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A Comparison of Two Methods of Running to First Base

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A COMPARISON OF TWO METHODS OF RUNNING TO FIRST BASE

(TITLE)

BY

LEON CAMPBELL

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
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Chapter 1

INTRODUCTION

One of the great spectator sports in the United States is baseball; a game which preoccupies and thrills thousands each summer from Pony League Parks to Major League Stadiums. The prevalence of national enthusiam for the game supports the presumption that it is a phenomenon worthy of scientific investigation. Undoubtedly, no one study could encompass the intensive and exhaustive investigation necessary to studying the sport in its entirety. For that reason, the study was limited to a specific area: a comparison of two methods of running to first base.

PURPOSE OF THE STUDY

The purpose of the study was to investigate the difference involved in the time it takes to run to first base, using one of two methods: watching the ball for the first twenty feet, or looking at the first base bag throughout the entire run.

STATEMENT OF THE HYPOTHESIS

Null hypothesis: No statistical significant difference exists between criterion scores of groups running to first base while looking at a target for twenty feet, and groups running to first base while looking at the base.

NEED FOR THE STUDY

There has been much controversy concerning the advisability of running to first base while looking at the ball, or running to first base while looking at the first base bag. Written material on the subject has been reviewed relative to the method employed in running to first base, and the majority of opinions appear to support running to first base, keeping the eyes on the bag. However, little statistical evidence was found to substantiate that opinion. The writer felt that the paucity of any such experimental data pertinent to the subject was proof of the definite need for the study.

Furthermore, his contention was that if looking at the ball enabled a batter-runner to get to first base faster, then looking at the base is detrimental to his performance and should not be done, or vice versus. If there does not exist any significant difference, then the option of performance should be left to the discretion of the batter-runner.

DELIMITATIONS OF THE STUDY

The study was conducted at Eastern Illinois University, Charleston, Illinois. Twenty-eight members of the softball service classes, P.E.M. 106, and twenty members of the Eastern Illinois University Varsity Baseball Team served as subjects. All subjects were righthanded batters. Two basic groups (Skilled and Unskilled)

were established on the basis of experience or non-experience. The Skilled Group was composed of the members of the varsity baseball team, and the Unskilled Group was comprised of the members of the softball service classes, P.E.M. 106. Both groups were subdivided into a Light Group and a Base Group. Light groups were instructed to run to first base while watching the light; base groups were instructed to run to first base while looking at the first base bag throughout the entire run.

The experiment was conducted during spring quarter of the 1970-71 academic year. It was prefaced by a pilot study, and covered a period of two weeks. The testing involved three phases. Phase I was devoted to pretests. Phase II was an instructional stage. Phase III was consigned to posttests. All groups were involved in each phase of the experiment. The performance of each subject was timed and recorded during the course of the experiment. Later, the data collected was analyzed and interpreted.

The study was limited by the fact that only righthanded batters were used; all subjects wore tennis shoes; the experiment was conducted within the field house of the Charles P. Lantz Physical Education and Recreation Building; and the experiment was not investigated under actual game conditions. A further limitation was imposed on the study because of the fact that only male students at Eastern Illinois University were used as subjects---a fact which prevented the possibility of a double check.

DEFINITION OF TERMS

The following list of terms were presented because they are applicable to the study and are unique to the game of baseball:

Approach	---the run and/or adjustment made by the athlete prior to the actual competitive effort.
Base Hit	---a fair batted ball which permits the batter to reach first base without the aid of an error by the defense.
Base Line	---the direct line between bases.
Bases	---three bags and a rubber plate at the extremities of the base lines; namely, first base, second base, third base, and home plate.
Batter	---the player hitting the ball.
Batter Runner	---the batter running to first base.
Batter's Box	---the area in which a player must remain while batting the ball.
Foul	---a legally batted ball that settles on foul territory before reaching first or third base, or that bounds past first or third base, on or over foul territory, or that first falls on foul territory beyond first or third base, or touches the person of an umpire or a player or any object foreign to the ground while on or over foul territory.
Grip	---type of handhold on an implement such as a bat.
SBG	---Skilled Base Group. Subjects from baseball team who ran to first base watching the bag.
SLG	---Skilled Light Group. Subjects from the baseball team who ran the first twenty feet watching the light.

UBG ---Unskilled Base Group. Members of the softball service classes who ran to first base watching the bag.

ULG ---Unskilled Light Group. Members of of the softball service classes who ran the first twenty feet watching the light.

Chapter 2

REVIEW OF RELATED LITERATURE

Unlike many sports, each player on a baseball team must perform both offensively and defensively. To win the game, a team must score more runs than its opponent. This can be accomplished by methodically executing the running of bases.

The investigation of literature on baseball produced an abundance of material on base-running in general, but very little material was available on the time it takes to run to first base; watching the ball or looking at the base. There was only one published study found which related in any way to the time involved in running to first base; however, several unpublished Master's Theses were found which dealt with the subject. Additional literature about base-running revealed that many professionals in the sports world of baseball share a difference of opinion as to how one should make his approach to first base. The diverse opinions included such admonitions as follows:

1. The base-runner should not watch the ball.
2. The base-runner should look for the base line.
3. The base-runner should respond according to the direction in which the ball is hit.
4. The base-runner should watch the ball.

Such controversial opinions were perplexing because all of the opinions collated were elicted from men, equally imminent in stature in the world of baseball.

