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Validation de la version francophone de l'instrument de mesure d'engagement des élèves

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Article abstract

The purpose of this study is to explore the psychometric properties of the French version of the Student Engagement Instrument in order to perform a cross-cultural validation of its factorial structure, based on a sample of 919 French Canadian high school students. Results confirm the reliability of the instrument with good internal consistency (Cronbach's alpha between .76 and .84). Confirmatory factor analysis shows the validity of the six scales composing the French version of the instrument. Results are significant as there were no standardized instruments with which to evaluate student engagement in high school students in French. Student engagement represents an important intervention target towards improving student achievement and preventing dropout.

VALIDATION OF THE FRENCH VERSION OF THE STUDENT ENGAGEMENT INSTRUMENT

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ABSTRACT. The purpose of this study is to explore the psychometric properties of the French version of the Student Engagement Instrument in order to perform a cross-cultural validation of its factorial structure, based on a sample of 919 French Canadian high school students. Results confirm the reliability of the instrument with good internal consistency (Cronbach's alpha between .76 and .84). Confirmatory factor analysis shows the validity of the six scales composing the French version of the instrument. Results are significant as there were no standardized instruments with which to evaluate student engagement in high school students in French. Student engagement represents an important intervention target towards improving student achievement and preventing dropout.

VALIDATION DE LA VERSION FRANCOPHONE DE L'INSTRUMENT DE MESURE D'ENGAGEMENT DES ÉLÈVES

RÉSUMÉ. Le but de cette étude est d'explorer les propriétés psychométriques de la version française de l'instrument de Mesure d'engagement des élèves afin de réaliser une validation interculturelle de sa structure factorielle, basée sur un échantillon de 919 élèves francophones du secondaire au Canada. Les résultats confirment la fiabilité de l'instrument avec une bonne cohérence interne (alpha de Cronbach entre .76 et .84). L'analyse factorielle confirmatrice démontre la validité des six échelles composant la version française de l'instrument. Les résultats sont significatifs étant donné l'absence d'instruments normalisés pour évaluer l'engagement des élèves du secondaire en français. L'engagement des élèves représente une cible d'intervention importante pour améliorer la réussite scolaire et prévenir l'abandon scolaire.

In Quebec, more boys than girls leave high school without their diplomas: 18.8 % of boys as opposed to 11.9 % of girls (Ministère de l'Éducation, de l'Enseignement supérieur et de la Recherche, 2015). Several factors have been identified in predicting dropout. Low student engagement, for instance, has been found to contribute significantly to the risk of dropping out (Fortin et al., 2013).

Similarly, student engagement trajectories identified as unstable—that is, student engagement which fluctuates over time — have also been found to be strongly related to school dropout (Janosz et al., 2008): When a student's engagement level decreases, the dropout risk increases more for those in unstable trajectories than for those students following normative or stable engagement timelines. Student engagement thus appears to be an important factor to consider both in terms of its evaluation and in terms of its use as a target for dropout prevention efforts. However, a review of the literature reveals that there are no valid instruments with which to evaluate student engagement, in the present context, in French-speaking high school students. This methodological gap results in the difficulty of identifying students with unstable engagement trajectories in a timely manner (Janosz et al., 2008), thus excluding them from the opportunity to benefit from preventive measures. Considering the high dropout rate amongst French-speaking Canadians, developing a self-reported assessment tool in French would be key to helping determine students' engagement level. In a comparative analysis of different tools used to measure student engagement, Fredricks and McColskey (2012) identified Appleton et al.'s (2006) Student Engagement Instrument (SEI) as the self-report measure evaluating students' cognitive and affective engagement with the highest internal consistency and adequate test-retest and interrater reliability. The SEI's strong psychometric value guided the choice for its translation into French. Validating this new version of the SEI to address the lack of engagement measurement tools for French-speaking Canadian students is the purpose of this study.

