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Treatment Adherence in Cognitive Processing Therapy for Combat-Related PTSD With History of Mild TBI

Jeremy J. Davis
Cincinnati VA Medical Center, Cincinnati, Ohio and University of Utah School of Medicine

Kristen H. Walter
Cincinnati VA Medical Center, Cincinnati, Ohio

Kathleen M. Chard
Cincinnati VA Medical Center, Cincinnati, Ohio and University of Cincinnati Medical School

R. Bruce Parkinson and Wes S. Houston
Cincinnati VA Medical Center, Cincinnati, Ohio

Objective: This retrospective study examined treatment adherence in Cognitive Processing Therapy (CPT) for combat-related posttraumatic stress disorder (PTSD) in Veterans of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) with and without history of mild traumatic brain injury (mTBI). ***Method:*** Medical record review of consecutive referrals to an outpatient PTSD clinic identified veterans diagnosed with combat-related PTSD who began treatment with CPT. The sample ($N = 136$) was grouped according to positive ($n = 44$) and negative ($n = 92$) mTBI history. Groups were compared in terms of presenting symptoms and treatment adherence. ***Results:*** The groups were not different on a pretreatment measure of depression, but self-reported and clinician-rated PTSD symptoms were higher in veterans with history of mTBI. The treatment completion rate was greater than 61% in both groups. The number of sessions attended averaged 9.6 for the PTSD group and 7.9 for the mTBI/PTSD group ($p = .05$). ***Implications:*** Given the lack of marked group differences in treatment adherence, these initial findings suggest that standard CPT for PTSD may be a tolerable treatment for OEF/OIF veterans with a history of PTSD and mTBI as well as veterans with PTSD alone.

Keywords: posttraumatic stress disorder, mild traumatic brain injury, cognitive processing therapy, veterans

Impact and Implications

- Although the co-occurrence of mTBI and PTSD is not uncommon in OEF/OIF veterans, the optimal empirically supported treatment for PTSD in the cases remains an area of ongoing research. This study of CPT for PTSD in veterans with and without history of mTBI extend previous clinical trials demonstrating the efficacy of CPT by examining its utility under standard clinical conditions. OEF/OIF veterans with a history of PTSD and mTBI did not demonstrate marked differences in treatment adherence from veterans with PTSD alone. These preliminary findings indicate that standard CPT for PTSD may be a tolerable approach for veterans with PTSD and history of mTBI. If supported by additional research, these preliminary findings indicate that standard CPT might useful among veterans regardless of mTBI history.

Jeremy J. Davis, Mental Health Care Line, Cincinnati VA Medical Center, Cincinnati, Ohio, and Division of Physical Medicine and Rehabilitation, University of Utah School of Medicine; Kristen H. Walter, Trauma Recovery Center, Cincinnati VA Medical Center; Kathleen M. Chard, Trauma Recovery Center, Cincinnati VA Medical Center, and Department of Psychiatry, University of Cincinnati Medical School; R. Bruce Parkinson and Wes S. Houston, Mental Health Care Line, Cincinnati VA Medical Center.

Correspondence concerning this article should be addressed to Kathleen M. Chard, 3200 Vine Street, Cincinnati, OH 45220. E-mail: kathleen.chard@va.gov

Introduction

Posttraumatic stress disorder (PTSD) and mild traumatic brain injury (mTBI) are commonly encountered by clinicians treating veterans of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) in both mental health and general medical settings (Department of Defense [DOD], 2007; Seal, Bertenthal, Miner, Sen, & Marmar, 2007; Tanielian & Jaycox, 2008). A number of studies have explored the relationship of mTBI sequelae and physical and mental health outcomes in OEF/OIF veterans. In a well-known postdeployment survey of infantry soldiers, Hoge and colleagues (2008) found that respondents with a history of mTBI were more likely to report poor health, increased medical visits and missed workdays, and greater somatic and cognitive complaints compared to those who sustained other injuries. When PTSD was included in logistic regression analyses, the association between mTBI and negative health outcomes was greatly reduced, which suggested that PTSD might mediate health outcomes. An independent investigation of postdeployment National Guard and reserve personnel found PTSD to mediate health and psychosocial outcomes (Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009). Similarly, Schneiderman, Braver, and Kang (2008) examined the prevalence of mTBI, PTSD, and postconcussive symptoms in OEF/OIF veterans and found a greater association between PTSD and postconcussive symptoms than history of mTBI after removal of overlapping symptoms. In yet another study, self-

reported postconcussive symptoms varied by TBI severity until PTSD symptoms were entered as a covariate (Belanger, Kretzmer, Vanderploeg, & French, 2010). Thus, emotional complaints (e.g., self-reported PTSD symptoms) appeared to be more strongly related to postconcussive symptom endorsement than TBI severity.

