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The effects of scripted instruction on proper foot plant during A -Skip in a practice high school track and field setting

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THE EFFECTS OF SCRIPTED INSTRUCTION ON PROPER FOOT PLANT DURING A-SKIP IN A PRACTICE HIGH SCHOOL TRACK AND FIELD SETTING

by

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ABSTRACT

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Track and field is a sport that thrives on technique correction for skill acquisition (Mero, Komi and Gregor, 1992). Research in terms of approaches to improving skill acquisition and technique correction in novice high school track and field sprinters has been limited. Although recent efforts to improve skill acquisition in track and field have been effective (Hanin, Korjus, Jouste & Baxter, 2002 & Shestakov, Arakelian & Primakov, 2000), there does not appear to be any studies utilizing Gangstead and Beveridge's (1984) explicit instruction model as a way to improve skill acquisition for novice high school track and field sprinters. Explicit instruction in the academic setting has already been shown to be highly effective for increasing academic performance for novice learners (Adams & Engelmann, 1996). Therefore, the purpose of this study was to

examine the effects of Gangstead and Beveridge's (1984) scripted instruction model on acquisition of correct foot strike placement during the A-Skip drill in a high school practice track and field setting.

A multiple baseline A-B design across participants was utilized to conduct the study. Four high school sprinters were selected to receive the explicit instruction, while one sprinter served as the control and did not receive the intervention. The two coaches selected for the study were the ones who implemented the explicit instruction to the sprinters. It was hypothesized that sprinters using Gangstead & Beveridge's (1984) explicit instruction model would increase their number of correct trials of foot strike placement during the A-Skip drills and be satisfied with the goals, procedures and outcomes of the study. Results of the study indicated that the sprinters increased the number of correct foot plants during the A-Skip drill with use of the intervention. Analyses of results were conducted in accordance with single subject research guidelines, which include evaluating both magnitude and trends of data collected on a graph (Barlow and Hersen, 1984). Further research using explicit instruction in different events within a sport or different athletic settings is recommended in order to examine generalization effects.

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CHAPTER 1

INTRODUCTION

High school athletics has become a rather large and significant part of the culture in the United States (Eitzen & Sage, 1997). At the turn of the century 70% of males and 53% of the females participated in one or more high school sports (Pate, Tross, Levin & Dowda, 2000). According to the Center for Disease Control, sports participation has the potential to contribute to healthy lifestyles for our youth (CDC, 2003). If one of the objectives of sport participation is to develop healthy lifestyles then students must be given the opportunity to develop their sports skills. Exposure to appropriate methods and the acquisition of movement concepts, although important, do not make the student proficient in motor skills. Herbert and Landin (1994), Janelle, Mousseau, Coombes and Champenoy (2003) and Williams and Hodges (2005) contend that technique correction, as a way to improve the acquisition of fundamental motor skills, is vital to successful athletic performance.

Sprinting is an activity that thrives on technique correction for skill acquisition (Mero, Komi & Gregor, 1992). Sprinting involves a combination of various actions of the legs, arms, trunk and ankles to produce a coordinated total body movement (Hay, 1978). For any movement to occur the body must overcome its own morphological constraints. Specifically, muscle groups must work together in

an aggregate fashion to produce angular and rotary motions at joints, which ultimately leads to linear movement (Higgins, 1977). The sprinting movement is brought about by a combination of internal (muscular contractions to cause a change in ground reaction by overcoming resistance from muscle viscosity, tendons, ligaments, etc.) and external (force of gravity, air resistance and force exerted by the ground through the body) forces (Hay, 1978; Dyson, 1977).

During sprinting each body part performs certain actions that ultimately work together to cause balanced and efficient sprinting. The legs work in a cyclical fashion through three phases called the support (foot landing and passing of one's center gravity), driving (foot leaving the ground) and recovery (foot off the ground and being brought forward for next foot contact) phases (Hay, 1978). The arm action in sprinting works as an opposite reaction to movement in the lower body. During sprinting, as the left leg and knee move in a forward and upward motion, the right arm is then brought forward and upward while the left arm moves backward and upward (Hay, 1978). These movements are reversed as the right leg and knee begin to swing upward and forward. This counter movement causes a balance of the sprinting motion. Lastly, in order to combat the tendency of a sprinter to lean backwards and rotate during sprinting, a slight forward lean of the trunk is necessary. All of these movements performed correctly have the potential to significantly improve sprinting performance.

McFarland (1994) asserted that drills to create motor pathways are vital to successful sprinting performance. Efforts in terms of approaches to improving skill acquisition and technique correction for sprinters have been limited. Two

recent efforts in approaches to improve skill acquisition have been the rapid technique correction approach (Hanin, Korjus, Jouste & Baxter, 2002) and computer simulation approach (Shestakov, Arakelian & Primakov, 2000).

One particularly important technical aspect to improvement of sprinting performance is the correct performance of foot planting underneath the hips during sprint mechanic drills. Coach Bill Walton, Head Track and Field Coach at James Madison University for the past 20 years, revealed that one of the most difficult skills for young track athletes to acquire is getting the foot underneath the hips in order to prevent reaching and pulling, which adversely affects sprinting performance (personal communication, March, 9th, 2006, 8:07 pm).

Proper foot plant position underneath the hips allows for sprinters to create a vertical and horizontal force, which in turn increases ground reaction force (Yessis, Retrieved on May 22, 2006). Increased horizontal force and horizontal distance from a sprinter's center of gravity creates a more balanced sprinting movement (Dyson, 1977). The end result of proper foot planting and balanced sprinting is increased sprint speed, which is the ultimate goal for all sprinters. Therefore, learning the correct foot plant technique is considered vital for transfer to actual sprinting. In an event in track and field where winning is often determined by mere tenths of seconds, small improvements in technique can lead to significant improvements in sprinting performance.

For the purposes of this study, the A-Skip drill was used to facilitate improvement in proper foot planting. The A-Skip drill is a common sprint mechanic drill used by experts in the track and field community to help sprinters

increase ground reaction force, which in turn increases velocity and acceleration during sprinting (Coach Bill Walton, personal communication, March, 9th, 2006, 8:07 pm; Coach Al McDaniels, personal communication, April 7th, 2006, 11:30 am). The A-Skip drill occurs in the sagittal plane with a medial lateral axis at the hip. The A-Skip drill involves flexion at the hip placing the thigh parallel to the ground with the knee flexed 90 degrees at the thigh. The foot on the same side of the thigh that is parallel to the ground is dorsal flexed towards the shin. During the drill the sprinter moves forward down the track alternating legs while performing the above-mentioned skipping actions.

In terms of being classified as either a closed or open skill, the A-Skip drill fits the description of both. According to Schmidt (1982), a closed skill is one that is performed without having to make quick decisions based on unpredictable environmental changes. During the A-Skip drill there are no defenders to elude or moves to counter from an opponent. However, the A-Skip drill can be classified as an open skill (skill performed in relation to unpredictable environmental changes) as well because of the forward motion of the drill. While the environment may be fairly stable, when a sprinter makes contact with the ground each contact will not be exactly the same. The sprinter must make adjustments with each move forward to stay within correct foot planting performance. Therefore, a case can be made for the A-skip drill to be classified as both an open and closed skill.

For this study the researcher chose to utilize a scripted skill analysis and observation model developed by Gangstead and Beveridge (1984) in order to

facilitate improvement in proper foot planting during the A-Skip drill. A scripted approach to instruction involves a teacher providing a carefully sequenced presentation of materials along with on going communication during tasks in order for learners to acquire a particular skill. Scripted interventions are highly effective due to the focus being on both teacher and student or in this case both coach and athlete. In traditional approaches such as child centered or eclectic instruction, the teacher is more of an outside facilitator rather than a direct provider of information (Snider & Schumitsch, 2006). Scripted interventions allow for teachers to improve their classroom presentation strategies and students to receive concise lesson formats with clear instructional language (Becker, 2001 and American Federation of Teachers, 1999).

Implementation of scripts in various academic settings has already been shown to be highly effective for increasing academic performance for novice learners (Adams & Engelmann, 1996). Bereiter and Engelmann's (1966) early work with disadvantaged youth showed that scripted instruction was an effective instructional approach. Since that time scripted instruction has been shown to be effective in other academic settings and subjects areas such as spelling, reading, math, writing and language (Earl, Wood & Stennett, 1981; Kameenui & Carnine, 1998).

In theory, successful implementation of a scripted intervention in the competitive athletic setting could have tremendous implications for improvement in skill acquisition. Using Gangstead and Beveridge's (1984) scripted skill

analysis and observation model could possibly improve novice sprinters performance.

Gangstead and Beveridge's (1984) scripted skill analysis and observation model for analyzing and improving motor skills involves knowledge of the components that are occurring during a skilled performance (process) rather than focusing on the end result of the performance (product). In this model emphasis is placed on the critical components of the movements being performed. Breaking down the skill into temporal and spatial foci is essential when implementing Gangstead and Beveridge's scripted skill analysis and observation model (1984). The temporal focus, which refers to a sequence or order, is on the preparation, action and follow-through phases of the skilled movement. The preparatory phase involves a lengthening of appropriate muscle groups to generate force and contraction for the following phase. The action phase is the actual skilled movement and usually involves maximal muscle contraction. Finally, the follow through phase is where deceleration of limbs occurs to slow down the body's movements. Although the focus is on the main action of the movement, it is still important to observe the movement as a whole to provide more concise and accurate instruction and feedback to the performer.

The spatial focus, or the position of the body or body parts in space, is on the performer's body weight, path of hub (slowest moving parts) and actions of the arms, legs, trunk, head and impact or release. In particular, the spatial aspect of Gangstead and Beveridge's (1984) model focuses on angular positioning of limbs (i.e. 90-degrees of hip flexion).

Gangstead and Beveridge's (1984) scripted skill analysis and observation model involves a three-step process. This process involves a description of the task or skill to be performed, demonstration and isolation of steps associated with the skill and feedback cues appropriate for the skill.

During initial skill description the coach provides meaningful and specific descriptions of the skill to be performed by the athlete. The coach must paint a picture of how the skill should be performed correctly. For example, a visual description for a volleyball player ready to strike a ball would be "performer assumes a ready position in line behind an approaching ball, clasps hands and strikes ball to propel it upward approximately 10' to target an area on the court" (An Articulated System of Task Analysis, Retrieval April 21, 2006).

The next step in this scripted skill analysis and observation model involves a head to toe process of listing the sequencing of skills necessary for correct acquisition of a particular skill. The scripted list is usually no more than seven to eight sequences long because human memory is generally able to retain no more than seven to nine pieces of information at a time (Miller, 1956).

To facilitate skill acquisition, verbal cues and feedback are given by facilitators to provide reinforcement and correction of the skill being performed. Verbal cues not only provide a physical engagement, but also a mental engagement for the participant to learn necessary skills. Examples of verbal cues in a variety of sports are "bend your knees" or "step with your opposite foot". Feedback is crucial in learning any skill (especially in the initial stages of learning) and without it skill acquisition rarely, if ever occurs (Schmidt, 1991).

Problem Statement

The purpose of this study was to examine the effects of a scripted skill analysis and observation model on acquisition of proper foot strike placement during the A-Skip drill in a high school practice track and field setting. The high school setting was chosen versus the college setting because in the college setting participants will have already had more exposure and experience in instructional approaches for the purpose of skill acquisition for crucial fundamental skills in the sport of track. Below are questions that were examined:

1. Does a scripted skill analysis and observation model increase the incidence of correct foot strikes during A-Skip in a high school track and field setting?
2. Is a scripted skill analysis and observation model valued or seen as important by the coaches and athletes using it?

Research Hypotheses

The following research hypotheses were formulated in reference to testing the a-skip drill as a result of Gangstead and Beveridge's (1984) scripted skill analysis and observation model. The hypotheses were based upon the researcher's assumption that scripted instruction would improve acquisition and subsequent technique correction of foot strike placement during the A-Skip drill. The hypotheses for this research study are as follows:

1. Participants using the scripted skill analysis and observation model will significantly increase their number of correct foot strikes during the A-Skip drill.

2. Participants using the scripted skill analysis and observation model will significantly find that using this intervention is worthwhile and important to their skill related development in track and field.

Significance

Skill acquisition and technique correction are vital components in the quest for success in all sports (Ziegler, 1994, 1997). However, track and field is a sport where technique and skill acquisition are crucial to athletic performance. Unfortunately, many youth are not exposed to the sport until the beginning or latter part of high school. Additionally, with short seasons and even less practice time, acquisition of skills and technique correction are difficult to focus on consistently for the purpose of improvement in sprinting performance. In terms of this issue, quotes like the ones below are far too numerous among coaches:

> "The biggest problem that I've seen as a coach is that kids tend to reach too much with their feet when sprinting on the long jump runway or track. They need to understand to get their feet underneath their hips. It's really hard teaching kids this concept because they are usually taught the wrong way so there's a lot of reprogramming that has to be done. Heck, I was never even taught this stuff when I was a track athlete." (Coach Qualls, Baldwin City High School, personal communication, March 1, 2006, 3:30 pm).

The significance of these issues is not only a problem for high school coaches, but also for college coaches as well. "Ninety-nine percent of kids are not taught proper mechanics in track and field so they need to be reprogrammed

to learn them the right way" (Coach D. Martin, Adams State College, personal communication, March 1, 2006, 1:14 pm).

These quotes serve as a resounding exclamation mark for the importance of skill acquisition and technique correction in the sport. Furthermore, without acquisition of necessary skills such as foot strike placement, athletes tend to not enjoy participation in sport as much (Williams & Hodges, 2005). Therefore, designing and implementing a solid and effective intervention in this case would greatly help to improve the concerns many high school and college coaches have regarding proper skill acquisition and technique correction for high school sprinters.

Limitations

The following were limitations of this study:

1. Participants were purposefully selected based on certain technical skill issues related to sprinting drills.
2. The intervention's primary focus was on foot strike placement during sprint mechanic drills and not other techniques that may also be important.
3. Generalization or external validity is not a prominent factor in the study due to small sample size and purposeful selection of participants.
4. The specific data collected is limited to the practice environment only as opposed to practice and meet environments.
5. Social validity responses by participants are inherently biased in data reporting.

Assumptions

1. The participants cooperated fully in their participation in the study.
2. The scripted instructions, data collection and analysis were valid and reliable.
3. The behaviors displayed during recording and observation were representative of what actually occurred.

Operational Definitions

The following definitions were used for this research study:

1. Sports skill acquisition: development of appropriate psychomotor skills through use of verbal and non-verbal instruction and evaluation in order to facilitate athletic performance. In this study it was sprint technique sports skill acquisition.
2. Technique correction: involves correcting specific mechanical areas related to sprint technique.
3. Sprinting mechanic drills: refers to specific sprint related drills that are rehearsed frequently to create motor pathways to develop proper sprint mechanics.
4. Task analysis model: the process of examining and developing proper motor skills through ongoing evaluation during a skill performance
5. Process movement analysis: refers to analyzing skill movements while the participant is actively performing the skill.
6. Product movement analysis: refers to analyzing skill movements after the skill has been completed.

