a holistic view of the relationship between the variables displayed on the left of the table as a measure of overall GPA. Across all model specifications there are somewhat interpretable patterns, but overall there is an unexpected lack of correlation between variables. Despite the data providing fairly significant limitations and insignificant findings, the results are interesting and can be interpreted in an economic sense.

Unfortunately tuition fees were found not to be correlated to GPA in the models. This suggests that the amount students pay for university education has no significant relationship with academic performance. As mentioned before, this lack of correlation could be a result of the opposing hypothesis: that higher fees mean more effort is put in by students, but also more pressure is put on them, negatively impacting grades. The other factors are significant as well here, especially financial aid and hours worked and these could also explain the weak direct impact of the tuition fee variable.

Following on from this, aid coverage had a much more significant coefficient in the specifications. The table indicates a positive correlation: that higher levels of financial aid are associated with better academic results. This could be attributed to several factors, but it is worth noting that students that receive financial aid are usually academically high performing in the first place, hence the scholarship. Having to pay less tuition, or none at all, can also take a lot of pressure off students, positively impacting GPA scores. Another factor is that aid coverage can be linked to more financial stability, allowing students to dedicate more time and effort towards their degree instead of having to work alongside studying.

Unexpectedly, study hours have a consistently negative coefficient on GPA. This is rather counterintuitive, and is counteracted by the study which Zubair et al. have posted last year. After visualizing the plot between study hours and GPA, we see no obvious pattern. One interpretation of this may be poor study methods as time spent studying doesn't necessarily guarantee productive learning. Besides, there is plenty of room for omitted variable bias and this survey does not have enough data to include these omitted factors or control for them. This might be caused by survey data error since it is hard to track accurate daily study hours, and students would report wrongly.

While the hours worked variable wasn't statistically significant, there was a negative coefficient suggesting part time employment alongside university usually has a slight negative impact on academics.



A broader limitation of this analysis is the cross-sectional design of the regression data, which somewhat restricts causal interpretation. For example, while more aid is associated with a higher GPA, we cannot conclude that receiving aid definitely causes GPA to rise. Higher-achieving students may simply be more likely to secure funding in the first place. Future studies which incorporate panel data or instrumental variable techniques could be more appropriate and better at isolating causal effects.

One other limitation was the sample bias. The survey was collected exclusively from UBC Economics classes during the 2024–2025 Winter semester, which was not randomized and primarily includes students majoring in economics or business. As a result, the findings may not generalize to students from other faculties. Furthermore, the lack of participation from other post-secondary institutions, particularly those in different regions, limits the broader applicability of our results. UBC is a prestigious institution where many students may receive substantial financial support from their families, reducing financial stress and potentially diminishing the perceived impact of tuition on academic performance. Additionally, Vancouver’s high cost of living could normalize high expenses among students, which may blunt their sensitivity to tuition costs.

Although the student survey was anonymous, based on the regression output and results shown above, it is clear that some answers were not completely accurate and there was likely an aspect of social desirability bias. We suspect that some participants may have completed the survey without carefully verifying their answers. There may be some aspect of pressure to either understate study hours or overstate GPA, or of course, a combination of both.



Besides, during data cleaning, we encountered unit errors—for instance, some students reported total hours for all courses instead of per-course averages. Similar unit errors appeared in other responses, requiring us to remove outliers, which slightly reduced our sample size. While we retained a reasonably large sample of 86 students, the presence of data inaccuracies still impacts on correlation and makes it more difficult to draw conclusions on the variables.

## VII. Specifications and Robustness Checks

In order to test the specifications and robustness of our model, we decided to check for the possible omission of an interaction term. We ran through all the possibilities of interactions and created pairwise ANOVA tests which compared our base model to a model that included an interaction between percentage of tuition covered by aid/scholarships and hours worked. Interestingly, the interaction model not only had an F-value of 4.004, but was also the only statistically significant interaction model with a P-value of 0.049.