FUNDAMENTAL BACKGROUND OF BASE-RUNNING

At some time during the game, each player probably has the opportunity to bat the ball. As a result of that opportunity, he may become a batter-runner if he fulfills either one of the following conditions:

> . . .the moment he hits the ball into fair territory; at the moment a third strike is missed or dropped by the catcher, provided that first base is unoccupied and there are fewer than two outs. (With two outs the batter may run for first base, even if it is occupied.)[1]

Good base-running, according to Litwhiler, will enable a ball club to win more than 50% of its games.[2] In the following statement Weiskopf asserts that there are obvious results of good base-running: "more base hits, fewer double plays, more extra base hits, and many other advantages."[3] Thus, base-running is a skill not to be slighted by any player. Coombs contends that "it

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[1]O. H. Vogel, Ins and Outs of Baseball (Saint Louis: The C. V. Mosby Company, 1952), p. 144.

[2]Danny Litwhiler, Baseball Coach's Guide to Drills and Skills (Englewood Cliffs: Prentice-Hall Inc., 1963), p. 167.

[3]Don Weiskopf, Baseball The Major League Way (New York: The Ronald Press Company, 1962), p. 49.

is a real qualification in the make-up of an expert in the game.[4]

Weiskopf states that speed is a definite asset to a base-runner.[5] Yet, in some instances speed is not the only essential. Allen holds that judgement is often the determining factor in rating a base-runner.[6] If this is true, then, the assertion by Stallings that the success of becoming a good base-runner rests with the individual's skill and strategy rather than with the skill and strategy of the base coaches or the coach in the dugout,[7] supports the presumption that there must exist in the player a quality beyond that of blind, mechanized obedience.

As far back as 1910, similar concern was apparently felt because Johnnie Evers, one-time captain, manager, and second baseman of the Chicago Cubs, stated that baseball had been reduced to a science and was in danger of becoming mechanical unless base-running remained an art based on individual effort. At that time, he attributed the decline in the art of base-running to individual

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[4]John W. Coombs, Baseball (New York: Prentice-Hall, Inc., 1939), p. 144.

[5]Weiskopf, "Baseball's Key Fundamentals," Athletic Journal, XLV (March, 1965), 12.

[6]Ethan Allen, Baseball and Strategy (New York: The Ronald Press Company, 1959), p. 211.

[7]Jack Stallings, "Individual Base-Running Strategy," Athletic Journal, XL (March, 1960), 10.

effort being sacrificed in favor of team work, and the vast improvement of pitchers in watching the bases.[8] The same trend of thought is evident today in the thinking of some coaches. Lew Watts has recognized the value of advice and instructions of the coach, but expressed the opinion that whenever a player enters the batter's box, he is on his own, and 90% of the time his success from that moment on depends entirely upon his own ability.[9]

In any event the art of base-running issues from the premise that the initial manuever of a base-runner must be to get out of the batter's box, and proceed to first base as quickly as possible. Richard's states that "the number one objective of any base-runner, of course must be to score,"[10] and that may be true. However, it does not eliminate the fact that the primary concern of any batter, is the attainment of first base with all possible speed.

The base-runner has the option of moving as quickly as possible to first base by utilizing one of two methods. The first, based on individual effort, would require him to look at the ball

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[8]Johnnie Evers, Baseball in the Big Leagues (Chicago: The Reilly and Britton Company, 1910), pp. 171-176.

[9]Lew Watts, The Fine Art of Baseball (Englewood Cliffs: Prentice-Hall, inc., 1964), p. 287.

[10]Paul Richards, Modern Baseball Strategy (Englewood Cliffs: Prentice-Hall, Inc., 1955), p. 73.

in flight, and act accordingly. The second, based on mechanized obedience, would require him to keep his eyes on the first base bag, and pay no attention to the ball.

LITERATURE RELATIVE TO BASE-RUNNING METHODS

The one published study found which related to the time involved in getting to first base, was conducted by Emery W. Seymour. The Seymour study was a comparative analysis of the time involved in getting to first base; "running directly to and beyond the base in normal stride, and leaping at the base in the final stride." The problem was to determine which of the two methods was the fastest. Seymour used fifteen varsity baseball players of Springfield College as subjects. The conditions under which the experiment was conducted was similar to an actual game situation; i.e., each run was begun at home plate and terminated at first base. He concluded from the results of the study that the fastest technique was to run to and beyond first base, using the normal stride and avoiding the leap upon approaching the base.[11]

The unpublished Master's Theses were comparative studies which dealt with one or the other of the following base-running factors: a) methods of running from home to first base; b) methods

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[11]Emery W. Seymour, "Comparison of Base-Running Methods," Research Quarterly, 30:221, October, 1959.

of rounding first base; or c) techniques of base-running. In neither instance, however, was the emphasis placed on whether the subject should watch the flight of the ball, or keep his eyes on the bag at first base. Methods of rounding first base were investigated by DeCristoforo, Browder, and Kaufman. Smith analyzed three methods of running from home to first base, and Moreland compared two techniques of base-running.

In an attempt to determine a fastest possible method of rounding first base, DeCristoforo compared the following five methods:

1. The Branch Rickey Method, using the left foot in touching the inside of the base.
2. The Round Out Method (at 20'), using the right foot in touching the inside of the base.
3. The Round Out Method (at 20'), using the left foot in touching the inside of the base.
4. The Round Out Method (at 60'), using the right foot in touching the inside of the base.
5. The Round Out Method (at 60'), using the left foot in touching the inside of the base.