7. Scripted Instruction: process where coaches and/or teachers take participants through a detailed description of the skill to be learned, isolated the specific steps associated with the skill and provides feedback to reinforce desired skilled behaviors.
8. Demonstration: related to scripted instruction and refers to coaches actively engaging in showing participants how to correctly perform certain skills. Physical guidance of skills may also be used meaning that the coach physically guides the athletes through the correct movements of the skills in order for them to pick up the skill properly.
9. Feedback: related to scripted instruction and refers to verbal or non-verbal communication that is sent to the participant after a skill is performed.
10. Skill description: refers to scripted instruction and refers to meaningful and specific verbal descriptions of the skill or skill to be performed.
11. Foot strike placement: refers to a specific sprinting body position of the foot. This action involves knee and hip extension along with dorsal flexion of the ankle and subsequent contact of the foot onto the ground. Unacceptable foot placement is the heel passing the instep of the opposite foot or the toe positioned behind the instep of the opposite foot. Acceptable foot strike placement during A-Skip is between the two unacceptable ranges of placement, which is underneath the body's center of mass.

12. Preparation: related to the task analysis model and refers to when body parts are positioned and lengthened to produce appropriate force production for sports skill movement.
13. Action: related to the task analysis model and refers to when the actual main movement or action part of the sports skill. Also, known as near maximal concentric activity.
14. Follow-through: related to the task analysis model and refers to what happens after the action part of the skill has been completed. In this phase deceleration of limbs or body segments are occurring.
15. Flexion: shortening movement that involves decreasing the angle at a joint.
16. Extension: lengthening movement that involves increasing the angle at a joint.
17. Dorsal flexion: refers to the ankle and involves flexion of the ankle towards the anterior tibia.
18. Plantar Flexion: refers to the ankle and involves extension movement that results in foot/toes moving downward away from the anterior tibia.
19. Temporal: referring to a sequence or order of movements such as starting out in with preparation of movement then moving on action and follow through of the movement.
20. Spatial: refers to the position of the body or limbs in space such as the position of the head, arms, legs, trunk, etc.

21. A-Skip: a sprinting drill that involves flexing the hip and the knee into a 90-degree angle or positioning the knee and the leg parallel to the ground. The foot on the same side of the leg that is parallel to the ground is flexed towards the shin as well. During the skill the sprinter alternates legs while performing these actions down the field or track.
22. Session: a session consists of the investigator recording a participant performing the A-Skip drill for 20 foot contacts.

CHAPTER 2

REVIEW OF LITERATURE

A number of studies have been conducted on skill acquisition in track and field utilizing various coaching methods (Hanin, Korjus, Jouste & Baxter, 2002; Shestakov, Arakelian & Primakov, 2000). However, no studies were found that utilized scripted instruction relative to sprinting skill acquisition.

Due to the lack of previous scripted instruction literature in sprint skill acquisition, this review of literature focuses on pertinent studies related to the problem of this study. This information will be presented under the following headings: (1) academic scripted instruction programs (2) motor learning and scripted instruction feedback (3) sprint mechanic problems and (4) social validity research. A summary will be presented at the end of the chapter.

Academic Scripted Instruction Programs

Scripted instruction is an instructional approach that involves sequencing of instruction, demonstration and guided practice of a task in conjunction with feedback (Marchand-Martella, Kinder & Kurbina, 2005). The distinctive aspects of scripted instruction give it a significant advantage over other traditional educational approaches for both student and teacher. In terms of the teacher, scripted instruction allows both teacher and student to be simultaneously

involved in the learning experience as opposed to approaches such as child-centered or eclectic instruction where the teacher is more of an outside facilitator rather than a direct provider of knowledge (Snider & Schumitsch, 2006). Scripted instruction also helps teachers develop effective classroom instruction and presentation strategies through use of recurring examples (Becker, 2001). One of the biggest advantages of scripted instruction is in the area of training and supervision with teachers. Specific skills are clearly specified in the curriculum so a supervisor could come in a classroom and easily compare what a teacher is doing and what should be happening in the lesson (Becker, 2001).

For students, scripted instructions clear instructional language lessens student confusion (American Federation of Teachers, 1999). Additionally, clear instructional formats provide students with more concise directions on how to acquire newly introduced skills (American Federation of Teachers, 1999). Finally, the careful sequence of skills in scripted instruction not only promotes step by step mastery of new skills for students, but also a progression towards independent practice of skilled activities (American Federation of Teachers, 1999).

Another advantage of scripted instruction is its years of strong research support. Research efforts in scripted instruction have provided a number of successful programs. Two programs that have been successful using the scripted instruction approach are Dixon and Engelmann's (1999) Spelling Mastery Program and Engelmann and Brunner's (1995) Reading Mastery

Program. Studies by Gettinger (1993) Darch and Simpson (1990) Earl, Wood and Stennett (1981) and Sommers (1995) revealed that Spelling Mastery was more effective than traditional spelling programs in teaching children a variety of skills related to spelling. Results of McCormick and Fitzgerald's (1997) study revealed that Spelling Mastery could raise spelling skills of 6th graders at least one year above their grade level norms. Darch and Simpson (1990) conducted a study examining the difference between Spelling Mastery and a traditional spelling approach for children with learning disabilities. Results indicated that Spelling Mastery's rule based and skill directed approach with specific correction and practice procedures was more effective than a traditional approach for teaching children with learning disabilities how to spell.

Gettinger (1993) investigated the difference between Spelling Mastery and an instructional spelling approach with children with emotional and learning disabilities. Results revealed that students using Spelling Mastery spelled more words correctly than the more traditional approach. Earl, Wood and Stennett's (1981) research comparing Spelling Mastery with traditional spelling programs also showed that students using Spelling Mastery exhibited greater spelling gains than those using traditional programs.

In the area of reading skill acquisition and direct instruction, a 25-study review by Schieffer, Marchand-Martella, Martella, Simonsen and Waldron-Soler (2002) indicated that Engelmann & Brunner's (1995) Reading Mastery Program was more effective than both traditional and other alternative reading programs in helping children to learn new words. Adam's (1990) found that the explicit letter-

sound sequencing in Reading Mastery promoted increased word recognition in early grade levels. Brown and Felton's (1990) study comparing Reading Mastery's structured phonics with a context emphasized approach showed that systematic phonic instructions led to more effective reading outcomes for students at risk for reading disabilities.

While there have been numerous studies indicating effective outcomes using scripted instruction programs for skill acquisition in the academic setting, there appear to be no studies utilizing scripted instruction programs in the track and field setting for acquiring vital sprint mechanic techniques. In order to conduct this study, the researcher used Gangstead and Beveridge's (1984) study to provide a point of reference to extend the use of a scripted instruction model in the athletic setting.

The purpose of Gangstead and Beveridge's (1984) study was to evaluate the implementation of a sports skill instructional approach (The Utah Sports Analysis Test) based on a systematic skilled observation model. The researchers used a pre-test-posttest experimental control group design to examine the effects of this methodological approach in relation to analytical proficiency of 20 undergraduate students. These undergraduate students were randomly assigned to an experimental and control group. The experimental group received instruction in sports skill analysis for eight weeks, three times a week for one-hour intervals. The experimental group learned and analyzed specific movements in four sports skills to include: over arm throw, standing long jump, stationary kick and batting.

The control group received no instruction and only received the pre-test and post-test assessments.

The pre-test and post-test assessed perceptual (absence or presence of specific motor skill movements) and diagnostic (description of specific movements in correct performances of motor skill) proficiency in the four sports skills. The researchers hypothesized that students who received the intervention would be more proficient in learning and analyzing sports skill movements. Results of the study revealed that students in the experimental group had higher levels of perceptual proficiency. More specifically, the researchers suggested that students in this group were more effectively able to attend to specific body movement in sports skills. Additionally, students in the experimental group were more adept at recalling motor skills instructions and demonstrations. Finally, the results suggested that higher perceptual efficiency was likely due to implementation of the systematic sports skill model used in the study.

Motor Learning and Scripted Instruction Feedback

Throughout the years there has been several motor learning models used for the purpose of helping participants acquire important skills. Early work in motor learning could be seen as far back as the early 1920's. Research progressed into the 50's with behaviorist such as Thorndike and Skinner. Eventually, research in the area of motor learning and skill acquisition transitioned into how the process of learning new skills occurred cognitively. Two main representations of this came from Adam's (1971) and Schmidt's (1975) closed loop and schema theories. Both theories advanced our understanding of motor behaviors

significantly. Adam's theory (1971) examined information related to detecting or evaluating how effective the movement was that was just completed by a person. Adam's theory (1971) examined what individuals felt during a movement and what they wanted to happen for the result of that movement. Schmidt's theory (1975) took Adam's theory a step further by explaining how learners estimate what they will feel as a result of previously performing the skill and knowing the sensations associated with that skill.

One model that linked heavily onto the cognitive aspect of motor learning was Fitts and Posner's (1967) model. This model was extremely influential in that it explained how learners acquired motor skills in three stages. The first stage involves a verbal/cognitive process in which learners try to make sense of the task before them. Learners in this stage learn what is critical for skill development and what is not. Lots of mental activity is involved in this stage and there is a heavy feedback component here as well. Learners then move into the associative stage where movement skills are refined. Feedback is still a part of this stage; however it becomes less frequent as the learner understands the skill better. Finally, the learner has the opportunity to move into the autonomous stage where feedback is infrequent and the learner performs the skill correctly without thinking about it.

Fleischman (1957) and Newell (1986) helped to validate and support Fitts and Posner's (1967) work through different studies examining how the cognitive aspect of learning decreases over time and the action or psychomotor aspect of learning takes over to lead to total coordination at some point in the future.

Finally, another researcher who helped to shape motor learning and what we know about it is Bandura. Bandura's (1969, 1977) social learning theory has been well researched and read. The social learning theory promotes learning through observation and modeling. More recently, Bandura (1986) proposed that the learner must be able to attend to pertinent information, remember this information, use it and then be willing and able to perform desirable behaviors. Although this seems simple enough, it is still a concept that can be difficult for some learners if there are any limiting factors.

An important aspect related to motor learning and the problem of this study is the integration of feedback along with the implementation of a sports skill instruction and observation model. Research results by Magill (2001) suggested that the amount of feedback and the timing of feedback are crucial to motor skill acquisition. Results of studies by Wulf, Shea and Matschiner (1998) and Williams and Hodges (2005) revealed that the amount of feedback needed appears to be based on the complexity of the skill, type of skill and the learning stage of the participant. However, Berkey's (1986) research findings suggests that regardless of the complexity or type of skill, that specific observation of a skill followed by immediate reinforcement or error correction tends to increase the percentage of motor appropriate activity.

More recent research on motor learning and rate and timing of feedback has yielded mixed results. Research by Young and Schmidt (1992) compared average knowledge of results feedback (feedback given after a set of trials) and single trial feedback (feedback given after a single performance) on single point

movement tasks. One group was given single trial feedback and two other groups were given average of trials feedback for a single point movement task. The results of this study showed that the two groups who received average knowledge of results feedback was more effective than the one group who received single trial knowledge of results feedback in producing increased performance in single point movement tasks.

However, research by Wulf and Schmidt's (1998) provided different results concerning rate and timing of feedback during motor skills. In this study the researchers examined the effects of rate of frequency on a right arm level movement with certain spatiotemporal goal movement patterns. The researchers examined various rates of knowledge of results feedback with the conclusion being that while various rates of feedback provided no difference in learning the fundamental spatiotemporal task, average knowledge of results feedback did decrease the learner's ability to parameterize the actions of the movement. However, in the same research by Wulf and Schmidt (1998), they suggested that single trial knowledge of results feedback might be more effective than average knowledge of results feedback for complex whole movement patterns. Therefore, further research is necessary to examine the rate and timing of feedback in regards to different aspects of certain motor skills.

Conversely, the topic of excessive feedback being detrimental to motor skill acquisition is widely supported in the literature. Maxwell, Master's and Eves (2000) study on golf putting revealed that use of excessive feedback actually hampered performance in the competitive environment. Button and Pepping

(2006) reported in their study about golf putting skill acquisition that while movement related feedback has been shown to be important for optimal skill acquisition, feedback in small increments is preferable for desired results.

The type of instruction and feedback is also an important aspect in relation to acquiring motor skills. Hodges and Franks (2002) examined theirs and other previous studies involving learning of a novel bimanual coordination task. In relation to instruction and feedback, the findings of the review were numerous. The authors found that the depth and specific nature of the instruction for motor skill acquisition had great bearing on the specific type of feedback the learner would receive. The authors also discovered that limb-related instructions and feedback were effective in making the learner more efficient at error detection during performance of skills. Furthermore, Hodges and Frank's (2001) study on learning a coordination skill indicated that concurrent feedback is highly effective for learning proper limb positioning for motor skills that require complex coordination skills.

The use of feedback in academic scripted instruction programs for the purpose of target skill acquisition has been well documented (French, 1997; McLaughlin & Pfeifer, 1998; Karant, 1989). Gleason and Hall's (1991) scripted instruction research comparing in-class versus after class feedback for teaching behaviors found that in-class feedback resulted in minimal time between feedback and correction of performance. Coulter and Grossen (1997) found that in-class feedback results in quicker acquisition of target behavior skills than delayed feedback or no feedback at all. French's (1997) study on the

management of paraeducators revealed that feedback was most effective when it was descriptive and directed only towards the skill performed. In addition, research by Karant (1989) on supervision showed that effective feedback could also stimulate meaningful dialogue between teachers and students about the skill being performed.

Sprint Mechanic Problems

The central problem related to this study is foot strike placement during the A-Skip drill. In terms of research and experiential knowledge, there seems to be a general consensus that foot strike placement is the most difficult sprint mechanic skill for youth sprinters to acquire. Dare and Kearney's (1998) article indicated that short ground contact time as a consequence of proper knee lift and proper foot striking position are necessary components in sprint speed. Additionally, Yessis (2006) extends Dare and Kearney's findings by revealing that sprint mechanic technique is vital to short ground contact time.

Murphy, Lockie and Coutts' (2003) research examined the differences between good and poor acceleration and sprinting technique. In the study, the researchers compared individuals with fast and slow acceleration during a short 15 meter sprint. The results of the study indicated that individuals with fast acceleration had decreased left and right foot contact times and increased stride frequency. The authors suggest that coaching instruction and drills related to decreased foot contact time and increased force production are vital to improvement in maximum sprint speed.

Yessis (2006) also suggests that a major contribution to proper sprint mechanics is the pawing or having the leg come back and down before foot contact. Harrison and Warden's (Isolation Sprinting Drills, Retrieved May 23, 2006) research indicated that the down and forward motion of the foot relative to the forward motion of the body is the single most important aspect in sprint technique.

