

**KEEPING KIDS SMOKEFREE: RATIONALE, DESIGN,
AND IMPLEMENTATION OF A COMMUNITY, SCHOOL,
AND FAMILY-BASED INTERVENTION TO MODIFY
BEHAVIORS RELATED TO SMOKING AMONG MĀORI
AND PACIFIC ISLAND CHILDREN IN NEW ZEALAND***

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ABSTRACT

Despite a concerted, sustained and comprehensive tobacco control effort, smoking is prevalent among young people in New Zealand, particularly for Māori and Pacific Island teenagers. Many took up smoking in their pre-teen years. New Zealand research has shown that daily smoking by children aged 14-15 years is strongly influenced by parental smoking. The Keeping Kids Smokefree study is investigating whether changing parental smoking behavior and attitudes via a community-partnership approach with parents, schools, and local health providers can reduce smoking initiation by 11-12 year olds. It is a quasi-experimental trial involving four schools in an urban area of high social deprivation with large numbers of Māori and Pacific Islands families. Schools were allocated to intervention or control and the

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intervention was developed through a process of engagement with the schools, parents of children and local healthcare organizations. This article describes the rationale, context, methodology and methods involved in establishing the study. Building Māori and Pacific Islander research capacity was a secondary objective of the study.

INTRODUCTION

More attention is needed to address the problem of smoking initiation in Māori (the indigenous people of NZ) and Pacific young people. In New Zealand (NZ), major differences exist in smoking prevalence by ethnic group and sex from an early age. Māori and NZ resident Pacific Island people have substantially higher prevalences of daily smoking than any other ethnicity, irrespective of gender or age (Table 1) [1, 2]. Māori women have the highest prevalence of daily smoking (Table 1a) [2] and Māori girls and boys are more likely to be daily smokers than European/other girls and boys (Table 1b) [1]. Similarly, there is a difference in smoking prevalence, for both adults and adolescents, due to socio-economic status (SES) area (Table 2a). There is a correlation between the most deprived area and higher smoking prevalence [2], and between schools serving low-decile (lower socio-economic) communities and higher smoking prevalence (Table 2b) [1].

Although NZ has achieved an overall reduction in smoking, the gap in smoking prevalence between lower and higher SES groups and between different ethnic groups has increased [3, 4]. As a consequence, smoking is a major contributor to health inequalities [5]. In order to reduce health inequalities, public health programs need to target disadvantaged population groups [3]. In NZ, mainstream tobacco control programs appear to be more successful for the populations with a lower smoking prevalence [4] but there is still scope for more intensive and comprehensive programs [6]. Reducing tobacco smoking in population groups such as Māori and Pacific Island people is therefore a national health priority.

Table 1. Smoking Prevalence by Gender and Ethnicity, for
a) Adults (15+ Years) and b) Adolescents (14-15 Year Olds)

	a) Women	Men	b) Girls	Boys
Māori	49.7	40.4	21.6	12.6
Pacific Island	28.5	34.7	10.5	9
European/other	20.2	22.5	4.1	3.7
Asian	5.2	20.1	2.4	2.5

Table 2. Smoking Prevalence for a) Adults by SES area and
b) 14-15 Year Olds by School Decile Rating

	a) Women		Men	b) Girls		Boys
Least deprived	12.9	15.3	High decile	3.7	3.4	
	17.5	24.9	Medium decile	8.4	6.4	
	21.5	22.6	Low decile	15.9	10.8	
	23.9	27.2				
Most deprived	37	39.4				

One way to tackle this problem may be to change parental smoking behavior and attitudes. Research has found associations between the development of regular adolescent smoking and parental smoking [7-11]. About 65% of daily smoking by NZ adolescents can be attributed to parental smoking, similar to the proportion attributable to having a best friend who smokes [12]. The association with parental smoking is strongest among adolescent daily smokers, who are further along the smoking trajectory than less frequent smokers, illustrating that the effect of parental smoking starts earlier than impact of peer smoking [12]. Besides the direct effect from the example of parental smoking, parental attitudes also appear to exert a significant impact on youth uptake of smoking [13]. Parents who allow smoking in the home increase the risk of their children smoking [14-16]. Furthermore, regardless of their own smoking behavior, when parents engage in antismoking activity this significantly lowers the rates of intention to smoke and smoking initiation among their children [17-19]. However, the evidence that parental smoking cessation lowers the risk of adolescent smoking is mixed [17, 20, 21]: in one study an effect was shown but only if both parents stopped smoking [22]. Another study showed that the greatest decrease in risk occurred if parents ceased smoking before the child was 9 years of age [20]. Overall these studies suggest that smoking initiation prevention efforts may be best directed to early to middle childhood and aimed at parents as well as children.