These findings are consistent with evidence from research in civilian samples that has found postconcussive symptoms to be nonspecific (Gunstad & Suhr, 2002; Meares et al., 2011) and endorsed by a range of participants from healthy controls (Garden, Sullivan, & Lange, 2010; Iverson & Lange, 2003; Iverson, Lange, Brooks, & Rennison, 2010) to individuals with depression (Trahan, Ross, & Trahan, 2001) and chronic pain (Iverson & McCracken, 1997). Additional research has identified relationships between postconcussive symptom endorsement and factors unrelated to the injury, including premorbid emotional status (Greiffenstein & Baker, 2001), personality characteristics (Garden et al., 2010), assessment method (Villemure, Nolin, & Le Sage, 2011), combat stress (Cooper et al., 2011), and symptom exaggeration (Lange, Iverson, Brooks, & Rennison, 2010). It has been proposed that persistent postconcussive symptoms may also be iatrogenic phenomena in some patients (i.e., that diagnosis threat, diagnostic misinformation, or treatment context might contribute to symptom maintenance; Howe, 2009). The interaction between PTSD and history of mTBI has been described as "mutually exacerbating" (King, 2008, p. 3). Extending the notion of mutual symptom exacerbation in PTSD and mTBI, Brenner, Vanderploeg, and Terrio (2009) proposed a model of cumulative disadvantage for understanding the complex clinical presentation and increased risk of poor outcomes when the conditions co-occur. According to this model, stressors due to a range of problems from emotional and psychosocial issues to vocational and financial difficulties exert a cumulative effect that may result in increases in the severity and persistence of symptoms. Brenner and colleagues recommended treatment aimed at symptom reduction to lower the burden load, regardless of etiology.

Numerous studies and meta-analytic reviews have provided strong evidence of symptom resolution following mTBI with full recovery being the expectation in three months (Belanger, Curtiss, Demery, Lebowitz, & Vanderploeg, 2005; Binder, Rohling, & Larrabee, 1997; Carroll et al., 2004; Dikmen, Machamer, Winn, & Temkin, 1995; Frencham, Fox, & Maybery, 2005; Iverson, 2005; McCrea et al., 2003; Schretlen & Shapiro, 2003). The meta-analytic findings have been challenged on methodological grounds (Iverson, 2010; Pertab, James, & Bigler, 2009), and some studies have reported statistically significant group differences on measures of cognitive and emotional functioning more than 3 months post-mTBI after controlling for performance validity (Konrad et al., 2011; Meyers & Rohling, 2004). There is a growing appreciation of the potential for negative outcomes in cases in which a subsequent mTBI occurs before complete resolution of the initial injury (i.e., second impact syndrome; Cantu, 1998) and when athletes sustain multiple concussions over the course of a career in boxing or football (DeKosky, Ikonomovic, & Gandy, 2010). In cases involving a single uncomplicated mTBI (i.e., without findings on neuroimaging), a recent review (McCrea et al., 2009) concluded that complete symptom resolution "within days to weeks in the overwhelming majority of cases" (p. 1381) is the expectation. The authors noted a need for further research to examine competing claims regarding mTBI recovery and stressed the importance of a biopsychosocial treatment model with "attention to the diagnosis and treatment of psychological disorders in the context of mTBI" (p. 1384). Given the possibility that psychosocial factors might complicate recovery from mTBI and the increased prevalence of PTSD among veterans, treatment aimed at reducing PTSD would appear a useful therapeutic target.