Wiemann and Tidow (1995) conducted research regarding the importance of the hip and knee extensors and sprint mechanic technique. Using electromyography to study the contributions of the hip and knee extensor muscles, the authors concluded that maximum velocity in sprinting is directly related to the velocity of the swing back of the legs and pawing of the foot during ground contact in sprinting.

Adding credence to research related to foot striking and sprinting is experiential knowledge from seasoned and acclaimed track and field coaches. Al McDaniels, former head coach of the University of Nevada Las Vegas' Women's Track and Field Program for 30 years, explained that foot strike, heel recovery and relaxation are not only essential components in sprint technique, but also some of the most challenging to teach and correct in the sport (personal communication, April 7th, 2006, 11:30 am). Mike Spielman, Baldwin City High School Track and field coach for the past 16 years, also echoed Coach Mc Daniel's comments. Coach Spielman indicated that the biggest problem with youth track and field athletes is the difficulty they have in actively putting their feet underneath their hips (personal communication, March 1st, 2006, 3:30 pm).

Social Validity Research

One of the most important aspects of this research study is its use of social validity. Social validity assesses the participant's satisfaction (positive or negative) of the goals, procedures and outcomes of the study. The successful nature of social validity can be seen in various studies. Tierney, et al. (2007) examined social validity in relation to parents' satisfaction with a multi-site acute clinical trial intervention with autistic children. Results of the study revealed that over 90% of the parents expressed a high level of satisfaction with their children's participation in the clinical trials. A majority of the parents also recommended the clinical trials to other families with similar children. Daunic, Smith, Prank and Penfield (2006) investigated the use of a social problem solving curriculum with teachers as way to prevent or ameliorate destructive behaviors of their students. In terms of social validity, the teachers' ratings of the goals, procedures and outcomes of the study were in general very positive.

Papalia-Beradi and Hall (2007) conducted social validity research to assess the acceptability, use and implementation of the Teacher Assistance Team model for general education teachers. This model has been used as a pre-referral intervention in various empirical studies. The social validity results revealed that general education teachers were satisfied with the purpose of TAT and quality of the team member's assistance. However, the social validity results also showed that the teachers were neutral and sometimes slightly dissatisfied with intervention quality and process. Codding, Feinberg, Dunn and Pace (2005) used social validity questionnaires to assess teachers' satisfaction with

immediate performance feedback on implementation of behavior support plans. The results of the social validity questionnaire indicated that teachers rated immediate performance feedback positively in regards to the goals, procedures and outcomes of the study.

These findings support Schwartz and Baer's (1991) belief that social validity is highly effective in assessing the participant's satisfaction towards the goals, procedures and outcomes of research studies. However, Schwartz and Baer (1991) also advocate the continued improvement of social validity measures to further improve social validity effectiveness in experimental research.

Summary

This chapter reviewed the relevant literature related to the problem of this study, which was to examine the effects of a scripted instruction model on acquisition of proper foot strike placement during the A-Skip drill in a high school practice track and field setting. Due to virtually no research related to using a scripted instruction model in the track and field setting, literature from academic scripted instruction programs was reviewed. The review of literature revealed that scripted instruction has been highly effective in the academic setting.

In addition to scripted instruction, motor learning and scripted instruction feedback research was reviewed. Research revealed that immediate feedback after performance of a skill decreases correction time and improves the percentage of motor appropriate activity. Additionally, small increments of feedback provided during performance of a skill are vital for optimal skill acquisition.

Research literature and experiential knowledge related to the most difficult skill for sprinters to acquire was also reviewed. Both research literature and experiential knowledge indicated that the skill of putting one's foot directly underneath the hips is most difficult technical skill for sprinters to acquire. Finally, social validity literature was reviewed. Literature in social validity revealed the effectiveness of a social validity in experimental research.

CHAPTER 3

METHODS

Chapter three describes the procedures and methodology used to conduct the study. Included in the chapter will be: (A) a description of the participants and the setting (B) a description of the research design, (C) target skill selection (D) operational description of the dependent variable (E) general procedures (F) data collection and recording procedures (G) baseline procedures (H) intervention procedures (I) reliability and fidelity procedures (J) social validity procedures and (K) graph analysis methods. At the end of this chapter a summary will be presented.

Participants and Setting

The participants in this study consisted of five high school sprinters on the varsity track and field team at a small rural high school in eastern Kansas. Two of the sprinters were females and the other three were males. The two females were 15 and 16 year old sophomores with two years of participation as sprinters in track and field. Two of the males were 14 year old freshmen with one year of experience as sprinters in track and field. The other male participant was a 15 years old sophomore with two years of experience as a sprinter in track and field.

Two coaches from the same high school as the five sprinters were also part of the study and were assigned to administer the study's intervention. The two

coaches differed in years coaching experience. The first coach was in his sixteenth year of coaching while the second coach was in his second year. Both coaches were males. Each coach was the head coach of his particular team/event (boys and girls track and field). The participants were selected by the researcher from preliminary observation that identified foot placement problems during sprinting drills.

After preliminary observation of track practice and following communication with a number of experts in the field, the researcher concluded that the action of planting the foot underneath the hips during sprint mechanic drills was the primary problem. None of the participants had previously been exposed to the scripted instruction model used in this study. Furthermore, the two coaching participants who worked with the selected sprinters had never been exposed to the intervention.

Once selected, the participants were given a student assent form and a parental consent form (See Appendix IX & VIII). Both forms had to be signed and returned to the researcher before the sprinters were allowed to participate in the study. The two coaches participating in the study also received a coaching consent form to sign and return to the researcher (See Appendix VII). At the conclusion of the data collection, both coaches and all four sprinters who received the intervention were given the social validation survey (See Appendix IV & V).

The setting of the study was a rural high school in Eastern Kansas that serves 438 students in grades 9-12. The student body is 98% Caucasian with a high

percentage coming from middle class families. The five athletes for the study were Caucasian participants.

Observation and implementation of the intervention took place at the high school's track and field facility, which consisted of an eight lane 400 meter track located on the outside of a standard foot ball field.

Design

The experimental design was an A-B multiple baseline design across participants (Barlow & Hersen, 1984). The conditions for this design are as follows:

A- Baseline Phase (No Intervention)

B- Treatment Phase (Scripted Instruction Intervention)

The design for this study was chosen because of its high degree of internal validity (Barlow & Hersen, 1984). Threats such a history, instrumentation and maturation are greatly lessened with this design. The multiple baseline design is conducive to the natural setting of this study (field based research) because it does not require withdrawal of the intervention, unlike other single-subject designs, such as the reversal design. Therefore, the coaches did not have to substantially alter what they normally did during practice other than the intervention procedures.

Selection of Target Skill

In order to select the target skill, the researcher made inquires to various sources. The first and most important avenue was to review the track and field literature on what technique or skilled movement in sprinting was the most

challenging for sprinters to acquire. Dare and Kearney (1998) and Harrison and Warden, (2006) revealed that proper knee lift and correct foot strike placement are difficult and necessary components to increased sprinting speed. A second source was personal communications with a number of experts in the field. Coach Bill Walton, Head Track and Field Coach at James Madison University for the past 20 years, revealed that one of the most difficult concepts for young track athletes to acquire is getting the foot underneath the hips in order to prevent reaching and pulling, which adversely affects sprinting performance (personal communication, March, 9th, 2006, 8:07 pm). Al McDaniels, former head coach of the University of Nevada Las Vegas' Women's Track and Field Program for 30 years, explained that foot strike, heel recovery and relaxation are not only essential components in sprint technique, but also some of the most challenging to teach and correct in the sport (personal communication, April 7th, 2006, 11:30 am).

As a former collegiate sprinter and collegiate sprint coach, the researcher found that foot strike placement underneath the hip during sprint drills was the most difficult action for sprinters to acquire. In addition, the coaches in the study were asked what they thought was the most difficult sprint skill for sprinters to acquire. They concurred that proper foot placement was a difficult skill for their track and field athletes to acquire. Through these different outlets of information it was determined that proper foot strike placement during sprint mechanic drills would be the target skill for intervention.

Dependent Variable

The sprinting drill used in this study is referred to as the "A-Skip" drill. This drill involves flexion at the hip placing the thigh parallel to the ground with the knee flexed 90 degrees at the thigh. The foot on the same side of the thigh that is parallel to the ground is dorsal flexed towards the shin (See Figure 1).

Figure 1

During the drill the sprinter moves forward down the track alternating legs while performing the above-mentioned skipping actions.

Correct foot placement during performance of the A-Skip drill was the target skill to be studied for the effects of the intervention. There were two ways to score a target performance of foot placement during the A-Skip drill. One involved having the heel and toes of one foot aligned with the opposite heel and toes of the other foot (See Figure 2). Or a target performance could be the heel of one foot being within the instep of the opposite foot (See Figure 3). A non-

target performance involved the heel of one foot passing the instep of the opposite foot (See Figure 4).

Figure 2

Figure 3

Figure 4

General Procedures

Scripted instruction has been shown to be a highly effective instructional approach in various research studies (Earl, Wood & Stennett, 1981; Sommers, 1995). The scripted instruction intervention using Gangstead and Beveridge's (1984) model was implemented within the course of the natural practice setting for four high school track and field sprinters. The natural setting allows observation of the participant in the context of his or her specific environment (Gay, 1996; Loucopoulos & Karakostas, 1995). According to Blacker and Mortimore (1996), research in the natural setting tends to be more flexible and conducive to interventions that produce durable gains over a longer period of time. Furthermore, a number of studies have supported the effectiveness of field-based observations in the natural environment (Biscan & Hoffman, 1976; Barrett, 1979; Scully, 1986).

The beginning of the study involved gathering baseline data to establish the frequency of the desired behavior (foot strike underneath the hips) during the A-Skip drill before the intervention. Once at least four sessions of stable baseline data were collected for each participant, scripted instruction was provided by the coaches as the intervention. Per multiple baseline design requirements, the scripted instruction intervention was implemented in a staggered fashion for each of the four sprinters selected to receive the intervention. The first sprinter to receive the scripted instruction intervention was randomly selected. The second sprinter remained in baseline data collection for at least four to six more sessions before receiving the scripted instruction intervention from one of the coaches in the study. This pattern of data collection continued until all four sprinters were given the scripted instruction intervention. Once each of the four participants received the intervention, they continued to receive the scripted instruction intervention until the end of the study. There were a total of 24 data collection sessions. The fifth participant served as the control and did not receive the intervention. This, in effect, strengthens the argument that the intervention was the only possible cause of any detected differences in foot strike placement.

Data Collection and Recording Procedures

Data collection consisted of four observation sessions per week. All observations took place at the end of the school day. Practices started approximately at 3:30 pm and recording began exactly at 3:45 pm. During the observations the participants were observed and videotaped by the researcher in real time. All trials were recorded from a vantage point perpendicular to the plane

of motion of the A-Skip drill (Knudson & Morrison, 1997). In this case all participants were video recorded from the right side. An isolated area of the practice facility was procured to videotape the participants performing the A-Skip drill. This isolated area provided privacy for the participants and minimized the chances of outside influences on the participants drill performance.

During the baseline phase the researcher recorded all 20 foot contacts of the A-Skip drill that each participant performed during each session. During the intervention phase the researcher recorded the following: (a) coaches providing the intervention to the participants (b) the 20 foot contacts during the A-Skip drill and (c) the coaches providing feedback to the participants after the 20 foot contacts were completed. Recording was done using a Pure Digital PSV 350 video camera and a visual evaluation form (Appendix VI) developed by the researcher.

After the researcher recorded each participant's session in real time, the researcher replayed the video of each participant's entire session using slow motion and stop action controls. This allowed the researcher to have an accurate view of correct versus incorrect performances of foot placement during the A-Skip drill for each participant. Relying on the naked eye when watching a fast moving and complex drill such as A-Skip would not have yielded accurate results in a real time situation. Therefore, it was more appropriate for the researcher to videotape each A-Skip drill session and then watch the replay of it in slow motion in order to provide accurate results. While watching the playback, frequency recording was used to mark the number of correct foot placements that occurred

during the 20 foot contacts of the A-Skip drill. If a participant performed an incorrect foot placement during the 20 foot contacts then it was not marked on the visual evaluation form (Appendix VI). Recording took place in the natural practice setting and was completed in an unobtrusive manner so as not to interrupt the participant's normal practice routine.

Intervention Training and Implementation

Prior to implementation of the intervention, the researcher met with both coaches in the study and spent two one-hour training sessions teaching the coaches how to use and implement the intervention. The researcher trained the coaches in six stages:

One, the researcher read word for word in a normal conversational tone instruction 1 and 2. Instruction 1 says the coach will say in a normal conversational tone "the A-Skip drill helps you to learn how to put your foot directly underneath your hips when your foot contacts the ground." Instruction 2 says the coach will say in a normal conversational tone "contacting your foot directly underneath your hips allows you to create a horizontal force, which will propel you forward with more power and speed." The researcher explained to the coaches that these two instructions were important because they explained to the sprinters the importance and application of proper foot planting during the A-Skip drill. The researcher then told the coaches that these two sentences must be read exactly as they are written down and they must be said in a normal conversational tone.

Two, the researcher read word for word instructions 3a through 3h off of the scripted intervention sheet in a normal conversational tone (See Appendix XII). These specific instructions explained the appropriate preparation, movement and follow through phases of the A-Skip drill (See Appendix XI). The researcher then read word for word instructions 4a and 4b off of the scripted intervention sheet in a normal conversational tone (Appendix XII). These instructions specifically defined the acceptable range of correct foot placement during the A-Skip drill. After completing this stage of the training the researcher emphasized to the coaches that these instructions must be read word for word in a normal conversational tone to each athlete for every session.

Three, the researcher read word for word in a normal conversational tone instruction 5a and 5b. Instruction 5a says the coach will say word for word in a normal conversational tone, "I will now repeat word for word the instructions for performing the A-Skip drill while also physically demonstrating those instructions." After repeating instructions 3a through 3h and physically demonstrating those instructions, the researcher then read instruction 5b, which is a verbal repeat of instruction 4a and 4b (See Appendix XII). This was done to review the acceptable range of correct foot placement during the A-Skip drill. After completing this stage of the training the researcher emphasized again to the coaches that these instructions must be read word for word in a normal conversational tone to each athlete for every session.

Four, the researcher read word for word in a normal conversational tone instruction 6a through 6c (See Appendix XII). Instructions 6a through 6c are the

cues related to correct performance of the A-Skip drill. For example, instruction 6b says the coach will say in a normal conversational tone "keep your toe up, knee up and heel up when you raise your thigh parallel to the ground." Once instructions 6a through 6c were read, the researcher then read word for word in a normal conversational tone instruction 7, which says "the coach will tell the sprinter in a normal conversational tone to now perform 20 foot contacts of the A-Skip drill while moving down the field." The researcher then explained to the coaches that at this point in the script that they were to now observe the sprinter performing 20 foot contacts of the A-Skip drill. Once again the coaches were reminded that the instructions should be read word for word in a normal conversational tone to each athlete for every session.

