

## **Lloyd Lowell Messersmith: Pioneer of Notational Analysis of Performance in Sport**

Keith Lyons, Centre for Notational Analysis, University of Wales Institute, Cardiff, Wales

### **1 Introduction**

Notational analysis of performance in sport is often regarded as a new academic enterprise. In the United Kingdom, for example, Charles Reep's (1968, 1971) work on the analysis of skill and chance in association football and in ball games and Jake Downey's (1970) Laban-inspired notation of tennis are often cited as key works in the genesis of notational analysis. Elsewhere clusters of researchers in academic institutions have emerged who have sought to record and analyse performance. Over this period the academic study of performance has flourished. An International Society of Notational Analysts was established in 1991 and currently has more than one hundred members world wide.

Notational analysts use systematic observation to notate and then analyse selected aspects of performance in sport. They work with a variety of audiences or client groups to: provide accurate observations of performance; facilitate accurate recall of performance; and analyse the collated information.

Despite this apparently recent flourishing of notational analysis as an academic pursuit, it is interesting to note that the earliest published academic accounts of notational analysis appeared in the *Research Quarterly* between 1931 and 1944. For the most part, this scholarly incandescence has received little attention from present-day notational analysts. The purpose of this paper is to draw together some of the foundation work reported in the *Research Quarterly* at that time and to highlight the importance of Lloyd Lowell Messersmith in this work.

## 2 Lloyd Lowell Messersmith: Some Biographical Data

Lloyd Lowell Messersmith was born in Gibson County, Francisco, Indiana on 29 January 1905. He was the first of eight children in his family. He graduated from Francisco High School in 1922 and attended Oakland City College. He taught for two years in a one-room rural school house and then went to DePauw University, Greencastle, Indiana in 1924.

At DePauw he represented the University at basketball, baseball and football. He earned freshman numerals and three varsity letters in each of these sports. He was captain of basketball in his senior year and was selected as an end on the first all state team in football by the *Indianapolis News* in 1927. He damaged his retina in his right eye in a basketball accident in his senior year and was advised to "refrain from all strain and excessive exercise in order to prevent any greater detachment of the retina". When he graduated in 1928 he was awarded the Walker Cup for outstanding performance during his time at DePauw.

After graduation, Lloyd received a teaching and coaching position at Shortridge High School in Indianapolis. He taught history and coached basketball at the school for two years. Lloyd also 'moonlighted' by refereeing basketball and football games all over Indiana. Whilst at the school he married Fae Houston in August 1929. His coaching ability was much respected by his students at Shortridge where he made "a deep impression during his all too brief stay". In 1930 Lloyd returned to DePauw University as a freshman coach and an assistant in the department of physical education.

He coached football, basketball and baseball. His position did not attract a high salary and he supplemented his income by officiating at basketball and football games during the Depression years. Many years later his wife wrote of these times:

The pay was \$15 for basketball officials and \$25 for football. The fellowship with other officials was good and the extra money was nice. Fae didn't mind the excited Indiana basketball fans and their boos at the officials as she knew that 'Messer's' decisions were fair; however there were times they hurried away after a game! (Personal Communication)

Lloyd received a Master's degree from Columbia University in 1932 after four summer terms there.

In all, he was at DePauw University for fifteen years from 1930 to 1945. Towards the end of his time there he was the Acting Director of Athletics. He had a sabbatical year in 1942 to complete his doctoral dissertation at Indiana University. The original title for his dissertation was: 'A Study of the Comparative Physical Fatigue Engendered by Participation in a Major Sport - Basketball'; but this ultimately became

'The Development of a Measurement Technique for Determining the Distances Traversed by Players in Basketball'.

In 1945, Lloyd was offered the position of chairman of physical education at the Southern Methodist University (SMU), Dallas. He remained as chairman for the next twenty-five years until his retirement in 1970. Throughout this period he taught handball. It is reported that he was unbeaten at the game and that he reserved an 'A' grade for any student that could beat him.

