



Journal of Human Sport and Exercise

E-ISSN: 1988-5202

jhse@ua.es

Universidad de Alicante

España

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Journal of Human Sport and Exercise, vol. 8, núm. 2, 2013, pp. S61-S71

Universidad de Alicante

Alicante, España

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Researching the aptitude of young volleyball players (children and adolescents)

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ABSTRACT

Ilcs KB, Bakk AB, Suskovics C. Researching the aptitude of young volleyball players (children and adolescents). *J. Hum. Sport Exerc.* Vol. 8, No. Proc2, pp. S61-S71, 2013. In order to establish a child's calculated performance in a selected branch of sport we need to clarify if he or she has the external and internal conditions with which he or she can be competitive. In our research the target age group of boys and girls are teenagers (13-16 year-olds) (N= 124). This research has a wide range of aspects; it covers anthropometrical measurements, general motor testing, parental and players' questionnaires. Our aim is to determine the player's aptitude for high performance. Based on the listed literature the right person is whose height at women is 175-195cm, at men is 185-210cm; moreover his or her motor skill standards are far better than the peers or the individual has favorable parental, environmental or any other kind of condition. **Key words:** VOLLEYBALL, APTITUDE, HEIGHT, MOTOR ABILITY, ENVIRONMENTAL FACTORS



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7th INSHS International Christmas Sport Scientific Conference, 9-12 December 2012. International Network of Sport and Health Science. Szombathely, Hungary.

JOURNAL OF HUMAN SPORT & EXERCISE ISSN 1988-5202

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doi:10.4100/jhse.2012.8.Proc2.09

INTRODUCTION

When we analyze and interpret the definitions of researchers, studying the scientific methods how to identify and select talents (Rókusfalvy, 1974; Bompá, 1985; Harsányi, 2000; Brown, 2001; Harsányi, 2004); we come to the conclusion that selection is actually the process of examining aptitude and proof of fitness. Aptitude involves suitability of sports activity as well as athlete personality, moreover it enables the athlete to provide an excellent performance in the long run; thereby aptitude serves not only as an aid to but also as a prerequisite of proving fit later on.

The identification of aptitude requires the joint assessment of both genetic and environmental factors.

The duplex experiments prove that the height of an individual is determined by the genetic code (90%). Therefore in those sport branches – for example in case of volleyball – where height is an underlying criteria for achieving a profitable performance (a tall player with long limbs by on set or by blocking with vertical jump at the net is far more effective), it must be handled as the basic factor (Harsányi, 2000; Frenkl, 2003) Hančík at al. (1990) define the height of men players in the first rank in 185-210 cm while female players' height in 175-195 cm.

The motor skill is one of the indicators by talent selection (Frenkl, 2003). This skill covers the hereditary and gained coordinative, potential aspects of the exercises (Harsányi, 2000).

Volleyball is a rush and speedy sport with changing regulations and snapping ball game. Therefore the players have only seconds to solve or react on a situation. Consequently within a short interaction with the ball must they decide and give a solution which naturally influences hint and scoring.

Other characteristic of this sport is the comparative rate of the court and the number of players. The bound is a 9×9 meter area per team where six players are lined up in a specific order. Depending on the size of the court, a player needs to do movements in a relatively small area (13, 5 m²). Consequently the characteristic dislocation types for a player is short-term, couple of meters forward, backward and sideward (Rigler, 2006).

Volleyball as a team sport has its own feature this is the so called put the ball in play, make a “rally” by serving and tossing the ball. Since every rally ends in a score, the role of serving has been grown. The powerful hit force when serving the ball, setting the ball's direction, grounding point, speed and acceleration are also key factors during the play.

To sum up, among the motor skills how quick the player reacts in occasions is really important. For example the agility of reaction, the capability of process of moving from place to place promptly and the high standard of the explosive strength of upper and lower limbs have significant defining role in performance.

The environmental factors like parents, family, the teacher, the coach and the peer age groups are functioning as prominent catalysts of talent discovery and education. Furthermore during improvements on talent education these factors bear various influences.

The parental model – more precisely the way they act – can determine the children's own actions. For example if one of the parents does sports regularly or professionally it is highly probable that the children will also lead an actively sporty life (Kurimay et al., 2012), however it does not always materialize or at least not in the same sport branch (Frenkl, 2003).

