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ORIGINAL ARTICLE

The Role of Self-compassion as a Mediator Between Insomnia, Depression, and Anxiety

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Abstract

Purpose Insomnia, depression, and anxiety are associated constructs with direct impact on health and quality of life. However, the specific mechanisms underlying these associations remain largely understudied. One of the possible intermediary variables underlying these associations might be self-compassion. Therefore, the goal of the current study was to specifically examine if self-compassion mediates the relationship between insomnia and depression (and vice versa) and insomnia and anxiety (and vice versa).

Methods Data from 494 individuals were collected. The participants were recruited from the general population and filled out an online survey containing a set of self-reported measures of insomnia severity, depression, and anxiety.

Results The findings indicated that insomnia effect on depression operates through self-compassion ($b = 0.08$; 95% CI [0.01, 0.12]), whereas the effect of depression on insomnia through self-compassion was not supported. Regarding anxiety, it was observed that self-compassion has a mediating effect on the relationship between insomnia and anxiety ($b = 0.06$; 95% CI [0.03, 0.09]). Cross-sectional design of the study does not allow to infer causal relationships. Mediator variable did not support the indirect effect of anxiety on insomnia.

Conclusion Self-compassion seems to be an important factor to be taken into account in preventive and intervention programs for insomnia.

Keywords Insomnia · Depression · Anxiety · Self-compassion · Mediation analysis

1 Introduction

Insomnia disorder and insomnia complaints are quite prevalent in community and clinical populations. A vast amount of literature has demonstrated significant associations between insomnia and psychiatric disorders [1]. The association between insomnia and depression is well-known in the field of sleep medicine. Depression and anxiety symptoms are highly prevalent and comorbid in insomnia [2]. On the one hand, not only do non-depressed people with insomnia have a twofold risk to develop depression compared to people with no sleep difficulties [3] and studies show that, in many cases, insomnia precedes (depression) and is linked to greater levels of depression—being insomnia a risk factor for later development and worsening of depression—but it is also the most common residual symptom in depressed patients and considered a predictor of depression relapse; on the other hand, individuals with depressive symptomatology frequently develop insomnia or poor sleep complaints, at least. The influential role one plays on the other has long

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been recognized [4–8] and is now known to be a complex bidirectional relationship [5].

The same is true for anxiety. While high levels of anxiety are frequent in insomnia patients, there are also high rates of sleep disturbance in patients with anxiety [9]. Not only do the two conditions very often co-occur, studies have found anxiety to be a risk factor for insomnia [9, 10] and, inversely, insomnia to be a risk factor for anxiety [6, 11]. Given the multiple evidence that these disorders do not simply co-occur and apparent conflicting findings on the direction of this relationship, it seems that there should be, in fact, a bidirectional relationship between anxiety and insomnia, as suggested by Jansson-Fröjmark and Lindblom [9], Glidewell, McPherson Botts and Orr [12], among others. A conceptualization for the anxiety-insomnia interconnection has even been proposed by Harvey [13] in her cognitive model for insomnia explaining the effect each has on exacerbating the other.

However, the possible mediating effects underlying these associations have been less studied. A recent study by Kim and Suh [14] explored the role of social support as a mediator between insomnia and depression in a sample of undergraduate women and found a significant effect of social support. However, when the insomnia was considered the dependent variable, the association between depression and insomnia through social support was not supported. Kirwan, Pickett and Jarret [15] have also tried to understand the underlying mechanisms of these associations, namely with anxiety. Grounded on the detrimental effect poor emotion regulation has on sleep quality (and vice versa), the authors examined the interaction between anxiety symptom severity and emotional regulation difficulties in relation to insomnia symptom severity, in a sample of undergraduate students. This research posited that the interaction between anxiety symptoms and both emotion regulation difficulties and limited access to emotion regulation strategies were associated with insomnia symptom severity and, in a subsample of clinically significant levels of insomnia, emotion regulation moderated the relationship between anxiety severity and insomnia severity [15]. Similarly, Tsypes, Aldao and Mennin [16] researched the role of emotion dysregulation as a potential mediator of the relationship between specific sleep difficulties and generalized anxiety disorder (GAD). Interestingly, the authors found that difficulties in emotion regulation fully mediated the relationship between GAD and sleep problems but not subjective sleep quality and habitual sleep efficiency which was hypothesized to be due to the possibility of these problems being more strongly related to the cognitive components of emotion regulation not targeted in the measure of emotion regulation used.