This article describes the rationale, design and implementation of a community-, school-, and family-based intervention trial aimed at modifying key behaviors (e.g., parental smoking, parental rules about smoking, and tobacco retailer sales to minors) and attitudes of parents related to uptake of smoking by Māori and Pacific Island children from a lower socio-economic community. A secondary objective was to build capacity in tobacco control research, particularly for Māori and Pacific Island people which has been identified nationally as a priority [23].

CONCEPTUAL FRAMEWORKS

Bandura's [24] social learning theory and the Health Belief Model [25] have influenced the design of many tobacco control programmes seeking to reduce initiation and promote cessation. Models more consistent with a broader social environmental perspective of causation, such as the Ecological Metaphor [26] and Behavioural Ecological Model (BEM) [27], recognize the interaction between individuals and the social environment to explain behavior. Hovell and colleagues [27] have used the BEM to guide the design of projects similar to the one described in this article but for reducing children's exposure to secondhand tobacco smoke.

In this study an indigenous model, Te Whare Tapa Wha (the four-sided house), was used to guide intervention design and implementation. Te Whare Tapa Wha conceptualizes health as comprising four interdependent elements: te taha tinana (the physical body); te taha hinengaro (the mental realm); te taha whānau (family and social relationships); te taha wairua (the spiritual realm) [28]. To reflect this model, the intervention is holistic in nature, targets the "physical" addiction to nicotine and the attitudes (mental) of parents (family). The spiritual realm is acknowledged in the processes, for example, by the use of karakia (prayers) to open events and meetings. Glover's [29] proposal to add te ao turoa (the environment) to the model acknowledges the effects of the wider political and economic context (such as the influence of the tobacco industry).

The project additionally drew on the principles of community development, which are consistent with Māori and Pacific Island values—fostering social cohesion and strengthening group interrelationships; encouraging self-help and decision-making; identifying and developing local leaders; developing a sense of civic responsibility [30, 31]—to increase participant involvement, and to ensure the appropriateness, acceptability, and thus to facilitate a sense of ownership of the study.

OVERVIEW OF THE STUDY DESIGN

This was a quasi-experimental study involving four South Auckland "intermediate" schools (catering for children aged 11-13 years of age) chosen for their high proportion of Māori and Pacific Island students and total student numbers. A randomized trial design was not possible because of the limited number of schools meeting the above criteria and the need for intervention schools to be within a contiguous area so that the intervention could be implemented. Schools were invited to take part in either the intervention or control group. Students enrolled in the two intervention schools comprised about 1300 in total each year and in the two control schools, 1600 in total each year (Table 3). At baseline in the first year (2007) pre-intervention, all parents and students of all four schools (intervention and control) were surveyed. At the beginning of each subsequent year (2008-2009) only new Year 7 students and their parents

Table 3. Total Number of Students
in the Participating Schools,
for Each Intervention Year

Year	Intervention	Control
2007	1320	1650
2008	1250	1575
2009	1147	1590

were surveyed. Follow-up surveys of Year 8 students and their parents were undertaken at the end of each year and at the end of the third year all (Year 7 and 8) parents and students were surveyed. Baseline characteristics of participants, both parents and students, of control and intervention schools are described in Table 4. Mainly mothers/female caregivers completed parent surveys and parents and students of Pacific Island ethnicities made up just over 40% of participating sample. The percentage of current smokers among parents reflects these demographic characteristics. The higher proportion of students who reported ever-smoking tobacco in the intervention schools (19.7% versus 12.2% in the control school) is consistent with the ethnic variations between schools, with intervention schools having a higher proportion of Māori and lower proportion of Asian students.

Ethics approval for the study was obtained from the University of Auckland Human Participants Ethics Committee (Ref. 2006/416). The study was registered with the A&NZ clinical trials register.