Researchers and clinical collaborators within the Veterans Health Administration (VHA) and DOD have developed guidelines for assessment and treatment of PTSD and TBI (VHA, 2005, 2007; VHA & DOD, 2004, 2009). With regard to psychotherapeutic intervention for PTSD, prolonged exposure (PE) and cognitive processing therapy (CPT) have been endorsed as best practice models (Foa, Keane, Friedman, & Cohen, 2008; VHA & DOD, 2004). Both of these treatments have been extensively examined through clinical research, including randomized controlled trials, with civilian samples and to a lesser extent, with veterans (Chard, Schumm, McIlvain, Bailey, & Parkinson, 2011; Chard, Schumm, Owens, & Cottingham, 2010; Foa et al., 1999; Monson et al., 2006; Resick, Nishith, Weaver, Astin, & Feuer, 2002; Schnurr et al., 2007). However, evidence-based treatments for TBI and PTSD have typically been developed independently of one another (Chard, 2005; Gordon et al., 2006; Monson et al., 2006), and research that examines psychotherapeutic interventions for PTSD in patients with a history of TBI is limited (Soo & Tate, 2007; Stein & McAllister, 2009; Vasterling, Verfaellie, & Sullivan, 2009).

The research addressing PTSD in the context of TBI primarily involves case studies and randomized clinical trials in civilian samples. For example, McGrath (1997) reported a case study in which a cognitive–behavioral intervention was implemented for PTSD following a motor vehicle accident that resulted in mTBI. Therapeutic gains included improved work performance and reductions in intrusive thoughts, angry outbursts, self-reported anxiety, and self-reported depressive symptoms. Williams, Evans, and Wilson (2003) described two cases in which cognitive–behavioral therapy was used to treat PTSD during intensive neurorehabilitation for TBI. Both patients showed symptom reductions following treatment, but residual anxiety symptoms persisted. Bryant and colleagues (2003) compared cognitive–behavioral and supportive interventions for acute stress disorder in individuals with a history of mTBI. At posttreatment, 58% of participants in the supportive group continued to meet criteria for PTSD, and 8% of the cognitive–behavioral group continued to meet criteria. Tiersky et al. (2005) examined the efficacy of cognitive remediation in conjunction with psychotherapy in patients with history of mild to moderate TBI. Compared to waitlist controls, participants in the treatment group showed posttreatment reductions in overall symptom severity and on specific measures of anxiety and depression.

One recent study examined psychotherapy for PTSD in veterans with a history of TBI. Chard et al. (2011) reported that veterans in a residential TBI/PTSD program receiving a modified version of CPT (i.e., CPT-C, which does not involve written trauma narratives) demonstrated reductions in clinician-assessed PTSD symptoms and self-reported symptoms of PTSD and depression. Although these findings provide initial support for cognitive–behavioral interventions for PTSD in the context of TBI, there remains a paucity of studies of veterans with a history of mTBI. Veterans presenting with PTSD and history of mTBI may represent a unique clinical group that is distinct from veterans with

PTSD alone, and it remains an empirical question whether veterans with PTSD and history of mTBI will participate in standard outpatient intervention (Vasterling et al., 2009). The goals of the present study were to describe the symptom presentation and treatment adherence of veterans with and without a history of mTBI who underwent unmodified CPT for PTSD in an outpatient clinic. It was hypothesized that veterans with a history of mTBI and PTSD would report greater symptoms, consistent with previous research. Exploratory analyses were also conducted to examine whether mTBI affected engagement in PTSD treatment.

Method

Participants

Review of medical records from consecutive referrals to an outpatient PTSD program at a Midwestern VA Medical Center revealed 1,128 cases of which 285 were OEF/OIF veterans diagnosed with combat-related PTSD. One hundred twenty-five cases did not undergo CPT and 160 cases initiated treatment with CPT. Twenty-four cases were excluded from this group for several reasons including ongoing treatment ($n = 14$), subthreshold PTSD ($n = 8$; defined as endorsing 2 symptoms of avoidance or 1 symptom of hyperarousal, but otherwise meeting criteria for PTSD), and history of moderate-severe TBI ($n = 2$) resulting in the pretreatment sample ($N = 136$). The two cases with a history of moderate-severe TBI were excluded because they were insufficient to serve as a separate group. Participants who initiated CPT did not differ from those OEF/OIF veterans did not initiate CPT in age, $t(283) = 0.13$, $p = .90$; ethnicity (i.e., Caucasian vs. not Caucasian), χ^2 (1, $N = 282$) = 0.88, $p = .35$; education, $t(185) = 0.06$, $p = .95$; or service area (i.e., Iraq, Afghanistan, or both), χ^2 (2, $N = 285$) = 0.67, $p = .71$.