In this line, positive functioning variables may have a role in the association between insomnia and depression/anxiety. Self-compassion is an actual focus of interest for many behavioral researchers and that is why it has been extensively investigated both from a preventive and intervention perspectives. There are even psychological treatments based on self-compassion research—Compassion Focused Therapy [17] and Mindful Self-Compassion program [18]. Put it simply, self-compassion refers to a positive non-judgmental, kind and caring attitude of a person toward her- or himself in the face of failures and individual shortcomings that can be viewed as an emotional coping strategy [19]. Since Neff [19] first defined and conceptualized the construct of self-compassion, research has been blooming, linking self-compassion to several positive mental health outcomes, either in a direct or indirect way—decreased psychopathology, increased positive well-being, increased psychological functioning, resilience to burnout [20–22]. Such is the case with both depression and anxiety [23–26]. Recent studies have also found significant associations between sleep / insomnia and self-compassion variables [27–31]. As in other disorders, some authors have suggested that self-compassion may constitute a protective factor in insomnia [32]. However, there is no systematic investigation on this topic.

Considering the extant research on the associations between self-compassion and sleep/insomnia, and on the mediating/moderating role of social support and emotion regulation, we hypothesize that self-compassion may be influential in the aforementioned relationship. In the current study, our aim was to examine weather self-compassion mediates between insomnia and depression, and between insomnia and anxiety. It was expected that self-compassion mediates the association between insomnia and depression, and insomnia and anxiety, in bidirectional ways.

2 Methods

2.1 Participants

A sample constituted by 494 community-dwelling adults (395 women) who had more than 18 or more years old were recruited. The mean age was 32.1 (SD = 12.6) for total sample and 31.4 (SD = 12.0) and 35.1 (SD = 14.6) for women and men, respectively. This age difference between both sexes was statistically significant [t (132,871) = 2.314; p = 0.022], being the men older than women. More information may be consulted in Marques et al. [33] and Marques, Gomes, and Pereira [32].

2.2 Procedure

The study was conducted in 2018 through online survey which was disseminated via several institutions and social media, a research strategy that has been quite used in last decades in psychology [34] and sleep medicine (e.g., [32,

33]). The first page of the survey served as an informed consent that participants were required to read to proceed in the study. The participants were informed that confidentiality was assured and that their data would be used strictly for scientific purposes. The study was authorized by the Department of Education and Psychology at the University of Aveiro (Portugal).

Only individuals ≥ 18 years of age with European Portuguese nationality were recruited. Data were collected through an online platform (Google Forms). Questionnaires were available online during one month.

2.3 Measures

Sociodemographic Data. Participants reported sex, age, marital status, and educational level.

Insomnia Severity Index (ISI). The ISI was used to assess insomnia. It is a brief measure comprising 7 items which aims to evaluate insomnia severity [35]. The items assess the severity of insomnia in the past 2 weeks and the questions are related to sleep onset, sleep maintenance, early awakening, level of satisfaction with sleep pattern, level of interference with daily functioning, perception of sleep difficulty by other people, and level of concern about current insomnia. It is constituted by 7 items comprising a 5-point Likert scale (0–4). The global score results from the sum of the 7 items, ranging from 0 to 28 points. In this study, we used the European Portuguese version adapted by Clemente et al. [36] which yielded a Cronbach's alpha of 0.81.

Hospitalar Anxiety and Depression Scale (HADS). The HADS is a self-report measure of anxiety and depression constituted by 14 items [37]. Seven items (even items) concerns to anxiety and seven items (odd items) pertains to depression. Scores may range from 0 to 21 in each of the domains. In this study, we use the European Portuguese version adapted by Pais-Ribeiro et al. [38] which yielded a Cronbach's alpha of 0.60 for anxiety and 0.81 for depression.