Numerous surveys indicate that (Bicsérdy, 2002; Gál, 2003; Pápay & Szabó, 2003; Biróné & Csátaljay, 2011) the role of the parents is crucial by taking up a sport. Among others (friends, press, and PE teachers) parental commitment or preference to a certain branch of sport stands is the base for taking up sports in case of young adults (Biróné, 1983). Consequently the parents choose the first sport branch for their kids, which not in every case remain the only one; but it is undeniably rule the future sport activities. The career is also influenced by the rate or the extent of the parental support (financial and time), distance between residency and training location and additionally the way or the means to get to the training sessions.

Managing the preparation phase and the improvement of the capacity are driven by the coach or trainer based on his/her professional readiness. From the survey of Biróné and Csátaljay (2011) it is clearly revealed that the coach-player relationship is a really significant aspect (mainly in case of adolescent age group) which can gradually influence the chance to lead a successful career in the future. Among the environmental factors probably the training itself possesses hidden chances the most. Its content, applied methodologies, conditions – like quality of equipment, assets and the court – can tempt young adults to take up sports.

MATERIAL AND METHODS

Participants

In our research we conducted an investigation with multi aspects (N=124). The target group was the new supplies of women and men volleyball teams, with the age group of adolescent and kids (13-16 year-olds). The sampling within the teams was fully comprehensive. The boys who were 12 years old during the data collection to have reached 13 years when we have test them.

The gender and class distribution of players within a team is demonstrated by Tables 1a, 1b.

Table 1a. *Distribution by gender.*

		Frequency	Percent	Valid Percent	Cumulative Percent
	1.00	54	43.5	43.5	43.5
Valid	2.00	70	56.5	56.5	100.0
	Total	124	100.0	100.0	

Table 1b. *Distribution by age.*

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
12.00	12	.9	.9	9.6
13.00	33	26.6	26.6	36.3
14.00	28	22.6	22.6	58.9
15.00	37	29.8	29.8	88.7
16.00	14	11.3	11.3	100.0
Total	124	100.0	100.0	

Measures

In our research we applied such measurement methods that should have the accurate levels to achieve proper performance in volleyball. To be able to state if the individual is capable or not we used anthropometric measurements, general testing of motor skills and questionnaires with the participation of parents and players. Data collection was executed from October to December in 2012.

Procedures

Anthropometric measurements

We measure test subjects on 24 points of their bodies (Martin & Saller, 1957; Weiner & Lourie, 1969) to determine their prospective adult height and body type as well as their biological age.

Testing motor skills

Motor skills are tested at the training venues of the teams taking into consideration that the hall should be suitable for testing an 18 meter sprint. Examination is carried out in the following sequence:

- a) 18 meter sprint – we measure running performance between the two baselines of the volleyball court using photocell equipment. Athletes sprint individually from a standing start, no starting command is given.
- b) 3kg stuffed ball shot forward – leaning with their backs to the wall, the athletes hold the ball at their chest and shoot it as far as possible. They can step forward as much as half a foot's length during the exercise but they must keep their backs at the wall. The distance between the wall and the last trace of the ball is measured in cm at an accuracy of 0.001 m using a HILTI laser distance meter. A trial is followed by two measured shots, the best ones are recorded.

