

## ***Attachment and Exploration in Infancy: Research and Applied Issues***

***David A. Caruso***

***Purdue University***

The quality of infants' attachment to their primary caregiver has become a major concern of researchers and practitioners. A recent approach to understanding infant behavior and development suggests that attachment, wariness, and exploration function as one interdependent behavioral system. Because of its integrative nature, this new approach can provide a richer understanding of infant development and serve as a conceptual framework for addressing applied and public policy concerns. In this article, major theories of attachment are contrasted, and recent research relevant to the interdependent system perspective is evaluated. Directions for future basic and applied research are suggested, and implications for practice and public policy are discussed.

Recently, considerable research in infant social and cognitive development has focused on the related issues of attachment to the caregiver, wariness of strangers, and exploratory competence. Because of widely documented societal factors that contribute to increasing numbers of teen-age parents, single parents, and two-career families, these issues have also become a major concern of professionals involved in application and in public policy for infants and their families. The initial motivation for this interest was based on theories that attribute an important role in early development to attachment, wariness, and exploration. Consequently, the developmental significance of each of these aspects of infant behavior has been studied extensively. However, a number of investigators have recently suggested that a more complete understanding of infant development may result when attachment, wariness, and exploration are conceptualized as related aspects of one interdependent behavioral system that promotes optimal development only when functioning in balance. Because of its integrative nature, this new approach holds considerable promise for providing a richer understanding of infant development and serving as a conceptual framework for further research, applied issues, and public policy concerns.

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Correspondence and requests for reprints should be sent to David A. Caruso, Child Development and Family Studies, Child Development and Family Studies Building, Purdue University, West Lafayette, IN 47907.

This paper will focus on the implications of the attachment–exploration construct for applied and public policy issues. It will first review the major theories of attachment and discuss the groundbreaking research that supports the interdependent system point of view. Recent research that focuses on the attachment–exploration system and that is particularly relevant to applied and public policy issues will also be discussed. In the final section, directions for further research and issues of concern to practitioners and public policy advocates will be addressed. Readers who are interested in a comprehensive review of the attachment literature should see one of several recent papers written for that purpose (Bretherton, 1985; Campos, Barrett, Lamb, Goldsmith, & Steinberg, 1983; Lamb, Thompson, Gardner, & Char-nov, 1985).

### *THEORIES OF ATTACHMENT*

The attachment relationship between infants and their primary caregivers has been seen as a critical aspect of early development for quite some time. The earliest concepts about the nature and meaning of attachment were based largely on Freudian psychoanalytical theory. Freud viewed the mother–infant bond as a product of a secondary drive that grew out of the child’s primary need for oral gratification. This perspective has been further developed in the work of Mahler, Pine, and Bergman (1975) and Erikson (1950). They assert that the mother–infant relationship is critical to the child’s developing sense of self because the early dependent attachment that Freud postulated must change with the child’s emerging autonomy. In general, then, various psychoanalytic points of view assign an important role to mother–infant attachment and assume that it develops out of the mother’s role in fulfilling the baby’s needs. These theories therefore attribute to the mother considerable power to influence the child’s developing personality.

An opposing view of the psychological mechanisms that lead to attachment is presented in the social learning theory approach. Whereas the psychoanalytic perspective stresses internal drives, the learning approach attempts to explain attachment in terms of external stimulus factors. These theories range from the concept of dependency as a drive (Sears, Rau, & Alpert, 1965), which attempts to adapt the Freudian point of view to be consistent with learning theory, to radical behaviorist perspectives (Skinner, 1938; Gewirtz, 1965), which abandon the drive concept and attempt to account for attachment solely as the result of external reinforcement as postulated by operant conditioning theory. Because they assume that attachment results from external factors, the proponents of the learning theory approach reject the concept of a generalized attachment construct and substitute a focus on specific attachment behaviors and the circumstances that influence them. This perspective implies that different child care arrangements such

as babysitters or day care might lead to more than one attachment relationship and possibly to varying strengths of attachment.