Self-compassion Scale (SCS). The SCS is a questionnaire comprising 26 items that assesses six dimensions of self-compassion [39]: self-kindness (e.g., "I'm tolerant of my own flaws and inadequacies"), self-judgment (e.g., "When times are really difficult, I tend to be tough on myself."), common humanity (e.g., "I try to see my failings as part of the human condition"), isolation (e.g., "When I think about my inadequacies it tends to make me feel more separate and cut off from the rest of the world"), mindfulness (e.g., "When something upsets me I try to keep my emotions in balance"), and over-identification (e.g., "When something painful happens I tend to blow the incident out of proportion"). Items are rated on a 5-point Likert-type scale ranging from 1 (almost never) to 5 (almost always). For the purposes of the current study, we only considered the total score of the scale—which is produced summing all items divided by the number of items i.e., a mean score—whose internal consistency value was $\alpha = 0.93$. Higher scores denote higher levels of self-compassion. The European Portuguese version adapted by Castilho and Pinto-Gouveia [40] was used.

2.4 Statistical Analysis

For this study's purposes, we computed the following analyses: frequency analyses, descriptive statistics (means and standard deviations), Cronbach's alphas to assess reliability of the measures, and Pearson correlations to examine the associations among variables [41]. All the analyses were carried out in IBM SPSS Statistics v.25 software. To perform mediation analyses it was used the PROCESS macro v.3.4.1 (Model 4) which runs in the IBM SPSS Statistics software [42]. To estimate the significance of direct and indirect effects we used the bootstrapping bias corrected percentile method with 1000 resamples [43]. The bootstrapped confidence interval makes no assumption about the shape of the sampling distribution. The effect size was assessed with completely standardized indirect effect size. According to Preacher and Kelley [44] the effect size was interpreted as small (0.01), medium (0.09), and large (0.25). Additionally, we computed the proportion of total effect mediated (*P*m) which is defined as *ab*/*c* [45].

For all the analyses, a significance level (p) at 0.05 was set.

3 Results

3.1 Descriptive Statistics and Correlation Analysis

Means and standard deviations for all the variables considered in our study may be consulted in Table 1.

Table 1 Descriptive statistics and correlations of insomnia, depression, anxiety, and self-compassion ($N = 494$)

	1	2	3	4
1. ISI	–			
2. HADS-A	0.28***	–		
3. HADS-D	0.40***	0.65***	–	
4. SCS	– 0.20***	– 0.54***	– 0.59***	–
M (SD)	8.85 (4.95)	11.22 (3.04)	5.57 (3.84)	75.45 (15.53)
Range	0–28	5–19	0–16	27–122.2

***$p < 0.001$

ISI Insomnia Severity Index, *HADS-A* Hospital Anxiety and Depression Scale (Anxiety), *HADS-D* Hospital Anxiety and Depression Scale (Depression), *SCS* Self-Compassion Scale, *M* Mean, *SD* Standard Deviation

3.2 Self-compassion as a Mediator in the Effect of Insomnia on Depression

The model comprising self-compassion as a mediator in the effect of insomnia on depression accounted for approximately 16% of the variance in depression ($R^2 = 0.164$; F [2, 491] = 48.21; $p < 0.001$). The effect of insomnia on depression remained significant after controlling for the effects of self-compassion. The indirect effect of self-compassion in the association between insomnia and depression was significant as the confidence intervals did not contain the zero value ($b = 0.08$; 95% CI [0.01, 0.12]. The value of the completely standardized indirect effect size was 0.10 which can be considered in the interface between medium and large effect size. The *P*m was 0.72 (Fig. 1).

3.3 Self-compassion as a Mediator in the Effect of Depression on Insomnia

The model comprising self-compassion as a mediator in the effect of depression on insomnia accounted for approximately 44% of the variance in insomnia ($R^2 = 0.435$; F [2, 491] = 48.218; $p < 0.001$). The indirect effect of self-compassion in the association between depression and insomnia was not significant as the confidence intervals did contain the zero value ($b = -0.04$; 95% *CI* [– 0.11, 0.03]) (Fig. 2).

