A Micro-Analysis of the Alley-Oop With Notes on the Race and IQ Controversy

Halford H. Fairchild
University of California, Los Angeles

1 The author gratefully acknowledges the comments of Paul Abramson and Russell Stockard to an earlier draft of this manuscript. Correspondence concerning this article should be addressed to the author, Department of Psychology, UCLA, 405 S. Hilgard Ave., Los Angeles, CA 90024.

Running Head: Alley-Oop
Abstract

This article conducts a micro-analysis of a play in basketball commonly referred to as the alley-oop. The play, involving a high pass above the rim and slam-dunk scoring, is viewed as evidence of a high order of information processing ability, i.e., intellectual functioning. A micro-analysis of the key components of the play reveals the complexity of the perceptual, sensory, and decision-making processes involved. Recent literature on the construct of "intelligence," especially theories emphasizing the biological bases of intelligence, underscores the intellectual nature of athletic performance. This has importance for the continuing controversy concerning the nature of intelligence and racial differences in IQ. It is concluded that all races share the potential for athletic superiority, and that all races share the potential for other indicators of intellectual superiority.
A Micro-Analysis of the Alley-Oop With Notes on the Race and IQ Controversy

Magic jumps high for the rebound, spins, and heads up the court looking left and right. He spots Michael Cooper on the right wing and lofts a pass high above the rim. Cooper leaps, palms the ball, and slams it home. Two points.

Basketball fans have become accustomed to the above play that is commonly referred to as the "alley-oop". But what Magic Johnson and Michael Cooper of the Los Angeles Lakers have made routine is actually a marvelous display of the human machine's capacity to perceive the environment, to quickly adapt to changing situations, and to act out precisely calculated behaviors that result in desired outcomes. The alley-oop, then, has significance for the most fundamental epistemological questions in psychology: the nature of consciousness, the role of information processing (i.e., the intellect) in behavioral production, and the relationship between mind and body.

An analysis of what actually happens in a play such as the alley-oop demonstrates the amazing array of intellectual processes that take place, the decisions that are made, and the translation of these decisions into successful behavioral actions. And if we accept the
notion that intelligence is exhibited in athletic contests, then there are obvious implications for our understanding of the nature of intelligence and for the race and IQ controversy.

A Micro-Analysis of the Alley-Oop

What actually happened in the play described above? Although the whole play lasted only a few seconds, even a brief description of what took place is necessarily involved.

The play begins with the rebound. A player's rebounding ability is no doubt conditioned by experience, so that even as the ball is approaching the basket, the experienced rebounder begins to "position" for the rebound. As a result, good rebounders are constantly making subtle position adjustments during the flight of the ball to the basket. During this time the player must also confront the attempts of the opposing team's player to thwart his efforts at getting the rebound. As the ball hits the rim and bounds up, the defensive player sneaks around the opposition, and leaps for the ball.

Jumping for the ball is no small feat for a basketball player either. Indeed, the timing of the jump is what makes the difference between a great rebounder and an average one. While height is certainly an important asset in basketball, the greatest rebounders in the game are not necessarily the tallest players. What differentiates a good rebounder from an average one is his timing. Thus, certain players get more than their fair share of rebounds. This is because
of their ability to quickly judge the flight and trajectory of the
errant shot, and make the decision to leap at precisely the right
instant to complete the rebound. Rebounding, then, is fundamentally
a question of perception, encoding, processing or decision making,
and acting. After getting the rebound, the player, still aware of the
presence and location of opposing players, spins and pushes the ball
up the floor.

Dribbling also requires considerable cognitive and physical
ability. The bounce of the ball is a quick event, and on closer
analysis may be seen to involve the real-world use of geometry,
trigonometry, and even physics. Certainly the laws of motion are
involved during dribbling, and the player is constantly pushing the
ball ahead of him as he runs down the floor, thus necessitating
extrapolations into the future. The ball, then, carves a sine-like
wave as it moves down the floor, and the player must coordinate the
movement of the ball, the speed of his body and the motion of his
hands, to simply keep the dribble going.