At the end of the study, the statistics obtained failed to show any significant difference in the methods investigated. He did discover that statistically, the Round Out Method at 60' was slightly faster than the other methods; that realistically, either the right or left foot could be utilized; and that theoretically, the runner, rounding first base at 60',tends to apply less pressure

than in any of the other base-running methods.[12]

Browder compared four methods of rounding first base: the Branch Rickey Method, using the left foot in touching the inside of the base; the Branch Rickey Method, using the right foot; the Round Out Method; and a Method which he called the Angle Method. As a result of the study, he formed the following conclusions:

1. The primary component in running performance was running speed rather than any of the particular methods of running.
2. The mean time for the Angle Method was the fastest, but not significantly faster as compared to the Round Out Method.
3. The Round Out Method produced the second fastest time.
4. The Rickey Method was the third fastest.
5. The adaptation of the Rickey Method proved to be the slowest of them all.[13]

Kaufman compared two methods of rounding first base: one, two variations of the Round Out Method before first base, using as the distance in making the desired swing around first base, arcs of four and six feet, respectively; and two, two variations of Browder's Angle Method, using the same arcs of four and six feet. The follow-

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[12]James Francis DeCristoforo, "A Study to Determine the Fastest Method of Rounding First Base" (unpublished Master's thesis, Springfield College, 1963), pp. 44-46.

[13]James Browder, "A Study to Compare Four Methods of Rounding First Base" (unpublished Master's thesis, Ohio State University, 1959), pp.6-7, cited by James F. DeCristoforo, "A Study to Determine the Fastest Method of Rounding First Base" (unpublished Master's thesis, Springfield College, 1963), p. 11.

ing conclusions were drawn from that study:

1. The difference of means between the four foot 'Round Out' and the six foot 'Round Out' was not significant.
2. The difference of means between the four foot 'Round Out' and the four foot 'Angle' was significant at the .01 level of confidence.
3. The difference of means between the four foot 'Round Out' and the six foot 'Angle' was significant at the .01 level of confidence.
4. The t of 4.348 for the difference between the six foot 'Round Out' and the four foot 'Angle' was significant at the .01 level of confidence.
5. The t for the four foot 'Angle' and the six foot 'Angle' was not significant.
6. Both 'Angle' times produced scores superior to both 'Round Out' times. Their mean difference resulted in significance at the .01 level of confidence.[14]

The following three methods of running to first bases were compared by Smith: The Branch Rickey Method; The Round Out Method before first base; and the method of running to the base and swinging wide into rightfield. According to his findings, the 'Rickey Method' was .37 of a second faster than cutting into right field. The t proved to be 9.25, which was significant at the .01 level of confidence. The mean difference between the 'Rickey' and the 'Round Out' methods was .17; its t, 4.25, which was indicative of signifi-

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[14]Wayne Kaufman, "A Comparison of Two Methods of Rounding First Base in Baseball" (unpublished Master's thesis, Ohio State University, 1961), pp. 22-24, cited by James F. DeCristoforo, "A Study to Determine the Fastest Method of Rounding First Base" (unpublished Master's thesis, Springfield College, 1963), p. 12.

cance beyond the .01 level of confidence. The mean difference between the method of swinging wide into rightfield and the 'Round Out' proved to be .20 of a second; the t was 5.00, which once again denoted a significance beyond the .01 level of confidence.[15]

In order to compare two techniques of base-running, Moreland used the 'Jab Step Method' and 'Cross-over Step Method' to conduct his experiment. Twenty members of the varsity baseball club served as subjects. Mean time for the 'Cross-over Step' was .048 seconds faster than the 'Jab Step' method. Moreland concluded that nineteen of the subjects scored faster times when they used the 'Cross-over Step.' The t for sixteen of the subjects was significant at the .01 level of confidence. Two cases for this method were found to be significant at the .05 level of confidence. The results of the remaining two subjects indicated that their difference was not significant.[16]

Although the texts reviewed by professionals did not concentrate on the time involved in running to first base, they did

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[15]Joseph Smith, "A Study to Compare Three Methods of Running from Home to Second" (unpublished Master's thesis, Springfield College, 1955), pp. 10-11, cited by James F. DeCristoforo, "A Study to Determine the Fastest Method of Rounding First Base" (unpublished Master's thesis, Springfield College, 1963), p. 10.

[16]Ronald Moreland, "A Comparison of Two Techniques of Base-running in Baseball" (unpublished Master's thesis, Northern Illinois University, 1962), p. 34, cited by James F. DeCristoforo, "A Study to Determine the Fastest Method of Rounding First Base" (unpublished Master's thesis, Springfield College, 1963), p. 14.

emphasize the importance of employing the method most conducive to getting to first base as fast as possible. Several methods were elicited from that research: the runner may proceed to first base as quickly as possible by not watching the flight of the ball; by looking for the base line; by responding according to the direction in which the ball is hit; and by watching the ball.

The method most frequently supported in those texts, was the traditional---a base-runner should not watch the ball. That opinion was supported by baseball experts such as Rauseo, Allen, Smilgoff, and Petroff.

Rauseo stated that "in attempting to beat out a grounder the base-runner should keep his eyes straight ahead, not on the ball, and hit first base while taking a normal stride." He contended that it is only after a player has passed first base "at top speed," that he should look for the ball. Rauseo relegated the practice of watching the ball to the realm of most common error in unorganized baseball.[17]

Allen appears to have concurred with Rauseo. He asserted in one of his texts that batters are often thrown out at first base because they "hesitate" to see if the ball is fair or foul. That he contended, was a fault which needs to be corrected. He advocated

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[17]Michael Rauseo, "Running The Bases," Athletic Journal, XXXVI (April, 1956), 61.

keeping the "eyes straight ahead on the target (base)."[18] A similar contention is held by Smilgoff who also believes that after hitting the ball, the initial thought of the base-runner should be to start immediately to first base, reach that base as quickly as possible, and "in doing this the runner pays no attention whatsoever to the ball."[19] Petroff incorporated the same philosophy into some "general points to remember" about base-running fundamentals. In that listing by Petroff, the second point made was "do not watch the ball."[20]

Although DeGroat agreed with the traditionalists in that the base-runner should not watch the ball, he did not agree with those professionals who advocated watching the base. Instead, he stipulated that the base-runner should look for the base line.[21]

Two coaches recommended that a base-runner should look or not look at the ball when approaching first base, according to the direction in which the ball is hit. Krupa set forth the following procedure for getting to first base: if the hit were a single to

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[18]Archie P. Allen, Baseball Coach's Handbook of Offensive Strategy and Techniques (Englewood Cliffs: Prentice-Hall, Inc., 1964), pp. 64-68.