3.4 Self-compassion as a Mediator in the Effect of Insomnia on Anxiety

The model comprising self-compassion as a mediator in the effect of insomnia on anxiety accounted for approximately 33% of the variance in anxiety ($R^2 = 0.325$; F [2, 491] = 118.273; $p < 0.001$). The effect of insomnia on anxiety remained significant after controlling for the effects of self-compassion. The indirect effect of self-compassion in the association between insomnia and anxiety was significant as the confidence intervals did not contain the zero value ($b = 0.06$; 95% CI [0.03, 0.09]). The value of the completely standardized indirect effect size was 0.10 which can be considered in the interface between medium and large effect size. The *P*m was 0.71 (Fig. 3).

3.5 Self-compassion as a Mediator in the Effect of Anxiety on Insomnia

The model comprising self-compassion as a mediator in the effect of anxiety on insomnia accounted for approximately 9% of the variance in insomnia ($R^2 = 0.086$; F [2, 491] = 23.179; $p < 0.001$). The indirect effect of self-compassion in the association between anxiety and insomnia was not significant as the confidence intervals did contain the zero value ($b = 0.06$; 95% *CI* [– 0.02, 0.14]) (Fig. 4).

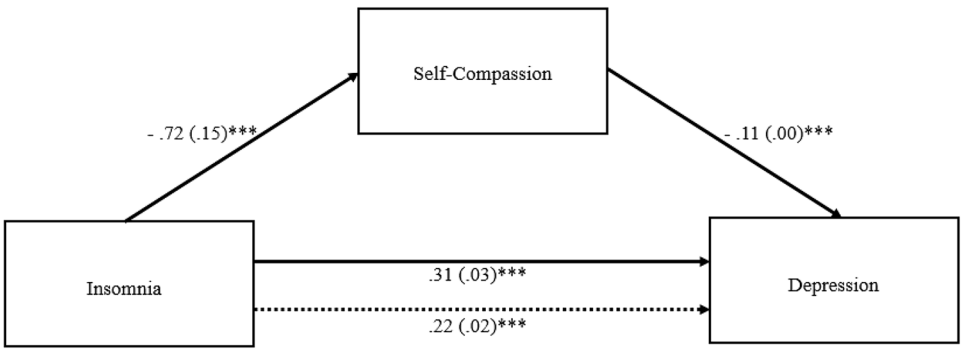

Fig. 1 Effect of insomnia on depression through mediation of self-compassion. There are displayed the unstandardized coefficients with standard errors in parentheses. Dashed line represents direct effect

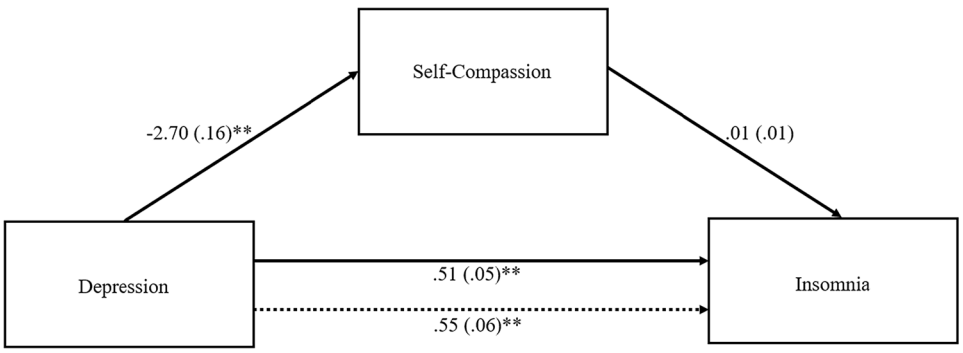

Fig. 2 Effect of depression on insomnia through mediation of self-compassion. There are displayed the unstandardized coefficients with standard errors in parentheses. Dashed line represents direct effect