While the player is dribbling the ball down the court, he looks
left and notices an opponent attempting to break off the drive. He
may estimate the opponent's speed and direction in relation to his
own, and conclude that he'll need help from a teammate. Past
experience (i.e., long term memory) tells him that he can expect a
teammate to be following the flow of the play on either the left or
right wing. He looks right and sees a teammate streaking down the
right sideline. Behind him may be an opponent who is desperately trying to catch up. In successful executions of this play, the dribbler must accurately "read" the court and anticipate future court positions. He looks to the basket to get a fix on its range and position.

He looks to his teammate on the right wing, and when eye contact is established, he lofts the pass high on the right side of the rim. This pass represents yet another complex information processing task. Using past experience as a guide, the distance to the basket is estimated, the speed and motion of the teammate is examined, and an extrapolation into the future must take place if the play is to be successfully executed. Most importantly, all of these considerations must be followed by a complex behavioral response: Passing the ball at the right time, with the right trajectory, and with an appropriate amount of force. Kinesthetic feedback, between musculature and the central nervous system, regulates this complex responding.

On seeing the pass leave the passer's hands, the receiving player must quickly adjust his speed and direction so that he can leap at the appropriate instant. The jump is not directed at the ball, but at a space where the ball is going to be. Such a feat requires precise calculations of speed, trajectory, and timing. Grabbing the ball above the rim is perhaps the easiest part, but a quick look to the rim assures the two points as the player slams it home. The play
is over when the scorer lands from the ten foot altitude and, frequently, shares "high-fives" with his teammates.

The alley-oop, then, is a complex series of events that requires an assessment of the situation (perception), an internal imagery of that external situation (sensation), an interpretation of that imagery (based on short term and long term memory), calculations of future images, the making of decisions, and appropriate behavioral responding—all at a high rate of speed. Interestingly enough, these are the key ingredients of recent theories of intellectual functioning.

The Nature of Intelligence

The nature of intelligence has been debated for decades, perhaps centuries (cf. Cronbach, 1975). Needless to say, the current discussion will not provide a definitive end to this debate. Most theorists, however, agree that intelligence refers to the ability to learn, or the extent to which one benefits from experience. And basketball (and all other athletic events, for that matter), is certainly a learned ability.

In addition, the role of neurophysiological factors in information processing and intellectual functioning is receiving increasing scientific attention. Jensen (1980b) and others (e.g., Gordon, 1980; Hendrickson & Hendrickson, 1980) have argued that the speed of neural transmission in response to external stimuli is a key measure of raw intellectual ability (also see Posner, 1982; Posner & Mitchell,
1967). Jensen (1980b) has therefore suggested that a culture-free intelligence assessment might involve reaction time experiments. The thesis is that the time it takes to react to external events, especially when the reaction involves some decision making (i.e., "choice reaction time"), is a good indicator of raw intellectual ability. The alley-oop, certainly, reflects this sort of information processing.

Much of the recent attention on the biological bases of intelligence, and on the more general information processing paradigms, has stemmed from a growing dissatisfaction with the psychometrically-based theories of intelligence that were rooted in traditional paper-and-pencil measures of IQ (Sternberg, 1981). In particular, these psychometric or factor-analytic theories of intelligence have failed to provide an adequate means for hypothesis testing, have failed to identify the processes of intellectual functioning, and have failed to provide action implications for training and developing intellectual functioning either for individuals or the broader society (Sternberg, 1981).

The information processing approaches, in contrast, view the organism as a perceiver, transducer, encoder, processor, and actor in the context of environmental stimuli. This approach has received considerable attention in recent years (e.g., Sternberg, 1981; Rafferty, 1980), and holds much promise for raising the study of intelligence out of its current malaise.
The information processing approach to human intelligence is bolstered by the recent attention to the neurophysiology of intelligent behavior. Hendrickson and Hendrickson (1980) have articulated a comprehensive theory that places perception, memory, and the intellect at the molecular level: at the level of the neuron and inter-neuron spaces (i.e., synapses). This theory argues that there are physical limits to the organism's capacity to process information, with those limits determined by the speed of individual and collective nerve impulses (in their terminology, "pulse trains"). In a series of studies, Hendrickson and Hendrickson (1980) have at least tentatively identified a positive connection between measures of neurophysiological activity (e.g., various measures of brain wave activity in response to external stimuli) and independent measures of intelligence (i.e., IQ).