Student engagement represents a research construct which can help provide knowledge and specific targets for dropout prevention in the fields of research on educational intervention and school achievement. However, there are a number of aspects of this construct which still need to be clarified. As a case in point, studies focusing on student engagement do not always provide a clear definition of student engagement, nor do they always clearly identify the dimensions which are considered in measuring student engagement. As outlined by Fredricks et al. (2011), student engagement may be assessed through different means (observation, interviews, or self-report surveys), but, fundamentally, the means need to be anchored conceptually and refer to a specific definition of student engagement. As a result, empirical studies on the topic tend to operationalize student engagement differently, considering several indicators in their evaluation. This reality constitutes one of the limits on growth in this field of research and, more specifically, in acknowledging the role of evaluation in furthering the development of knowledge in this field; evaluation is a methodological question, one that begins with defining the construct.

We define student engagement as a multidimensional (Appleton et al., 2008; Fredricks et al., 2004; Jimerson et al., 2003) and dynamic concept (Finn, 1989; Fredricks et al., 2004). Student engagement denotes the relationship the student develops with both school and learning (Appleton et al., 2008; Hart

et al., 2011) as a function of the interactions between the student's personal and contextual factors, where the latter refers to the school, the home, and the sociocultural environments. Moreover, the three dimensions associated with student engagement (cognitive, behavioral, and affective) are dynamically related (Wang & Peck, 2013), despite the fact that they can follow distinctive trajectories over time (Li & Lerner, 2011; Wang & Eccles, 2011) and contribute in distinct ways to student achievement and educational aspirations (Wang & Eccles, 2011). Thus, behavioral, affective, and cognitive engagement trajectories may vary in different ways in one student over the course of high school. Janosz et al. (2008), in their longitudinal study following 13,300 French Canadian high school students, found that students following unstable engagement trajectories displayed a higher probability of obtaining lower grades and were at greater risk of dropping out of school than the students evolving on more stable trajectories. Unstable trajectories, as identified by Janosz et al., were characterized by lower levels of initial student engagement and by a more significant decrease in engagement levels over time than those of stable trajectories.

Empirical studies tend to rely on a taxonomy of student engagement varying between two and four subtypes (emotional / affective, behavioral, cognitive, psychological) with associated indicators also varying. Fredricks et al. (2004) considered three subtypes of engagement: behavioral, affective, and cognitive. According to Fredricks et al., behavioral engagement refers to the positive behaviours fostered by the student towards school and learning which contribute to enhancing positive adaptation and achievement. These behaviours include, but are not limited to, involvement in school tasks and active participation in school and extracurricular activities. Affective engagement refers to the student's affective reactions in the classroom and their reflection in school bonding, as well as the value attributed to school and learning. Cognitive engagement involves the student's investment in learning, which may manifest itself through the use of self-regulation and organizational skills in learning tasks.

In their thorough comparative analysis of methods and tools to assess student engagement, Fredricks and McColskey (2012) outlined the strengths, shortcomings, and psychometric properties of several methods and measures. Although there may be some advantages in using observation methods or teacher reports to assess engagement in younger students, self-report survey measures have been found to provide a better measure of the student's subjective perception, particularly in terms of emotional / psychological and cognitive dimensions, which are not readily observable. Evaluating the affective / psychological and cognitive dimensions of student engagement from observation of the student behaviour relies heavily on the observatory / evaluator's inferences (Appleton et al., 2006). Fredricks and McColskey (2012) compared 11 self-report survey measures, outlining the dimensions evaluated, the intended use of the measure, as well as its psychometric properties. This thorough analytical comparison was used in determining which measure to employ in our study.

Our own survey measure selection process was based on five criteria. First, the context of our research is anchored primarily in dropout prevention efforts, and this preventive framework relies on a solid partnership with local high schools where behavioral indicators are systematically monitored. In this context, the need to assess the behavioral dimension of student engagement is not prevalent. Our second criterion was the age group, with high school students being the focus of our research. Our third criterion pertained to the survey's psychometric properties, that is, a high internal consistency and adequate test-retest, which are important to make sure results were strongly linked to engagement and stable over time. Our fourth criterion was based on the aim to measure cognitive and affective engagement through a self-report survey, while our fifth one concerned issues of availability, cost, and length. With all these considered, the SEI (Appleton et al., 2006) was found to be the most relevant self-report survey measure for our research context. We requested the authorization to perform a cross-cultural validation with a French-language version of the instrument, relying on Betts et al. (2010), who demonstrated its validity across different age groups, as well as Moreira et al. (2009), who performed the first cross-cultural validation with a Portuguese version.