Five, the researcher read word for word in a normal conversational tone instruction 8a and 8b (See Appendix XII). This was the last instruction of the scripted intervention and it trained the coaches on how to provide immediate feedback to the sprinters after they performed the A-Skip drill. The coach will either read instruction 8a which says the coach will say in a normal conversational tone "the foot contacts were within the acceptable range for correct foot plant performance" or instruction 8b which says the coach will say in a normal conversational tone "the foot contacts were outside the acceptable range for correct foot plant performance." Again the researcher emphasized to the coaches that these instructions must be read word for word in a normal conversational tone to each athlete for every session.

Six, the coaches were then required to take the researcher through each stage of the intervention exactly as it was explained to them. The coaches had to act like they were providing the intervention to the researcher in order for the researcher to assess both coaches competency in implementing the intervention with the participants. When each coach was able to take the researcher through each stage of the intervention without error, the coaches were then deemed ready by the researcher to implement the intervention to the participants.

Once the coaches were trained on the intervention, the coaches implemented the intervention in a staggered sequence in accordance with multiple baseline design to four of the sprinters in the study (Barlow & Hersen). The fifth sprinter was the control and did not receive the intervention. When each sprinter was given the intervention by the coaches they only received it once during each session.

Baseline

For baseline data the researcher videotaped each of the five participants performing the A-Skip drill without the aid of any instruction from the coaches. The A-Skip drill consisted of 20 foot contacts for 15-20 yards. Data were collected on the frequency of proper foot plants during the 20 allotted foot contacts during the A-Skip drill. Baseline data were collected until the investigator determined that each participant had reached at least four sessions of stable baseline performance.

Intervention Procedures

The scripted instruction intervention was based on Gangstead and Beveridge's (1984) scripted instruction model. This model emphasizes the process or sequence of skilled movement as opposed to the end product. Scripted approaches to learning skills have already been shown to be highly effective for novice learners in the cognitive setting of the academic environment (Adams & Engelmann, 1996). However, in high school track and field, this scripted instruction intervention has not been used.

The investigator randomly selected one of the five participants to receive the scripted instruction intervention first. The next three participants received the scripted instruction intervention in a staggered fashion in accordance with a multiple baseline design (Barlow & Hersen, 1984). After the first sprinter received the scripted instruction intervention, the second sprinter remained in baseline data collection for at least four to six more sessions before receiving the scripted instruction intervention from one of the coaches in the study. This pattern continued until all four participants received the scripted instruction intervention. Once all four participants received the scripted instruction intervention, they continued to receive it until the end of the study. The study ended after the 24^{th} data collection session. Out of the five total participants, one was randomly selected to serve as the control. This participant did not receive the scripted instruction intervention.

During the implementation of the intervention, each of the participants received the intervention one time per session. After the coach went through the

intervention steps with the participants, the coach then observed the participants performing 20 consecutive foot plants during the A-Skip drill. Once the participants completed 20 foot plants, the participants immediately walked back to the coach. The coach then provided immediate feedback to the participants about their A-Skip drill performance.

Reliability and Fidelity Procedures

Before data collection occurred, the three main steps of establishing reliability were used to ensure the best possibility of reliability. First, two personal training students, who were recruited by the researcher were trained on the criterion standard, which was a videotape of multiple instances of the desired skill behavior. The observers watched and recorded 5-minute segments of the videotape and they did this for approximately 5 total hours of training. Once observers met a 90% or greater level of agreement they could perform reliability checks. Inter-observer checks were done for 35% of the practice sessions. The checks were assigned randomly throughout each phase so as to ensure that IOA was done during all parts of each phase.

All the inter-observer agreement checks were conducted in an empty classroom at the researcher's place of employment. The researcher watched the A-Skip drill sessions on a projector screen located in the center of the room independently from the personal training students. When the two personal training students watched the A-Skip drill sessions on the projector screen the researcher was present in the room, but not actively involved in any way in the personal training students inter-observer checks.

The video replay of the A-Skip drill sessions were projected on the screen through the researcher's Dell Inspiron B120 laptop computer. The two personal training students and the researcher separately watched randomly selected A-Skip drill sessions on the projector screen.

During independent inter-observer checks, the number of correct foot plants out of 20 total foot contacts during the A-Skip drills sessions was marked on the visual evaluation form (Appendix VI). Any incorrect foot placements viewed out of the 20 total foot contacts of the A-Skip drill sessions were not marked. During the course of the inter-observer agreement checks in the study, there was a 91% agreement level (range, 71-100). The formula for calculating inter-observer agreement was the point-by-point agreement formula (Barlow & Hersen, 1984), which is:

$$\text{Point-by-Point Agreement} = \frac{A}{A + D} \times 100$$

A= agreements for frequency of correct foot plants
D= disagreements for frequency of correct foot plants

In order to evaluate the accuracy of the implementation procedures in the study, an accuracy of intervention implementation checklist was formed (Appendix II). If the coach skipped, for example, number five on the checklist, which says "I will now repeat word for word the instructions for performing the A-Skip drill while also physically demonstrating those instructions" then it was not marked on the checklist. After that particular observation the coach would receive feedback from the researcher about the missed step in the intervention

implementation. The correction and retraining protocol (Appendix III) would then be used to make sure the coach implemented the intervention correctly during the next recording session. The steps of the accuracy of implementation checklist are as follows:

1. The coach will say in a normal conversational tone, "the A-Skip drill helps you to learn how to put your foot directly underneath your hips when your foot contacts the ground."
2. The coach will say in a normal conversational tone, "contacting your foot directly underneath your hips allows you to create a horizontal force, which will propel you forward with more power and speed."
3. The coach will say in a normal conversational tone, "I will now read you the instructions for the A-Skip drill."
    a. "In your stance be tall with a slight 5 degree body lean."
    b. "Bring your left knee up to 90 degrees at the thigh."
    c. "Point your left foot up towards your shin."
    d. "Position your right arm at 90 degrees and your left arm at 120 degrees."
    e. "Forcefully drive your left knee and foot down underneath your hips while swinging your left arm up to 90 degrees and your right arm back to 120 degrees."
    f. "Bring your right knee up to 90 degrees at the thigh."
    g. "Point your right foot up towards your shin."

h. "Forcefully drive your right knee and foot underneath your hips while swinging your right arm up to 90 degrees and your left arm back to 120 degrees."

4. The coach will say in a normal conversational tone:
    a. "Correct foot placement during the A-Skip drill is one foot aligned with the opposite foot."
    b. "Correct foot placement is also one foot between the instep of the opposite foot."
5. The coach will repeat word for word in a normal conversational tone:
    a. "I will now repeat word for word the instructions for performing the A-Skip drill while also physically demonstrating those instructions."
    b. "Remember, correct foot placement during the A-Skip drill is one foot aligned with the opposite foot or one foot between the instep of the opposite foot."
6. The coach will say in a normal conversational tone, "These are your performance cues for performing the A-Skip drill."
    a. "Don't tip your hips during the A-Skip drill."
    b. "Keep your toe up, knee up and heel up when you raise your thigh parallel to the ground."
    c. "Be faster than gravity when you drive your foot down underneath our hips."
7. The coach will tell the sprinter in a normal conversational tone, "Now perform 20 foot contacts of the A-Skip drill while moving down the field."

8. After performance of the 20 foot contacts of the A-Skip drill, the coach will say in a normal conversational tone:
    a. "The foot contacts were within the acceptable range for correct foot plant performance."

        OR

    b. "The foot contacts were outside the acceptable range for correct foot plant performance."

The two personal training students recruited by the researcher also collected treatment fidelity data for 35 % of the practice sessions. The observers needed to obtain an inter-observer agreement of 90% or greater. During the study observers had a 100% agreement level on the percentage of steps completed accurately by the coaches. Coach A & B completed 100% of the steps accurately during intervention fidelity checks. The formula to calculate inter-observer agreement was the same as the reliability formula.

Social Validity

It is the goal of the researcher to produce effective and important outcomes for the participants. Therefore, social validation of the study was conducted (Schwartz & Baer, 1991; Wolf, 1978). Carr, Austin, Britton, Kellum and Bailey (1999) define social validity as "the degree that behavior change efforts impact favorably upon consumers". Introduction social validity was first recognized in the late 70's via important articles by Kazdin (1977) and Wolf (1978). More recently, the importance of socially validating the goals, procedures, and

outcomes of applied studies has been acknowledged (Schwartz & Baer, 1991; Hawkins, 1991; Foster & Mash, 1999).

Social validation data were collected at the end of the study for each sprinter who received the intervention and each coach who implemented it. The researcher sat down with each sprinter and coach individually and gathered social validation data using an open-ended interview style method (Marshall, 1995) that explored their perceptions of the goals, procedures and outcomes of the study (See Appendix IV & V). The researcher asked each coach the same coaching social validation questions and wrote down verbatim each response that was given to each question (Appendix IV). The researcher also asked each sprinter the same student-athlete social validation questions and wrote down verbatim each response that was given to each question (Appendix V).

The questions for the coaches were as follows:

1. Now that you have been given a full description of the study, how important and/or significant do you think that the concept of putting together a scripted instruction program is for athletes to acquire skills more effectively?
2. How realistic or feasible do you think it will be to implement and integrate this instructional approach with you and your coaching staff?
3. What was the best part of your experience with the scripted instruction approach in this study and what part of scripted instruction (goal setting, immediate feedback, etc.) did you find most useful?

4. How important are the results of this study in relation to your daily coaching practices?

The questions for the sprinters were as follows:

1. Do you as a sprinter find that a scripted instruction program helps sprinters to perform a-skip better?
2. Do you believe that this type of instruction could be used with each person on your team?
3. What did you like the most about this type of instruction when your coach used it?
4. Do you find the results of this study to be important for sprinters?

Analysis

The frequency data collected in this study were converted to graph form and then analyzed using visual inspection criteria in accordance with single subject research (Barlow & Hersen, 1984). Data were reported in terms of mean number of correct foot plants during baseline and intervention phases, latency of skilled behavior change with implementation of the intervention and trends. Social validity data were analyzed by examining common themes or recurring patterns in the answers to each social validity question asked to both coaches and sprinters (Marshall, 1995, Spradley, 1980). Once the dominant themes were compiled by the researcher, the data were reported by using direct quotes from both coaches and sprinters in support of those dominant themes.

Summary

This chapter described the research methodology used in this study. Foot plant placement underneath the hips was selected as the target skill based on information from experts in the field and track and field literature. Participants were selected based on difficulty acquiring proper foot plant placement during the A-Skip drill. Correct and incorrect performance of foot plant placement during the A-Skip drill was operationalized (See Appendix I). A multiple baseline design across participants was implemented in the study.

Baseline, intervention, recording, treatment fidelity, social validity and data analysis procedures were described. During baseline each participant was given 20 foot contacts of the A-Skip drill. The researcher marked the participants' number of correct foot plants during the A-Skip drill without the intervention. During the intervention phase the coaches administered the scripted instruction intervention to the participants in a staggered fashion. The researcher then marked the number of correct foot plants out of a possible 20 with implementation of the intervention. Frequency recording was done using observations from a digital video camera. Only correct foot placements were marked on the visual coding form (Appendix VI). Treatment fidelity was assessed through use of the accuracy of implementation checklist (Appendix II). The goals, procedures and outcomes of the study were assessed using both coach and sprinter social validity interviews (Appendix IV & V). Finally, data was converted to graph form and analyzed and reported using visual inspection components. Official approval to conduct this research study was obtained via the University of

Nevada Las Vegas Internal Review Board. The official approval date of the study was January 5, 2007.

CHAPTER 4

FINDINGS OF THE STUDY

A summary of the intervention procedures used and results of the intervention on the data are presented in this chapter. Included in this chapter will be results of scripted instruction on A-Skip foot plant occurrence for sprinters and social validity outcomes for both coaches and sprinters.

A-Skip Foot Plant Occurrence

After a review of the literature and communication with experts in the field, the investigator chose to examine the effects of scripted instruction on correct foot plant occurrence during the A-Skip drill. Before the intervention was implemented the researcher gathered baseline data on the number of correct foot plants during the A-Skip drill. Only correct foot placement (See Appendix I) was recorded during all phases of the study. Each sprinter was given 20-foot plant contacts during performance of the A-Skip drill each session. Therefore, the number of correct foot plants possible was 20. Baseline data were collected until the investigator determined that each participant had reached at least four sessions of stable baseline performance. Once baseline data was established for each participant, the investigator randomly selected one of the five participants to receive the scripted instruction intervention first.

After the first sprinter received the scripted instruction intervention, the second sprinter remained in baseline data collection for at least four to six more sessions before receiving the scripted instruction intervention from one of the coaches in the study. This pattern continued until all four participants received the scripted instruction intervention. Once all four participants received the scripted instruction intervention, they continued to receive it until the end of the study. The study ended after the 24th data collection session. Out of the five total participants, one was randomly selected to serve as the control. This participant did not receive the scripted instruction intervention.

Overall, onset of scripted instruction corresponded with an immediate and substantial increase in correct foot plants for Sprinters A, B, C, and D. Sprinters A, B, C, and D displayed an average of only 0.46 correct foot plants (range, 0-1.7) during baseline, which increased to an average of 12.125 correct foot plants (range, 5-16) during intervention. In contrast, control Sprinter E who never received the intervention, evidenced no improvement during the study.

Sprinter A remained in baseline for six recording sessions. During the baseline, Sprinter A performed a mean of 0.16 correct foot plants (range, 0-1) during the A-Skip drill. Once the intervention was implemented after the sixth session, Sprinter A showed an immediate increase in number of correct foot plants. Sprinter A went from zero correct foot plants in the sixth session with no intervention to seven correct foot plants in the seventh session. Sprinter A's mean number of correct foot plants during the intervention phase was 12.5

(range, 5-18). Sprinter A experienced an ascending trend in correct foot plants until session 15.

Sprinter B remained in baseline for 10 recording sessions. During the baseline phase Sprinter B had a mean of 1.7 (range, 1-3) correct foot plants during performance of the a-skip drill. Once the intervention was introduced during session 11, Sprinter B also showed an immediate increase in correct number of foot plants. Sprinter B went from two correct foot plants to eight correct plants with introduction of the intervention. Sprinter B's mean number of correct foot plants with the intervention was 16 (range, 8-19). As with Sprinter A, Sprinter B also experienced an ascending trend in correct foot plants until session 15.

Sprinter C remained in baseline for 14 sessions. Sprinter C had a mean of zero correct foot plants during baseline data collection. As with the other participants, Sprinter C showed an immediate change in the number of correct foot plants once the intervention was implemented in session 15. Sprinter C went from scoring zero correct foot plants during session 14 without the intervention to 10 correct foot plants during session 15 with the intervention. Sprinter C performed a mean of 15 correct foot plants (range, 8-19) during the intervention phase of the study. However, while Sprinter C experienced a large increase in correct foot plants when the intervention was implemented, there was large variability around the mean for the first few sessions of the intervention phase.