He held a number of offices in physical education associations in Indiana and Texas. In 1961 he received an Honor Fellow award from the American Association for Health, Physical Education and Recreation. In 1969, as part of the football centennial celebrations, he was chosen as one of DePauw University's twenty-five outstanding players. His hobbies included photography and he was the movie photographer for the SMU Mustang football team for almost three decades. Throughout his life Lloyd was an active Methodist and was listed in *Who's Who in American Methodism*. He and his family were members of the Highland Park Methodist Church in Dallas. He was a non-smoker and a non-drinker.

He retired from his University post in 1970. All his life he was a physically active person. From 1970 to 1975 he exercised daily and at the age of 70 was still able to do 100 push ups a day! In his more restful moments he particularly enjoyed playing bridge and was described by a friend as "a better partner than opponent". He suffered a stroke in January 1975. A second stroke resulted in his death on 27 July 1977. At his funeral service a eulogy by his friend Willis Tate, President Emeritus at Southern Methodist University observed that: "A giant tree has fallen in the forest leaving a wide empty space in the sky."

### **3 Lloyd Messersmith's Research Publications**

The *Research Quarterly* published six articles related to Lloyd Messersmith's work over a period of thirteen years. Five of these were co-authored by him. The final article published in 1944 was the only work that appeared solely under his name and is in essence the abstract of his doctoral dissertation. One article appeared in another journal, the *Athletic Journal*, in 1938. His doctoral dissertation was submitted in May 1942 in partial fulfilment of the requirements of Doctor of Education in the School of Education, Indiana University. It is interesting to note, therefore, that Lloyd was not only the first peer refereed notational analyst but also the first doctoral student to submit a notational analysis dissertation.

Lloyd was interested in the distances players travelled in competitive sport. All but one of his published papers refer to basketball. The exception was a paper written with Paul Fay (1932) on the distances traversed by American football players. His papers can be synthesised under the following headings:

1. Empirical focus
2. Methodology
3. Subjects
4. Data collected
5. Validity and reliability
6. Analysis
7. Bibliographical information

#### **3.1 Empirical Focus**

The earliest published paper was a study of one basketball player in university basketball game (Messersmith and Corey, 1931). The second paper was a study of three football games (Messersmith and Fay, 1932). Subsequent papers focused exclusively on basketball and examined: the effect of rule changes on distances travelled in University competition (Fay and Messersmith, 1938a); distances travelled by Big Ten players (Messersmith and Bucher, 1939); a comparison of distances travelled by male and female basketball players in University intra-mural competition (Messersmith, Laurence and Randells, 1940); distances travelled by players of different ability levels (Messersmith, 1944).

### **3.2 Methodology**

Lloyd Messersmith reported a similar methodology in all his published studies. He conducted real-time tracks of a player using an electrical pursuit apparatus. Normally he tracked one player per game although in his 1944 paper he reports the use of up to three electrical pursuit apparatus at a single basketball game. He describes the electrical pursuit apparatus in detail (Messersmith, 1944) and provided drawings of the equipment used. A photograph of the pursuit apparatus appeared in *The Indianapolis Times* on 17 February 1938.

### **3.3 Subjects**

Lloyd Messersmith had a research interest in University sport in general and basketball in particular. His first paper reported a whole-game track of the DePauw University floor guard in a match against Miami University (Messersmith and Corey, 1931). Thereafter he and colleagues tracked: a right half-back, a left end and a half-back in college and high school football (Messersmith and Fay, 1932); a guard, a centre and a forward from DePauw University basketball team (Fay and Messersmith, 1938a); an Indiana University centre and two guards (one from Indiana University and one from Minnesota University) in Big Ten basketball (Messersmith and Bucher, 1939); ten male and ten female intra-mural basketball games (Messersmith, Laurence and Randels, 1940); two hundred basketball players of varying abilities from two universities and one high school (Messersmith, 1944).