Appleton et al. (2006) proposed a student engagement taxonomy composed of four subtypes: academic, behavioral, cognitive, and psychological. Following a systematic review of the literature on the cognitive and psychological / affective engagement subtypes, as well as the existing tools to evaluate them, Appleton et al. created the Student Engagement Instrument. The researchers chose to measure these subtypes through a self-report instrument as it offers a more reliable and comprehensive understanding of each student's cognitive and psychological / affective engagement. The research focus of Appleton and his team is rooted in a preventive framework in which assessing engagement and providing intervention leads to higher achievement and lower dropout rates. In proposing their taxonomy, the researchers relied on the theoretical works of Finn (1989), Connell (1990), Connell and Wellborn (1991), and McPartland (1994), as well as their extensive intervention experience with Check & Connect[1] (Evelo et al., 1996), a dropout prevention program which has been widely implemented in North American schools over the past 25 years.

The SEI (Appleton et al., 2006) assesses cognitive and psychological / affective engagement in high school students based on the contribution of six factors: (a) Teacher-Student Relationships (TSR); (b) Control and Relevance of Schoolwork (CRSW); (c) Peer Support for Learning (PSL); (d) Future Aspirations and Goals (FAG); (e) Family Support for Learning (FSL); and (f) Extrinsic Motivation (EM). In its original version, the questionnaire included 35 items scored on a four-point Likert-type scale ("highly agree," "agree," "disagree," and "highly disagree"). The original instrument showed an internal consistency (Cronbach's alpha) ranging between .72 and .92 (Fredricks & McColskey, 2012). Appleton et al. (2006)

confirmed the six-factor structure of their instrument. The instrument included two reverse-keyed items to reduce response acquiescence.

The purpose of this study is to validate the French version of the SEI and determine the extent to which the factorial structure of the SEI is invariant across students' cultural backgrounds.

MATERIALS AND METHODS

Participants

A sample of French Canadian secondary school students participated in the study ($N = 919$). They attended an urban public school in the Eastern Townships region of Quebec, Canada. The school was chosen on the basis of its representativeness as its student population encompasses students from significantly heterogeneous ethnic and economic backgrounds, similar to those found in other schools in Quebec. Students who participated were between 11 and 18 years of age, with the average age being 14.26 years old. Secondary schooling in Quebec spans over 5 years. In this sample, 18.9% were enrolled in Secondary 1 (Grade 7), 22.2% in Secondary 2 (Grade 8), 18% in Secondary 3 (Grade 9), 23.1% in Secondary 4 (Grade 10), and 13.9% were in Secondary 5 (Grade 11). A small percentage (1.3%) spanned grades, having, for example, passed math in Secondary 3, but having failed French in Secondary 2. The sample was composed of 40.7% girls and 59.3% boys, with 76.5 % having French as their mother tongue. This sample was subdivided into two subsamples for cross-validation purposes. The first subsample ($n = 448$) included 36.2% girls and 63.8% boys, while the second ($n = 471$) included 45% girls and 55% boys.

Procedure

The consent of the authors of the original version of the SEI (Appleton et al., 2006) to proceed to its translation into French and to its validation was obtained in December 2013. As the translation of an instrument, in and of itself, plays a fundamental role in its validation process, the forward-only translation technique (Maneesriwongul & Dixon, 2004) was used to translate the original questionnaire from English to French. This process encompassed three phases. First, a professional translator translated all questions from English to French, and also translated the guidelines provided for its use. Second, the first French version was submitted to an inter-judge committee composed of two judges knowledgeable in the field of educational research. Both judges independently reviewed the French version of the questionnaire, comparing each of the items to the ones in the original English version. Each judge suggested a few modifications. For example, the word "guardian" was translated to "parental figure" to avoid confusion, as "guardian" is synonymous to "babysitter" in Quebec culture. Third, after discussion amongst the judges about the proposed modifications, the French version of the questionnaire was modified and ready for its first use. It was used

in the spring of 2014. The questionnaires were distributed in the classrooms, during a 45-minute study period. As indicated in the guidelines for use in the English version, an adult read the guidelines and then each question. Students filled in their responses as the adult proceeded to read the questionnaire.