Sprinter D remained in baseline for 18 sessions and was the last participant to receive the scripted instruction intervention. Sprinter D had a mean of zero

correct foot plants during baseline performance of the A-Skip drill. Sprinter D showed an immediate increase in number of correct foot plants with introduction of the intervention in session 19. Sprinter D went from scoring zero correct foot plants during session 18 of baseline data collection to four correct foot plants with implementation of the intervention during the session 19 of data collection. Overall, Sprinter D had a considerably lower mean of five correct foot plants (range, 3-8) during intervention.

Sprinter E was the control participant in the study. This participant never received the scripted instruction intervention. Sprinter E's mean of correct foot plants during performance of the A-Skip drill was 0 for all 24 sessions of the study. Results for all of the participants can be seen below in figure 5.

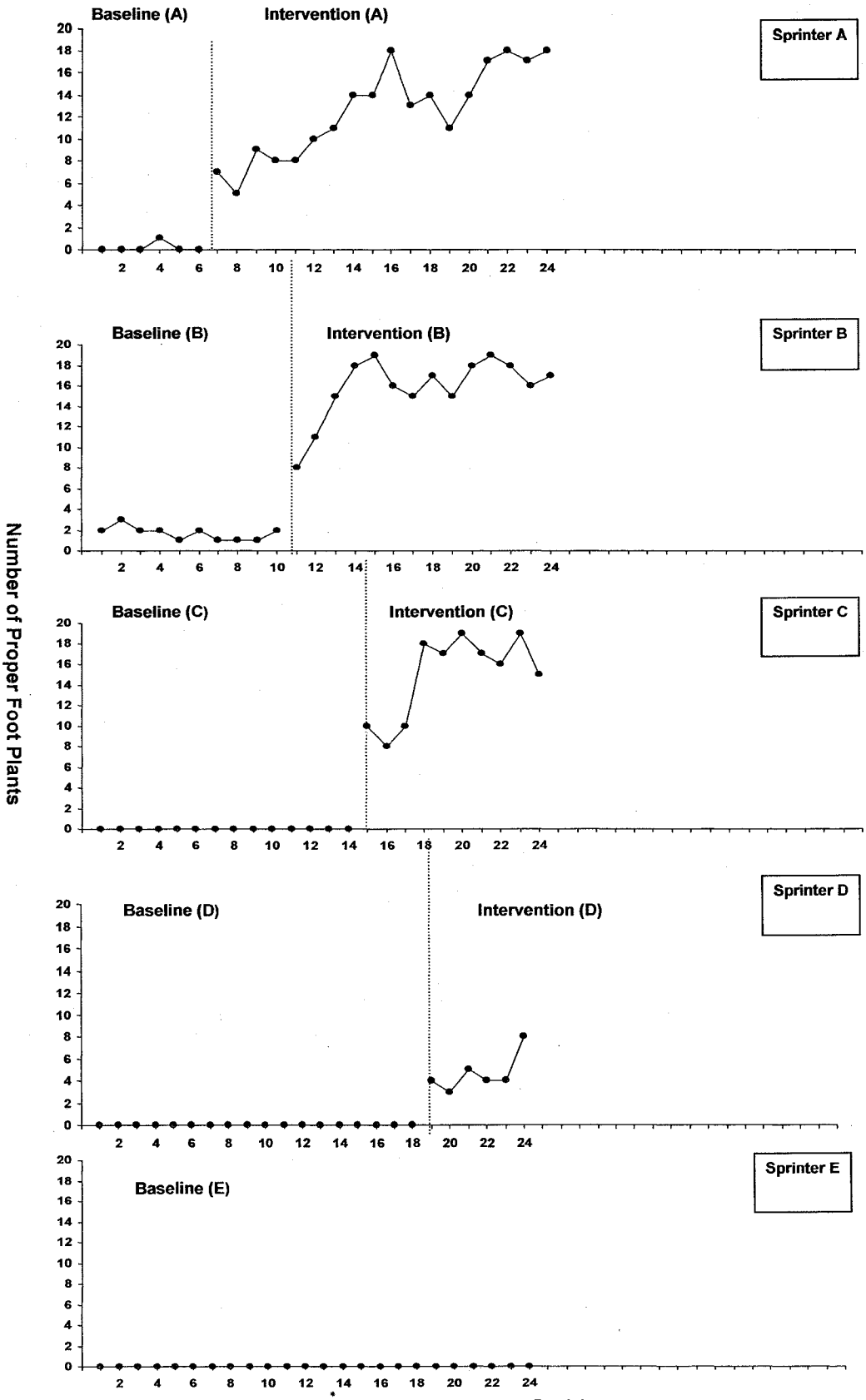

Figure 5. Proper Foot Plants during A-Skip Drill Across Participants

Social Validity

Social validity interviews were conducted to determine the level of satisfaction for both coaches and sprinters in the study. In order to determine the coaches and sprinter's level of satisfaction for the study, the researcher had to analyze each question that was asked to determine the patterns and themes that existed in the answers to the social validity questions.

The first thing to do to determine themes and patterns was to create domains, which are categories of meaning. There were two central domains in this study. One was student-athletes and the other was coaches. These domains were then further broken down into two categories consisting of student-athletes who were sprinters and coaches who were sprint coaches.

In order to continue to determine the dominant themes and patterns for both categories, the researcher determined the semantic relationships that linked the two categories of people based on the social validity questions that were asked to them. The apparent relationships between the two categories were the goals, procedures and outcomes of the study. Once relationships were determined then both a cover term and included terms were taken from the answers given by each of the coaches and sprinters from the social validity questions asked to them (Appendix IV & V).

Based on the social validity questions asked to both coaches and sprinters and their corresponding answers, the cover term chosen was the word satisfaction. The word satisfaction best described the point of emphasis when asking the social validity questions. At this point during the process of

determining dominant themes and patterns for social validity, it was clear that the determined relationships of goals, procedures and outcomes of the study were related to kinds of satisfaction. The next step was figuring out the included terms to discover which ones were consistent with the goal, procedure and outcome satisfactions of the study.

First, the coaches' answers to the social validity questions were examined to find consistent included terms for each selected relationship. Here is a list of the coaches' social validity questions:

1. Now that you have been given a full description of the study, how important and/or significant do you think that the concept of putting together a scripted instruction program is for athletes to acquire skills more effectively?
2. How realistic or feasible do you think it will be to implement and integrate this instructional approach with you and your coaching staff?
3. What was the best part of your experience with the scripted instruction approach in this study and what part of scripted instruction (goal setting, immediate feedback, etc.) did you find most useful?
4. How important are the results of this study in relation to your daily coaching practices?

The included terms for question one, which examined the goals of the study, were the words consistency, direction and improvements. The researcher was then able to determine that the major theme in regards to the goals of the study was that the goals created consistency, direction and improvement for the

sprinters in the study and therefore it also increased the coaches' level of satisfaction. This assertion is supported by Coach A's statement that "the consistency in the goal oriented instruction helped the athletes to acquire the skills more effectively."

The included terms for questions two and three, which were related to the intervention procedures of the study, were the words simple, effective and difficult. It was determined that the major pattern in the answers to these questions was that the intervention procedures were easy to follow and to implement one on one, but could be difficult in a large group. Therefore, the level of satisfaction for the intervention procedures was mixed between the two coaches. This statement was supported by Coach A saying "he believed the intervention could be easy to integrate with the rest of the team as long as it was done by adding a few drills at a time." However, Coach B stated that while he "believed the procedures were very effective, he specifically stated that he thought it would be difficult for the intervention to be implemented with the whole team due to the size of the team and short practice time."

The included terms for the final question, which was about the outcomes of the study, were the words important and useful. The major theme in terms of the outcomes of the study was that the intervention helped the sprinters significantly improve their performance in a vitally important skill. Therefore, important and useful outcomes were related to a high level of satisfaction for the coaches in the study. This assertion was supported by Coach A when he said "that the outcomes of the study were important because they showed that one on one

explicit instruction was useful." Coach B then backed that statement up by saying that "the outcomes were important because they outlined the key technical aspects of A-Skip drill that needed to be addressed for each athlete."

Next, the sprinters' answers to the social validity questions were examined to find consistent included terms for each selected relationship. Here is a list of the sprinters' social validity questions:

1. Do you as a sprinter find that a scripted instruction program helps sprinters to perform a-skip better?
2. Do you believe that this type of instruction could be used with each person on your team?
3. What did you like the most about this type of instruction when your coach used it?
4. Do you find the results of this study to be important for sprinters?

The included terms for question one, which examined the goals of the study, were the words focus and application. The major theme in terms of goals of the study was that the intervention helped to provide a direction and focus towards improving their performance of foot planting during the A-Skip drill. Therefore, focused goals with direct application to sprinting were related to a high level of satisfaction for sprinters in the study. To support this statement, Sprinter A said that "the instruction helped her to be more explosive and powerful when performing the A-Skip drill." Sprinter B also said that the instruction actually helped her focus on applying it to her running workouts."

The included terms for questions two and three, which were about the procedures of the intervention, were the words specific, detailed, useful and feedback. The major theme for the procedures of intervention was that the specific instruction and feedback provided the sprinters with a better understanding of how to perform the A-Skip drill. Therefore, the specific and detailed nature of the intervention created a high level of satisfaction for the intervention procedures. This statement is supported by Sprinter B who said "that she liked how the coaches were specific with making sure that she came straight down underneath her hips during the A-Skip drill." Additionally, Sprinter C said that "he liked that he was told exactly what he was doing incorrectly so that he could perform the drill right."

The included terms for question four, which was about the outcomes of the study, were the words improvement, instruction, technique and form. The major theme for the outcomes of the study was that visible improvements in technique and form are important to sprinters. Therefore, the visible improvement in foot placement during the A-Skip drill and overall A-Skip drill performance created a significant level of satisfaction for the outcomes of the study. Sprinter D explained that "the outcomes were important because they could help a sprinter's form." Sprinter A stated that "the outcomes showed that improvements in running mechanics could be made with good instruction.

Overall, the results of social validity for both coaches and sprinters supported the effectiveness of the intervention in this particular setting. Common themes when answering the social validity forms for both sets of participants were

consistency, individual attention, visible demonstration, more focus and exact instructions. Additionally, both sets of participants agreed that there was a change in form that was visible almost immediately.

CHAPTER 5

DISCUSSION OF RESULTS AND RECOMMENDATIONS

In chapter five the researcher provides a more in-depth discussion of the results of the study. Included in this chapter will be discussion related to the findings of increased foot plant occurrence during the A-Skip drill, further examination of social validity themes, recommendations for future research and a conclusion.

Discussion of Results

The results of the study indicated that the use of scripted instruction was effective in increasing the occurrence of proper foot plants during the A-Skip drill. The most significant sign of success was the immediate difference that was seen once each sprinter was given the intervention. As stated in the results section and shown in figures 1-4, each sprinter improved substantially once he or she received the intervention. Before implementation of the intervention, all of the sprinters had means of correct foot plant occurrences close to zero. The results of this study supports previous research by Dixon and Engelmann (1999), Gettinger (1993) and Earl, Wood and Stennett's (1981) in the academic setting showing that direct instruction is a highly effective instructional approach for the purpose of skill acquisition for novice learners.

In examining this low number of foot plant occurrences pre-intervention, one of the biggest problems was the type of instruction the sprinters were given during the normal course of their sprint mechanic drill sessions.

During the warm-up and sprint mechanic drills at the beginning of practice, the coaches tended to use very general instructions when explaining how to perform different drills. For instance, when explaining the important keys to performing the A-Skip drill, the coaches in the study regularly explained that the "knees should come up and the foot should come down quickly". One problem with this type of instruction is that it leaves performance of the drill open to quite a bit of interpretation. How far should the knee come up? Where should the foot actually be placed? These are valid questions to ask when trying to understand how to perform the A-Skip drill properly.

The absence of explicit instructions and its effects on A-Skip drill foot plant performance was clearly evident with the one sprinter who was the control in the study. This sprinter never received the scripted instruction intervention. The result was that this person did not perform a correct foot plant one time during the entire length of the study. However, the sprinters who received the intervention made significant improvements in proper foot plants during A-Skip drill performance. The fact that the control sprinter did not improve at all and the other sprinters did lends strength to the argument that the increases in foot plant occurrences during the A-Skip drill were solely due to the intervention and not other extraneous variables.

One of the possible reasons why the instruction was very general in nature could have been due to the large team size. There were at least 50 student-athletes on the track and field team with at least 25 of them being sprinters, jumpers and hurdlers. Additionally, there were only three coaches for that many student-athletes and practices regularly only lasted one and half hours. Both of these factors posed a large problem in terms of providing explicit instruction for vitally important drills. With the large group size it seemed to be almost easier for the coaches to administer instruction in a more general way rather than take the time to work with each individual student-athlete.

Another issue related to poor foot plant performance pre-intervention was the lack of feedback provided during drill practice. In particular, there was little limb related feedback for the foot, knee or arm placement during performance of the A-Skip drill. Limb related feedback has been shown to be highly effective in learning complex skills that require significant amounts of coordination (Hodges & Franks, 2001). Additionally, specific observation of a skill followed by immediate reinforcement or error correction tends to increase the percentage of motor appropriate activity (Berkey, 1985). Therefore, the lack of feedback during sprint mechanic sessions seemed to hamper correct acquisition of important sprint mechanic drills.

When further examining occurrences of correct foot plants during the A-Skip drill with implementation of the intervention, the researcher discovered some other interesting findings. One such finding was that there appeared to be an ascending trend in correct foot plant occurrences for three out of the four

sprinters after the initial increase in correct foot placements during the A-Skip drill. This ascending trend could have been due to the fact that the sprinters did not receive the intervention on a daily basis during the first couple weeks of the intervention phase due to practice cancellations for inclement weather.

Another interesting finding was the difference in skill acquisition and behavior between the females and males in the study. As shown in figures 1-4, the females (the first two sprinters on the graph) showed a quicker increase in proper foot plant occurrences than the males in the study. When the instruction became explicit the females tended to grab on to each step of the instructions very intently. The females in the study consistently asked questions and as time passed in the study, began to repeat the instructions word for word with the coaches providing the instruction in order to show the coaches that they were learning the information. The males in the study showed very little verbal interaction during instruction and feedback. Furthermore, when observing the videotape, the females exhibited what appeared to be much quicker contact time and explosive foot placements than the males.

These observations may be linked to a shifting trend in terms of female sports participation and instructional preferences being more in line with male preferences. Early research by Chelladurai and Saleh (1978) and Neil and Kirby (1979) indicated that gender influenced coaching behavior and instruction preferences of athletes. Research by Terry and Howe (1984) supported earlier research by indicating that males preferred more direct and autocratic instructional behaviors than females. However, more recent research by Anshel

(1995) and Plaisted (1995) has revealed more similarities between genders in terms of preference in coaching instructional behaviors.