RECRUITMENT

Schools

The intervention community was chosen for:

1. number of Māori students;
2. number of Pacific Island students;
3. availability of community tobacco action network and support services (health promotion workers, smoking cessation services); and
4. willingness of schools to participate.

Engagement with schools occurred in a variety of ways. A local newspaper article about the proposed study serendipitously attracted the attention of the principal from one of our pre-selected target intervention schools, who asked for the intervention to be conducted at her school. We then invited one other school

Table 4. Baseline Characteristics of Students and Parents of Both Intervention and Control Schools

	Students			Parents		
	Intervention (N = 1,938) %	Control (N = 2,570) %	Total (N = 4,688) %	Intervention (N = 1,626) %	Control (N = 2,214) %	Total (N = 4,144) %
Gender						
Female	51.1	51.1	51.1	72.9	68.8	70.2
Male	48.9	48.9	48.9	20.4	23.7	22.1
Ethnicity						
Maori	38.9	19.3	27.4	38.4	17.7	25.8
PI	44.0	44.8	44.5	38.1	41.2	40.3
Asian	9.5	29.1	21.0	9.7	28.6	24.1
European & others	7.6	6.8	7.1	11.3	10.3	10.5
Ever smoked						
Yes	19.7	12.2	15.3			
No	79.6	87.7	84.3			
Missing	0.7	0.1	0.4			
Current smoker				35.4	23.1	28.3
Ex-Smoker				21.5	18.2	19.6
Never Smoker				38.6	55.1	48.1
Missing				4.5	3.7	4.0

from the same community to make up the required sample size, and a pair of schools from one of two possible comparable communities to take part as the control group. These other schools were visited by the investigators and the study was explained to a staff member assigned by the school principal. The school principals in turn discussed the study with their boards, comprising trustees elected by local communities. All school boards agreed to participate.

Parents

To engender interest and participation of parents, within the first few weeks of the school year parents were sent an "advance notice" flyer about the study, featuring photos and supportive or explanatory quotes from media and sports celebrities, community leaders and researchers with their children/family. A few days later a study pack for parents was sent home with students. The pack comprised a covering letter, an information sheet; a consent form, the baseline questionnaire; and a pre-addressed postage-paid reply envelope. To encourage participation the survey was promoted to the students and staff at a school assembly, using drama to show how students should deliver the study materials to their parents. Families were eligible for prizes (including passes for two adults and four children to a local family fun park, a family restaurant or movie) if a completed parents' questionnaire and consent form were returned. School staff members were given a further briefing during a morning tea break. In recognition of the important role teachers play, the teacher whose class returned the most study packs in the shortest time won a restaurant meal for two, a \$50 retail voucher, or a movie pass for two adults. The winning class won a free lunch and the two runner-up classes received bags of smokefree items, such as pens, stickers, or key-rings.

Where a pack with the completed questionnaire and consent form was not returned within the time allocated by the school (in most cases one week) a reminder postcard was posted to children's home address. If necessary a further parent pack was sent home with students or posted, up to two times. Finally if necessary, prior to the day of the student survey, a further consent form was sent home with students. If the consent had still not been returned by the day of student data collection, telephone calls were made to obtain verbal consent. This strategy has been repeated for follow-up surveys, except that consent is sought once only until refused or obtained. Only data from children whose parents gave consent were used in the study.

THE INTERVENTION

The intervention was developed with input from a range of stakeholders (for more details, see Charlier, Glover, and Robertson [32]). The following organizations were approached to participate in developing the intervention

content: an independent non-governmental tobacco control action organization, regional public health providers, a regional tribal Māori health provider organization, a sport and recreation association, and the New Zealand Health Sponsorship Council.

In line with a community development approach, the Keeping Kids Smokefree (KKS) team sought to establish a group of representatives from the intervention schools (board members, staff, and students), community (parents, local business association), health provider representatives and researchers, prior to intervention commencement to participate in the intervention design. However, this idea was rejected by school representatives who expected the workload to be too great. They seemed to expect KKS to present with a predetermined set of expectations that to varying degrees would stretch the schools' capacity. Therefore, the intervention was developed with local healthcare providers and then the schools were consulted to check the feasibility of each component. Of the proposed components, described in detail in the next sections, three were necessary to the behavioral change aims of the study.