Data analysis strategy

To thoroughly examine the SEI factor structure, statistical analyses were conducted in different steps. We first ran a series of exploratory factor analysis (EFA) with oblique rotations to identify the correct number of factors. Once the correct number of factors was found, the measurement model was more fully explored through an EFA in a confirmatory factor analysis (CFA) framework (Jöreskog, 1969). The EFA in the CFA framework is an analytic step between the EFA and the CFA that enables researchers to study the plausibility of complex loadings across factors. The EFA in the CFA framework uses the same number of restrictions as the EFA. In the framework, model restrictions start by fixing factor variances to 1, finding an anchor item for each factor, and fixing the loading of this item to 1 for the factor and 0 for all other factors. After our first estimation, all non-significant factor loadings were fixed to 0. Following Hoyle and Duvall (2004) as well as Betts et al. (2010), when the expected percentage of variance accounted for in the indicator by the factor was less than 10%, the loading of this indicator was set to 0. Thus, all standardized factor loadings less than or equal to .30 were fixed to 0 in subsequent model estimation. In a third step, a CFA was carried out. In the last step, the reliability of the scale was computed. To cross-validate the SEI structure, the total sample (N = 919) was divided into two samples. The first sample (n = 448) was used to conduct an EFA, the EFA in the CFA framework, and a tentative CFA model. The second sample (n = 471) was used for cross-validation purpose.

Following common practice, goodness of fit was evaluated using a variety of fit indices: the comparative fit index (CFI; Bentler, 1990), the Tucker-Lewis index (TLI; Bentler & Bonett, 1980; Tucker & Lewis, 1973), the root mean square of approximation (RMSEA; Browne & Cudeck, 1993), as well as the probability that the RMSEA was at or below .05. For the CFI, guidelines for acceptable value of model fit are at .90 or greater (Garson, 2015). For the TLI, values less than .90 indicate that the model could be improved (Marsh et al., 1988) and those greater than .95 indicate good fitting models (Hu & Bentler, 1999). For the RMSEA, values less than .05 indicate close fit, values between .05 and .08 indicated reasonable fit, those between .08 and .10 indicate mediocre fit, and values greater than .10 indicate unacceptable fit (Browne & Cudeck, 1993).

Finally, covariance matrices of the ordered categorical variables were analyzed using Mplus 6.11 (Muthén & Muthén, 2011). Weighted least squares estimation with missing data (Asparouhov & Muthén, 2010) available in Mplus was used for model estimation. The modeling results accounted for the non-independence of

students nested within schools by adjusting the standard error using a sandwich estimator.

RESULTS

Exploratory factor analysis

Results of EFA showed that the six-factors solution, as well as solutions with a higher number of factors, fit the data well (see Table 1). The five-factors solution had acceptable fit in regard to CFI and TLI but had low probability (p = .017) of the RMSEA, falling below the .05 upper bond for good model fit. Consistent with Appleton et al. (2006), the six-factors solution — x^2 (400) = 817.557, p < .001, CFI = .968, TLI = .952, RMSEA = .048 (p = .701) — was retained.

TABLE 1. *Results for exploratory factor analyses in the Student Engagement Instrument Validation Model for Sample 1*

Factor	x^2	*df*	*p*	CFI	TLI	RMSEA	RMSEA <.05[a]
1	4163.747	560	<.001	.722	.704	.120	<.001
2	2541.627	526	<.001	.844	.824	.093	<.001
3	1706.690	493	<.001	.906	.887	.074	<.001
4	1311.594	461	<.001	.934	.915	.064	<.001
5	1023.307	430	<.001	.954	.937	.056	.017
6	817.557	400	<.001	.968	.952	.048	.701
7	694.768	371	<.001	.975	.960	.044	.969
8	578.803	343	<.001	.982	.968	.039	.999
9	473.484	316	<.001	.988	.977	.033	1

NOTE. CFI = comparative fit index, TLI = Tucker-Lewis index, RMSEA = root mean square of approximation.

[a] Probability based on a two-tailed 90% confidence interval, which indicates that the upper confidence estimate is less than .05.