The more recent perspective, which sees attachment and exploration as an interdependent system, avoids the dichotomy between internal and external factors. This approach is based in large part on the ethological and evolutionary viewpoint of Bowlby (1958) and Ainsworth (1964, 1969, 1982). They consider the attachment construct to be interrelated with separation anxiety (Bowlby, 1960), fear or wariness of strangers (Morgan & Ricciuti, 1969), and exploration of the environment (Ainsworth, 1969, 1974). This point of view asserts that mother–infant attachment should be understood as an organized system that involves the interrelationships among these behaviors and that serves basic adaptive, biological functions. In general terms, attachment to the caregiver is seen as providing a secure and safe base from which the infant can move in order to explore the environment, whereas wariness provides the motivation to terminate exploration and seek proximity to the attachment figure when the environment is perceived as threatening. Sroufe (1977) summarized the breadth of this new perspective when he said, “Attachment and wariness are interacting systems that influence and are influenced by each other and by affiliative and exploratory tendencies as well” (p. 742). He also points out that the whole system is under the influence of “contextual factors” in the immediate environment; these factors include family structure, alternate child care arrangements, and parenting behaviors. Sroufe argues persuasively that mother–infant attachment and wariness have considerable explanatory power when viewed as an interdependent, organizational construct encompassing the overall social–cognitive organization of infant behavior rather than simply as internally driven developmental milestones, traitlike behaviors, or conditioned responses as in the other theories.

The view of attachment and exploration as an organizational construct has not been without its detractors, however. Initially a number of investigators raised questions about various aspects of the theory. For example, the concept of wariness of strangers was criticized on the basis of claims that negative reactions to strangers are unstable, have not been consistently observed, and are less important than the affiliative tendencies of infants (Rheingold & Eckerman, 1973). Others found that specific index behaviors of attachment were not highly intercorrelated (Coates, Anderson, & Hartup, 1972; Maccoby & Feldman, 1972); this was interpreted to suggest that the attachment construct is of little consequence developmentally (Cairns, 1972; Gewirtz, 1972; Masters & Wellman, 1974). Also, some investigators argued that exploration is predominant over attachment as a basic attribute of infants’ early social and cognitive functioning (Rheingold, 1970; Rheingold & Eckerman, 1970, 1973).

More recently, Lamb and his colleagues (Lamb, Thompson, Gardner, Charnov, & Estes, 1984) have suggested that the attachment–exploration

construct fails to adequately consider the influence that children's characteristics, such as temperament and family and caretaking characteristics, have on attachment relationships. For example, Kagan (1982) argues that infants' threshold for distress, an aspect of early temperament, is directly related to quality of attachment. Also, Thompson and Lamb (1984) found that temperamental differences in emotional expressiveness were independently related to both overall infant temperament and quality of attachment. However, as pointed out by Campos et al. (1983) in their review article, quality of attachment does not seem to simply reflect children's characteristics such as temperament, because a number of studies (Lamb, Hwang, Frodi, & Frodi, 1982; Main & Weston, 1981) have found that infants have different attachment relationships with mothers and fathers. If attachment patterns were determined largely by infant temperament, an infant would be expected to have the same quality of attachment with different caregivers.

Given the theoretical significance that the interdependent system perspective attributes to both the social factors of attachment and wariness and the cognitive aspects involved in exploratory behavior, it is important to examine how research in this area addresses these questions. Considerable research over the last fifteen years has focused on issues relevant to the idea that attachment and exploration function as an interdependent system. In the following section, the research that addresses three specific issues will be reviewed: (1) the attachment-exploration balance, (2) contemporaneous correlates of secure attachment, and (3) developmental implications of variations in quality of attachment.

## ***RESEARCH ON THE ATTACHMENT-EXPLORATION CONSTRUCT***

### ***Attachment-Exploration Balance***

Sroufe and Waters (1977), in rebutting critiques of the organizational construct point of view, argue that the occurrence of certain behaviors as "indexes" of attachment does not adequately address the issue of the interdependent system of behaviors as presented in the organizational perspective. Rather, they assert, it is the meaning of behavior and its functional equivalence as a member of a class of behaviors that should be considered. In other words, they argue that variations in attachment cannot be inferred from any particular behavior, but only "from the pattern of behavior, in consideration of context, across time" (p. 1189). In this respect, the interdependent system perspective addresses the issue of the influence of family context on attachment-exploration patterns that is raised by Lamb et al. (1984) and others (Kagan, 1982) with regard to more narrow interpretations of attachment. As Lamb and his colleagues conclude after reviewing a

number of studies, attachment quality, when combined with family and caretaking characteristics, does explain important aspects of development.