Results of the social validity interviews for both coaches and sprinters revealed a consensus of value and effectiveness for the intervention. In terms of the goals of the study, the participants agreed that they helped provide them with a more specific aim of exactly what is necessary to perform the foot planting correctly. Procedurally, both coaches and sprinters felt that the scripted intervention was easy to follow and could be implemented with the rest of the team in various events. Furthermore, the results of the study were very important to both coaches and sprinters. The sprinters revealed that the results helped them to know that they could actually improve their sprint mechanics. The coaches felt the results were important because they believe it helped them further identify how much more work the kids needed and how useful this type of instruction can be.

However, even with overwhelmingly positive results from the social validity survey, it is hard to tell if maintenance of the high level of occurrences of proper foot planting will continue in absence of this study. The biggest possible indicator of confirmation of social validity might be the maintenance of the behavior change in the future and ultimately improved sprint times.

Recommendations for Future Research

The results of this study suggest several areas of future research related to maintenance of the intervention, generalization of the intervention with different

events and sports settings and optimal number of trials to establish stability of correct foot plant performance during the A-Skip drill.

Future research of Gangstead and Beveridge's (1984) scripted instruction model should be used to examine the maintenance of high levels of correct foot plants during A-Skip among high school track and field novice sprinters. Kennedy (2002) defines maintenance of behavior change as "the durability in levels of behavior once operational goals, procedures, and outcomes of an experiment have been achieved." Valuing the maintenance of a high level of performance of a skill is crucial to long-term adherence of that skill (Nader, et al., 1999). Research by Bock, Marcus, Pinto and Forsyth (2001) indicated the effectiveness of implementing a follow up or maintenance phase to a study. Additionally, Finney (1991) suggests that the addition of a maintenance phase provides a strong condition in which to study the success or failure of the intervention.

Although the coaches asked for and received the script used in the study, it is not known whether or not the coaches will continue to actually use the script in future track and field seasons. Adding a maintenance phase to examine whether the sprinters continued to exhibit high levels of correct foot plant placement during the A-Skip drill could have possibly added more strength to the results of the study. Baer, Wolf and Risley (1987) explained that behavior change that is not preserved or continued over time should not be thought of as effective. Therefore, examination of maintenance of correct foot plant is highly recommended in future research.

Another recommendation for further research would be to examine usage of Gangstead and Beveridge's (1984) scripted instruction model in different events in track and field or in different sports to begin to generalize the results of the study. While there were significant positive changes in the number of correct foot plants during the A-Skip drill in the study, purposeful selection and small sample size of the participants do not allow for the results to be generalized to the immediate larger population. While single subject research is aimed more at helping the people being worked with at one particular time (Barlow & Hersen, 1984 & Graziano & Raulin, 1989), there is still a concern in relation to generalization within and across different settings.

One way to begin to generalize the results of this study would be to conduct generalization probes across different skills in various events in track and field. For example, one could use scripted instruction not only for instances of correct foot placement in the A-Skip drill, but also for pole placement drills in the pole vault or the penultimate step in the long jump. If similar positive results were found for increasing the correct number of performances of those important skills in those different events, then it would be much easier to infer that Gangstead and Beveridge's (1984) scripted instruction model can be generalized within the track and field setting.

Future research implementing Gangstead and Beveridge's (1984) scripted instruction model in different sports settings such as football, baseball, basketball and many other sports might also strengthen the results of the study. If further research showed increases in correct performances of vital skills in different

sports using Gangstead and Beveridge's (1984) scripted instruction model then a case for a wider scale of generalization could be made. For example, future research could involve Gangstead and Beveridge's (1984) scripted instruction model being implemented at three different high schools for three different sports. One scenario could involve using the scripted instruction model for foot placement during the A-Skip drill in track and field, hand placement in pass blocking in football and foot placement in landings in gymnastics. This would be an interesting situation to examine whether scripted instruction could be generalized across settings.

However, it is important to note that when conducting generalizations probes that adequate measures are taken to control for threats to internal validity and intervention fidelity. In fact a frequent cause of lack of generalization in many research studies is due to poor intervention fidelity (Glasgow, Klesges, Dzewaltowski, Sheana & Estabrooks, 2004). Therefore, necessary measures need to be taken to ensure proper examination of generalization probes.

Finally, it would seem appropriate for future research to focus on the number of trials necessary for performance stability. While there has been some research on appropriate numbers of trials for vertical jumping (Rodano & Squadrone, 2002), hurdling (Salo et al., 1997) and landing (James, Herman, Dufek, & Bates, 2007), there has been no relevant studies related to appropriate number of trials for stable data for the A-Skip drill. Knudson and Morrison (1997) suggest 5-8 trials of any skill so that the observer won't focus on just insignificant and minor variations in a drill sequence. However, examination of the data in the study

through videotape replay showed that most of the sprinters caught the rhythm and execution of correct foot plants mid-way through the 20 allotted trials of the drill. Research on a small number of trials indicates that it does not provide a solid generalized performance to observe and examine (Bates, Dufek & David, 1992). Therefore, it would seem necessary for future research to thoroughly examine what the proper number of trials for the A-Skip drill should be for stable performance of foot plant placement. One way this could be done is to compare the difference between two different trial numbers. One group of students could receive 20 trials of the A-Skip drill (such as was done in the current study) and the other group could receive 10 trials of the A-Skip drill. This might provide an interesting look at whether more or less trials are appropriate for stabilization of the data.

Conclusion

In short, the results of the study revealed that Gangstead and Beveridge's (1984) scripted instruction model was effective in improving the sprinter's number of occurrences of correct foot plant placement during the A-Skip drill. While these results may not generalize to the immediate larger population, they do provide some important findings for future research in this area. With little research being done with scripted instruction in the sport of track and field, it would seem that the potential would be tremendous for improving skill acquisition in a variety of events in track and field. It is also possible that research using scripted instruction in different sports could help to magnify the importance of Gangstead and Beveridge's (1984) instructional model on a broader spectrum.

Even so, the most exciting aspect of the study was that it helped the sprinters drastically improve their number of correct foot placements during the A-Skip drill. It is the researcher's hope that the athletes helped in the study continue to improve their sprint technique and ultimately improve their actual sprinting performance.

APPENDIX I

GOOD VS BAD PERFORMANCE OF FOOT PLACEMENT

- Good performance of A-Skip
  - Hips are parallel to the ground.
  - Knee is flexed 90 degrees at the thigh.
  - Toes on same side are dorsal flexed towards the shin.
- Bad performance of A-Skip
  - Hips are above parallel to the ground.
  - Knee is above 90 degrees of flexion at the thigh.
  - Hips are below parallel to the ground.
  - Knee is below 90 degrees of flexion at the thigh.
  - Toes on same side are not plantar flexed.
- Good performance of foot plant during A-Skip
  - Heel and toes of one foot aligned with the opposite heel and toes of the other foot.
  - Heel of one foot is within the instep of the opposite foot.
- Bad performance of foot plant during A-Skip
  - Heel of one foot passing the instep of the opposite foot

APPENDIX II

INTERVENTION FIDELITY CHECKLIST

1. ___The coach will say in a normal conversational tone, "the A-Skip drill helps you to learn how to put your foot directly underneath your hips when your foot contacts the ground."
2. ___The coach will say in a normal conversational tone, "contacting your foot directly underneath your hips allows you to create a horizontal force, which will propel you forward with more power and speed."
3. ___The coach will say in a normal conversational tone, "I will now read you the instructions for the A-Skip drill."
    a. "In your stance be tall with a slight 5 degree body lean."
    b. "Bring your left knee up to 90 degrees at the thigh."
    c. "Point your left foot up towards your shin."
    d. "Position your right arm at 90 degrees and your left arm at 120 degrees."
    e. "Forcefully drive your left knee and foot down underneath your hips while swinging your left arm up to 90 degrees and your right arm back to 120 degrees."
    f. "Bring your right knee up to 90 degrees at the thigh."
    g. "Point your right foot up towards your shin."

h. "Forcefully drive your right knee and foot underneath your hips while swinging your right arm up to 90 degrees and your left arm back to 120 degrees."

4. ___The coach will say in a normal conversational tone:
   a. "Correct foot placement during the A-Skip drill is one foot aligned with the opposite foot."
   b. "Correct foot placement is also one foot between the instep of the opposite foot."
5. ___The coach will repeat word for word in a normal conversational tone:
   a. "I will now repeat word for word the instructions for performing the A-Skip drill while also physically demonstrating those instructions."
   b. "Remember, correct foot placement during the A-Skip drill is one foot aligned with the opposite foot or one foot between the instep of the opposite foot."
6. ___The coach will say in a normal conversational tone, "These are your performance cues for performing the A-Skip drill."
   a. "Don't tip your hips during the A-Skip drill."
   b. "Keep your toe up, knee up and heel up when you raise your thigh parallel to the ground."
   c. "Be faster than gravity when you drive your foot down underneath our hips."
7. ___The coach will tell the sprinter in a normal conversational tone, "Now perform 20 foot contacts of the A-Skip drill while moving down the field."

8. ___After performance of the 20 foot contacts of the A-Skip drill, the coach will say in a normal conversational tone:

   a. "The foot contacts were within the acceptable range for correct foot plant performance."

      OR

   b. "The foot contacts were outside the acceptable range for correct foot plant performance."

APPENDIX III

COACH CORRECTION AND RETRAINING PROTOCOL

When a coach makes a mistake during implementation of the intervention script or forgets to mention a sequence on the script the following protocol will be implemented:

1. The researcher will stop recording and ask the coach to go over the sequence that was missed during intervention implementation.
2. The researcher will sit down with the coach after recording has been completed for that particular session and will reiterate the importance of following the script for accuracy of implementation.
3. The researcher will then go back over the scripted intervention sequence with the coach to make sure that he/she understands the order of the intervention.

Regular retraining in terms of using the scripted intervention will occur throughout the treatment phase and the protocol for this is as follows:

1. The researcher will have 10-15 minute meetings with the coaches to reiterate the importance of following the scripted intervention sequence.
2. The researcher will once again go over the pre-intervention training which includes three key steps:

a. The researcher explaining in great depth the description of the different phases of the task or skill to be performed. Specific emphasis being placed on terminology related to the A-Skip drill.
b. The researcher demonstrates and isolates each phase of the A-Skip drill while emphasizing the concept of putting the foot underneath the hip as the main variable in the study. The coaches learn the operationalized difference between a good performance of foot underneath the hip and a failure of that performance (Appendix A).
c. The researcher explains both technical and informal feedback cues for each phase of the A-Skip drill and the main component of that drill, which is foot placement underneath the hips.

APPENDIX IV

COACH SOCIAL VALIDATION

Name: _____ Date: _____

1. Now that you have been given a full description of the study, how important and/or significant do you think that the concept of putting together a scripted instruction program is for athletes to acquire skills more effectively?

2. How realistic or feasible do you think it will be to implement and integrate this instructional approach with you and your coaching staff?

3. What was the best part of your experience with the scripted instruction approach in this study and what part of scripted instruction (goal setting or immediate feedback) did you find most useful?

4. How important are the results of this study in relation to your daily coaching practices?

APPENDIX V

STUDENT-ATHLETE SOCIAL VALIDATION

Name: _____ Date: _____

1. Do you as a sprinter find that a scripted instruction program helps sprinters to perform A-Skip better?

2. Do you believe that this type of instruction could be used with each person on your team?

3. What did you like the most about this type of instruction when your coach used it?

4. Do you find the results of this study to be important for sprinters?

APPENDIX VI

RECORDING FORM FOR PROPER FOOT PLANT PLACMENT DURING A-SKIP

*Only mark good performances of a-skip foot placement as stated in Appendix I
*Each participant will get 20 a-skip foot contacts

Student A

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Student B

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Student C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Student D

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Student E (Control)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

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COACH INFORMED CONSENT

Department of Sports Education & Leadership

TITLE OF STUDY: The effects of scripted instruction on proper foot plant during a-skip in a high school practice track and field setting

INVESTIGATOR(S): Monica Lounsbery, Ph.D, Department Chair
Darian Parker, M.S., Ph.D. Candidate

CONTACT PHONE NUMBER: (702) 895-5057

Purpose of the Study

You are invited to participate in a research study. The purpose of this study is to investigate the effectiveness of step by step instruction (scripted instruction) on proper foot plant during a-skip. If you give approval to participate in this study, the data we collect for the purposes of describing the procedures you use in the practice setting will be observed and videotaped. Also, the data we get from this procedure will be described in confidence (e.g. Coach A or B) to others to provide support for this type of instruction. The information that we collect from this study will be stored in a locked cabinet for 3 years. After that time we will destroy the information. The only people that will review the data will be the researchers and the university advisor. Also, you will have access to the data for your own coaching practice purposes.

Participants

You are being asked to participate in the study because you are a high school track and field coach in the Baldwin School District.

Procedures

If you volunteer to participate in this study, you will be asked to do the following: This study will consist of five days per week of observation of selected sprint athletes and coaches for 10 weeks. As a part of this study you will be asked to introduce a new kind of instruction for specific periods of times with the sprinters selected for the study. Also, at the end of the study you will complete a social validation survey, which lets me know what you thought of the study and how important it was to you.

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COACH INFORMED CONSENT

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Darian Parker, M.S., Ph.D. Candidate

CONTACT PHONE NUMBER: (702) 895-5057

Benefits of Participation

There *may* be direct benefits to you for being involved in this study. The main one being that this scripted approach might become an additional coaching aid to help you become an even more effective coach. An indirect benefit that might occur would be that your athletes may improve their running technique and/or form, which could possibly lead to better sprinting results. Even if there are no indirect benefits we hope to learn more about skill acquisition in practice, which will not only help yourself, but other coaches as well.

Risks of Participation

There are risks involved in all research studies. This study will only include minimal risks. You might feel some slight discomfort due to being instructed how to implement a new type of instructional approach. Also, feedback based on your delivery of this new type of instruction may be uncomfortable. However, the risk will be greatly reduced as the feedback will be non-critical and only in a constructive way.

Cost /Compensation

There *will not* be financial cost to you for participating in this study. The commitment of your time for this study will be one-two hours of learning the new instructional approach and 10-15 minute meetings for feedback one-two times per week during the study. Finally, you will spend 20-30 minutes of time at the close of the study to fill out a social validation questionnaire regarding what you found most effective about this study for yourself. You *will not* be compensated for your time. *The University of Nevada, Las Vegas may not provide compensation or free medical care for an unanticipated injury sustained as a result of participating in this research study.*

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CONTACT PHONE NUMBER: (702) 895-5057

Contact Information
If you have any questions or concerns about the study, you may contact Dr. Monica Lounsbery at **895-5057**or Darian Parker at **(785) 594-3355.** For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office for the Protection of Research Subjects at 702-895-2794.**

Voluntary Participation
Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Confidentiality
All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All data will be stored in a locked facility at UNLV during the study and for three years after the studies completion. Thereafter, the stored data will be destroyed.