Exploratory factor analysis within the confirmatory factor analysis framework

Following Betts et al. (2010), Item 1 was used as the anchor item for TSR, Item 10 for CRSW, Item 19 for PSL, Item 25 for FAG, Item 31 for FSL, and Item 18 for EM. After running all restrictions on parameters, as outlined above, the final model resulted in a simple structure. Indeed, none of the cross loadings had a standardized value greater than .30.

Confirmatory factor analysis

Results from the two CFAs demonstrated that the model fit the data well. Indeed, fit statistics were x^2 (545) = 960.138, $p < .001$, CFI = .948, TLI = .943, and RMSEA = .041 ($p = 1$) for Sample 1, and x^2 (545) = 994.427, $p < .001$, CFI = .945, TLI = .94, and RMSEA = .042 ($p = .999$) for Sample 2. Furthermore, Table 2 shows that the indicators were highly related to their purported factors, with standardized factor loadings ranging from .56 to .89 in the first sample and from .54 to .89 in the second sample.

TABLE 2. *Standardized parameter estimates in the six-factor structure of the Student Engagement Instrument Validation Model*

	Item Parameter Estimate											
	TSR		CRSW		PSL		FAG		FSL		EM	
Item	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
3	.79	.69										
5	.69	.69										
10	.63	.63										
13	.75	.66										
16	.85	.77										
21	.84	.82										
22	.72	.73										
27	.69	.64										
31	.83	.71										
2			.62	.56								
9			.61	.54								
15			.64	.66								
25			.56	.57								
26			.69	.67								
28			.71	.58								
33			.70	.66								
34			.72	.76								
35			.64	.68								
4					.82	.75						
6					.77	.74						
7					.79	.86						
14					.79	.83						

23	.82	.81						
24	.65	.72						
8			.75	.80				
11			.82	.95				
17			.77	.87				
19			.85	.80				
30			.83	.75				
1					.85	.75		
12					.74	.77		
20					.81	.83		
29					.86	.80		
18							.80	.89
32							.89	.85

NOTE. S1 = Sample 1; S2 = Sample 2; TSR = Teacher-Student Relationships; CRSW = Control and Relevance of School Work; PSL = Peer Support for Learning; FAG = Future Aspirations and Goals; FSL = Family Support for Learning; EM = Extrinsic Motivation.

Scale reliability

Following Appleton et al. (2006), we computed the Cronbach's alpha for each of the factors in the final model as well as the bivariate correlations between the six factors in each sample (see Tables 3 and 4). Consistent with Appleton et al. (2006), all bivariate correlations were positive in the two samples, ranging from .08 to .78 in the first sample and from .16 to .73 in the second sample. High reliability was found for the scales in the two samples, ranging from .78 to .88 in the first sample and from .76 to .84 in the second sample (see Table 5). Internal consistency for both the original and the French version of the SEI were similar.

TABLE 3. *Reliabilities and correlations between factors in the six-factor structure of the Student Engagement Instrument Validation Model for Sample 1*

Type	TSR	CRSW	PSL	FAG	FSL	EM
TSR	**.88**	.78	.56	.51	.60	.08
CRSW		**.82**	.45	.68	.68	.45
PSL			**.84**	.43	.47	.11
FAG				**.78**	.65	.32
FSL					**.78**	.21
EM						**.82**

NOTE. TSR = Teacher-Student Relationships; CRSW = Control and Relevance of School Work; PSL = Peer Support for Learning; FAG = Future Aspirations and Goals; FSL = Family Support for Learning; EM = Extrinsic Motivation. Reliability estimates are given in bold in the diagonal.

TABLE 4. *Reliabilities and correlations between factors in the six-factor structure of the Student Engagement Instrument Validation Model for Sample 2*

Type	TSR	CRSW	PSL	FAG	FSL	EM
TSR	**.84**	.68	.53	.43	.48	.21
CRSW		**.81**	.42	.73	.57	.23
PSL			**.83**	.47	.52	.16
FAG				**.80**	.52	.36
FSL					**.76**	.21
EM						**.84**

NOTE. TSR = Teacher-Student Relationships; CRSW = Control and Relevance of School Work; PSL = Peer Support for Learning; FAG = Future Aspirations and Goals; FSL = Family Support for Learning; EM = Extrinsic Motivation. Reliability estimates are given in bold in the diagonal.