A hallmark of the interdependent system perspective has been research that demonstrates a balanced interrelationship between attachment and exploration early in life. This is based on the hypothesis that they are both part of a system with the important adaptive developmental function of providing a secure base from which to explore.

There is ample evidence that infants often move away from their mothers in the course of exploration (Ainsworth, 1967; Anderson, 1972; Rheingold & Eckerman, 1973). Several studies suggest that this distancing is in the service of exploration. For instance, Rheingold and Eckerman (1970) found that infants become distressed if the caregiver, rather than the baby, increases the distance or if they stay in a room separated from the baby. Also, Carr, Dabbs, and Carr (1975) found that the infants spent more time in play if they could readily make visual contact with their mother. It is important to note that the children in this study did not in fact look at their mother more. It therefore seems that the mere opportunity to do so, when controllable by the child, enhances exploration and play. Additional evidence concerning the interrelationship between attachment and exploration is provided by findings that infants move and explore more freely and exhibit less negative affect in a novel environment when in the presence of the attachment figure (Cox & Campbell, 1968; Gershaw & Schwartz, 1971; Lester, Kotelchuck, Spelke, Sellers, & Klein, 1974; Maccoby & Feldman, 1972). Similar findings have also resulted from research concerning social exploration. For example, in the presence of the caregiver, infants show less wariness of a stranger's approach (Bronson, 1972; Campos, Emde, & Gaensbauer, 1975; Morgan & Ricciuti, 1969) and move closer to their caregivers before visually exploring a stranger (Bretherton & Ainsworth, 1974; Feldman & Ingham, 1975). This research seems clearly to support the idea that attachment and exploration function as an interdependent system because it suggests that infants' play, exploration of objects and people, general activity, and affective expression are enhanced when the attachment figure is present or within contact by the infant.

### *Correlates and Consequences of Quality of Attachment*

The concept of attachment and exploration as an organizational system is also supported by research concerning both contemporaneous correlates and later developmental consequences of variations in the quality of attachment. The earliest studies of this question focused mainly on aspects of cognitive development and their relationship to quality of attachment. For example, Bell (1970) demonstrated a relationship between quality of attachment and an aspect of cognitive functioning based on the development of the object concept in relation to mothers. Similarly, Ainsworth and Bell

(1974) reported that differences in mother–infant interaction styles are related to the quality of the attachment relationship and the development of the object concept during the second year of life. Furthermore, this study also reported relationships between the quality of attachment and the level and quality of exploratory behavior and play. In a related study, discussed by Ainsworth and Bell (1974), Bell (1971) presented data demonstrating a relationship between quality of attachment and both IQ at 8 and 11 months and how well the infant conforms to maternal requests.

Since these early studies, a number of investigators have addressed the developmental significance of the attachment–exploration system longitudinally and found important relationships between early attachment patterns and both cognitive and social development later in childhood. For example, quality of attachment has been found to play an important role in later exploratory competence. In a study involving toddlers, Main (1973) found increases in attention span and positive affect during free play in children earlier classified as securely attached. Also, as noted by Sroufe (1977), both Main and Louderville (1977) and Matas (1977) found that variations in quality of attachment predict exploration and play behavior up to a year later.

In a more comprehensive study that elaborates on the earlier findings, Matas, Arend, and Sroufe (1978) found a variety of aspects of later competence, both social and cognitive, to be related to quality of attachment at 18 months. For example, subjects who were securely attached at 18 months showed more symbolic play; were more enthusiastic, affectively positive, and persistent in a tool-use task; and exhibited less nontask behavior and noncompliance than those infants who were not securely attached. Because of its integration of conceptually linked aspects of both cognitive and social development, this study demonstrates the breadth and power of the interdependent attachment–exploration system.

More recently, social development has also been examined in a number of studies of the relationship between early quality of attachment and behavior during the toddler, preschool, and early school years. Pastor (1981), for example, observed 2-year-olds in a play situation and found that the securely attached toddlers were both more sociable and more positive in their social interactions than were insecurely attached age-mates. A similar finding was reported by Thompson and Lamb (1983) regarding attachment to fathers and sociability with 12½- and 19½-month-olds. Also, Sroufe (1983) found that insecurely attached 18-month-olds were inept or hostile and distant in interaction with peers.