Dependent variable:								
	GPA_percent							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
tuition	-0.001* (0.0004)	-0.001 (0.0004)	-0.001 (0.0004)	-0.0005 (0.0004)	-0.001 (0.0004)	-0.0005 (0.0004)	-0.0004 (0.0004)	-0.0004 (0.0004)
aid_coverage		0.075** (0.033)	0.075** (0.033)	0.072** (0.034)	0.067* (0.036)	0.056 (0.035)	0.043 (0.036)	0.026 (0.036)
all_study		0.016 (0.062)	0.016 (0.062)	0.005 (0.065)	-0.007 (0.067)	-0.0001 (0.068)	0.025 (0.070)	0.006 (0.069)
course_take4				-0.798 (3.561)	-1.306 (3.566)	-1.661 (3.579)	-1.926 (3.233)	-2.615 (3.175)
course_take5				0.617 (3.591)	0.279 (3.475)	-0.355 (3.432)	-1.131 (3.169)	-1.605 (3.156)
work					-0.135 (0.184)	-0.117 (0.186)	-0.086 (0.173)	-0.195 (0.143)
media						0.005* (0.003)	0.006*** (0.002)	0.006*** (0.002)
anxiety							-1.842*** (0.687)	-1.676** (0.683)
aid_coverage:work								0.029** (0.013)
Constant	79.232*** (1.513)	77.661*** (1.977)	77.661*** (1.977)	77.928*** (3.807)	79.047*** (4.172)	78.339*** (4.208)	84.042*** (4.653)	84.701*** (4.546)
Observations	88	88	88	88	88	88	88	88
R2	0.038	0.091	0.091	0.100	0.110	0.148	0.228	0.265
Note:						*p<0.1; **p<0.05; ***p<0.01		

To confirm our suspicions we ran a robustness check on the interaction model only to find out that the interaction model outperformed our base model. While minimal, we also found a positive relationship between GPA and the interaction. We rationalized it by stating that students who work more tend to benefit more from financial aid coverage when it comes to their GPA. This suggested that aid may help offset the pressures of working, leading to better academic performance. While nothing in our model seemed to be statistically significant, this interaction term seemed to defy that. Our model turned out to not be the best representation of the relationship between GPA and the covariates. However, we do partially attribute this to our data not being accurate and not being the best representation of a population that we want to test.

As seen in the figure above, the interaction model, characterized by model (8) had the lowest  $R^2$ , most statistically significant variables while our other models failed to deliver any conclusive relationships.

### **Robustness Analysis**

Performing a white test on both the linear regression model and the interaction model, we found the p-values to be larger than 0.05, thus rejecting the null hypothesis and concluding we do not have heteroskedasticity. Another important factor to consider is multicollinearity. By calculating the VIF for our linear regression model and interaction model, we see that the VIF scores are all under 2, indicating no multicollinearity issue.

The second robustness check was carried out by replacing work hours with club participation hours. This was to test whether or not extra curricular clubs were better at predicting GPA than work hours and to analyse whether or not time spent being social and engaging in activities had a more positive affect on academic results. The improved model does suggest that club involvement may be a more meaningful control variable than work hours when predicting GPA.

## **VIII. Conclusion**

Our study set out to examine the extent to which tuition fees influence academic performance, and whether they serve as a motivator or a financial burden that hinders success. Given that academic outcomes are shaped by multiple factors, we were particularly interested in isolating the effects of tuition and financial aid on GPA.

However, after running our regressions, we were unable to confirm our hypothesis that higher tuition fees and greater financial aid coverage would lead to better student performance. The coefficients for both tuition and aid coverage were small in magnitude and largely insignificant, which is consistent with Fricke's (2017) empirical findings suggesting that higher tuition has little to no impact on academic outcomes. While aid coverage initially appeared to have a positive and significant effect on GPA in simpler models, its significance disappeared once

additional control variables were introduced—indicating that the earlier results may have been affected by omitted variable bias.

In contrast, control variables such as time spent on social media and anxiety level showed strong and significant relationships with GPA. These findings align with existing literature, such as Eisenberg et al. (2007), which links mental health issues to lower academic performance, and Rosen et al. (2013), which suggests that excessive non-academic screen time can negatively impact study focus.

Interestingly, our final model, which includes the interaction term between aid coverage and work hours, showed the best fit. This interaction suggests that the effect of financial aid on GPA may depend on how much students are working—perhaps reflecting how aid relieves financial pressure, especially for students balancing work and study.

We also conducted robustness checks, and our findings remained consistent, lending credibility to the results. Overall, while tuition fees may not directly impact GPA in a statistically significant way, our study highlights the importance of considering both financial and psychological factors in understanding student performance. That said, our original expectation—that higher tuition might positively influence GPA by motivating students—was not supported by the data.

Since the OLS estimator only captures correlations rather than causal effects, we cannot conclude that tuition has no impact on GPA. Our analysis is limited by the non-randomized nature of the sample, which consists solely of students enrolled in UBC Economics courses during the 2024–2025 Winter semester. Future research expanding the sample size and including students from a broader range of faculties and institutions would help create a more randomized and representative dataset, thereby improving the accuracy and generalizability of the research findings.

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