- c) Standing broad jump – the task is to carry out a dynamic two-legged jump bending the knees and simultaneously swinging the arms obliquely backward and downward. The distance between the jumping line and the point of landing is measured in cm at an accuracy of 0.001 m using a HILTI laser distance meter. A trial is followed by two measured jumps, the best ones are recorded.
- d) 3kg stuffed ball roll back – standing with their backs to the throwing line athletes hold the ball in their raised arms, then bend forward with bent knees, swing the ball between their knees and finally dynamically straighten their knees and raise their torso (these two movements can be repeated several times to gain momentum) to thrust the ball backward over their heads. It is important that the gluteal muscles must be kept flexed during thrust. The distance between the throwing line and the last trace of the ball is measured in cm at an accuracy of 0.001 m using a HILTI laser distance meter. Having taught the right technique we take two measurements, the best ones are recorded.
- e) Sit-up – the exercise is performed on a mat. It begins with lying with back on the floor, knees in a bent straddle position and arms are behind head. The arms must be kept behind the back during the whole test! Test participants raise their torsos without any external help (feet cannot be held down by mates) and touch their knees with both elbows. Then they lie back on the floor immediately so that the back touches the mat at its full length. After one trial, the number of sit-ups in 30 seconds is counted, time is controlled by using a stopwatch. The test starts and ends at command ('Go' and 'Stop').
- f) Standing jump with one hand – before the exercise is performed the test subject stands to the wall and we measure the maximum reach height of the hitting hand in cm at an accuracy of 0.001 m using a HILTI laser distance meter. The athlete then stands close to the wall, positions feet shoulder width apart in the straddle stance and, dynamically swinging one arm upward, leaps (2 attempts) and reaches as high as possible with the hitting hand. The highest point of reach is measured at an accuracy of 0.001 m using a HILTI laser distance meter. The relevant test result is obtained by subtracting the standing reach height from the highest reach in two leaps.
- g) Special running with direction of change – test subjects stand behind a soft ball placed at the middle of the volleyball court base line (4.5 m) and then run around markers placed at various points in the court, return to the soft ball after each marker and run around it. The athletes can run around the markers in any order but they have to touch each of them as well as the soft ball every time. The exercise starts at the command of 'Go' and ends when the subject has run around the last marker and has touched the soft ball. Time is measured at an accuracy of 0.01 sec using a stopwatch.

Testing environmental factors

Besides genetic factors, the aptitude of athletes to sport is also greatly influenced by their environment. The environmental factors are studied by means of questionnaires. We obtain data from players and their parents alike.

Players' questionnaires include questions regarding the reasons behind choosing volleyball as a sport, their goals, previous sport experience, and other extracurricular activities, number of training sessions, training conditions and details about accessing the training venue. Questionnaires also enquire about the relationship with their coaches and teammates as well as about the support given by parents.

Parents are interviewed about their own sporting habits, their relationship to coach and to what extent they support their children. We also find it important to obtain information about the number of children in the family and to find out whether the siblings do sport or not.

Analysis

Data processing was executed with SPSS 17.0 program package. We used descriptive statistics for the environment factors analysis, and the motor skills performances were grouped with K-Mean Cluster.

RESULTS AND DISCUSSION

Because of the complexion of volleyball the most important criteria is height to achieve the best performance (by women this is 175-195cm, by men this is 185-210cm). On the other hand there are always exceptional cases; for example with the introduction of the libero player those who are do not fit to the height criteria are also given chance to play. This is not by chance that height is emphasized as criteria in volleyball because it can help in the specialization of a player's role within a team.

The 21.4 % of the research attendee girls fit to the height criteria, while in case of boys 38.8 % of them are suitable (libero height is not s criteria) (Figures 1a, b). Most of the girls (38.5%) prospectively are between 170-175cm, whilst the boys are between 180-185cm (27.7%).

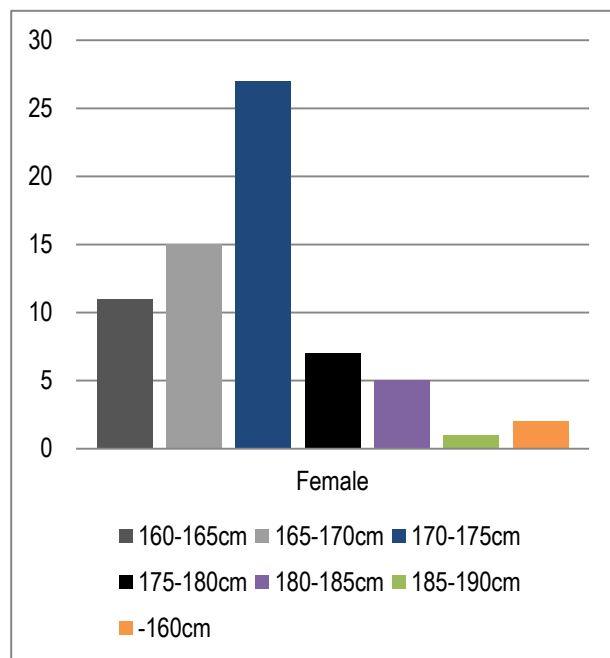


Figure 1a. Female's height.