All 136 participants met diagnostic criteria for PTSD based on a combat-related trauma as assessed by the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990). Among the participants, 44 (32%) had a documented history of mTBI, based on information gleaned from medical records. OEF/OIF veterans undergo a standardized screening procedure for TBI as they enter the VA system. Individuals with positive screening results are evaluated further in polytrauma clinics, so this information is often readily available in the medical record. According to VHA and DOD guidelines (2009), *mTBI* is defined as a brain injury caused by external force that leads to an alteration of consciousness (i.e., looking or feeling dazed or confused), loss of consciousness (0–30 min), and/or posttraumatic amnesia (0–24 hr).

Measures

PTSD. The Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990) is a structured clinical interview that follows PTSD diagnostic criteria outlined in the *DSM–IV–TR* (American Psychiatric Association, 2000). Each criterion of PTSD is rated for frequency and severity; these ratings are summed to obtain a total PTSD severity score (Blanchard et al., 1995), for which a cut-off of 45 was used for diagnosis. The CAPS has demonstrated excellent psychometric properties (Weathers, Keane, & Davidson, 2001).

The PTSD Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993) is a commonly used 17-item self-report measure for assessing PTSD with established psychometric properties. Items are rated on a 5-point Likert-type scale ranging from 1 (*not at all*) to 5 (*extremely*) and summed to yield a total score. A total score cut-off of 50 is suggested for diagnosis. Among samples of veterans, the PCL is shown to have excellent internal and test–retest reliability, along with strong convergent and discriminant validity (Weathers et al., 1993).

Depression. The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) is a widely used 21-item self-report measure of depressive symptoms with well-established psychometric properties. Each item is rated on a 4-point Likert-type scale ranging from 0 to 3, for a maximum score of 63 (higher scores indicate greater severity of depression symptoms). The BDI-II has demonstrated excellent internal and test–retest reliability, in addition to strong convergent validity (Beck et al., 1996).

Treatment Completion and Number of Sessions. Treatment completion was determined by chart review of session notes. If participants had completed the 12-session protocol or were early responders to treatment (e.g., reduced symptoms/impairment maintained prior to completing the protocol) and the clinician indicated treatment was completed, then participants were considered completers. Furthermore, participants who received more than 12 sessions, in keeping with the guidelines outlined in the CPT protocol, were included if treatment completion was indicated in the notes by the clinician. If participants did not return to treatment, required different services during the course of treatment, or were dismissed due to noncompliance, these participants were considered noncompleters. The number of sessions attended was also determined by chart review and refers to the total number of CPT sessions attended.

Procedure

This retrospective chart review was approved by a university institutional review board and the VA Research and Development Committee. Medical records were reviewed from consecutive intake assessments at an outpatient PTSD program between September 2001 and December 2008. Relevant information from the medical record was compiled into a database, including demographic and treatment variables.

Treatment

Participants in the study received individual CPT, as designed for a military population (Resick, Monson, & Chard, 2007). CPT was provided by a licensed clinician (nurse practitioner, social worker, psychiatrist, or psychologist) or trainee (psychiatry resident or psychology intern) supervised by a licensed clinician. All therapists were trained by one of the developers of CPT (Kathleen M. Chard), who provided weekly group supervision. CPT is a manualized treatment that consists of 12 60-min individual sessions. All sessions were in-person and provided at a VA PTSD specialty clinic. The therapy consists of three stages, including an initial phase that explores the impact/meaning of the trauma, the connection between thoughts and emotions, and begins the process of identifying "stuck points." The second stage involves the writing of traumatic accounts designed to activate and normalize the

natural emotions related to the trauma and to help the patient begin to examine their stuck points. The final phase of treatment focuses on challenging stuck points and replacing them with more balanced thoughts. Stuck points related to safety, trust, power/control, esteem, and intimacy as well as overgeneralized stuck points related to self, others, and the world are examined and allow the participant to scrutinize the logic behind their reasoning and to identify more healthy alternatives to their thoughts. Specifically, cognitive techniques are used using challenging questions, patterns of problematic thinking, and challenging beliefs worksheets. In addition, Socratic Dialogue is used throughout therapy to facilitate further evaluation of beliefs. During the final session, the individual is again asked to discuss the impact of the event to allow them to see concrete changes in their thinking from the start to the completion of the treatment.

