

MOVEMENT OBSERVATION: AN INTRODUCTORY EXPERIENCE

M. Bird and J. L. Hudson

University of North Carolina at Greensboro, NC

According to the "Guidelines and Standards for Undergraduate Kinesiology" (NASPE, 1980), "...practice in observation of performance and discrimination in quality of performance based on sound theoretical knowledge must be a primary goal of all undergraduate introductory kinesiology courses." The importance of observation is reiterated in two of the four minimum competencies in applied kinesiology. Specifically, "the student is able to observe and describe a movement technique accurately." And, "the student is able to evaluate the suitability of a performer's technique with reference to the task at hand."

Despite this emphasis on observation in our curricular guide, it is common belief that many students (and practitioners) are not astute observers of movement (Barrett, 1979, 1983; Brown, 1984; Eckrich, 1990; Hoffman, 1984). How can it be that these visually perceptive, young adults with their inherent interest in movement and their myriad of movement experiences have difficulty observing movement? One explanation is that observation is actually a hierarchy of processes, and our students are proficient at some, but not all, of these processes.

For the discussion that follows, we propose that "observation" be considered as an umbrella term for the processes of perception, recognition, description, interpretation, and evaluation. Perception is the simple awareness that a movement is occurring within the field of view. Because perception is not difficult, even for quite young children, it represents the starting point for the higher-order processes of observation. Recognition is the identification of the movement as a particular, previously known activity. For most people, recognition is an undivided or general process rather than a divided or segmentally specific process. Description builds upon recognition by representing the movement in words. In biomechanics, description can be general or segmental, anatomical or mechanical. Interpretation is a process of assigning meaning or explanation to movement. And finally, evaluation is an appraisal of the quality or quantity of movement.

Given these processes of observation, how proficient are the students who enter our classes? From the work of Johansson (1975) it is clear that most adults can perceive and recognize movements. When joint centers were marked with points of light and all other evidence of the performer was obscured, subjects could quickly discern what movement was being performed (e.g., dancing, walking). Based on these "dancing dot" studies, it appears that most observers can recognize complex movement from simple

displays. In contrast, observers may have difficulty in recognizing simple constructs about movement from complex displays. For example, identifying speed of motion may be impossible if one is attending to another simple construct, such as balance, or to certain aspects of the performer rather than the performance.

As for descriptive proficiency, untrained observers who viewed a videotape of a novel sports skill were capable of representing some aspects of the movement in words (Bird & Hudson, in press). Although their descriptions were simple (i.e., confined to a few concepts, more general than segmental, limited in language) and sometimes irrelevant, these untrained observers seemed to be operating from a base of common-knowledge biomechanics. Similar results were found by Stoner (1984) whose entry-level biomechanics students were able to describe movement in simple terms and to interpret movement with regard to skillfulness.

Based on the results of the foregoing studies, typical entry-level biomechanics students should be quite proficient at perception and relatively proficient at recognition. In addition, they should have a rudimentary, but unrefined, proficiency in the higher-order processes of description and interpretation. That is, they should be more proficient at general observation than segmentally specific observation. In most cases entry-level students should be inexperienced at using the processes of description and interpretation as a basis for the evaluation of movement. Assuming that we want our exit-level students to be proficient, and perhaps refined, evaluators of movement, the question becomes: How can we, as biomechanics instructors, help our students bridge the gap from the type of observation that they are proficient at to the type of observation that they are not so proficient at?

We do not presume to have the answer to this question. What we have is a provisional first step -- an introductory experience in movement observation. The goals of this introductory experience are for the students to 1) appreciate that they have a base of observational abilities, 2) identify what they know in terms of recognition and description, and 3) gain interest in developing the higher-order processes of observation.

The first part of this introductory experience involves a "dancing dot" video. Diverse samples of movement are displayed and the complexity of display is varied by manipulating the number and placement of dots. As the video is played, questions such as the following are posed: What is this movement (general recognition)? What is the minimum information necessary for you to recognize this movement (specific recognition)? How would you describe this movement (general description)? What information are you using to describe this movement (specific description)? Is the mover skilled (general interpretation)? At the conclusion of the "dancing dot" demonstration the students should be pleasantly surprised, as well as confident, that they are proficient at certain types of observation. They may also be aware of the limitations of this type of observation and interested in refining their observational abilities.

For the second part of this introductory experience we increase the complexity of

the display by adding information about the performer as well as the performance. Compared to the "dancing dots" video, this represents a substantial increase in the amount of visual information that can be noticed. To compensate for the complexity of display, we recommend starting with simple samples of movement (e.g., the Lucille Ball and Harpo Marx mirror scene) and simple mechanical constructs such as balance and speed of motion. Depending on curricular tastes, the planar aspects of movement can be introduced here. Once students recognize that much of movement is planar, they may be ready to learn the descriptions of planes and, then, the descriptions of segmentally specific actions. In terms of mechanical description, a student who can recognize balance may be ready to recognize and describe the base of support.

Considering 1) the number of anatomical and mechanical constructs in our curriculum, 2) the range of refinement of each construct from general to segmentally specific, and 3) the difficulty of focusing ones attention while viewing complex movement, it is unlikely that proficiency in recognition and description of movement will be attained in one introductory experience. It is also unlikely that the higher-order processes of interpretation and evaluation which are suggested in our curricular guide will be developed without some sort of introductory experience in the observation of movement.

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APPENDIX

Guidelines for producing a points of light video:

1. Video camera. Position the camera and frame the subject just as you would if you were collecting data for a study. Close down on the camera aperture and increase the shutter speed to darken the picture. Do not be afraid to underexpose the video. That is necessary.

2. Reflective markers. Place the markers on the subject in the desired locations. Anticipate any out-of-plane rotations when designing and positioning the markers. We use adhesive, reflective tape (model 8850) made by 3M and sold through Head Lites Corp., 2462 East County Road F, St. Paul, MN, 55110. It can be purchased by the roll and in varying widths.

3. Non-reflective surfaces. The best type of room has dark, non-reflective walls. If white or light-colored walls are unavoidable, reduce reflectivity by positioning the subject in the distant foreground. Also watch for any metal surfaces, as they can be quite reflective. Have the subject wear clothing that is neither light-colored nor reflective. White definitely should be avoided. Also monitor the subject (and any implement they may be using) for reflective objects on their person (e.g., watches, jewelry, and belt buckles are common culprits).

4. A light source. Position the light behind or near the camera and aim it at the subjects to enhance the effects of the reflective markers. Often, it is not necessary to eliminate other sources of light within the room. However, sources of light that are within the frame will interfere with proper exposure. Pay attention to doors and windows and other crevices that may admit light.

5. Willing subjects!!!

N.B. Some experimentation with these instructions may be necessary depending on the camera that is used, the reflectivity of the markers, the nature of the room, the subject's attire, the amount of illumination on the markers, the nature of the movement, and the relative placement of the markers with respect to the movement.