Section: Miscellaneous

Original Research Article

ANXIETY IN SCHOOL STUDENTS AND ITS ASSOCIATION WITH SCREEN TIME IN TIRUCHIRAPPALLI DISTRICT, INDIA – A CROSS-SECTIONAL ANALYSIS

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ABSTRACT

Background: Anxiety-related symptoms are increasingly prevalent among children and adolescents and are known to interfere with emotional, social, and academic development. This study aimed to examine the prevalence of anxiety symptoms and their association with screen time in school-going children in Tiruchirappalli, Tamil Nadu, India.

Materials and Methods: A cross-sectional study was conducted among 353 students aged 10–15 years (grades 5 to 9) attending English-medium schools. Anxiety symptoms were assessed using the Screen for Child Anxiety Related Emotional Disorders (SCARED), a validated self-report instrument designed for screening. Screen time was categorized into four groups (<1 hour, 1–2 hours, 2–4 hours, >4 hours), and specific digital activity types were recorded. Statistical analyses included Pearson's correlation, independent t-tests, chi-square tests, and one-way ANOVA, with significance set at $p<0.05$.

Results: Elevated anxiety symptoms (SCARED score >25) were reported in 61.5% of students. Separation anxiety (53.2%) and panic symptoms (51.2%) were the most frequently endorsed domains. Anxiety symptom scores were significantly higher in females ($p=0.04$) and increased with age ($r=0.15$, $p=0.003$). Students with more than 2 hours of daily screen exposure had a 2.63-fold greater likelihood of elevated anxiety symptoms. Associations were observed between specific screen activities—social media use and school avoidance ($p=0.002$), video gaming with panic and school avoidance, and entertainment media with overall anxiety ($p=0.001$–0.035).

Conclusion: Anxiety symptoms were highly prevalent and showed significant associations with both screen time duration and digital content type. These findings highlight the need for age-appropriate screen time guidelines and early mental health support in school-aged populations.

Keywords: Anxiety, Screen time, Screen for Child Anxiety Related Emotional Disorders (SCARED).

INTRODUCTION

Anxiety-related symptoms in childhood and adolescence are increasingly recognized as critical determinants of emotional, cognitive, and social development. Globally, anxiety disorders rank among the most prevalent psychiatric conditions affecting youth, with recent meta-analyses estimating prevalence rates ranging between 6% and 20% depending on assessment methods and cultural context.[1,2] Early-onset anxiety symptoms, even when subthreshold, are linked to academic difficulties, impaired peer relationships, sleep disturbances, and an elevated risk of subsequent psychopathology.[3-5]

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), anxiety disorders are characterized by excessive fear or worry accompanied by behavioral and physiological disturbances.[6] The Screen for Child Anxiety Related Emotional Disorders (SCARED) is a well-validated, 41-item symptom screener developed to identify anxiety symptomatology in children and adolescents across five key domains—generalized anxiety, separation anxiety, panic/somatic symptoms, social anxiety, and school avoidance.[7] It is important to note that the SCARED instrument is not diagnostic, but rather serves to quantify symptom burden and identify those warranting further clinical evaluation.[8]

The psychosocial context of adolescence, marked by neurodevelopmental transitions and identity formation, heightens susceptibility to both internalizing symptoms and environmental risk factors. Among modifiable influences, screen time exposure has garnered increasing attention in recent years. Defined broadly as time spent interacting with digital devices—including smartphones, televisions, tablets, and computers—screen time has been associated with emotional dysregulation, social comparison, sleep disruption, and increased psychological distress in multiple global studies.[9-11] Guidelines from the World Health Organization (WHO) and the Indian Academy of Pediatrics recommend limiting recreational screen exposure to no more than 1–2 hours daily in school-aged children, citing concerns about its impact on psychosocial and physical development.[12,13] However, empirical data examining the relationship between screen time and specific anxiety symptom clusters in Indian populations remain limited. The type of screen-based content (e.g., social media, gaming, entertainment media) may also differentially influence symptom domains, though this remains underexplored in low- and middle-income settings.

This study aimed to address this gap by investigating the prevalence and patterns of anxiety symptoms in school-aged children in Tiruchirappalli, Tamil Nadu, and examining their associations with screen time duration and content type. We hypothesized that higher screen exposure would be associated with increased anxiety symptomatology, particularly in domains of panic, school avoidance, and generalized worry.