[19]James Smilgoff, "Run Those Bases," Athletic Journal, XXXI (March, 1951), 8.

[20]Thomas A. Petroff, "Base-Running Fundamentals Integrated Into Purposeful Drills," Athletic Journal, XLI (March, 1961), 51.

[21]H. S. DeGroat, "Base-Running," Athletic Journal, XXVIII (March, 1948), 20.

left, or center, the runner should not look for anything until he had rounded the bag. On the other hand, if the ball were hit to right field, the runner should look in that direction just before reaching the bag.[22] Irace outlined the following conditions for deciding when to look for the ball:

> As soon as the batter hits the ball his status has changed to that of a baserunner and he should run as fast as possible to first base in one of the following ways: If the ball has been hit into the air to the outfield, the runner's path should immediately begin to assume the form of an arc from home plate to first base in foul territory. As he rounds first base he should be looking and listening for directions from the coach. If the ball has been hit toward right field the runner should attempt to steal a glance at the ball without impairing his speed. Any time the play is ahead of the runner he should take advantage of this fact by stealing a glance. If the batter hits the ball on the ground he heads for first base in a straight line in foul territory.[23]

The final extremity of opinion was apparent in the comments of those coaches who advocated looking for the ball, almost unconditionally. Spackman and Vogel were two such men. Spackman felt that:

> Base runners should run hard to all bases, with heads up and eyes on the ball. If the opposing outfielder or infielder fumbles a ball, hesitates, or are in a position to

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[22]Thomas J. Krupa, "Good Base-Runners Think Ahead," Athletic Journal (March, 1962), 20.

[23]S. Charles Irace, Comparative Baseball Strategy (Minneapolis: Burgess Publishing Company, 1967), p. 73.

> throw, take the chance to advance an extra base. A team that runs will make outfielders rush their throws, take their eyes off the ball and make errors.[24]

Vogel contended that:

> When the ball is hit into the right field side of the diamond, the play is in front of the batter-runner and he can easily see what happens to the ball. When the ball is hit to the left field side of the diamond, the batter-runner should take a quick glance over his shoulder to locate the ball as he runs to first base. He then will often be able to decide whether to make the turn, run straight through, or to continue on to second base. He should also look at, and listen to, the first base coach for instructions.[25]

The related literature reviewed indicated that many coaches and professional instructors employed diverse methods to achieve the same end---the attainment of first base with a minimal loss of time. While it was impossible to obtain unanimous agreement concerning the best possible method for running to first base, there did appear to be a consensus of opinion among baseball coaches and professionals that running there (first base) as quickly as possible, was to be desired.

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[24]Robert R. Spackman, Baseball (Annapolis: United States Naval Institute, 1963), p. 82.

[25]Vogel, op. cit., p. 262.

Chapter 3

METHODOLOGY

The study was conducted during spring quarter of the 1970-71 academic year at Eastern Illinois University, Charleston, Illinois. The subjects for the experiment were all righthanded batters. On the basis of experience and non-experience, they were divided into two specific groups: Skilled and Unskilled. The Skilled Group was composed of 20 members of the Eastern Illinois University Varsity Baseball Team, and the Unskilled Group was comprised of 28 members of the freshmen softball service classes, P.E.M. 106. Each group was further sub-divided into two groups: Base and Light.

The experiment was conducted in the field house of the Charles P. Lantz Physical Education and Recreation Building. It was felt that the conditons of the natural elements and the possibility of the subjects being exposed to observation by spectators would increase the chance of variables; and thus, lessen the objectivity of the study.

EXPERIMENTAL DESIGN

The experimental design was effected by creating a simulated replica of home plate and first base within the field house. Home plate (a regulation rubber plate) was placed 90' from first

base (a regulation baseball base). At home plate, a piece of tape placed on the floor suggested the batter's box, and indicated where the subject should stand when batting the ball.

In order to determine the speed of each subject's run, a timing device was installed; the operation of which depended upon, the sound caused by the batter making contact with the ball---that sound initiated the recording device. That device was stopped only when the runner stepped on first base. To facilitate this operation, a 60' nylon cord was attached to two volley ball stands placed on either side of home plate. At its center, the cord passed through a steel ring, approximately one inch in diameter. To that ring was attached another nylon cord, at the end of which a 12 inch softball was fastened. The ball was allowed to swing free in the center of home plate, and could be regulated to approximate the perfect pitch for each batting subject.

When the ball was hit, the sound triggered the mechanism of a Heath Kit Junior, model JK27, an electronic device which activated a Dekan Automatic Performance Analyzer. The Automatic Performance Analyzer recorded the time of the trial runs to the nearest one-hundreths of a second. At first base, there was a rubber mat under the bag. It was connected to the Automatic Performance Analyzer. When the runner stepped on the first base bag, he stopped the timing device with the pressure he applied to the rubber mat beneath the bag. The Heath Kit was a unique feature in the experiment in

that it enabled the Automatic Performance Analyzer to commence operation at the exact moment that contact was made with the ball.