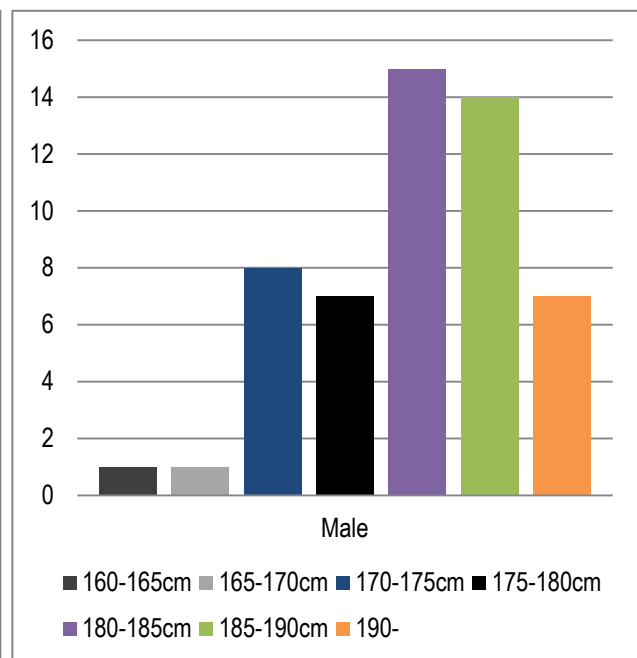


Figure 1b. Male's height

Testing and measuring motor skills is a preferred sphere in sport science because these measurements can be executed easily and within a relative short term. Their importance lies in their high-standard status so they can influence or rule performance and trainability. With continuous measurements the stages of improvements can be determined. These improvements naturally would also contribute to performance forecast. The results of the seven tests can be found in the following Tables: 2. a, b, c, d, e, f, g. The performances were grouped with K-Mean Cluster. Our goal was to highlight the results of those who on any of the 7 test have achieved excellent performance. On the other hand we did not disregard the age of the players because it can also influence the motor skill test results. Clear majority of participants had done other sport before they changed to volleyball; those who had not, they have been volleyball players for minimum 2 years.

Table 2a. 18 meter sprint results.

Cluster – male	Players	Cluster - female	Player
3.72-3.80	2	3.63-3.74	4
3.38-3.62	6	3.45-3.59	15
3.13-3.34	16	3.25-3.38	34
2.94-3.08	18	3.06-3.24	13
2.81-2.90	12	2.94	2
Total	54	Total	67

Table 2b. 3kg stuffed ball shot forward results.

Cluster - male		Cluster – Female	
3.21-3.39	5	3.01-3.32	9
3.56-3.78	6	3.46-3.71	13
4.40-5.09	20	3.82-4.13	31
5.17-5.89	14	4.21-4.62	12
6.15-6.58	8	4.88-5.01	2
Total	53	Total	67

Table 2c. Standing broad jump results.

Cluster - male		Cluster - female	
1.42-1.60	6	1.38-1.48	4
1.65-1.85	10	1.52-1.68	13
1.94-2.11	14	1.72-1.85	21
2.13-2.35	16	1.90-2.00	20
2.42-2.62	8	2.02-2.18	9
Total	54	Total	67

Table 2d. 3kg stuffed ball roll back results.

Cluster - male		Cluster - female	
3.74-5.62	9	4.19-5.10	7
5.73-7.29	7	5.49-6.28	18
8.02-10.35	17	6.30-7.20	16
10.98-12.51	19	7.42-8.81	23
14.37-15.11	2	9.68-10.51	3
Total	54	Total	67

Table 2e. Sit – up results.

Cluster - male		Cluster - female	
11-17	3	13-18	11
21-26	18	19-23	20
27-31	19	25-27	16
33-37	12	28-31	13
39-42	2	32-36	7
Total	54	Total	67

Table 2f. Standing jump with one hand results.