MATERIALS AND METHODS

Study Design and Setting

This was a descriptive, cross-sectional study conducted between November 2024 and January 2025 in Tiruchirappalli, Tamil Nadu, India. The study was carried out in four co-educational, English-medium private schools affiliated with the Central Board of Secondary Education (CBSE) and Tamil Nadu State Board. These schools were selected based on willingness to participate and geographic accessibility within the urban region.

Participants

A total of 353 students from grades 5 to 9, aged between 10 and 15 years, were included in the study. Stratified random sampling was used to ensure representation across grades and gender. Inclusion criteria were: (1) age between 10 and 15 years, (2) ability to read and understand English, and (3) written informed assent from students and consent from parents/guardians. Children with known developmental disorders, diagnosed psychiatric illnesses, or sensory impairments were excluded.

Ethical Considerations

The study protocol was approved by the Institutional Ethics Committee of of Trichy Sri Ramaswamy Memorial (SRM) Medical College Hospital and Research Centre (Approval No: 640/TSRMMCH&RC/ME1/2024-IEC, number 114). Written informed consent was obtained from parents or legal guardians, and assent was obtained from all participating students. School authorities granted permission for data collection during regular school hours.

Measures

1. **Sociodemographic Data**
   A structured questionnaire captured age, gender, class, type of family (nuclear/joint), parents' occupation and education level, and household internet access.
2. **Screen Time Assessment**
   Screen time was assessed through a self-administered questionnaire adapted from prior studies on digital behavior in Indian school settings. Daily average screen time was categorized as <1 hour, 1–2 hours, 2–4 hours and >4 hours. Students were also asked to indicate their primary screen-based activities, including: (a) social media use, (b) video gaming and (c) TV and online entertainment (e.g., YouTube, streaming)
3. **Anxiety Symptom Assessment**
   Anxiety symptoms were assessed using the Screen for Child Anxiety Related Emotional Disorders (SCARED). This 41-item self-report tool evaluates five domains: separation anxiety, generalized anxiety, panic/somatic symptoms, social anxiety, and school avoidance.[14] Items are rated on a 3-point Likert scale (0 = not true, 1 = somewhat true, 2 = very true). A total score >25 suggests clinically significant anxiety symptoms. The SCARED scale has demonstrated strong reliability and validity across Indian and international adolescent populations.[15]

Data Collection Procedure

Data were collected in classroom settings during school hours under the supervision of the research team and school staff. Participants were provided verbal and written instructions, and researchers

ensured privacy and confidentiality throughout the process.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 26.0. Descriptive statistics (means, standard deviations, frequencies) were used to summarize variables. Inferential analyses included Pearson's correlation for continuous variables, independent t-tests and one-way ANOVA for group comparisons, and chi-square tests for categorical data. A p-value of <0.05 was considered statistically significant.

RESULTS

Sample Characteristics

The final sample comprised 353 students, of whom 153 (43.3%) were male and 200 (56.6%) female. The age distribution was concentrated between 12 and 13 years, with 115 students (32.5%) aged 13 and 64 (18.1%) aged 12. The majority belonged to nuclear families (71.6%, n = 253), and approximately one-third of participants (31.4%) reported that both parents were employed.

Table 1: Sociodemographic characteristics of the study participants (N = 353)

Variable	Frequency	Percentage (%)
Gender		
Male	153	43.3
Female	200	56.6
Age (in years)		
10	10	2.8
11	72	20.3
12	64	18.1
13	115	32.5
14	86	24.3
15	6	1.6
Type of Family		
Nuclear	253	71.6
Joint	100	28.3

Prevalence of Anxiety Symptoms

Based on the SCARED screening instrument, 217 students (61.5%) scored above the threshold suggestive of clinically significant anxiety symptoms. The number of children with specific anxiety disorders, such as Separation anxiety, Panic disorder, School avoidance, Generalised anxiety disorder, and Social anxiety, is 53.2%, 51.2%, 38.8%, 26.3%, and 16.7%, respectively. [Table 2] presents domain-specific prevalence rates of Anxiety symptoms.