Several recent longitudinal studies also reported important social sequelae of patterns of attachment. Erickson, Sroufe, and Egeland (1985) reported that insecurely attached infants were more likely to have behavior problems as preschoolers, and Sroufe and his colleagues (Sroufe, Schork, Mott, Law-

roski, & LaFreniere, 1984) found that securely attached infants were later rated as higher on positive affect and lower on negative affect by their preschool teachers. In one of the few longitudinal studies following children beyond the preschool years, Main, Kaplan, and Cassidy (1985) studied the relationship between infant quality of attachment and 6-year-olds' overall social functioning with parents and others and their use of representation and language. Early security of attachment was found to predict the child's overall functioning with an interviewer, fluency of parent-child discourse, emotional openness, and representation of attachment relationships in general 5 years later.

In general, then, the evidence discussed here seems to support the notion that attachment, wariness, and exploration function as an interdependent organizational system that plays a central role in both cognitive and social development early in life. This research demonstrates the usefulness of this perspective in constructing an integrated understanding of infant development and also suggests productive avenues for future research efforts.

### *DIRECTIONS FOR FUTURE RESEARCH*

Given the knowledge gained from basic research about the integrated nature of attachment and exploration in infancy as well as societal changes influencing infants' early environments, it seems particularly important to broaden future studies in order to address clearly defined applied implications. For example, security of attachment in infancy has been found to predict later competence in the peer group (Sroufe, 1983). As Sroufe (1977) suggests, securely attached infants should be generally competent and confident in their dealings with both objects and people and may therefore be well liked by both peers and teachers in later childhood. However, while studies have found that quality of attachment is related to aspects of behavior that are in turn related to continuing development into later childhood, little research to date has studied directly the long-term predictive value of the attachment-exploration construct beyond the preschool years. Such longer term studies, particularly involving specific applied issues, would be an important next step in developing our understanding of early attachment-exploration patterns.

For example, studies of children's social functioning in a variety of classroom settings during the elementary years would begin to elaborate suggestive early findings during the preschool years. Also, differences might be found in how variations in attachment influence children's adjustment to highly structured versus relatively unstructured classroom settings as well as academic achievement in a variety of areas.

The effects of alternate group care of infants on parent-child attachment patterns is another question that merits further attention. While a number

of early studies (Cochran, 1977; Farran & Ramey, 1977; Kagan, Kearsley, & Zelazo, 1978) and review papers (Belsky & Steinberg, 1978) suggested that infant day care does not have a general detrimental effect on mother–infant attachment, Belsky (1986) raises serious concerns in a recent review of this literature. In his new interpretation of the research, Belsky suggests that infant day care, particularly when begun before 12 months of age, may be associated with greater insecurity in the attachment relationship and is therefore a risk factor for later development (Belsky & Rovine, 1988). His interpretation, however, has generated a spirited debate among day care researchers, with a number of authors arguing strenuously that Belsky's interpretation is actually a misinterpretation of the current research literature (Chess, 1987; Phillips, McCartney, Scarr, & Howes, 1987).

While there is currently no consensus in the scientific community regarding the issue of effects of infant day care, the current debate about this issue does serve to stress the inadequacies of research on infant day care to date and the continuing need to refine our approach to this issue. As pointed out recently by Vaughn, Deane, and Waters (1985), in addition to such problems as inadequate measurement and nonequivalent control groups, a major problem continues to be that most research has been conducted in high quality, often university-based, day care centers, even though almost 90% of community-based infant day care takes place in homes rather than in day care centers (Belsky, 1986). This remains an area of great need for additional research because, given the potential importance of day care quality, very little research has studied quality in infant care homes.

The few studies that have looked at quality in day care homes do not present a hopeful picture. Keyserling (1972), for example, found that 62% of infant care in homes was of only fair to poor quality. More recently, Howes and Stewart (1987) assessed quality in day care homes, using a standardized instrument. They found a wide range of quality in the homes included in the study, with many scoring very low. Importantly, they also found that child care quality was significantly related to quality of children's play when family characteristics were controlled. This suggests a pressing need for additional research that examines the influence of lower quality care on attachment and exploration early in life.