TABLE 5. *Internal consistency of the six subscales of the French version of the Student Engagement Instrument*

		Cronbach's alpha		
		Original	French Version	
Scale	Subscale	Scale	Sample 1	Sample 2
School Cognitive Engagement	Control and Relevance of School Work	.80	.82	.81
	Future Aspirations and Goals	.78	.78	.80
	Extrinsic Motivation	.72	.82	.84
School Psychological Engagement	Teacher-Student Relationships	.88	.88	.84
	Family Support for Learning	.76	.78	.76
	Peer Support for Learning	.82	.84	.83

DISCUSSION

The purpose of the study was to validate the French version of the SEI (Appleton et al., 2006). Consistent with the findings of Appleton et al. (2006), our results supported the six-factor structure of the SEI. Furthermore, the fit statistics from the CFA in the current study (e.g., Sample 1: CFI = .948, TLI = .943, RMSEA = .041; Sample 2: CFI = .94, TLI = .94, RMSEA = .042) were good and very close to those reported in Appleton et al. The interfactor correlations ranged from .08 to .78 in the first sample and from .16 to 73 in the second sample, which are higher than those reported in Appleton et al.'s findings (*rs* = .073 to .506) but close to results reported in Betts et al. (2010; *rs* = .45 to .79). The reliability of the scales ranged from .78 to .88 in the first sample and from .76 to .84 in the second sample, which are similar to Appleton et al.'s findings (Cronbach's alphas = .72 to .88). Finally, as was the case in the study by Appleton et al., simple factor structure was found for the six factors as all standardized cross

loading were less than .30. These results confirm the validity and reliability of the French version of the SEI and contribute further to the comprehension of student engagement as a universal concept.

Three elements merit further discussion. First, evaluating student engagement, defined as the relationship the student develops with school and learning, is necessary both to facilitate dropout prevention efforts and to better target students who are at risk of dropping out and would benefit from intervention. The regular evaluation of student engagement throughout the academic careers of secondary school students could make a difference in identifying those students who would benefit from preventive efforts. The validation of the French version of the SEI will now allow opportune and efficient evaluation of student engagement in French-speaking high school students. Moreover, results from the evaluation using this instrument will provide more specific data with which to offer targeted intervention, specifically in line with changes in trajectories of each of the six factors evaluated.

Second, one of the challenges associated with validating an instrument in a language other than the one in which it was created is cross-cultural validation. Whereas Moreira et al. (2009) found significant cultural differences when they attempted to validate the Portuguese version of the SEI, our validation process of the French version yielded comparable results to the original version, measuring six factors to describe psychological / affective and cognitive engagement in secondary school students. Internal consistency for both the original and the French version is similar. This consistency could perhaps be explained by the fact that school systems and the culture are more similar within North American borders, but it may also be explained by an accurate semantic translation of the instrument in French.

Third, we wish to outline the importance of discussing the pertinence of including extrinsic motivation as a factor linked with cognitive engagement. In their validation of the SEI in middle and high school students, Betts et al. (2010) excluded this factor. Although the researchers' decision to change the structure of the instrument is not clearly discussed in their article, we support the need for further discussion of whether or not to include extrinsic motivation as part of a subscale for cognitive engagement, as defined through self-regulation, relevance of school work to future endeavors, value of learning, personal goals, and autonomy. Despite the fact that extrinsic motivation may have an impact on self-regulation or autonomy as part of cognitive engagement, extrinsic motivation in and of itself includes affective and behavioral components. Measuring cognitive engagement using extrinsic motivation may therefore present as imprecise, conceptually. Future research efforts could contribute to the identification of more precise indicators of cognitive engagement, for instance, in relation with autonomy and self-regulation as cognitive processes involved in learning.

In our efforts to prevent school dropout and increase student achievement, student engagement represents a worthwhile intermediate outcome to monitor. The use of a validated self-report survey instrument was required in French for use in Quebec secondary schools. This cross-cultural validation demonstrates that the French version of the instrument presents similar psychometric properties to its original English version. Future research could confirm our findings.

NOTES

1. Check & Connect is an intervention program developed by Evelo et al. (1996) in which students identified as being at-risk of school dropout are paired up with a significant adult in the school environment who then monitors studeznt attendance and achievement (check) and provides guidance during the span of the school year (connect).

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