Essential Intervention Components

Three behavioral change intervention components were considered to be essential to the intervention (Figure 1). There were three additional components intended to increase the profile of the intervention, and in this way facilitate engagement with and the participation of parents, thereby leading to a greater impact on behavior change.

Promoting Smoking Cessation to Parents and School Staff

Increasing the number of quit attempts is an important strategy for reducing smoking. The more quit attempts a smoker makes, the more likely they are to eventually succeed [33, 34]. Thus, a range of strategies was used to prompt quit attempts among parents and school staff who smoked. At intervals throughout the year, material was sent to parents who were identified from the data as smokers to prompt and assist quit attempts (Figure 2).

In addition, two "Quit and Win" type competitions were run, which have been used elsewhere with some success [35-37]. KKS' "Sponsor To Win" competition encouraged students to find someone who smoked to quit for them by World Smokefree Day (31 May). For each sponsor who succeeded at quitting, the student was entered into a draw to win one set of prizes per intervention school with the first and major prize being a home computer package. Another competition was run in the last school term of the year solely for school board members and staff. Weekly sessions were also held at each school for parents and teachers to meet KKS intervention staff for support to quit.

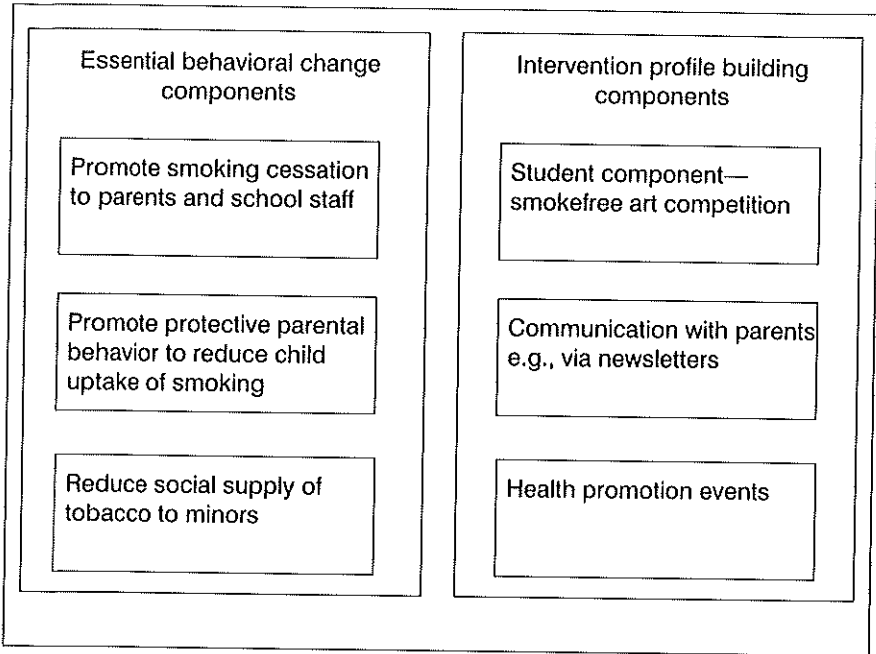


Figure 1. The different intervention components; behavior change and profile building components.

- Notices or pamphlets advertising smoking cessation services, such as Quitline (the national free phone smoking cessation advice service), and Aukati Kai Paipa (a face-to-face smoking cessation service offered by a local Māori health provider);
- Material reminding parents to quit smoking, such as a KKS quitting tips fridge magnet, and smokefree home and smokefree car stickers (produced from the winning student art work);
- An unsolicited Quitcard (which can be exchanged at a pharmacy for subsidized Nicotine patches).

Figure 2. Material sent to parents to prompt and assist quit attempts.

Promoting Protective Parental Behavior to Reduce Child Uptake of Smoking

A DVD was produced, called *Our Choice, Their Future* that involved children from the intervention schools and celebrities. Each child was given a copy to give to their parents for viewing. The key messages on the DVD are shown in Figure 3.