A related issue that should be assessed empirically involves studying separately those children for whom the differential effects of day care experience are particularly strong. In other words, all studies reporting relationships between day care and quality of attachment find both secure and insecure attachment patterns in the sample. However, little is known about factors that may explain why only some children in out-of-home care are found to have insecure attachment relationships. One contributing influence may be the infant's attachment relationship with the day care provider. The role of multiple attachment relationships in early development has received little attention and may be another avenue that can contribute to a fuller under-



standing of the developmental implications of the attachment–exploration system. Answers to such questions are more likely to be found, however, when investigations are conceptualized in terms of the complex ecology implied by the interacting set of variables involved in the child, family, and day care setting rather than in simple, causal, “effects of day care” terms as in most current research.

The issue of appropriate measurement of attachment quality is also relevant to continued productive research in this area. The ability of this research to address applied issues, such as infant day care, is somewhat circumscribed by the methodology of measurement. For example, all of the research being cited in the current debate about the effects of infant day care uses the Strange Situation laboratory procedure developed by Ainsworth (1969) to assess attachment quality. As pointed out by Thompson (1987), however, the fact that the Strange Situation was validated on middle-class, home-reared children raises serious questions about its validity for studying samples of infants in day care. Recent cross-cultural studies (Lamb et al., 1985) suggest that specific aspects of day care infants’ experience, such as frequency of stranger contact and number of separations from mother, can influence Strange Situation classifications of quality of attachment.

While the laboratory procedures and the focus on mother–child attachment prevalent in the research to date have led to important advances in our knowledge, many applied concerns might be addressed more meaningfully when more naturalistic measures that incorporate cultural variation are developed. A recent example of important work on this issue is found in the efforts of Waters and Deane (1985) to develop a parent report, Q-sort methodology to assess attachment behavior. Since this measure bases its attachment assessment on caregivers’ observations of attachment behavior in naturalistic settings, rather than on laboratory procedures, it promises to be more sensitive to cultural variation. Further work along these lines is needed to advance understanding of the young child’s attachment relationships in a range of natural environments as well as to expand it beyond the mother–child dyad:

Regarding more basic research questions with applied implications, a refinement of previous work examining variations in quality of attachment and individual differences in exploratory behavior would also provide a productive direction for future investigations. For example, it seems important to examine more specific, qualitative aspects of exploratory behavior in light of recent findings of relationships between individual differences in the quality of early exploration and other aspects of cognitive functioning (Caruso, 1986; Jennings, Harmon, Morgan, & Yarrow, 1979). This line of research would be particularly useful for addressing applied questions if it focuses on specific cognitive skills that are used in everyday settings rather than on global IQ scores from standardized tests. Additionally, there is a need to pursue directly the nature of cognitive structures and skills that sup-

port the development of attachment behavior and to study aspects of caregiver–infant interaction in relation to those specific skills.

### *APPLIED AND PUBLIC POLICY ISSUES*

In addition to its importance as an integrating perspective for basic and applied research, the interdependent system point of view also contributes a meaningful framework for addressing the concerns of practitioners. The sensitivity of infants' attachment–exploratory behavior to variations in context and its relationship to important aspects of social, motivational, and cognitive development suggest serious questions for those directly involved in services for infants and their families and in public policy formation.

Infant day care, for example, is one issue that directly involves the relationship between infants and their parents. According to 1982 U.S. Census Bureau figures, 38% of women with children under 3 years of age are in the work force. More recently, studies have found that between 33% (Klein, 1985) and 50% (Kamerman, 1986) of women with infants under 12 months of age were working. The resulting widespread use of infant care outside the home raises important questions regarding issues related to parent–child attachment. For example, our knowledge about the developmental significance of the early attachment–exploration system suggests that day care should be designed to enhance the overall relationship between parent and child rather than undermine it. This might be achieved in a number of ways, including: siting infant care facilities at the workplace so that parents can maintain consistent contact with their children; using professional infant caregivers with knowledge of infant development and the important role of attachment and exploration in early development; providing each infant with a specific caregiver who knows that child well and can therefore effectively share information with parents; and providing a planned, coherent parent involvement–education component as an integral aspect of infant care programs.