Table 2: Prevalence of Anxiety Symptoms Across Domains Based on SCARED Screening (N = 353)

Anxiety Domain	Number of Students with Symptoms (n)	Percentage (%)
Any Anxiety Disorder (Total SCARED >25)	217	61.5
Separation Anxiety Symptoms	188	53.2
Panic Symptoms	181	51.2
School Avoidance	137	38.8
Generalized Anxiety Symptoms	93	26.3
Social Anxiety Symptoms	59	16.7

Associations with Sociodemographic Variables

There was a low but statistically significant positive correlation between age and total anxiety symptom score (r = 0.15, p = 0.003), suggesting a modest trend of increased symptom burden with age. Female students were more likely to report elevated anxiety scores (mean = 29.39 ± 11.42) compared to males (mean = 26.98 ± 10.04); this difference was statistically significant (t = 2.06, p = 0.04).

Children from nuclear families exhibited marginally higher mean anxiety scores (28.99 ± 10.72) than those from joint families (26.7 ± 11.21), though this difference did not reach statistical significance (t = –1.79, p = 0.075).

[Table 3] summarizes group-wise comparisons.

Table 3: Group-wise comparison of anxiety scores by sociodemographic variables (N = 353)

Variable	Category	N	Mean Anxiety Score ± SD	t-value	p-value
Gender	Female	200	29.39 ± 11.42	2.06	0.040
	Male	153	26.98 ± 10.04		
Family Type	Joint	100	26.70 ± 11.21	–1.79	0.075
	Nuclear	253	28.99 ± 10.72		

Anxiety Symptom Subtypes by Gender and Family Type

Separation anxiety emerged as the most common subtype across both genders and family types. Among students with anxiety:

- Females were more likely than males to report social anxiety (20.7% vs. 8.3%) and school avoidance (41% vs. 39.1%).

- Nuclear family residence was associated with higher rates of separation anxiety (65.9%), panic symptoms (64.5%), and school avoidance (49.7%) compared to joint families.

[Table 4] presents the detailed subtype-wise distribution.

Table 4: Distribution of anxiety symptom subtypes by gender and family type among participants with anxiety (N = 217)

Variable	With Anxiety n (%)	Panic Symptoms n (%)	Generalized Anxiety n (%)	Separation Anxiety n (%)	Social Anxiety n (%)	School Avoidance n (%)
Family Type						
Nuclear	164 (75.5)	140 (64.5)	70 (32.2)	143 (65.9)	44 (20.2)	108 (49.7)
Joint	53 (24.4)	41 (18.9)	23 (10.6)	45 (20.7)	15 (6.9)	29 (13.3)
Gender						
Male	89 (41.0)	93 (42.8)	40 (18.4)	105 (48.3)	18 (8.3)	85 (39.1)
Female	128 (59.0)	125 (57.6)	58 (26.7)	157 (72.3)	45 (20.7)	89 (41.0)

Screen-Based Activity and Symptom Domains

Subdomain-specific associations with screen-based behavior were identified:

- **Social media use** was significantly associated with school avoidance (χ^2 = 15.24, p = 0.002)
- **Video gaming** was associated with both panic symptoms (χ^2 = 14.2, p = 0.003) and school avoidance (χ^2 = 43.68, p < 0.001)
- **Entertainment media** use correlated with overall anxiety (χ^2 = 8.6, p = 0.035), panic symptoms (χ^2 = 16.42, p = 0.001), and school avoidance (χ^2 = 14.96, p = 0.002)
- No significant association was found between educational screen use and any anxiety domains.

Associations between Screen Time and Anxiety Symptoms

Daily total screen time was significantly associated with anxiety symptoms. Among students with >2 hours of daily screen exposure, 130 (72.6%) reported elevated anxiety compared to 87 (50.3%) of those with ≤2 hours. The relative risk (RR) of elevated anxiety in students with >2 hours of screen time was 2.63.