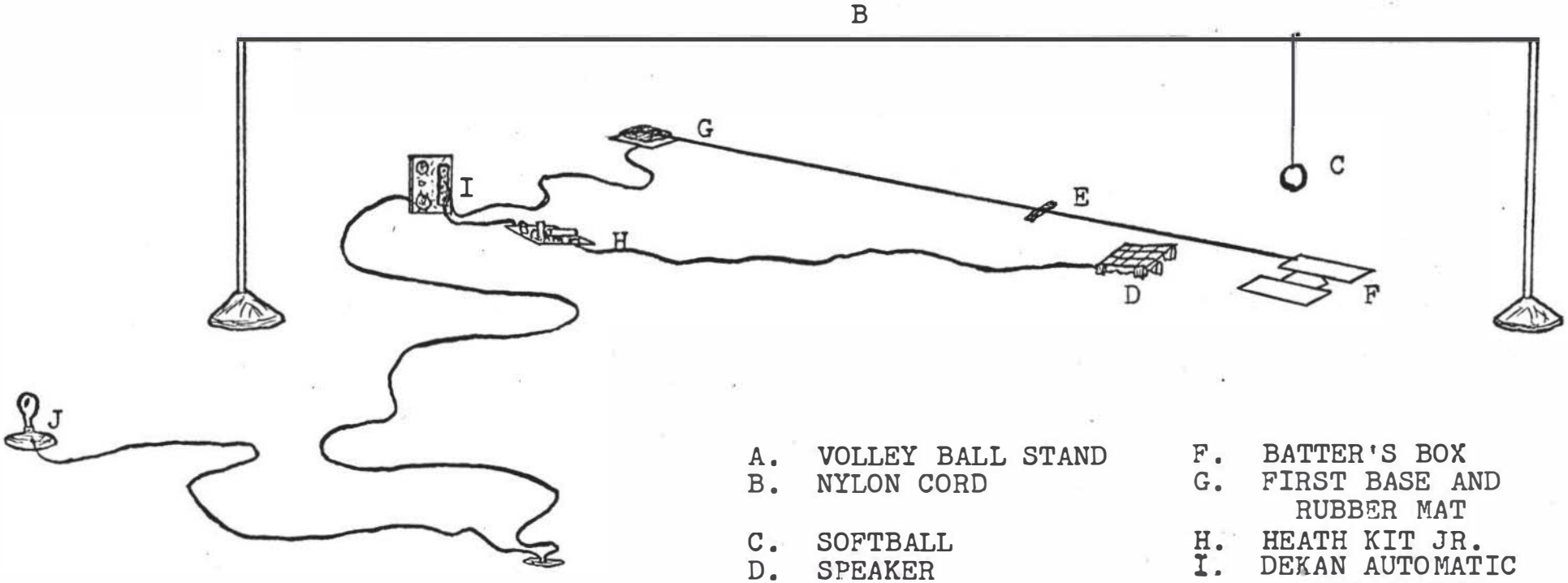
On a wooden chair in the shortstop position, a light was placed. With the aid of a switch the writer could operate it manually. The light, when lit, simulated the progress of a batted ball in flight.

EXPERIMENTAL TESTING PHASES

The study covered a period of two weeks. It was prefaced by a pilot study, and involved three experimental testing phases. Phase I was devoted to pretests. Phase II was an instructional stage. Phase III involved posttesting. Each subject participated in all three phases of the experiment. The performance of each subject was timed and recorded for later analysis.

During Phase I, the pretest period, the subjects reported to the field house on alternate days according to scheduling by the writer. The Skilled Group was tested on the first testing day of that phase, and the Unskilled Group, the next testing day. The Skilled Group was always tested at three o'clock in the afternoon prior to baseball practice. The Unskilled Group was always tested at eleven o'clock in the morning during their class period.

When a group had assembled, the writer explained the equipment to them. Then, they were given a warm-up period consisting of four thirty-yard sprints. After completing the warm-up exercises, they were given the following instructions:



A. VOLLEY BALL STAND
B. NYLON CORD
C. SOFTBALL
D. SPEAKER
E. 20' MARKER
F. BATTER'S BOX
G. FIRST BASE AND RUBBER MAT
H. HEATH KIT JR.
I. DEKAN AUTOMATIC PERFORMANCE ANALYZER
J. LIGHT

Figure 1

A Diagram Of The Experimental Design

> Each of you is to hit the ball, make good contact with it, and run directly to first base. When you reach first base, do not leap or lunge at the bag; run through the base, using the 'straight' through stride. Each of you will have three trials. In order for this to be a valid study you must run as fast as you can on all three trials.

The instructions above were mimeographed, and a copy was given to each participant. The subjects read the instructions silently while the writer read them aloud. After receiving their instructions they watched the writer demonstrate the manuever twice, before performing the test. Both the Skilled Group and the Unskilled Group received the same instructions during Phase I.

In order to perform the tests, the participants in a group were placed in a straight line, arranged alphabetically according to surnames.

Prior to Phase II, the time of each subject's run was recorded and a table set up ranking the group members according to the best performance time. On the basis of that record both groups were sub-divided, forming a Light and a Base group within the major groups. The sub-divisions were established by using the method of equating subjects into groups. The process involved in the method of equating subjects into groups, is as follows: the subject with the fastest time was placed into the Light Group; the subjects with the second and third fastest times were placed in the Base Group; subjects with the fourth and fifth fastest times were placed

in the Light Group; subjects with the sixth and seventh fastest times were placed in the Base Group; and so on by alternating pairs until each subject had been assigned to either a Light or a Base group.

At the end of the equating process, there were an equal number of subjects in each sub-division of a basic group; i.e., of the 20 varsity baseball subjects, 10 became Skilled Light Group (SLG) subjects, and 10 became Skilled Base Group (SBG) subjects. Of the 28 subjects from the softball service classes, 14 became Unskilled Light Group (ULG) subjects, and 14 became Unskilled Base Group (UBG) subjects. Both 'light' groups were to run directly to first base, watching the light for the first 20'. Both 'base' groups were to proceed to first base, keeping their eyes on the bag throughout the entire run.