This general finding is further supported by research that demonstrates a relationship between reaction time and IQ (Gordon, 1980; Hendrickson & Hendrickson, 1980; Jensen, 1980b). Similarly, research has demonstrated that the amount of time that individuals take to perceive a visual stimulus (as in tachistoscope experiments) is inversely related to traditional measures of IQ (cf. Hendrickson & Hendrickson, 1980). In short, recent research on the biological bases of intelligence emphasizes raw physiological efficiency and accuracy as being implicated in general intellectual functioning. This research suggests that the ability to perceive external reality, to encode that reality, to tap short-term and long-term memory stores,
and to act on contingencies that are inherent in that context, are an integral aspect of human intelligence. Thus, the root of intellectual functioning may lie in either electrochemical or cytoarchitectural aspects of the central nervous system (Gordon, 1980).

At the physiological level, a micro-analysis of the alley-oop could include all of the processes of attention, perception, and sensation. This involves the transforming of energy from electromagnetic or aural form to electrochemical energy within the central nervous system. These electrochemical messages, or impulses, are summed across neural units in order to produce the pulse trains identified by Hendrickson and Hendrickson (1980), and which are the building blocks of behavioral responses to external stimulation. When this neural activity is considered, the alley-oop may be seen to be exceedingly more complex than that which was described in the foregoing micro-analysis.

Indeed, if intelligence is defined as the ability to accurately perceive external reality, to make judgments about that perception, and then to act out those decisions, then all athletic contests must be viewed as contests of the intellect. Certainly there are basketball players that have more raw physical talent (e.g., height, weight, jumping ability, speed) than, say, Magic Johnson; but what makes Magic Johnson such a great player is his thinking ability during the course of a professional basketball game. Sporting events, such as
basketball, may therefore be viewed as a "critical indicator" of human intelligence.

_Notes on the Race and IQ Controversy_

A great deal of literature has been generated concerning racial differences in intellectual ability. Indeed, the finding that Black Americans average about 15 IQ points below the average for White Americans has been cited as evidence for the genetic inferiority of Black Americans, at least as it pertains to intellectual abilities (e.g., Eysenck, 1972; Jencks, 1980; Jensen, 1969, 1978, 1980a, 1980b, 1980c; Jensen & Figueroa, 1975; Jensen & Inouye, 1980; Sattler & Gwynne, 1982; Shockley, 1971, 1972; Terman, 1917). Although this position has been heavily criticized on theoretical, methodological, statistical, and ethical grounds (e.g., Baba & Darga, 1981; Brace, 1980; Brody & Brody, 1980; Clarke, 1980; Dorfman, 1980; Eckberg, 1980; Fairchild & Gurin, 1978; Kamin, 1974, 1980; Mackenzie, 1980a, 1980b; Persell, 1977, 1981; Simpkins, Gunnings, & Kearney, 1973; Terrell, Terrell, & Taylor, 1980; Vetta, 1980a, 1980b; Williams, Dotson, Don, & Williams, 1980; Williams & Mitchell, 1980), the controversy remains very much alive in the psychology of the 80's (see Cronbach, 1975; Eysenck & Kamin, 1981; Jencks, 1980; Jensen, 1978; McCall, 1981; Persell, 1981).