Chi-square analysis confirmed a statistically significant association between:

- Total screen time and anxiety (χ^2 = 22.12, p < 0.001)
- Screen time and panic symptoms (χ^2 = 20.78, p < 0.001)
- Screen time and generalized anxiety (χ^2 = 9.03, p = 0.029)
- Screen time and school avoidance (χ^2 = 30.74, p < 0.001)

Table 5: Association of anxiety symptoms and subtypes with screen time, gender, and family type (chi-square analysis)

Variable	Associated Anxiety Domain	Chi-square (χ^2)	p-value
Frequency of Social Media Use	School Avoidance	15.24	0.002
Frequency of Video Game Use	Panic Symptoms	14.20	0.003
	School Avoidance	43.68	<0.001
Frequency of Entertainment Media Use	Any Anxiety Disorder	8.60	0.035
	Panic Symptoms	16.42	0.001
	School Avoidance	14.96	0.002
Total Screen Time (All Uses)	Any Anxiety Disorder	22.12	<0.001
	Panic Symptoms	20.78	<0.001
	Generalized Anxiety Symptoms	9.03	0.029
	School Avoidance	30.74	<0.001
Gender	Separation Anxiety Symptoms	4.42	0.036
	Social Anxiety Symptoms	7.86	0.020
	School Avoidance	4.24	0.040
Family Type	Any Anxiety Disorder	4.23	0.040
	Panic Symptoms	5.62	0.018

ANOVA Findings

One-way ANOVA revealed that students with >4 hours of total screen time had significantly higher mean anxiety scores compared to those with less exposure (F = 5.84, p = 0.001). Similarly, screen use for entertainment purposes was significantly associated with higher anxiety scores (F = 5.97, p = 0.001). However, ANOVA tests for video games and social media use did not yield statistically significant differences.

[Tables 6A and 6B] and [Box Plots] visualize these associations.

Table 6a: Distribution of anxiety symptoms by daily screen time duration (n = 353)

Daily Screen Time	With Anxiety (n)	Without Anxiety (n)
Less than 1 hour	2	8
1–2 hours	85	78

<2 hours (combined total)	87	86
More than 2 hours	130	50
2–4 hours	112	44
More than 4 hours	18	6

Table 6b: One-way ANOVA results for association between screen time and anxiety symptom scores

Screen Time Category	F-value	p-value
Social Media Use	0.92	0.432
Video Game Use	1.19	0.313
Entertainment Media Viewing	5.97	0.001
Total Daily Screen Time	5.84	0.001

Anxiety Symptom Scores by Daily Social Media Use

Y-axis label:

Change to: **"SCARED Total Anxiety Score"**

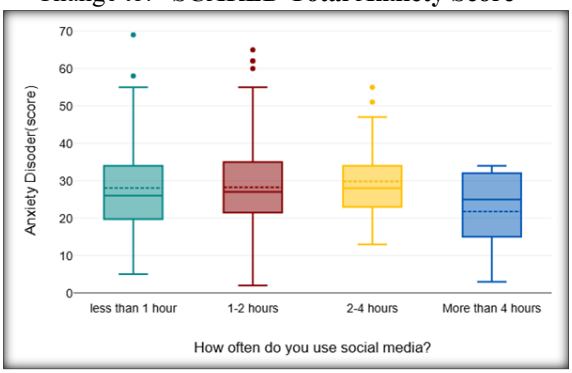

Figure 1: distribution of anxiety symptom scores by daily social media use among schoolchildren (n = 353)

This box plot displays the distribution of SCARED anxiety symptom scores across four categories of daily social media usage: <1 hour, 1–2 hours, 2–4 hours, and >4 hours. Each box represents the interquartile range, with median (solid line), mean (dashed line), and outliers. Although a statistically significant association was not observed in ANOVA (F = 0.92, p = 0.432), higher median anxiety scores were noted among students using social media for 2–4 hours daily.

Anxiety Symptom Scores by Daily Video Game Use

Y-axis label:

Change to: **"SCARED Total Anxiety Score"**

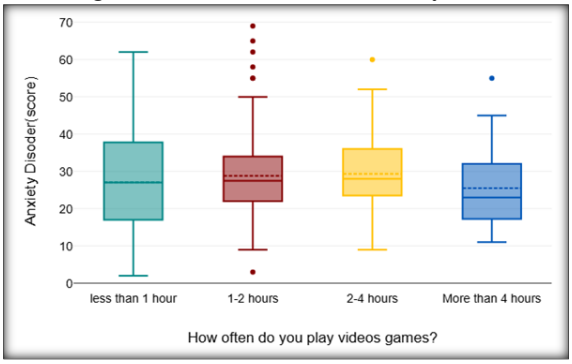

Figure 2: Distribution of anxiety symptom scores by frequency of daily video game use (n = 353)