Reducing Social Supply of Tobacco to Minors

The Auckland Regional Public Health Service conducts controlled purchase operations (CPOs) in response to complaints about tobacco product sales to minors. For KKS, they provided a proactive program of CPOs in the intervention area. Within the intervention schools' catchment area, tobacco retailers in close proximity to the schools or on a major thoroughfare for students traveling to and from the schools were targeted. Two monthly CPOs have been shown to be more effective than 4 or 6 monthly visits [38]. CPOs were therefore increased in frequency from once to twice a year in the second year of the intervention. In addition, a poster developed from a student's entry in the KKS sponsored art competition carried the message "Don't sell or offer cigarettes to children," and "Report under 18 sales Ph: Smokefree Officer" including the phone number to call. The posters were distributed to all retailers along with an information pack containing an explanation of why retailers should not supply tobacco to children and information about the Smoke-free Environments Amendment Act. A wallet card encouraging people to report tobacco sales or supply to minors was developed for distribution in the wider community during health promotion events. The messages on the reverse side of the card are listed in Figure 4.

- Don't smoke yourself;
- Tell your children you don't want them to smoke;
- Have a smokefree home and car;
- Don't supply your children with cigarettes (store tobacco out of reach and dispose of butts carefully);
- Monitor how children spend their money; and
- Limit how much smoking children see on television or in other media.

Figure 3. Key messages to parents.

Tell friends and whānau not to supply your children with cigarettes
 Kids save small amounts of money they get on a daily basis to buy cigarettes—monitor your child's spending
 Children smoke leftover cigarettes and butts—dispose of them carefully
 Poisons are kept out of reach. Do the same with cigarettes

Figure 4. Messages on the reverse side of wallet cards.

Student Component

KKS originally proposed offering an educational and support group for students who smoked tobacco, but this was rejected by the schools as they felt it risked singling out some students. Instead, a smokefree art competition was favored as it involved the whole student body. The winning art works produced by students were used in the design of the KKS logo, website, and promotional material for the intervention, such as the wallet card for parents, posters for community displays, and advertising on buses. It was anticipated that this would lead to greater buy-in to the intervention program by parents and the wider community.

Communicating with Parents

Quarterly newsletters, personal letters and notices were sent home with students, and a website (www.keepingkidssmokefree.org.nz) was set up to inform parents. Consistent with Māori and Pacific cultural preferences for face-to-face contact [39], a guiding principal of KKS was to create as many opportunities as possible to meet parents so they could see and assess who they were dealing with. Thus, written and electronic communication strategies were supplemented with direct communication; for example, KKS presentations to school staff, parents, and community groups, and showings of the DVD at community libraries during school holidays.

Health Promotion Events

KKS hosted or attended local events to meet and engage with parents, and had a stall at locally run sports or smokefree days in the community, for example at a local marae (traditional Māori meeting place). KKS ran a family fun day and sponsored events at each school including subsidized food and drink, celebrity appearances, prize draws, spot prizes, and give-aways of smokefree merchandise, sporting and class-based fun activities for the students, cultural dance and music

performances by the students, displays of students' art from the competition, on-the-spot smoking cessation assessments, and enrollment with Māori cessation support services. Health education resources, "Quitcards" and sample nicotine lozenges were also distributed at events. The program and its key messages were promoted on banners, via a promotional character "Balmy Palmy" (e.g. a palm tree costume inspired by the KKS logo), acknowledgments over the public address system, and, supported by short talks by celebrities and study personnel. The greatest engagement with parents and adult smokers in the community was achieved by having KKS stalls with intervention staff in local shopping malls. This strategy was first used to promote the "Sponsor To Win" competition leading up to World Smokefree Day, but was increased to a daily activity in the last year of the intervention.

Timing of Components

The intervention as a whole was implemented in each intervention school and the surrounding community only after surveying of students at the beginning of each school year had been completed. Intervention activity waned mid-Term 4 in conjunction with follow-up surveys beginning. A guide to the timing of delivery of various components is presented in Table 5. In the fourth year (2010) of the study the intervention will be implemented in the control schools to assess the replicability of the intervention to other communities.

RESEARCH

Student Questionnaire

Students were surveyed in class using self-administered questionnaires, one with 52 questions that used Epi Info™ software loaded on personal digital assistants (PDAs), the other with 12 multi-option questions on paper forms (see Table 6). The questions were modeled on other major youth smoking surveys such as the Global Youth Tobacco Survey [40], the NZ Health Sponsorship Council's Youth Lifestyle Survey [41], and Action on Smoking and Health's (ASH) Year 10 student survey [1]. To ensure the anonymity of students who smoked, similar numbers of questions were asked of both smokers and non-smokers by including "filler" questions for never smokers (for example, about recreational activities).