Phase II was an instructional stage. The Skilled Group (Light and Base) participated in the experiment on the first test day of that phase, but at different intervals. The Unskilled Group (Light and Base) participated on the following test day, but at different times. In both cases, the Light Group was tested first. While 'light' groups were being tested, 'base' groups were not in attendance. When the tests were finished; the Light Group was dismissed, the light was removed, and the Base Group reported for testing. The testing period for each group followed the same procedural agenda established during Phase I: a) warm-up period; b) instruc-

tional period; c) demonstration period; and d) the performance period.

All groups experienced the same warm-up exercises; four thirty-yard sprints at three-fourths speed. The three-fourths speed limitation was imposed to prevent the subjects from becoming fatigued before performing their trial runs.

After the warm-up period subjects received a mimeographed copy of instructions which they read silently as the writer read them aloud. Even though the 'light' group instructions differed from the 'base' group instructions, both the SLG and the ULG had the same instructions. In like manner, both the SBG and the UBG also had the same instructions.

The Light Group instructions were as follows:

> I am going to teach you a different method of running to first base. Each of you must listen and concentrate on the instructions which I am going to give you. Each of you will be given a number; when your number comes up, you will prepare to run to first base. In order to run to first base you must hit the ball. Do not step over or on the piece of tape on the floor until you have hit the ball. Notice that there is a light to your left. After hitting the ball, proceed directly to the base, but watch the light, keep your eyes on the light until it goes out. The light will not go out until you have run twenty feet. When the light goes out, direct your eyes toward the base. Look directly at the base. Keep your eyes on the base until you step on it. Be sure you step on the bag. Remember, when you hit the ball, you must proceed immediately to the base, following all previous instructions, without ever slowing down. Each of

> you will have five trials. You will follow in consecutive order every time---number two will always follow number one, and so forth. I am particularly interested in your doing the method correctly. For that reason, you may run your last two trials at three-fourths speed.

The Base Group instructions were as follows:

> The method you are going to use today will require some restrictions. Do not step on or over the piece of tape on the floor. You are to hit the ball and run immediately to first base, looking directly at the base. Do not turn your head in another direction. The moment you hit the ball, start running and keep your eyes on the base throughout the entire run. Be sure to step on the bag when you reach the base and complete your run. In order for this to be a valid study, you must follow the instructions to the letter. Make no variations. Once the testing has begun, do not talk, joke, or laugh at any time. You will have five trials to master this method. Each of you will be given a number. When your number comes up, you will prepare to bat the ball and run to first base. Remember your number because you will perform each trial in numerical order. Each time---number two will follow number one, and so on consecutively. You may perform the last two trials at three-fourths speed. Be sure that you concentrate on what you are to do.

After instructing the subjects as to the required method of running to first base, the writer demonstrated the manuever twice. At the end of the demonstration, the subjects formed a straight line according to their assigned numbers, and performed five trial runs ---two more runs than were demanded during the first phase. The

two additional runs were added in order to increase the subject's knowledge of the method and/or methods to be employed. When the trials were completed, the subjects were dismissed for the day.

During Phase III, groups followed a schedule and procedural agenda similar to that enacted during the second phase. The Unskilled Group was tested at different intervals during their eleven o'-clock morning physical education class on the first day, and the Skilled Group was tested at different times prior to baseball practice at three o'clock in the afternoon of the second day. The procedural agenda---warm-up period, instructional period, demonstration period, performance period---remained intact with two exceptions. One, the writer did not engage in any demonstrations; and two, only three trial runs were permitted.

At the end of the experimental stage, all records were reviewed, computed, analyzed, and interpreted. During the course of computation and analysis, the recorded, timed performance of each subject was prepared for IBM data processing; a procedure which calls for key punching the times for each run on IBM cards. These cards were then submitted to an IBM computer program.

Chapter 4

ANALYSIS AND INTERPRETATION OF THE DATA

Each of the 48 subjects completed a total of 11 trial runs. The first three runs of each subject were executed in order to classify them into a 'light' or 'base' group. The subsequent five runs were essential to instructing the subjects in the method to be employed when running to first base. The final three runs which were performed during the third phase were significant in that they supplied the data essential to making the comparative analysis for this study. The data for these trials are presented in 11 tables, which have been interpreted in this section.

Table 1 presents the mean times of each 'unskilled' subject who ran to first base, looking at the bag. Table 2 provides the mean times of each 'unskilled' subject who ran to first base, watching the light. Table 3 reflects the mean times of each 'skilled' subject who ran to first base, looking at the bag. Table 4 gives the mean times of each 'skilled' subject who ran to first base, watching the light. In these first four tables the trials have been listed in numerical order with the time of performance indicated. In the ensuing six tables the student t was utilized to determine whether there existed any significant difference between and within the groups being compared. The 5% level of confidence was applied

Table 1

The Mean Times of
the Unskilled
Base Group

SUBJECTS	FIRST	SECOND	THIRD	MEAN TIME
1.	4.23	4.27	4.22	4.24
2.	4.27	4.29	4.24	4.27
3.	4.35	4.54	4.50	4.46
4.	4.43	4.42	4.46	4.44
5.	4.69	4.42	4.35	4.49
6.	4.37	4.47	4.42	4.42
7.	4.48	4.44	4.47	4.46
8.	4.50	4.61	4.55	4.55
9.	4.85	4.64	4.78	4.76
10.	4.70	4.75	4.69	4.71
11.	4.63	4.59	4.56	4.59
12.	4.95	4.90	4.78	4.88
13.	4.73	4.75	4.82	4.77
14.	4.78	4.73	4.83	4.78