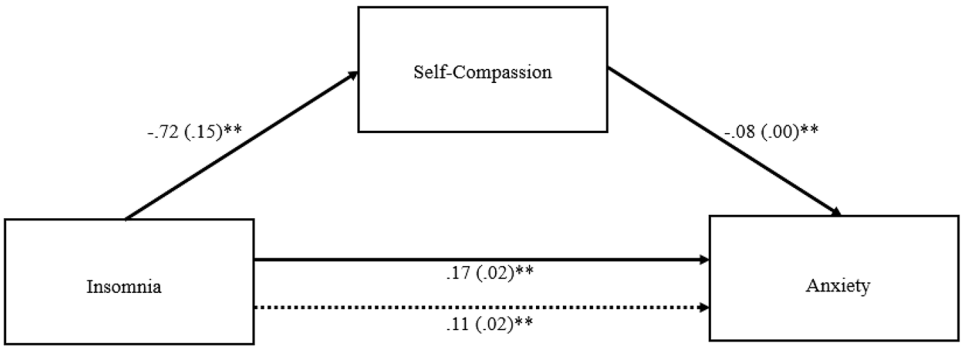

Fig. 3 Effect of insomnia on anxiety through mediation of self-compassion. There are displayed the unstandardized coefficients with standard errors in parentheses. Dashed line represents direct effect

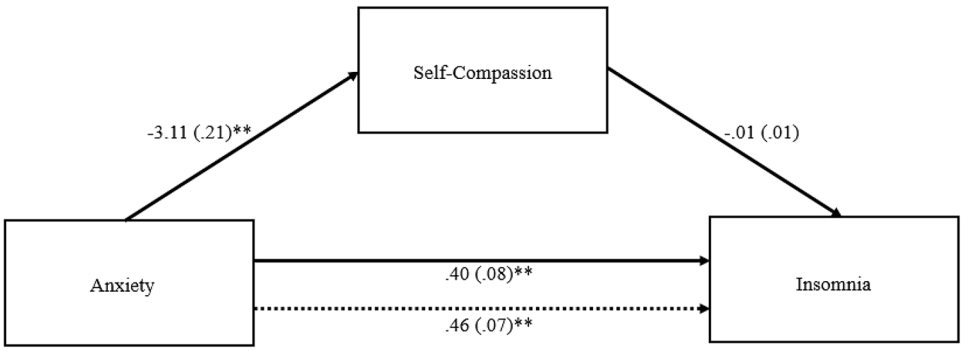

Fig. 4 Effect of anxiety on insomnia through mediation of self-compassion. There are displayed the unstandardized coefficients with standard errors in parentheses. Dashed line represents direct effect

4 Discussion

The aim of this study was to test the potential mediating effect of self-compassion on the insomnia and depression association and on the insomnia and anxiety association. The bidirectional relationships between depression and insomnia and anxiety and insomnia are well established. However, little is known about the underlying mechanisms on either of these relationships. By testing self-compassion as a potential mediator, we found depression to be partially mediated by self-compassion when insomnia predicts depression and anxiety to be significantly mediated by self-compassion when insomnia is the predictor. However, when depression/anxiety is used as predictors of insomnia, self-compassion does not influence either relationship.

As pointed out by Taylor [8], the relationship between insomnia and depression is not completely clear. Sometimes insomnia precedes depression, sometimes depression comes first, sometimes they are unrelated, and other times they are comorbid. From a methodological standpoint it is difficult to uncover this association since we can only rely upon quasi-experimental designs. Taylor [8] suggests various potential explanations for the association between insomnia and depression. One of these mechanisms is the lying awake in the dark as a *tabula rasa* for depressive rumination that may trigger a depressive episode. As to anxiety, its relationship with insomnia is also complex and, while they can simply co-occur, many times, one causes or maintains the other while playing a perpetuating role on itself. Harvey [13] expertly portrays the interactions between anxiety and insomnia (and vice versa).

In our study, overall, self-compassion seems to be a partial mediator when insomnia predicts depression. That is, insomnia accounts for a significant percentage of variance in depression in a direct way and in an indirect way since this relationship is attenuated when the mediator is introduced in the model. Thus, individuals with lower levels of self-compassion have their depressive symptoms intensified. On the contrary, when depression is considered the predictor and insomnia severity the outcome, this mediation effect is not verified. As to anxiety, it is visible an identical pattern to depression. Self-compassion constitutes a significant mediator between insomnia and anxiety; however, the other way round is not significant.