Lloyd Messersmith moved over the thirteen year period from a sample size of  $n=1$  to data on two hundred subjects. All subjects were observed in real-time and usually one subject per game.

### **3.4 Data Collected**

There are two kinds of data evident in Lloyd Messersmith's published papers. He collected data about the distances players traversed or travelled and the amount of time a player spent in attack and defence. The electrical pursuit apparatus he used gave him whole game data that he was able to summate. Changes in possession from attack to defence were also noted and gave him an accurate time signature of a game content. His dissertation (Messersmith, 1942) gives examples of his data collection proformas.

### 3.5 Validity and Reliability

Four of the six published papers explicitly discuss the validity of data collection methods used by Lloyd Messersmith and his co-workers. In his first paper it is reported that different observers used the pursuit apparatus with "no noticeable difference" (Messersmith and Corey, 1931). The pursuit apparatus was used on a scaled model of a basketball court or football field and efforts were made to calibrate measurements so that exact linear measurements could be checked. Once this check was made:

any inaccuracy in the results obtained would lie in the inability of the operator to duplicate accurately the movements of the player on the gridiron" (Messersmith and Fay, 1932)

so that any inaccuracy in the result lies in the inability of the operator to follow accurately the movements of the player (Fay and Messersmith, 1938a)

The 1944 article addresses validity and reliability issues. Experimenters were trained in the use of the electrical pursuit apparatus to standardise procedures. In one attempt to check inter-observer reliability, Messersmith (1944) reports a disagreement of 3.5%. He suggests that "errors of overestimation and underestimation probably cancelled each other out". Data was collected in real-time and this made it impossible to conduct intra-observer reliability studies.

### 3.6 Analysis

Lloyd Messersmith's final paper (Messersmith, 1944) and his dissertation (Messersmith, 1942) draw together data on two hundred subjects. In his published papers he discovered that in basketball:

A guard in a University game: travelled the same distances in the first and second half; travelled 608 feet every two minutes; was involved in 92 changes of possession; travelled greater distances in attack; and travelled a total game distance of 2.34 miles. (Messersmith and Corey, 1931)

Players were travelling more in games in 1938 than in 1931 and in some games for some players they covered 3.97 miles. (Fay and Messersmith, 1938a)

Big Ten players traversed distances comparable to college games but greater than high school games. The range players travelled was from 3.46 miles to 3.89 miles. (Messersmith and Bucher, 1939)

In intra-mural competitions the distances traversed by men were approximately twice that traversed by women per unit of playing time. (Messersmith, Laurence and Randels, 1940)

Court size had a direct influence on distances traversed. Rule changes did affect the pattern of play particularly in relation to the role of the centre jump. (Messersmith, 1944)

In the football paper, Messersmith and Fay (1932) reported: distances traversed in attack and defence: 'time in' and 'time out'; and distances traversed by quarter of the game.

### **3.7 Bibliographical Information**

One of the problems of being a pioneer is that one becomes self-referential or lost for literature! There is no mention of any other author in the bibliographies of the six papers written by Lloyd Messersmith and his co-workers. His dissertation (Messersmith, 1942) makes explicit reference to six other sources. Four of these papers appeared in the *Research Quarterly* during the period 1936-1940. It is interesting to note that these authors did not cite Lloyd Messersmith's work either!



#### **4 Implications of Lloyd Messersmith's Work**

Most academic disciplines eventually get round to tracing their paradigmatic origins. Notational analysts should be interested in the history of ideas that provide the background to current practice. Lloyd Messersmith and his co-workers have been ignored in most of the literature relating to notational analysis. It has been usual to cite only the 1939 paper on Big Ten Basketball (Messersmith and Bucher) which is the shortest of his six published articles.

Lloyd Messersmith also lays claim to the first notational analysis dissertation for a higher degree. It is likely that the next higher degree thesis to include some form of notational analysis about distances travelled was some thirty-four years later in a discussion of association football (Reilly, 1976).