Box plot representing the distribution of SCARED anxiety symptom scores across four categories of daily video game use: less than 1 hour, 1–2 hours, 2–4 hours, and more than 4 hours. Each box depicts the interquartile range, with the solid line indicating the median and the dashed line the mean. Outliers are shown as individual points. Higher anxiety scores were observed among students who reported playing video games for 1–2 hours per day. However, one-way ANOVA did not reveal statistically significant differences across categories (F = 1.19, p = 0.313).

Anxiety Symptom Scores by Daily Entertainment Media Use

Y-axis label:

Use: **"SCARED Total Anxiety Score"**

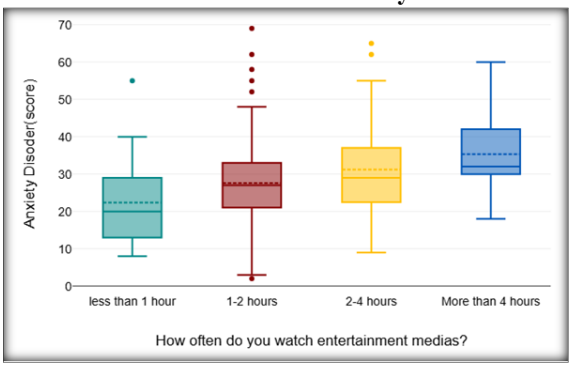

Figure 3: Distribution of anxiety symptom scores by daily entertainment media use among schoolchildren (n = 353)

This box plot illustrates the relationship between daily duration of entertainment media use (e.g., television, YouTube, OTT platforms) and total anxiety symptom scores as measured by the SCARED tool. Categories include less than 1 hour, 1–2 hours, 2–4 hours, and more than 4 hours. The solid line indicates the median, the dashed line represents the mean, and outliers are plotted individually. A statistically significant association was observed via one-way ANOVA (F = 5.97, p = 0.001), indicating that higher entertainment media consumption is associated with elevated anxiety symptom scores.

Anxiety Symptom Scores by Total Daily Screen Time
Y-axis label:
Change to: **SCARED Total Anxiety Score**

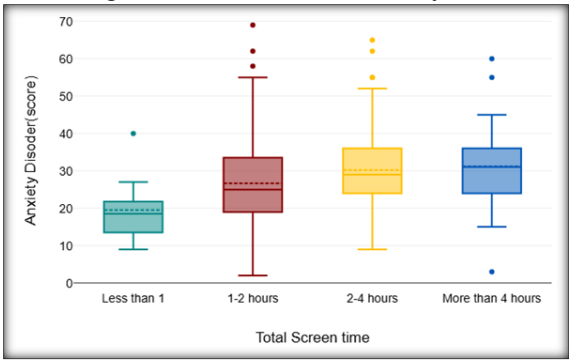

Figure 4: Distribution of scared anxiety symptom scores by total daily screen time (n = 353)

This box plot displays the variation in SCARED total anxiety symptom scores across four categories of daily screen time: less than 1 hour, 1–2 hours, 2–4 hours, and more than 4 hours. The box represents the interquartile range (IQR), the solid line denotes the median, and the dashed line indicates the mean. Dots represent outliers. A progressive increase in anxiety scores is evident with longer screen exposure, with students reporting more than 2 hours of screen use per day showing significantly higher anxiety scores. One-way ANOVA confirmed this association ($F = 5.84$, $p = 0.001$).

DISCUSSION

Anxiety remains one of the most prevalent and concerning psychological health issues globally, particularly during adolescence, a developmental stage marked by neurobiological, emotional, and social transitions. Understanding the triggers and correlates of anxiety in children and adolescents is essential, given its long-term implications on academic functioning, peer relationships, and emotional regulation. The present study employed the Screen for Child Anxiety Related Emotional Disorders (SCARED) scale, a validated self-report screening tool, to assess the prevalence and patterns of anxiety symptoms among schoolchildren aged 10–15 years.