Results

Veterans with and without history of mTBI were compared on demographic and treatment variables using chi-square and independent samples *t* test analyses. The PTSD and mTBI/PTSD groups were not significantly different in terms of age, ethnicity, education, marital status, service connected disability rating, or psychiatric comorbidity (see Table 1). In terms of pretreatment scores on outcome measures, the groups did not differ significantly on the BDI-II, $t(119) = -1.00$, $p = .32$, $d = .18$, but were significantly different on the CAPS, $t(132) = -2.19$, $p = .03$, $d = .40$, and PCL, $t(119) = -2.05$, $p = .04$, $d = .39$, with the mTBI group reporting more symptoms (see Table 2). The dropout rate did not differ significantly between PTSD and mTBI/PTSD groups, $\chi^2(1, N = 136) = 0.004$, $p = .95$. The mean number of CPT sessions attended was slightly higher for PTSD (M = 9.6; *SD* = 4.9) than mTBI/PTSD (M = 7.9; *SD* = 4.9) groups, which trended toward significance, $t(134) = 1.95$, $p = .05$, $d = .17$. On post hoc analysis, the achieved power for this comparison was 0.26. Given the sample size, a medium effect (specifically, $d = 0.52$) would be minimally detected at $1 - \beta = 0.80$. To further explore these findings, analyses were conducted to determine if differences were present on early treatment drop-out (i.e., 4 or fewer sessions; when the trauma account is assigned in CPT). The rate of early drop-out trended toward significance, $\chi^2(1, N = 136) = 3.84$, $p = .05$, $\Phi = .05$, with 20.7% of the PTSD and 36.4% of the mTBI/PTSD groups discontinuing treatment at or before Session 4 of CPT. Considering the sample size, a small effect (specifically, $w = 0.24$) would be minimally detected at $1 - \beta = 0.80$.

Discussion

This retrospective study examined pretreatment characteristics and CPT treatment adherence for veterans with PTSD, with and without a history of mTBI. The sample was grouped according to history of mTBI, and groups were compared on treatment adherence variables (e.g., number of sessions, treatment drop-out) and on three psychological measures administered at pretreatment—the PCL, CAPS, and BDI-II. The hypothesis regarding symptom presentation was supported as veterans with PTSD and history of mTBI reported more symptoms than veterans with only PTSD on both self-report and clinician-administered measures of PTSD. This finding is consistent with prior studies suggesting greater symptom report among individuals with mTBI history (Belanger et al., 2010; Hoge et al., 2008; Schneiderman et al., 2008). The observation of differences in both self-reported and clinician-assessed symptoms of PTSD also suggests that the cumulative disadvantage model proposed by Brenner and colleagues (2009) may be helpful in conceptualizing these cases. Although the history of mTBI does not offer a neurologic explanation for increased symptom report, as another psychosocial stressor it may increase emotional difficulty.

Findings related to treatment adherence were mixed. The mTBI/PTSD and PTSD groups demonstrated similar drop-out rates, but the PTSD group attended almost two more sessions on average than the mTBI/PTSD group. Although the difference in session attendance was not statistically significant, post hoc power analysis showed the present study to be underpowered for the observed effect size. The finding of similar drop-out rates with an almost significant difference in session attendance raises the possibility that participants in the mTBI/PTSD dropped out more quickly than those in the PTSD group. Further analyses showed that the data trended toward this pattern in that the mTBI/PTSD group had slightly higher rates of dropping out of treatment at or before the Session 4 of CPT. This is an interesting trend as it suggests the possibility that veterans with PTSD and a history of mTBI may be more likely to drop out early in CPT treatment, specifically before significant trauma processing and challenging of trauma-related stuck points were undertaken. However, this analysis was also inadequately powered, so results should be interpreted with caution. Further, weekly assessment of PTSD symptoms was not