Participant Consent:
I have read the above information and agree to participate in this study. I am at least 18 years of age. A copy of this form has been given to me.

_____ _____
Signature of Participant Date

_____

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

COACH INFORMED CONSENT

Department of Sports Education & Leadership

TITLE OF STUDY: The effects of scripted instruction on proper foot plant during a-skip in a high school practice track and field setting

INVESTIGATOR(S): Monica Lounsbery, Ph.D, Department Chair
Darian Parker, M.S., Ph.D. Candidate

CONTACT PHONE NUMBER: (702) 895-5057

Participant Name (Please Print)

I agree to be videotaped during this study

_____ _____
Signature Date

_____
Participant Name (Please Print)

Participant Note: Please do not sign this document if the Approval Stamp is missing or is expired.

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

PARENT INFORMED CONSENT

Department of Sports Education & Leadership

TITLE OF STUDY: The effects of scripted instruction on proper foot plant during a-skip in a high school practice track and field setting

INVESTIGATOR(S): Monica Lounsbery, Ph.D, Department Chair
Darian Parker, M.S., Ph.D. Candidate

CONTACT PHONE NUMBER: (702) 895-5057

Purpose of the Study

Your son or daughter is invited to participate in a research study that looks at the effectiveness of step by step instruction (scripted instruction) on proper foot plant during a-skip, which is a very important drill for sprinters to perform well. If you give approval for your son or daughter to participate in this study, the information collected for the purposes of describing the procedures that will be used in track practice will be videotaped and described in complete confidence (e.g. sprinter A or B) to others. We will be describing this information to other professionals at some point to show the progress and effectiveness of using the procedures for scripted instruction in this setting. During the study the only people that will have access to the information collected is the researchers and a university advisor.

Participants

Your son or daughter is being asked to participate in the study because he/she is a high school track and field athlete in the Baldwin School District.

Procedures

If your son or daughter is asked to participate in this study, he/she will be asked to do the following: This study will consist of five days per week of observation of practices for 10 weeks. Your son or daughter will simply participate in their regular track and field activities while also taking 5-10 minutes of time away from teammates not involved in the study so that we can collect videotaped information about scripted instruction and its effects on their a-skip foot placement.

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PARENT INFORMED CONSENT

Department of Sports Education & Leadership

TITLE OF STUDY: The effects of scripted instruction on proper foot plant during a-skip in a high school practice track and field setting

INVESTIGATOR(S): Monica Lounsbery, Ph.D, Department Chair
Darian Parker, M.S., Ph.D. Candidate

CONTACT PHONE NUMBER: (702) 895-5057

Benefits of Participation
There *may* be direct benefits to your son or daughter in this study. Your son or daughter might improve their sprint technique and/or form. This could possibly lead to improvement in sprinting performance down the road.

Risks of Participation
There are risks involved in all research studies. This study may include only minimal risks. Your son or daughter might feel some slight discomfort being observed, however, the risk is reduced because your son or daughter will only be videotaped away from other teammates and therefore will only be observed by the researchers and the coaches involved in the study.

Cost /Compensation
There *will not* be financial cost to your son or daughter for participating in this study. He/she *will not* be compensated for their time. Additionally, there will be no extra time commitment for your son or daughter in the study. *The University of Nevada, Las Vegas may not provide compensation or free medical care for an unanticipated injury sustained as a result of participating in this research study.*

Contact Information
If you have any questions or concerns about the study, you may contact Dr. Monica Lounsbery at **895-5057** or Darian Parker at **(785) 594-3355.** For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office for the Protection of Research Subjects at 702-895-2794.**

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UNIVERSITY OF NEVADA LAS VEGAS

PARENT INFORMED CONSENT

Department of Sports Education & Leadership

TITLE OF STUDY: The effects of scripted instruction on proper foot plant during a-skip in a high school practice track and field setting

INVESTIGATOR(S): Monica Lounsbery, Ph.D, Department Chair
Darian Parker, M.S., Ph.D. Candidate

CONTACT PHONE NUMBER: (702) 895-5057

Voluntary Participation

Your son or daughter's participation in this study is voluntary. He/she may refuse to participate in this study or in any part of this study. Your son or daughter may withdraw at any time without anyone becoming upset. You as well as your son or daughter is encouraged to ask questions about this study at the beginning or any time during the research study.

Confidentiality

All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link your son or daughter to this study. All data will be stored in a locked facility at UNLV during the study and for three years after the studies completion. Thereafter, the stored data will be destroyed.

Participant Consent:

I have read the above information and agree for my son/daughter to participate in this study. I am at least 18 years of age. A copy of this form has been given to me.

_____ _____

Signature Date

_____

Participant Name (Please Print)

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

PARENT INFORMED CONSENT

Department of Sports Education & Leadership

TITLE OF STUDY: The effects of scripted instruction on proper foot plant during a-skip in a high school practice track and field setting

INVESTIGATOR(S): Monica Lounsbery, Ph.D, Department Chair
Darian Parker, M.S., Ph.D. Candidate

CONTACT PHONE NUMBER: (702) 895-5057

I agree for my son or daughter to be videotaped during this study

_____ _____
Signature Date

_____
Participant Name (Please Print)

Participant Note: Please do not sign this document if the Approval Stamp is missing or is expired.

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

STUDENT ASSENT

Department of Sports Education & Leadership

TITLE OF STUDY: The effects of scripted instruction on proper foot plant during a-skip in a high school practice track and field setting

INVESTIGATOR(S): Monica Lounsbery, Ph.D, Department Chair
Darian Parker, M.S., Ph.D. Candidate

CONTACT PHONE NUMBER: (702) 895-5057

Purpose of the Study

My name is Darian Parker and I am asking you to take part in a research study because I am trying to learn more about how we can help sprinters like yourself to improve your skills in a really important sprinting drill called A-skip. If you agree to be in this study you will be videotaped doing the a-skip drill. This will happen away from your other teammates and only you and your coaches will be on film when I videotape you doing the drill. At some point during the study your coach will introduce to you a new type of instruction, which could help you improve your skills doing the a-skip drill. All information that collected on videotape will not be showed to anyone except me and my research partners.

Participants

You are being asked to participate in the study because you are a high school track and field sprinter who is coached by one of the coaches at Baldwin High School.

Procedures

If you agree to be in this study this is what you will need to know: I will collect information five days a week for 10 weeks. At the end of the 10 weeks I will ask you to fill out a form for me to let me know if you thought the study that was done with you was important to help sprinters become better at the a-skip drill.

Benefits of Participation

With this study it is my hope that you will improve your technique and form in doing the a-skip drill. If you can improve your technique and form then it is possible that down the road you could improve your sprinting results.

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UNIVERSITY OF NEVADA LAS VEGAS

STUDENT ASSENT

Department of Sports Education & Leadership

TITLE OF STUDY: The effects of scripted instruction on proper foot plant during a-skip in a high school practice track and field setting

INVESTIGATOR(S): Monica Lounsbery, Ph.D, Department Chair
Darian Parker, M.S., Ph.D. Candidate

CONTACT PHONE NUMBER: (702) 895-5057

Risks of Participation
There is very little risk if any at all for participating in this study. The information that collected from watching the videotape will only be viewed by me and my research partners. Also, to make sure the risk is low I will not include your real name or identity.

Voluntary Participation
Please talk this over with your parents before you decide whether or not to participate. I will also ask your parents to give their permission for you to take part in this study. But even if your parents say "yes" you can still decide not to do this. If you don't want to be in the study, you don't have to participate. Remember, being in this study is up to you and no one will be upset if you don't want to participate or even if you change your mind later and want to stop.

Contact Information
You can ask any questions that you have about the study. If you have a question later that you didn't think of now, you can call me at (785) 594-3355 or ask me next time.

Participant Assent:
Signing your name at the bottom means that you agree to be in this study. You and your parents will be given a copy of this form after you have signed it.

_____ _____
Signature Date

_____
Participant Name (Please Print)

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

STUDENT ASSENT

Department of Sports Education & Leadership

TITLE OF STUDY: The effects of scripted instruction on proper foot plant during a-skip in a high school practice track and field setting

INVESTIGATOR(S): Monica Lounsbery, Ph.D, Department Chair
Darian Parker, M.S., Ph.D. Candidate

CONTACT PHONE NUMBER: (702) 895-5057

I agree to be videotaped during this study

_____ _____

Signature Date

_____

Participant Name (Please Print)

Participant Note: Please do not sign this document if the Approval Stamp is missing or is expired.

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

Social/Behavioral IRB – Full Board Review
Approval Notice

NOTICE TO ALL RESEARCHERS:
Please be aware that a protocol violation (e.g., failure to submit a modification for any change) of an IRB approved protocol may result in mandatory remedial education, additional audits, re-consenting subjects, researcher probation suspension of any research protocol at issue, suspension of additional existing research protocols, invalidation of all research conducted under the research protocol at issue, and further appropriate consequences as determined by the IRB and the Institutional Officer.

DATE: January 5, 2006

TO: **Dr. Monica Lounsbery**, Sports Education & Leadership

FROM: Office for the Protection of Research Subjects

RE: Notification of IRB Action
Protocol Title: **The Effects of Scripted Instruction on Proper Foot Plant During A-Skip in a High School Practice Track and Field Setting**
Protocol #: 0610-2121

This memorandum is notification that the project referenced above has been reviewed by the UNLV Social/Behavioral Institutional Review Board (IRB) as indicated in Federal regulatory statutes 45CFR46. The protocol has been reviewed and approved.

The protocol is approved for a period of one year from the date of IRB approval. The expiration date of this protocol is December 7, 2007. Work on the project may begin as soon as you receive written notification from the Office for the Protection of Research Subjects (OPRS).

PLEASE NOTE:
Attached to this approval notice is the **official Informed Consent/Assent (IC/IA) Form** for this study. The IC/IA contains an official approval stamp. Only copies

of this official IC/IA form may be used when obtaining consent. Please keep the original for your records.

Should there be *any* change to the protocol, it will be necessary to submit a **Modification Form** through OPRS. No changes may be made to the existing protocol until modifications have been approved by the IRB.

Should the use of human subjects described in this protocol continue beyond December 7, 2007, it would be necessary to submit a **Continuing Review Request Form** *60 days* before the expiration date.

If you have questions or require any assistance, please contact the Office for the Protection of Research Subjects at OPRSHumanSubjects@unlv.edu or call 895-2794.

APPENDIX XI

A-SKIP DRILL MOVEMENT SEQUENCE

Body Components	Temporal phasing		
	Preparation	Action	Follow through
Path of hub	Over base of support	Over base of support	Over base of support
Body weight	Slight forward lean	Slight forward lean	Slight forward lean
Trunk action	Straight, no flexion at waist	Straight, no flexion at waist	Straight, no flexion at waist
Head action	Straight with eyes forward	Straight with eyes forward	Straight with eyes forward
Leg action	Left Hip & Knee 90 ° flexion Right Hip & Knee extension underneath hips	Left Hip & Knee extension straight down and back underneath hips Right Hip & Knee 45 ° flexion	Right Hip & Knee 90 ° flexion Left Hip & Knee extension underneath hips
Arm action	Right Arm 90 ° degree flexion at elbow Left Arm 120 ° extension at elbow	Right Arm 90 ° flexion at elbow Left Arm 100 ° extension at elbow	Left Arm 90 ° degree flexion at elbow Right Arm 120 ° extension at elbow
Ankle action	Left ankle 20 ° dorsiflexion Right ankle slight planter flexion	Left ankle 20 ° dorsiflexion during foot strike with ground Right ankle slight dorsiflexion	Left ankle slight planter flexion Right ankle 20 ° dorsiflexion

APPENDIX XII

SCRIPTED INTERVENTION

1. The coach will say in a normal conversational tone, "the A-Skip drill helps you to learn how to put your foot directly underneath your hips when your foot contacts the ground."
2. The coach will say in a normal conversational tone, "contacting your foot directly underneath your hips allows you to create a horizontal force, which will propel you forward with more power and speed."
3. The coach will say in a normal conversational tone, "I will now read you the instructions for the A-Skip drill."
    a. "In your stance be tall with a slight 5 degree body lean."
    b. "Bring your left knee up to 90 degrees at the thigh."
    c. "Point your left foot up towards your shin."
    d. "Position your right arm at 90 degrees and your left arm at 120 degrees."
    e. "Forcefully drive your left knee and foot down underneath your hips while swinging your left arm up to 90 degrees and your right arm back to 120 degrees."
    f. "Bring your right knee up to 90 degrees at the thigh."
    g. "Point your right foot up towards your shin."

h. "Forcefully drive your right knee and foot underneath your hips while swinging your right arm up to 90 degrees and your left arm back to 120 degrees."

4. The coach will say in a normal conversational tone:
    a. "Correct foot placement during the A-Skip drill is one foot aligned with the opposite foot."
    b. "Correct foot placement is also one foot between the instep of the opposite foot."
5. The coach will repeat word for word in a normal conversational tone:
    a. "I will now repeat word for word the instructions for performing the A-Skip drill while also physically demonstrating those instructions."
    b. "Remember, correct foot placement during the A-Skip drill is one foot aligned with the opposite foot or one foot between the instep of the opposite foot."
6. The coach will say in a normal conversational tone, "These are your performance cues for performing the A-Skip drill."
    a. "Don't tip your hips during the A-Skip drill."
    b. "Keep your toe up, knee up and heel up when you raise your thigh parallel to the ground."
    c. "Be faster than gravity when you drive your foot down underneath our hips."
7. The coach will tell the sprinter in a normal conversational tone, "Now perform 20 foot contacts of the A-Skip drill while moving down the field."

8. After performance of the 20 foot contacts of the A-Skip drill, the coach will say in a normal conversational tone:

    a. "The foot contacts were within the acceptable range for correct foot plant performance."

        OR

    b. "The foot contacts were outside the acceptable range for correct foot plant performance."

BALDWIN HIGH SCHOOL

415 Eisenhower
Baldwin City, Kansas 66006

Shaun B. Moseman - Principal 785.594.2725 Bret A. Jones - Assistant Principal

Brenda Durosinmi, MPA, CIP, CIM -Director
Office for the Protection of Research Subjects
University of Nevada Las Vegas
4505 Maryland Parkway Box 451047
Las Vegas, NV 89154-1047

Subject: Letter of Authorization to Conduct Research at Baldwin City High School.

Dear Ms. Durosinmi:

This letter will serve as authorization for the UNLV researcher/research team, Darian Parker to conduct the research project entitled, The Effects of Scripted Instruction on Proper Foot Plant during A-Skip in a High School Practice Track and Field Setting at Baldwin City High School located in Baldwin City, Kansas.

The research project has been reviewed by the appropriate facility administrative entity. Our legal advisor has also reviewed the project. We duly accept liability presented in the research project. The research may be implemented at the facility when the research project has received approval from the UNLV Institutional Review Board.

If we have any concerns or need additional information, the project researcher will be contacted and/or the UNLV Office for the Protection of Research Subjects.