#### **5 Conclusion**

In this research note I have tried to give a flavour of Lloyd Messersmith's work. In total he published seven articles between 1931-1944 of direct relevance to notational analysts. A thoroughgoing, cumulative research programme in notational analysis ought to be sensitive to those who have framed our enquiry. At his funeral oration his friend said that on Lloyd Messersmith's passing a giant tree had fallen. The aim of this paper has been to indicate where that tree was rooted.



## Bibliography

### 1 Lloyd Messersmith's Publications

- Fay, P J & Messersmith, L L (1938a) The Effect of Rule Changes Upon the Distance Traversed by Basketball Players, **Research Quarterly**, IX, 2, 136-137.
- Fay, P J & Messersmith, L L (1938b) The Distance Traversed by College and High School Basketball Players and Effect of Rule Changes upon Distance Traversed in College Games, **Athletic Journal**, XVIII, May, np.
- Messersmith, L L (1942) The Development of a Measurement Technique for Determining the Distances Traversed by Players in Basketball, unpublished Doctor of Education dissertation, University of Indiana
- Messersmith, L L (1944) A Study of the Distance Traveled By Basketball Players, **Research Quarterly**, 15, 29-37.
- Messersmith, L L & Bucher, C C (1939) The Distance Traversed by Big Ten Basketball Players, **Research Quarterly**, X, 1, 61-62.
- Messersmith, L L & Corey, S (1931) The Distance Traversed by a Basketball Player, **Research Quarterly**, II, 2, 57-60.
- Messersmith, L L & Fay, P (1932) Distances Traversed By Football Players, **Research Quarterly**, III, 1, 78-80.
- Messersmith, L L, Laurence, J & Randels, K (1940) A Study of Distances Traversed by College Men and Women in Playing the Game of Basketball, **Research Quarterly**, XI, 3, 30-31.

## 2 References Cited in Lloyd Messersmith's Dissertation

- Blake, R (1941) The Distance Traversed by Basketball Players in Different Types of Defense, **Athletic Journal**, XXI, January, 18-20.
- Fullerton, H (1910) The Inside Game: The Science of Baseball, **The American Magazine**, LXX, 1, 3-13
- Hodgson, P (1936a) Studies in the Physiology of Activity: I. On Certain Reactions of College Women to Measured Activity, **Research Quarterly**, VII, 1, 3-25
- Hodgson, P (1936b) Studies in the Physiology of Activity: II. On Certain Reactions of College Women Following Participation in Two-Court Basketball, **Research Quarterly**, VII, 2, 45-55
- Hodgson, P (1939) Studies in the Physiology of Activity: II. On Certain Reactions of College Women Following Participation in Three-Court Basketball, **Research Quarterly**, X, 1, 53-60
- Miner, N, Hodgson, P & Espenschade, A (1940) Study of Distance Traversed and Time Spent in Active Play in Women's Basketball, **Research Quarterly**, XI, 1, 95-101

### 3 References cited by Lloyd Messersmith's Contemporaries

Fullerton, H	(1910)	does not cite any other sources.
Hodgson, P	(1936a)	cites 21 references from physiology texts.
Hodgson, P	(1936b)	cites 6 references: one to (1936a); one to unpublished data prepared by A Espenschade, J Falconer and N Miner (1935) and four physiology texts.
Hodgson, P	(1939)	cites one reference - her (1936b) paper.
Miner, N et al	(1940)	cite three references: Hodgson (1936b, 1939); and a psychology text.

### 5 References Cited in This Paper

Downey, J Publications	(1970)	Tennis Notation. Sheffield: Downey
Reep, C & Benjamin, B	(1968)	'Skill and Chance in Association Football'. <b>Journal of the Royal Statistical Society</b> , 131, 581-585
Reep, C, Pollard, R & Benjamin, B	(1971)	'Skill and Chance in Ball Games'. <b>Journal of the Royal Statistical Society</b> , 134, 623-629
Reilly, T	(1976)	Unpublished doctoral thesis. Liverpool Polytechnic.