Cluster - male		Cluster - female	
25.30-30.40	7	26.00-30.30	6
33.00-38.90	12	31.30-35.20	13
39.50-46.00	14	36.00-40.30	29
47.30-53.00	15	40.70-45.10	13
57.00-61.00	5	46.10-51.60	6
Total	53	Total	67

Table 2g. Special running with direction of change.

Cluster - male		Cluster - female	
22.16	1	24.59	1
18.80-20.30	6	20.99-21.53	2
16.95-18.21	9	18.54-19.99	20
16.39-16.88	21	16.95-18.38	29
14.29-15.54	17	15.11-16.91	15
Total	54	Total	67

After the results of testing the motor skills we examined their individual performances too. For the sake of integrality we highlighted those participants who had 4 successful tests out of 7 (Figure 2).

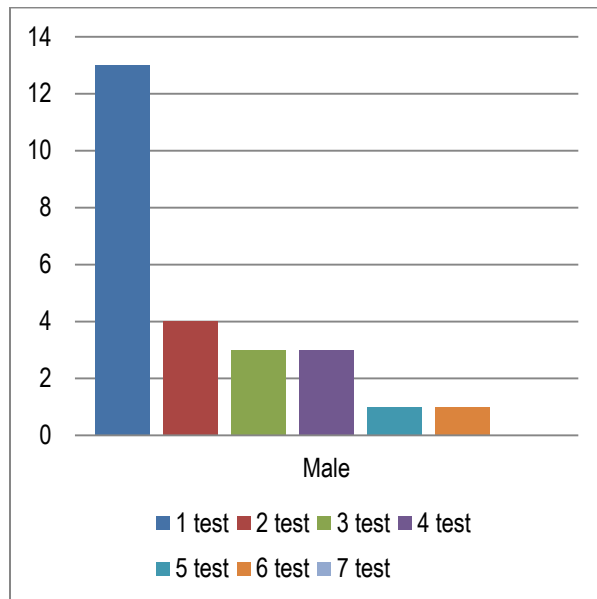


Figure 2a. Male's test results

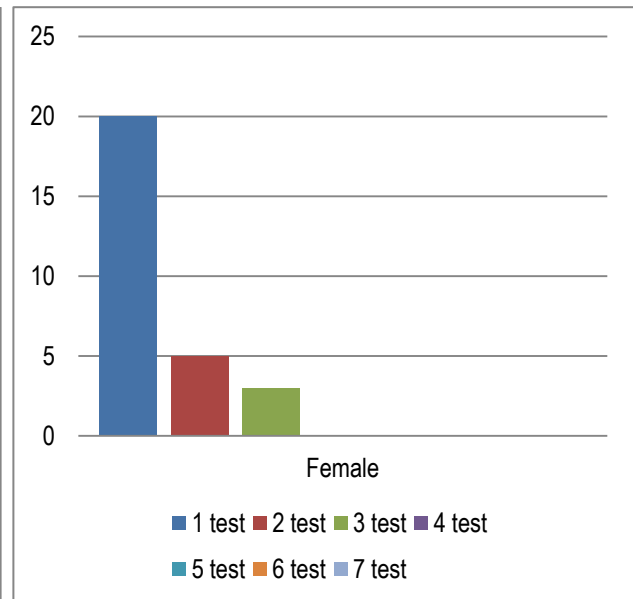


Figure 2b. Female's test results

73 of participants had motor skill test results out of 76 players. Among them 20.53% could have scored eminent results in 4 tests. More than the half of the girls (51.3%) was successful in one test, 16.2% of them was illustrious in 2 tests, 21.6% of them was outstanding in 3 tests and 10.8% of them was eminent in 4 tests. No better results have been recorded. In case of boys, 27.7% of them was outrageous in 4 or more motor skill tests and 22.2% of them was successful in 1, 2 or in 3 test exercises.