Sincerely,

Shaun B. Moseman — Authorized Facility Representative Signature

10/30/06 — Date

SHAUN B. MOSEMAN — Print Representative Name and Title

OPRS Ltr of Auth 7.2006

REFERENCES

Adam, G. & Engelmann, S. (1996). *Research on direct instruction: 25 years beyond DISTAR*. Seattle, WA. Educational Systems.

Adams, M. (1990). *Beginning to read: thinking and learning about print*. Cambridge,MA: MIT Press.

Adams, J.A. (1971). Closed-loop theory of motor learning. *Journal of Motor Behavior, 3*, 111-150.

American Federation of Teachers (1999). Five promising remedial reading intervention programs. Washington, D.C.

An Articulated System of Task Analysis: Bridging the Gap Between the Lab and the Gym. Retrieved (n.d.) on April 21, 2006.

Anshel, M. H. (1995). *Sport psychology: from theory to practice*. Scottsdale, AZ: Gorsuch Scarisbrick. Baer, M., Wolf, M. & Risley, T. (1987). Some still current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 20*, 313-327.

Bandura, A. (1969). *Principles of Behavior Modification*. New York: Holt, Reinhart & Winston.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Barlow, D. & Hersen, M. (1984). *Single case experimental designs.* (2nd Ed.). Massachussets. Allyn & Bacon.

Bates, B., Dufek, J. & Davis, H. (1992). The effect of trial size on statistical power. *Medicine and Science in Sports and Exercise, 24,* 1059-1065.

Becker, C. (2001). Teaching reading and language to the disadvantaged-what we have learned from research. *Journal of Direct Instruction, 4,* 31-52.

Bereiter, C., & Engelmann, S. (1966). *Teaching disadvantaged children in the preschool.* Engelwood Cliffs, NJ: Prentice-Hall.

Berkey, D. (1986). An examination of the effect(s) of specified teacher behaviors on student ALT-PE. *Research Proceedings of the National Convention of AAHPERD.* Cincinnati. OH.

Biscan, D. & Hoffman, S. (1976). Movement analysis as generic ability of physical education teachers and student. *Research Quarterly, 47,* 161-163.

Blacker, C. & Mortimore, C. (1996). Randomized controlled trials and naturalistic data: time for a change? *Human Psychopharmacology: Clinical and Experimental, 11*, 353-363.

Bock, B., Marcus, B., Pinto, B., & Forsyth, L. (2001). Maintenance of physical activity following an individualized motivationally tailored intervention. *Annals of Behavioral Medicine, 23,* 79-87.

Brown, I. & Felton, R. (1990) Effects of instructions on beginning reading skills in children at risk for reading disability. *Reading and Writing: An Interdisciplinary Journal, 2,* 223-241.

Button, C. & Pepping, G. *Enhancing skill acquisition in golf: some key principles.* Retrieved on May 19, 2006.

Carr, J., Austin, J., Britton, L, Kellum, K. & Bailey, J. (1999). An assessment of social validity trends in applied behavior analysis. *Behavior Interventions, 14,* 223-231.

Center for Disease Control (2003). *Youth Risk Behavior Surveillance System.*

Chelladurai, P. & Saleh, S.D. (1978). Preferred leadership in sports. *Canadian Journal of Applied Sports Sciences, 3*, 85-92.

Codding, R., Feinberg, A., Dunn, E. & Pace, G. (2005). Effects of immediate performance feedback on implementation of behavior support plans. *Journal of Applied Behavior Analysis, 38,* 205-219.

Coulter, G. & Grossen, B. (1997). The effectiveness of in-class instructive feedback versus after-class instructive feedback for teacher learning direct instruction teaching behaviors. *Effective School Practices, 16*, 21-34.

Dare, B. & Kearney, B (1998). Speed training. *Track Technique, 103*, 3289-3295.

Darch, C. & Simpson, R. (1990). Effectiveness of visual imagery versus rule bases strategies in teaching spelling to learning disabled students. *Research in Rural Education, 7*, 61-70.

Daunic, A., Smith, S., Prank, E. & Penfield, R. (2006) Classroom-based cognitive–behavioral intervention to prevent aggression: efficacy and social validity. *Journal of School Psychology, 44,* 123-139.

Dixon, R., & Engelmann, S. (1999). *Spelling mastery.* SRA/McGraw-Hill. Worthington, OH.

Dyson, G. (1977). *The mechanics of athletics*. New York, New York: Holmes & Meier Publishers.

Earl, L., Wood, J. & Stennett, R. (1981). Morphographic spelling: a pilot study of its effectiveness with sixth grade students. *Special Edition in Canada, 55*, 23-24.

Eitzen, D. & Sage, G. (1997). *Sociology of north american sport*. Sixth Edition. WCB/McGraw-Hill.

Engelmann, S. & Brunner, E. (1995). *Reading mastery*. Worthington, OH: McGraw Hill.

Fitts, P. M., & Posner, M. I. (1967). *Human performance*. Belmont, CA: Brooks/Cole.

Fleischman , E. (1957). A comparative study of aptitude patterns in skilled and unskilled. Psychomotor performance. *Journal of Applied Psychology, 41,* 263-272.

Foster, S. & Mash, E. (1999). Assessing social validity in clinical treatment research: issues and procedures. *Journal of Consulting and Clinical Psychology, 67,* 308-319.

French, N. (1997). Management of paraeducators. In A.L. Pickett & K. Gerlach (Eds.), *Supervising paraeducators in school settings: A team approach* (pp. 91-169). Austin, TX: Pro-Ed.

Gangstead, S.K. & Beveridge, S.K. (1984). The implementation and evaluation of a methodological approach to sports skill analysis instruction. *Journal of Teaching in Physical Education, 3,* 60-70.

Gay, L. (1996). *Educational research: competencies for analysis and application.* (5th Ed.) Upper Saddle River, NJ: Prentice-Hall.

Gettinger, M. (1993). The effects of invented spelling and direct instruction on spelling performance of second grade boys. *Journal of Applied Behavior Analysis. 26,* 281-191.

Glasgow, R., Klesges, L, Dzewaltoski, D., Sheana, B. & Estabrooks, B. (2004). The future of health behavior change research: What is needed to improve translation of research into health promotion practice? *Annals of Behavior Medicine, 27,* 3-12.

Gleason, M. & Hall, T. (1991). Focusing on instructional design to implement a performance based teacher training program. *Education and Treatment of Children, 14,* 316-332.

Graziano, A. & Raulin, M. (1989). *Research methods: A process of inquiry.* New York:Harper and Row, Publishers.

Hanin, Y., Korjus, T., Jouste, P. & Baxter, P. (2002) Rapid technique correction using old way/new way: two case studies with olympic athletes, *Sport Psychologist, 16,* 79-100.

Harrison, D. & Warden, P. (n.d.). Isolation sprinting drills. Retrieved on May 23, 2006.

Hawkins, R. (1991). Is social validity what we are interested in: argument for a functional approach. *Journal of Applied Behavior Analysis, 24,* 205-213.

Hay, J. (1978). *The biomechanics of sports techniques.* (2nd Ed.). Englewood Cliffs, NJ: Prentice-Hall.

Herbert, E. & Landin, D. (1994) Effects of learning a model and augmented feedback on tennis skill acquisition. *Research Quarterly for Exercise and Sport, 65,* 250-258.

Higgins, J. (1977). *Human movement: an integrated approach*. St. Louis, MO: The C.V. Mosby Company.

Hodges, N. J., & Franks, I. M. (2001). Learning a coordination skill: Interactive effects of instruction and feedback. *Research Quarterly for Exercise and Sport, 72*, 132-142.

Hodges, N. & Franks, I. (2002) Modeling coaching practice: the role of instruction and demonstration. *Journal of Sports Sciences, 20*, 793-811.

James, R., Herman, J., Dufek, J. & Bates, B. (2007). Number of trials necessary to achieve performance stability of selected ground reaction force variables during landing. *Journal of Sports Science and Medicine, 6,* 126-134.

Janelle, C., Mousseau, M., Coombes, S. & Champenoy, J (2003). Mechanisms of attentional cueing during observational learning to facilitate motor skill acquisition. *Journal of Sports Science, 21,* 825-838.

Kameenui, E.J., & Carnine, D.W. (1998). *Effective teaching strategies that accommodate diverse learners*. Upper Saddle River, NJ: Merrill.

Karant, V. (1989). Supervision in the age of teacher empowerment. *Educational Leadership, 35,* 27-29.

Kazdin, A. (1997). Assessing the clinical or applied importance of behavior changethrough social validation. *Behavior Modification, 1,* 427-452.

Knudson, D., & Morrison, C. (1997). *Qualitative analysis of human movement.* Champaign, IL: Human Kinetics.

Loucopoulos, P. & Karakostas, V. (1995) *System requirements engineering.* McGraw Hill International.

Magill, R.A. (2001). Feedback effects. In: B.Singer, H.Hausenblas & C. Jannelle (Eds.), *Handbook of sport psychology*, 2nd Edition. N.Y.: John Wiley & Sons.

Marchand-Martella, N., Kinder, D. & Kubina, R. (2005). Special education and direct instruction: an effective combination. *Journal of Direct Instruction,* 1-36.

Marshall, Catherine. (1995). *Designing qualitative research.* Thousand Oaks, CA: Sage Pub.

Maxwell, J. P., Masters, R. S. W., and Eves, F. F. (2000). From novice to no know-how: A longitudinal study of implicit motor learning. *Journal of Sports Sciences, 18*, 111-120.

McCormick, J. & Fitzgerald, M. (1997). School-wide application of direct instruction: spelling mastery at Yeshiva. *Effective School Practices, 16,* 39-47.

McFarlane, B. (1994). *Track technique, 126,* 4016-4020.

McLaughlin, M. & Pfeifer, R. (1988). *Teacher evaluation: Improve, accountability and effective learning.* New York. Teachers College Press.

Mero, A., Komi, P. & Gregor, R.J. (1992). Biomechanics of sprint running. *Sports Medicine, 6*, 376-392.

Miller, G. (1956). The magical number seven, plus or minus two: Some limits to our capacity for processing information. *Psychological Review. 63,* 81-97.

Murphy, A., Lockie, R. & Coutts, A. (2003). Kinematic determinants of early acceleration in field sport athletes. *Journal of Sports Science and Medicine, 2,* 144-150.

Nader, P., Stone, E., Lytle, L., Perry, C., Osganian, S., Kelder, S., et al. (1999). Three year maintenance of improved diet and physical activity: The catch cohort. *Archives of Pediatric Adolescent Medicine, 153,* 695-704.

Neil, G.I. & Kirby, S.L. (1979). Coaching styles and preferred coaching behaviors among rowers and paddlers. *Journal of Sport Behavior, 8,* 3-17.

Newell, K. M. (1986). Constraints on the development of coordination. In M. G. Wade & H. T. A. Whiting (Eds.), *Motor development in children: Aspects of coordination and control* (pp. 341-360). Dordrecht: Martinus Nijhoff Publishers.

Papalia-Berardi, A. & Hall, T. (2007). Teacher assistance team social validity: A perspective from general education teachers. *Education and Treatment of Children, 30,* 89-110.

Pate, R., Tross, S., Leven, S. & Dowda, M. (2000). Sports participation and health relatedbehaviors among US Youth. *Archives of Pediatrics & Adolescent Medicine, 154*, 904-911.

Plaisted, V. (1995). *Gender and sport.* In T. Morris & J. Summers (Eds.), *Sport psychology: theory applications and issues*, (pp.538-574), Queensland: Wiley & Sons.

Rodano, R. & Squadrone, R. (2002). Stability of selected lower limb joint kinetic parameters during vertical jump. *Journal of Applied Biomechanics, 18,* 83-89.

Salo, A., Grimshaw, P. & Viitasalo, J.T. (1997). Reliability of variables in kinematic analysis of sprint hurdles. *Medicine and Science in Sports and Exercise, 29,* 383-389.

Schieffer, C., Marchand-Martella, N., Martella, R, Simonsen, F. & Woldron-Soler, K. (2002). An analysis of the reading mastery program: effective components and research review. *Journal of Direct Instruction, 2,* 87-119.

Schmidt, R. (1975). Schema theory of discrete motor skill learning. *Psychological Review, 82,* 225-260.

Schmidt, R. (1982). *Motor control and learning.* Champaign, Ill: Human Kinetics Publishers.

Schmidt, R. (1991*). Motor learning and performance: From principles to practice.* Champaign, IL: Human Kinetics.

Schwartz, I. & Baer, D. (1991). Social validity assessment: is current practice state of the art? *Journal of Applied Behavior Analysis, 24,* 189-204.

Scully, D. (1986). Visual perception of technical execution and aesthetic quality of biological motion. *Human Movement Science, 5,* 185-206.

Shestakov, M., Arakelian, E. & Primakov, Y. (2000). Computer simulation as a base of controlling technique training in track and field. EAA Science Awards.

Snider, V. & Schumitsch, R. (2006). A comparison of teacher attitudes and beliefs about issues in education across conventional and direct instruction schools. *Journal of Direct Instruction, 6,* 17-33.

Sommers, J. (1995). Seven-year overview of direct instruction used in basic skills classes at Big Piney Middle School. *Effective School Practices, 14,* 29-32.

Spradley, J. P. (1980). *Participant observation.* Orlando, FL: Holt, Rinehart and Winston, Inc.

Tierney, E., Aman, M., Stout, D., Pappas, K., Arnold, E. Vitello, B., et al. (2007) Parent satisfaction in a multi-site acute trial of risperidone in children with autism: a social validity study. *Psychopharmacology, 191,* 149-157.

Wiemann, K. & Tidow, G. (1995). Relative activity of hip and knee extensors in sprinting: implications for training. *New Studies in Athletics, 10,* 29-49.

Williams, A. & Hodges, N. (2005). Practice, instruction and skill acquisition in soccer: a challenging tradition. *Journal of Sports Sciences, 23,* 637-650.

Wolf, M. (1978). Social validity: the case for subjective measurement or how behavior analysis is finding its heart. *Journal of Applied Behavior Analysis, 11,* 203-214.

Wulf, G. & Schmidt, R. (1998). Average KR reduces parameter learning. *Journal of Motor Behavior, 28,* 371-382.

Wulf, G., Shea, C. & Matschiner, S. (1998). Frequent feedback enhances complex motor skill learning. *Journal of Motor Behavior, 30,* 180-192.

Yessis (n.d.) *Understanding ground reaction forces.* Retrieved on May 22, 2006.

Young, D., & Schmidt, R. (1992). Augmented kinematic feed-back for motor learning. *Journal of Motor Behavior, 24,* 261-273.

Ziegler, S. G. (1987). Effects of stimulus cueing on the acquisition of groundstrokes by beginning tennis players. *Journal of Applied Behavior Analysis, 20,* 405-411.

Ziegler, S. G (1994). The effects of attentional shift training on the execution of soccer skills: A preliminary investigation. *Journal of Applied Behavior Analysis, 27,* 545-552.

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