Steps such as these are more likely to be implemented when practitioners and policy makers are aware of the important role that quality of attachment plays in early development. In fact, several large-scale national studies (Divine-Hawkins, 1981; Roup, Travers, Glantz, & Cohen, 1979) concluded that specific training in child development and care is strongly associated with quality of child care. Evidence that this is still an area for concern, however, was provided in a recent study (Eheart & Leavitt, 1986), which found that only 35% of home providers had training in child development and care, compared with 86% of center-based caregivers.

Practitioners in agencies that deal with adoption and foster care of young children may also play a central role in enhancing parent–child relationships. Recognizing the infant's need for a secure attachment relationship

stresses the importance of continuity in foster care arrangements and for adoption at the earliest possible age. Also, the forming of secure attachment relationships may be enhanced for adoptive and foster parents by providing preparation for parenting and continuing support and guidance in developing strong relationships.

Obviously, issues faced by direct practitioners, such as those discussed here, often require action by local, state, or national governments or changes in public beliefs and attitudes before adequate programs can be implemented. Therefore, both researchers and practitioners must address their concerns to the public policy arena. The range of issues relevant to parent-child attachment that are influenced by public policy decisions include adequate funding for high quality infant day care, parental work leaves for mothers and fathers of newborns, and parent education about infant development and the importance of the attachment-exploration system.

The issue of quality infant day care can serve as a useful example of the way public policy decisions affect family and child development. A whole range of specific public policy issues are related to the general problem of how to adequately fund quality infant day care that will enhance parent-child attachment. In most communities little is known about the range of quality of infant care options available to parents. As mentioned above, however, the few studies of this question have found that the majority of day care programs serving infants were only of fair or poor quality. Aspects of low quality infant care that are directly related to inadequate funding include high turnover and lack of adequate professional training for caregivers because of extremely low salaries, as well as high child-caregiver ratios that do not allow caregivers to develop a close relationship with each baby.

The issue of adequate funding for infant day care raises the difficult dilemma of parents' ability, or society's willingness, to pay and the clear relationship between costs and the quality of the care delivered. While providing the level of funds necessary for high quality infant care may seem very costly to society in the short term, the research discussed here suggests that long-term benefits may outweigh these initial costs. As pointed out recently by Wittmer (1986), this is particularly true for children in low-income families who cannot afford to purchase expensive, high quality care. However, current government mechanisms that address this issue fall far short not only in the amount of funding provided, but also in that they cover only a small fraction of families needing services. As discussed in the recent public policy paper on infant care by the National Center for Clinical Infant Programs (undated), this limitation is true of both federal and state programs. For example, at the federal level, dependent care tax credits do not help low-income families who owe no tax and do not recognize that infant care is inherently more costly than that for older children. At the state

level, child care allowances for AFDC families are often too small to purchase high quality care. Also, recent reductions in the federal Title XX child care support program to states have severely limited the ability of states to support quality child care and have even resulted in many states lowering child care regulation standards. To reverse these trends, a major effort in public policy advocacy and public education will be required by concerned policy makers, practitioners, and researchers.

### *SUMMARY AND CONCLUSIONS*

While initial interest in caregiver-child attachment was sparked by theories that attribute a central role in child development to parent-child relationships, current concern about this issue is also based on societal changes that have profoundly influenced family child-rearing patterns. Recently, the developmental significance of early attachment relationships has been stressed in research suggesting that attachment is interdependent with wariness of strangers and exploratory tendencies. Research findings of attachment-exploration balance and both contemporaneous and later correlates of quality of attachment support the notion that attachment, wariness, and exploration function as an organized system that promotes optimal development only when operating in balance. On the basis of both current knowledge from basic research and societal changes that influence infants' early environments, it is suggested here that future research address a broad range of applied questions such as those raised by the widespread use of infant day care.

The sensitivity of infants' attachment-exploration behavior to environmental variation and its relationship with social and cognitive development raises a number of issues for direct practitioners as well as for public policy. While some of these questions are related to specific aspects of settings serving infants and their families, many others cannot be adequately addressed without action at either the state or the federal level, particularly issues regarding funding. Given the importance of the quality of early attachment, it seems particularly important at this time that both researchers and practitioners address their concerns to the public policy arena. While a major, long-term effort may be required to reverse current trends and provide adequate regulation and funding for services for infants and their families, we now have evidence that the potential benefit for individual children and society may make this effort worthwhile.

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