Self-compassion is known to have an effect on reducing rumination which is a risk factor for depression and anxiety [19, 46], hence, this could be one possible explanation for the mediating role of self-compassion found on both anxiety and depression, even though different subtypes of cognitive content may be involved. This might also be due to the effect of self-compassion in reducing of self-criticism, increasing of self-awareness and self-care and fostering a sense of common humanity that hinders feelings of isolation [19]. When accounting for the effects of insomnia on quality of life, social and interpersonal and/or workplace performance

that may result in levels of distress which potentially trigger, maintain or worsen depression [8], individuals with higher levels of self-compassion may be able to better deal with these events and thus reducing their impact on depression. The same can be said for anxiety since self-compassion would also have a beneficial effect on both rumination and worry—known to be central constructs of anxiety—by allowing a more objective perspective taking (diminishing selective attention bias and distorted perceptions of [not only] sleep deficit) and reducing arousal, distress and excessive negatively toned cognitive activity that take part in the interaction between insomnia and anxiety [13].

In our study, when depression/anxiety was used as predictors, self-compassion no longer mediated their relationship with insomnia. There is extensive literature and etiological models explaining the factors and processes involved in insomnia among which are hyperarousal, rumination, dysfunctional beliefs about sleep, maladaptive sleep behaviors, excessive negatively toned cognitive activity about sleep and, more recently, metacognitive processes [13, 47]. Given this theoretical framework, it should be expected that self-compassion, as it reduces physiological arousal and rumination, impacts negative mood through cognitive reappraisal of distressing events and fosters awareness and openness to experience to the complete range of emotional expression [19]. In fact, studies have shown that self-compassion does positively correlate with sleep quality [28, 29, 48]. However, when depression or anxiety were introduced as predictors of insomnia, self-compassion did not have a mediating effect. A similar tendency was found on another research using a different type of positive functioning variable—social support [14]. We can only hypothesize as to why. One possibility may be that since depressed/anxious individuals already have high levels of arousal and/or negative mood and could, therefore, have more difficulty in accessing their self-compassion capacities [49]—thus impeding self-compassion to buffer against sleep difficulties. Another possibility relates to the physiological and behavioral aspect of insomnia. The maintenance and course of insomnia is not only linked to cognitive and emotional aspects but also to behavioral ones—maladaptive sleep behaviors play a fundamental role in both the course and treatment of insomnia and their modification (e.g., sleep hygiene, stimulus control and sleep restriction). Accordingly, self-compassion alone, as much as it reduces rumination, fostering cognitive reappraisal and increasing psychological wellbeing, may not be enough to impact insomnia in a meaningful way as it calls for specific action/strategies probably unfamiliar to the self-compassionate individual.

Despite the findings of this study, some limitations should be noted: First, this is a cross-sectional study and no causal explanations can be proposed. Second, this is a sample constituted predominantly by young people, thus, one should be cautious in the generalizability of the findings for other age groups. Third, the low internal consistency of the HADS-A ($\alpha = 0.60$) should be noted as having a potential implication on some observed results.

Future research should clarify the observed effect in the current study on clinical samples comprising individuals clinically diagnosed by sleep experts. In addition, longitudinal designs should be implemented whenever it is possible. Finally, the potential mediating role of positive functioning variables beyond self-compassion (e.g., mindfulness, cognitive inflexibility, gratitude, hope, etc.) should also be examined.

Identifying the mechanisms underlying relevant variables for insomnia and depression will benefit therapeutic interventions as they can be better tailored to each patient's idiosyncratic problem. Given that insomnia is a transdiagnostic process in most of psychiatric conditions, the research on mechanisms is crucial [1].

Self-compassion may be considered an emotion regulation strategy and thus may be have a relevant protective effect in psychopathology. Besides, self-compassion requires meta-cognitive activity implying a warm and accepting attitude towards the self and the own life. Our findings enhance the idea that mindfulness and acceptance approaches to psychotherapy may constitute important strategies in prevention of depression and anxiety [47, 50].

Despite the criticisms regarding the application of mediation analysis in cross-sectional studies, this is a common practice that has been posited by several authors [51].

In a recent published review, some of us pointed out that investigation and application of self-compassion techniques should constitute a trend in insomnia research for the next years [52].

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Data Availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent to Participate Informed consent was obtained from all individual participants included in the study.

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