As we have been evaluating the questionnaires we wish to publish some results. We analyzed those environmental factors which directly contribute to adolescent's career. From our point of view the most significant is the family and more precisely parental support. Majority of the players think (96%) that parents are completely at their sides when we are speaking about sport career. The answers from the parents provides us the same picture: 90.2 % of them by all means willing to support and 9% of them would support their children as far as possible their situation allows. As we noted before not kids but the parents make their mind when kids wish to take up a sport. That means the 33.8% of them took up volleyball because their parents encouraged them to do so and 35.45% of them were tempted by friends to start playing volleyball instead of another sport. Contrary to our previous research (Biróné & Csátaljay, 2011) the role of the coach has a much lower percentage, only 9.2%. This question was also raised towards parents because we intended to show what root cause they see behind choosing a sport for their own children. The 30.3% of parents said that it was their children's own free willing decision to choose volleyball, 25% percent suggested that their kids should take up volleyball and 17% of the players was encouraged by friends. Therefore parents and children adjudge the root cause behind choosing a sport branch in a different manner but the parental influence is significant in both groups.

From our perspective when choosing a sport type or branch for our child it is merely significantly important to know the parental relation to the given sport branch. The 73.6 percentage of fathers had done sports on a regular basis during their studies (the sample does not include those fathers who do not live together with their families), for example 30.3% of them were football player, 16% of them did more sport types parallel and the percentage of those who played volleyball was also notable (12.5%). The sporting habits of the mothers is also of a high account because 84.6% of them did at least one type of a sport regularly. Among these sport types 36.9% did volleyball and 16.9% of them tried several sport branches during their school studies.

In our survey we did not miss to investigate the goals of the players. We were willing to receive information for the following questions: Why they are playing volleyball? What would they like to achieve with this sport? For the half (50%) of them it is a good fun to play and it is also a useful free-time activity. Only 42.1 % of them would like to become a famous player, 3.9% wish to live on volleyball despite of the poor sponsorship in Hungary. The standard expectations of parents (61.5%) is that their child shall do sport regularly, 13.8% of parents thinks that it is when the child does not waste his or her free-time. Finally 12.3% of them wish to see their son or daughter in the first rank.

According to our experience the means of transport what they use to get to trainings and the time what they need for travelling can also allocate the choice of a sport branch. Diagram 2 presents us how the volleyball players can get to the trainings. Generally they need 20 minutes when they are travelling from school, or from home. There are some players who travel 35-45 minutes or even more.

When the player selects a sport branch or when we speak about his or her career the role of parents, the relationship with the trainer or coach is being emphasized. These two significant factors influence and rule the quality of the activity and the time spent or devoted. The major of players in the kids age group (88.2%) classify their relationship as good with the trainer, 1.3% thinks it is rather neutral, 5.3% thinks it is altering and 1.3% of the men considers this relationship specifically bad. In case of 37 adolescent players the numbers are varied: 94.6 % thinks that the relationship is good enough and only 5.4 % feels that it is altering.

Relationship with peers, the atmosphere of the trainings, proper quality of equipment rules significantly the commitment towards a sport branch in general. The participants in the sample provided their positive opinion about the quality and quantity of volleyball equipment; additionally they noted down that the court or the hall is well maintained enough for the trainings. Only 10% of them revealed that assets and material conditions are far beyond good but they are acceptable with proviso.

We considered the atmosphere of the trainings and the relationship with peers as part of the research subject and goal. The young players (except 6) have good relationship and the trainings have supportively good atmosphere.

CONCLUSION

In the current case study we represented the results of the volleyball players from adolescent and kid age groups. Our goal was to find those players among the sample who fit to the criteria previously set up by us. In other words these players, based on their height, their motor test results and on all-out support of their environment, may be competent to achieve significantly high performance rate. Although the age groups

are varied in reality these kids and teenagers play many times together in the same team during the Hungarian Champions League (kids with adolescent and adolescent with grown-ups).

To achieve an illustrious performance we determined that standard height which is necessary to it; separately for boys and girls. The same method was followed as we were doing the 7 motor tests and as we were examining those environmental factors which have a positive influence on sport career. The data were contrasted and we examined those individuals who fit to these criteria.

As a conclusion we can state that 9 boys out of 54 and 2 girls out of 70 would dispose such abilities, characteristics and respectively the environmental factors are favorable for them so later on there is a high probability that they become a successful volleyball player. There were 8 boys and 2 girls, whose environmental conditions and motor skills were suitable but their height was only a couple of centimeter below the border value what we have set up. For our point of view these players shall be also considered as successful competitors if they receive proper training.

We are planning to continue our investigations and further researches shall be executed; by doing it so we intend to involve more players.

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