Our findings indicated that 61.5% of participants scored above the clinical threshold for anxiety symptoms. This aligns closely with previous Indian studies. Muthusamy et al. reported a prevalence of 51% among adolescents aged 13–17 years in Tiruchirappalli, with the most common domains being separation anxiety (31%), panic disorder (23%), school phobia (17%), generalized anxiety (16%), and social phobia (13%).[16] Jayashree et al. found a prevalence of 54.7% in adolescents aged 15–18 years using the same scale, with panic disorder (44.3%) and separation anxiety (39.8%) as the most frequently endorsed subtypes.[17] Similarly, Kirubasankar et al. reported a 36% prevalence among 14–18-year-olds, noting significantly higher anxiety among urban students (66.5%) compared to rural ones (33.5%).[18]

Global epidemiological comparisons reveal regional variations in anxiety symptom prevalence. A meta-analysis of 192 studies indicated higher rates in Europe (34%) than in East Asia (17%) and North America (21%). The cumulative lifetime risk for anxiety disorders reached 73.3% by age 25, with 38.1% onset before age 14.[19] These findings resonate with the age trends in our study, which showed an increasing prevalence of anxiety symptoms among students aged 13 and above.

Gender Differences

Consistent with previous literature, female students in our study were more likely to report elevated anxiety symptoms. They accounted for 59% of those scoring above the SCARED threshold and had significantly higher mean scores in subdomains such as separation anxiety, social anxiety, and school avoidance. This gender disparity is also noted in Indian studies by Muthusamy et al,[16] Jayashree et al,[2] and Kirubasankar et al,[18] where anxiety disorders were more prevalent in females, possibly due to both biological and psychosocial vulnerability factors.

Family Type

Although students from nuclear families exhibited a slightly higher prevalence of anxiety symptoms, particularly in the domain of panic disorder, our study did not find a statistically significant difference in anxiety levels between nuclear and joint families. This finding is in line with Parida et al., who also reported no significant association between family structure and anxiety.[20] However, some Indian studies have suggested that joint families may be associated with higher anxiety levels due to intergenerational conflict and reduced autonomy.[17,18]

Screen Time and Anxiety

A key objective of this study was to examine the association between screen time and anxiety symptoms. A majority of participants reported 2–4 hours of screen use daily, and students who exceeded 2 hours had significantly higher anxiety scores, with a relative risk of 2.63. The association was especially notable among children aged 13 years and older.

A 2023 systematic review of 21 studies confirmed a positive correlation between screen time and anxiety symptoms.[21] One earlier study using the SCARED scale also found that more than 2 hours of screen exposure daily increased the odds of anxiety symptoms (adjusted OR = 1.36, 95% CI: 1.18–1.57).[22] Khouja et al. reported similar findings in a British cohort, with anxiety risk rising progressively with screen exposure, particularly on weekends.[23] Xu and Duan also reported that screen use beyond two hours daily was significantly associated with higher anxiety scores on the GAD-7 scale.[24]

In India, Saleem et al. used the GAD-7 to assess screen time and anxiety among adolescents aged

13–19 and found that 33.3% had anxiety symptoms, with a significant link to high screen time and social media use.[25] However, unlike our study, they did not explore anxiety subtypes or use the SCARED tool.

Our analysis further revealed content-specific associations: social media use correlated with school avoidance and social anxiety, video gaming with panic symptoms, and entertainment media with overall anxiety severity. These findings are consistent with international literature suggesting that high-arousal or socially comparative content (e.g., gaming, social media) is more anxiogenic than educational or passive viewing.

CONCLUSION

This study found a high prevalence of anxiety symptoms among school-aged children in Southern India, with significant associations identified between anxiety and screen time, particularly for entertainment media. Females and older adolescents appeared to be more vulnerable. While nuclear families showed slightly higher anxiety levels, the association with family type was not statistically significant. Our findings support the growing global evidence linking screen exposure and mental health risks in youth and underscore the need for early screening, parental guidance, and psychoeducational interventions.

Strengths and Limitations

The study's strengths include the use of a validated scale (SCARED), domain-wise symptom analysis, and focus on screen time content. Limitations include its cross-sectional design, reliance on self-reported data, potential recall bias, and underrepresentation of the younger age group due to limited parental assent. Despite these limitations, this is among the few Indian studies exploring screen time and anxiety symptoms using the SCARED tool.

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