Table 2

The Mean Times of the Unskilled Light Group

SUBJECTS	FIRST	SECOND	THIRD	MEAN TIME
1.	4.13	4.18	4.15	4.15
2.	4.22	4.36	4.29	4.29
3.	4.49	4.36	4.35	4.40
4.	4.49	4.35	4.41	4.42
5.	4.69	4.46	4.37	4.51
6.	4.49	4.57	4.46	4.51
7.	4.69	4.75	4.70	4.71
8.	4.44	4.47	4.39	4.43
9.	4.53	4.75	4.62	4.63
10.	5.11	4.66	4.67	4.81
11.	5.10	4.78	4.82	4.90
12.	4.73	4.68	4.75	4.72
13.	5.00	4.85	4.96	4.94
14.	4.81	4.72	4.75	4.76

Table 3

The Mean Time of the Skilled Base Group

SUBJECTS	FIRST	SECOND	THIRD	MEAN TIME
1.	4.03	4.01	4.01	4.02
2.	4.26	4.20	4.06	4.17
3.	4.20	4.20	4.18	4.19
4.	4.33	4.22	4.29	4.28
5.	4.51	4.34	4.39	4.41
6.	4.38	4.23	4.32	4.31
7.	4.53	4.54	4.57	4.55
8.	4.67	4.56	4.53	4.59
9.	4.67	4.55	4.52	4.58
10.	4.80	4.69	4.62	4.70

Table 4

The Mean Times of the Skilled Light Group

SUBJECTS	FIRST	SECOND	THIRD	MEAN TIME
1.	4.23	4.03	3.98	4.08
2.	4.16	4.11	4.09	4.12
3.	4.09	4.00	4.10	4.06
4.	4.24	4.41	4.26	4.30
5.	4.19	4.16	4.23	4.19
6.	4.52	4.47	4.65	4.55
7.	4.40	4.23	4.30	4.31
8.	4.58	4.39	4.42	4.46
9.	4.75	4.79	4.59	4.71
10.	4.68	4.63	4.36	4.56

as a basis for acceptance or rejection of the hypothesis.

Table 5 shows a comparison of SLG and SBG trials. The SLG had a mean time of 4.33 with a standard deviation of .22. The SBG had a mean time of 4.37 with a standard deviation of .21. The Student *t* was found to be .46. The results indicate no significant difference.

Table 5

A Comparison of Skilled Light Group and Skilled Base Group

GROUP	N	MEAN	S.D.	*t*-SCORE
SKILLED (LG)	10	4.33	.22	.46
SKILLED (BG)	10	4.37	.21	

Table 6 presents a comparison of ULG and UBG trials. The ULG evidenced a mean time of 4.58. The UBG evidenced a mean time of 4.56. The standard deviation of the ULG was .23, and the standard deviation of the UBG was .19. The Student *t* was found to be .31---a result which reveals no significant difference at the five percent level of confidence.

Table 6

A Comparison of Unskilled Light Group and Unskilled Base Group

GROUP	N	MEAN	S.D.	t-SCORE
UNSKILLED (LG)	14	4.58	.23	.31
UNSKILLED (BG)	14	4.56	.19	

Table 7 shows a comparison of SLG and ULG trials. The SLG mean time was 4.33 with a standard deviation of .22. The ULG mean time was 4.58; the standard deviation was .23. The Student t was found to be .26 and thereby, of no significant difference.

Table 7

A Comparison of Skilled Light Group and Unskilled Light Group

GROUP	N	MEAN	S.D.	t-SCORE
SKILLED (LG)	10	4.33	.22	.26
UNSKILLED (LG)	14	4.58	.23	

Table 8 presents a comparison between SBG and UBG trials. The SBG mean time was 4.38 with a standard deviation of .21. The UBG mean time was 4.56 with a standard deviation of .19. The Student *t* was .21, indicative of no significant difference.

Table 8

A Comparison of Skilled Base Group and Unskilled Base Group

GROUP	N	MEAN	S.D.	*t*-SCORE
SKILLED (BG)	10	4.38	.21	.21
UNSKILLED (BG)	14	4.56	.19	

Table 9 presents a comparison of SLG and UBG trials. The SLG mean time was 4.33; its standard deviation was .22. UBG mean time was 4.56; its standard deviation was .19. The Student *t* was 1.13; an indication that there is no significant difference.

Table 10 shows a comparison of ULG and SBG trials. The mean time for the ULG was 4.58; standard deviation .23. SBG mean time was 4.38; standard deviation .21. The Student *t*, being 1.03, evidenced no significant difference at the five percent level of confidence.

Table 9

A Comparison of Skilled Light Group and Unskilled Base Group

GROUP	N	MEAN	S.D.	*t*-SCORE
SKILLED (LG)	10	4.33	.22	1.13
UNSKILLED (BG)	14	4.56	.19	

Table 10

A Comparison of Unskilled Light Group and Skilled Base Group

GROUP	N	MEAN	S.D.	*t*-SCORE
UNSKILLED (LG)	14	4.58	.23	1.03
SKILLED (BG)	10	4.38	.21	

Table 11 presents the mean time and standard deviation of each of the four groups: Skilled Light Group, Skilled Base Group, Unskilled Light Group, and Unskilled Base Group.

Table 11

The Mean Time and Standard Deviation of All Groups

GROUP	N	MEAN	S.D.
SLG	10	4.33	.22
SBG	10	4.37	.21
ULG	14	4.58	.23
UBG	14	4.56	.19

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY

The study was conducted at Eastern Illinois University, Carleston, Illinois. It was undertaken during the spring quarter of the 1970-71 academic year. The purpose of the study was to determine the difference involved in the time it takes to run to first base using one of two methods: looking at the base throughout the entire run, or watching the ball for the first 20 feet. The paucity of research material available on the subject suggested that there was a definite need for the study.

Twenty members of the varsity baseball team and 28 members of the softball service classes served as subjects for the experiment. The subjects were divided into two specific groups: (Skilled and Unskilled), which were themselves divided into sub-groups (Light and Base), with the resultant divisions forming four particular groups: Skilled Base Group, Unskilled Base Group, Skilled Light Group, and Unskilled Light Group.