Biochemical Validation of Self-Reported Smoking Status

In the first year of the study, children whose parents had consented were tested for active smoking using NicAlert™ saliva-cotinine tests [42, 43]. These students were tested again at the end of the second year of the study. An expired breath

Table 5. Student Survey Questions

Category	Sample questions
Demographic	Sex, ethnicity, and family composition
Pocket money	Amount of pocket money, expenditure of pocket money and parental awareness of pocket money expenditure
Smoking status	Age at first cigarette, lifetime cigarette consumption, where did you obtain tobacco/cigarettes
Attitudes toward smoking	Would you puff on a lit cigarette from a friend, have you ever given or sold cigarettes to another student at school; how difficult do you think it would be to stop smoking
Smoking harm	Harms of smoking, exposure to smoking inside the home, a car, or other places in the previous week, attitudes toward smoking during pregnancy
Parents attitudes and rules for smoking	Parents' knowledge of child smoking, would parents be upset if you smoked, parental rules about not smoking cigarettes or tobacco
Tobacco providers	Tobacco companies rights to sell tobacco, tobacco companies are responsible for people starting to smoke and tobacco companies try to get young people to start smoking

sample to test for carbon monoxide (CO) using a Bedfont Smokelyser machine was undertaken at this testing to corroborate the NicAlertTM findings.

Parent Questionnaire

The parents' baseline questionnaire comprised 12 questions on a paper form (see Table 7). A follow-up parent questionnaire was administered that repeated questions about smoking in the home and car, smoking status, quitting behavior, and whether the parent had talked to their child about smoking in the previous 6 months. To assist with measurement of the social supply of cigarettes component of the intervention, parents were asked if they had seen people selling or giving cigarettes to minors in the previous 6 months and if so, how they had responded. Additional one-off questions were asked, such as parents' knowledge of smoking cessation treatments and their effectiveness. Intervention school parents were also

Table 6. Intervention Component

Component	Element	Timing
Promote smoking cessation	Promotion material	Ongoing
	Quit competition: Parents	April–31st May
	Quit competition: Teachers	Term 4
	Weekly support sessions	Ongoing
Promote protective parental behavior	DVD: <i>Our Choice, Their Future</i>	Upon release July 08; then Term 1 in subsequent years
Reduce social supply of tobacco to minors	Visit retailers; CPO	From April til completed, from August til completed
	Poster/wallet card	Ongoing
Student component	Smokefree art competition	At school's discretion
Communication with parents	Quarterly newsletters, personal letters, and website	Ongoing
Health promotion events	Attend local events	Ongoing
	KKS stalls in local shopping malls	Ongoing

asked questions about the study processes, for example, their recall of intervention notices, such as the notice to attend a family fun day at the school.

SUMMARY

The results of this large community intervention study will provide valuable insights to inform tobacco control and smoking cessation policy and programs and to reduce health inequalities. KKS has tested a wide range of strategies to enhance recruitment and engagement with parents, school staff, and their wider community, which will be of interest to school and family focused researchers. To date, the study has tested an enhanced questionnaire format, utilizing color and graphics, to increase parent completion of the questionnaire and to improve compliance with question instructions [44]. A further peer-reviewed publication reflects upon the challenges of a community engagement approach [32]. Noting a gap in local information on teachers' attitudes and smoking behaviors, a national

Table 7. Parent Survey Questions

Category	Sample questions
Demographic	Relationship to child, ethnicity
Smoking status	Family smoking and parents quitting behavior, smoking in the house and car
Attitudes toward smoking	Parents attitudes toward tobacco, whether they have talked to their child about smoking
Questions relating to tobacco and children	Child access to cigarettes within the home; children's access to tobacco and uptake of smoking; how much pocket money the child gets per week; and what they think can be done to protect children from smoke and taking up smoking

postal survey of teachers has been undertaken (paper in preparation). In line with our objective to build tobacco control research capacity, the study has supported two Master's scholars, an international visiting scholar, a post graduate diploma student, several summer students and Bachelor of Health Science internships.

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