The current micro-analysis of the alley-oop has implications for this controversy in at least two ways. First, it demonstrates that
intelligence should be broadly defined; at least broadly enough to include the complex kinds of cognitive activities that are exhibited during the course of an athletic contest. This is important because intelligence as a construct remains inadequately defined, and even more inadequately assessed (cf. Humphreys, 1980; Sternberg, 1981; Williams & Mitchell, 1980). Current assessments of intelligence rely almost exclusively on tasks and skills that are related to academic achievement and verbal abilities; and these abilities are those that are most sensitive to issues of potential cultural bias. Indeed, some have argued that intelligence tests are actually achievement tests in disguise (e.g., Williams & Mitchell, 1980). In this respect, contemporary intelligence tests measure the extent to which individuals profit from a certain kind of experience: experience related to material traditionally taught in schools. And while this kind of experience is important for success as a mature adult in American society, the range of "learning" for the human being appears to be virtually limitless (rather than a "fixed capacity"), with the endless variations in organized sport a notable exemplar of this infinite quality of the human intellect.

The second implication for the race and IQ controversy is the observation that many of the top athletes (especially in basketball) are Black. Such athletic excellence by Blacks, as a group, is evidence of the learning potential of Blacks, as a group, and negates the notion that Blacks have a limited store for knowledge or a limited
ability to profit from experience (i.e., to meaningfully process information).

Some may argue that Blacks' superior performance in athletics is due to their physical superiority rather than their intellectual or mental superiority. But such an argument necessitates a false schism between mind and body, and contradicts current theories of intelligence that point to the translation of external events into observable choice-behaviors as a key index of intellectual ability. That is, the display of intelligence fundamentally requires the coordination of mental and physical aspects of human behavior. There can be no question that Black Americans excel at athletic contests which require complex information processing and decision-based behaviors.

Are Blacks superior in neurophysiological efficiency and therefore intellectual ability? Recent developments in the biological bases of intelligent behavior may ultimately provide an answer to this question, and some researchers (e.g., Jensen, 1980b; Reynolds, McBride & Gibson, 1981) may be motivated to demonstrate racial differences (i.e., white superiority) in neurophysiological efficiency (see Jensen, 1969, 1980a, 1980c; Reynolds & Gutkin, 1981). The more fundamental point, however, is that a detailed analysis of complex human behavior, in real-world contexts such as sporting events, points to an essential equality among races in information processing potential.
Conclusion

Micro-analyses of athletic behavior provide additional insights into the structure and functions of the human organism. When viewed in terms of information processing models of intelligence, it is clear that sporting events are fundamentally exercises of intellectual functioning. Athletic contests reveal the marvels of the human species, and therein lie their appeal.

Thus, the psychology of sport offers more than an enhancement of athletic performance, or an assessment of human kinesiology (Danish & Hale, 1981, 1982; Nideffer, Feltz, & Salmela, 1982), but may include more fundamental insights into the nature of the species in terms of intellectual abilities. This is even more important since it takes the abstract notions of intelligence and examines its implications in a real-world context—-with real-world consequences—-a feature that has been woefully missing in this field (Sternberg, 1981).
Notes

1. For ease of exposition, the male form of the personal pronoun is used. It is clear to the author, however, that females are among the world's most outstanding athletes, including in basketball. The implications of the current analysis for the race and IQ controversy may therefore have some bearing on the question of gender differences in intellectual functioning.
References


Fischbein, S. IQ and social class. *Intelligence*, 1980, 4(1), 51-64.


Humphreys, L. G. Intelligence testing: The importance of a difference should be evaluated independently of its causes. *The Behavioral and Brain Sciences*, 1980, 3, 347-348.


Jensen, A. R. The current status of the IQ controversy. *Australian*

Jensen, A. R.  Bias in mental testing.  NY: Free Press, 1980.  (a)

Jensen, A. R.  Chronometric analysis of intelligence.  Journal of Social and Biological Structures, 1980, 3(2), 103-122.  (b)


Mackenzie, B.  Hypothesized genetic racial differences in IQ: A criticism of three proposed lines of evidence.  Behavior Genetics, 1980, 10(2), 225-234.  (a)


McCall, R. B.  Nature-nurture and the two realms of development: A


Sattler, J. M., & Gwynne, J. Ethnicity and Bender Visual Motor


Vetta, A. Correlation, regression and biased science. *The Behavioral and Brain Sciences*, 1980, 3, 357-358. (b)