The experiment covered a period of two weeks and involved three phases of experimentation: Phase I, the pretest stage; Phase II, the instructional stage; and Phase III, the posttest stage. During each phase, the participating subjects were allowed to hit the ball and proceed directly to first base according to whatever

method had been assigned. All subjects completed a total of 11 trial runs; the results of which were timed, recorded, computed, analyzed, and interpreted.

A Heath Kit Junior, model JK27 and a Dekan Automatic Performance Analyzer were used to time the trials of each subject. To facilitate computation the Student t was used to test for the significance of statistical differences occurring within and between groups. The five percent level of confidence was used as a means of acceptance or rejection of the findings.

CONCLUSIONS

The following conclusions resulted from the study:

1. There was no significance difference in the performance between the Skilled Group and the Unskilled Group, nor within either group. However, certain slight variations did occur:

   A. Both 'skilled' groups performed faster than either of the 'unskilled' groups.

   B. The Skilled Light Group performed faster than the Skilled Base Group.

2. In comparing the Unskilled Light Group with the Skilled Base Group, the Student t score was found to be considerably higher than the Student t scores found among the other comparisons.

3. In general all subjects performed better during

Phase III than they did during the other two phases.

4. The writer concluded that 'watching the ball' in flight could serve as a motivational factor.

RECOMMENDATIONS

As a result of the study, the following recommendations were made:

1. Further studies should be undertaken, using a larger and more diverse population in order to increase reliability.

2. Further comparative studies should be undertaken, using as subjects: 'unskilled light' groups with 'skilled base' groups; and 'skilled light' groups with 'unskilled base' groups, because the Student *t* scores in both of those instances were unusually high.

3. Further study should be undertaken under actual game conditions.

4. Further studies should be undertaken during which the distance of 'watching the ball' is varied for the subjects; i.e., instead of only watching the ball for the first 20 feet, alternate distances of 10 feet, 50 feet, 60 feet, and so forth---may be substituted.

5. Since a ball hit to the left side of the dia-

mond is outside the batter's range of vision, coaches should instruct their players that whenever those conditions arise, they should observe the ball for the first few strides.

6. When the ball is hit to anywhere other than the left side of the field, coaches should allow their players to use their own discretion in deciding which method of running to first base should be used.

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APPENDIX

Table 12

SKILLED GROUP
PRETEST

SUBJECT	FIRST	SECOND	THIRD
1.	4.19	4.04	4.10
2.	4.79	4.66	4.72
3.	4.51	4.34	4.39
4.	4.58	4.39	4.43
5.	4.24	4.41	4.26
6.	4.80	4.60	4.53
7.	4.59	4.54	4.33
8.	4.29	4.49	4.21
9.	4.82	4.71	4.62
10.	4.52	4.35	4.35
11.	4.54	4.41	4.46
12.	4.67	4.56	4.57
13.	5.58	4.59	4.65
14.	4.20	4.25	.4.25
15.	4.23	4.03	3.98
16.	4.16	4.11	4.09
17.	4.67	4.59	4.68
18.	4.26	4.20	4.06
19.	4.75	4.79	4.59
20.	4.34	4.14	4.11

Table 13

UNSKILLED GROUP
PRETEST

SUBJECT	FIRST	SECOND	THIRD
1.	4.58	4.34	4.36
2.	5.10	4.78	4.82
3.	4.85	4.64	4.78
4.	4.35	4.30	4.23
5.	4.57	4.55	4.60
6.	4.41	4.48	4.53
7.	4.63	4.49	4.47
8.	4.52	4.36	4.45
9.	5.12	5.15	5.20
10.	4.78	4.75	4.79
11.	4.47	4.52	4.60
12.	4.39	4.49	4.72
13.	5.00	4.85	4.94
14.	4.95	4.90	4.78
15.	4.85	4.80	4.79
16.	4.49	4.56	4.57
17.	5.13	5.22	5.24
18.	4.35	4.54	4.50
19.	4.23	4.27	4.22
20.	4.81	4.73	4.84
21.	4.47	4.36	4.35
22.	4.84	4.68	4.65
23.	4.65	4.47	4.41
24.	5.01	4.60	4.71
25.	4.40	4.38	4.36
26.	5.23	4.83	4.91
27.	4.26	4.28	4.24
28.	5.00	4.87	4.82

ELECTRONIC DEVICES

Heath Kit Jr.
Model JK-27
Heath Company
Benton Harbor, Michigan

Dekan Automatic Performance Analyzer
Dekan Timing Device
Glenn Ellyn, Illinois

VITA

LEON CAMPBELL

He was born August 7, 1942 in Jackson, Mississippi. He received his high school diploma from Brinkley High School in May of 1960. When a senior, he won all state honors in baseball. That fall, he enrolled at Jackson State College with a four-year scholarship in baseball. He served as captain of the team during his junior and senior years. After lettering four years in baseball, leading the team in fielding percentage for four years, and holding the second best batting average his senior year, he was the recipient of a Jackson State College "Honors Award Blanket." In May of 1964 he received a Bachelor of Science degree from that institution.

After an unsuccessful try-out with the Saint Louis Cardinal National League Baseball Club, he returned to Jackson, Mississippi where he served as a mathematics instructor and a coach for six years. In 1968 his football team won the city championship.

In the fall of 1970 he accepted a graduate assistantship in physical education at Eastern Illinois, Charleston, Illinois. While at Eastern, he served as Field Supervisor in Intramurals and assistant coach for the varsity baseball team.

He will return to the Jackson Public School system after graduation where he will continue to work as a teacher-coach. He is married to the former Ruth Antoinette Batton.