Table 1
Demographic Characteristics by Group

Characteristic	*n*	PTSD	*n*	mTBI/PTSD	*T* or χ^2	*p*
Age, *M* (*SD*)	92	30.1 (7.6)	44	30.3 (8.2)	0.16	.88
Caucasian, %	92	91.3	44	88.6	0.25	.62
Years education, *M* (*SD*)	92	13.1 (1.4)	44	13.1 (1.6)	0.02	.99
Married, %	92	52.2	44	65.9	2.29	.13
OIF, %	92	89.1	44	84.1	1.56	.46
Axis I comorbidity, %	92	72.8	44	79.5	0.72	.40
Service connected, %	92	39.1	44	40.9	0.04	.84

Note. PTSD = posttraumatic stress disorder; mTBI = mild traumatic brain injury; OIF = percentage of participants who served in Operation Iraqi Freedom; Service connected = percentage of participants with service-connected disability.

Table 2
Pretreatment Symptoms and Treatment Characteristics

	n	PTSD	*n*	mTBI/PTSD	*T* or χ^2	*p*
CAPS, *M* (*SD*)	91	67.9 (15.0)	43	74.1 (15.9)	2.10	.03
PCL, *M* (*SD*)	77	57.1 (10.5)	44	61.32 (11.3)	2.05	.04
BDI-II, *M* (*SD*)	78	27.8 (9.3)	43	29.6 (10.6)	1.00	.32
Sessions attended, *M* (*SD*)	92	9.6 (4.9)	44	7.9 (4.9)	1.95	.05
Drop-out rate, %	92	38.0	44	38.6	0.01	.95

Note. PTSD = posttraumatic stress disorder; mTBI = mild traumatic brain injury; CAPS = Clinician-Administered PTSD Scale; PCL = PTSD Checklist; BDI-II = Beck Depression Inventory-II.

routinely conducted during this time frame, so it is not possible to determine whether individuals who did not complete the full protocol were early responders to treatment. Although it is implausible that all individuals who dropped out were early responders to treatment by Session 4. Given the potential clinical utility of early identification of individuals who are likely to drop out of treatment, this topic would benefit from further study. It is important to note that the available data are not indicative of marked group differences in treatment adherence, which may mitigate the concern that patients with a history of mTBI might be more difficult to treat with cognitive–behavioral interventions (Vasterling et al., 2009).

This study has several strengths including the fact that these data were collected in a clinical population seeking care at a VA hospital, which adds to the external validity of the findings. In addition, the sampling procedure (i.e., consecutive referrals) did not impose stringent exclusionary criteria that would limit the generalizability of randomized clinical trials. As a result, these findings may be more readily generalized to the typical patients and service providers found in VA clinics. Finally, the use of standardized measures commonly used in PTSD treatment outcome studies allows for further comparison to existing treatment outcome studies using CPT. Despite these strengths, this study has several limitations, for example, reliance on self-reported symptoms in establishing the history of mTBI. The assessment procedure used in TBI/polytrauma clinics relies almost entirely on self-report, and corroboration of these reports is often impossible. The conditions of combat often preclude the collection of data at the time of injury, records which do exist are often unavailable, and the veterans themselves are routinely the only sources of information about events that occurred months to years in the past. A related consideration is that data relevant to describing TBI sequelae (e.g., time since injury and findings of neuropsychological evaluation) were not consistently available for this sample. Posttreatment data were limited, which precluded prepost comparisons and examination of hypotheses related to differential treatment gains by groups. Finally, symptom validity was not examined, so the degree to which the results may have been influenced by response bias remains unknown.

Future research might examine pre- and posttreatment data to examine whether therapeutic gains vary by groups. It might also be of benefit to investigate the influence of cognitive ability on treatment outcome by including neuropsychological data. To the extent possible, it will also be important to consider symptom validity in future research to explore its role in treatment nonresponse. Increased understanding of the best clinical practices for veterans with PTSD and history of mTBI is important given the frequency of this presentation among OEF/OIF veterans.

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