

EFFECT OF THREE COACHING TECHNIQUES ON THE SHOT PUT RELEASE
POINT AND DISTANCE OF THROW FOR MALE ATHLETES
WITH INTELLECTUAL DISABILITIES

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BY
HISHAM MUGHRABI, B.A., M.A., M.S.

DENTON, TEXAS

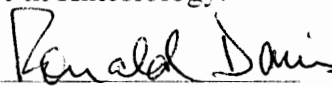
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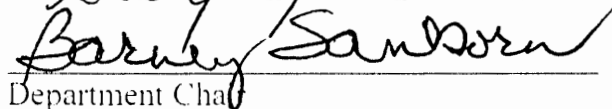
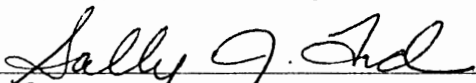
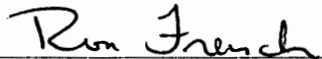
To the Dean of the Graduate School:

I am submitting herewith a dissertation written by Hisham Mughrabi entitled "Effect of Three Coaching Techniques on the Shot Put Release Point and Distance of Throw for Male Athletes with Intellectual Disabilities." I have examined this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Kinesiology.



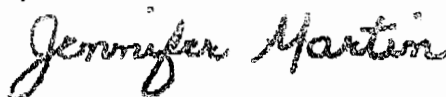
Ronald Davis, Ph.D., Major Professor

We have read this dissertation and recommend its acceptance:



Department Chair

Accepted:



Dean of the Graduate School

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ABSTRACT

HISHAM MUGHRABI

EFFECT OF THREE COACHING TECHNIQUES ON THE SHOT PUT RELEASE POINT AND DISTANCE OF THROW FOR MALE ATHLETES WITH INTELLECTUAL DISABILITIES

DECEMBER 2010

The purpose of this study was to determine the effects of three coaching techniques on shot put performance of 9 male athletes with mild and moderate intellectual disabilities (ID). The three coaching techniques were: (a) picture with verbal (PV), (b) demonstration with verbal (DV), and (c) physical assistance with verbal (PAV). An alternating treatment design with baseline, intervention, and maintenance phases was used (Horner, et al., 2005). Observational analysis was used to report level, trend, and latency of change. A two-way (release point and distance thrown x baseline and maintenance) repeated measure ANOVA ($p \leq .05$) addressed pre/post data. Following three sessions baseline phase, the intervention phase was initiated which involved six sessions of each treatment which were randomly selected (3 days per week for 6 weeks) and a three sessions maintenance phase followed 2 weeks later. Positive change in the shot put release point and distance thrown was analyzed by level (i.e., last data point in baseline to the first data point in intervention), trend (i.e., direction of change), and latency of change (i.e., quickness of performance change) using the PV and DV techniques. Similar profiles of change did not occur with the PAV technique as

determined by observational analysis. A significant difference was identified between the baseline and maintenance phases for shot put release point ($F(1, 8) = 25.13, p < .05$) and distance thrown $F(1, 8) = 6.54, p < .05$. Based on the limitations of this study, coaches of athletes with ID should consider the use of additional visual coaching techniques beyond demonstration. Additional techniques to include the use of a picture proved affective for athletes with mild through moderate ID within this study.

TABLE OF CONTENTS

Page

ACKNOWLEDGMENTS	iii
ABSTRACT.....	iv
LIST OF TABLES	ix
LIST OF FIGURES	x
 Chapter	
I. INTRODUCTION.....	1
Purpose of the Study	4
Delimitations	4
Limitations	5
Research Questions	5
Hypotheses	6
Definitions	6
II. REVIEW OF LITERATURE	10
Individuals with an Intellectual Disability	10
Classification	11
Learning	11
Characteristics	14
Hierarchy of Cueing Model	16
Application of the Hierarchy of Cueing Model	19
Shot Put Throwing Variables	24
III. METHOD	25
Procedures	25
Permission for Participation in the Study	25
Participants	26
Equipment	26

Setting	27
Research Assistants' Training.....	28
Research Design and Analyses.....	29
Phases	29
Coaching Techniques	30
Content Validity	32
Data Analyses	33
 IV. RESULTS	 37
Athlete's Demographics	37
Performance Results and Research Questions	39
Athlete 1: Shot Put Release Point Results	40
Athlete 1: Shot Put Distance Thrown Results	42
Athlete 2: Shot Put Release Point Results	44
Athlete 2: Shot Put Distance Thrown Results	46
Athlete 3: Shot Put Release Point Results	48
Athlete 3: Shot Put Distance Thrown Results	50
Athlete 4: Shot Put Release Point Results	52
Athlete 4: Shot Put Distance Thrown Results	54
Athlete 5: Shot Put Release Point Results	56
Athlete 5: Shot Put Distance Thrown Results	58
Athlete 6: Shot Put Release Point Results	60
Athlete 6: Shot Put Distance Thrown Results	62
Athlete 7: Shot Put Release Point Results	64
Athlete 7: Shot Put Distance Thrown Results	66
Athlete 8: Shot Put Release Point Results	68
Athlete 8: Shot Put Distance Thrown Results	70
Athlete 9: Shot Put Release Point Results	72
Athlete 9: Shot Put Distance Thrown Results.....	74
Null Hypothesis.....	76
First Null Hypothesis	76
Second Null Hypothesis	77
Third Null Hypothesis.....	77
Summary	78
 V. DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS.....	 81
Discussion	81
Conclusions	87
Recommendations	88

REFERENCES	89
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APPENDICES

A. Consent to Participate in Research	97
B. Media Release Form	101
C. Camera Set-up	103
D. Shot Put Release Point Scoring Rubric	105
E. Shot Put Release Point Picture	107
F. Shot Put Picture and Scoring Rubrics Rating Scale	109
G. Athletes' Information	112
H. Athletes' Release Point by Coaching Techniques	117
I. Athletes' Distance Thrown by Coaching Techniques	124
J. Institution Review Board Approval Letter	130
K. Raw Data	132

LIST OF TABLES

Table	Page
1. Athletes' Demographic Information	38
2. One Way ANOVA Release Point by Coaching Techniques	76
3. One Way ANOVA Distance Thrown by Coaching Techniques	77
4. The Shot Put Release Point and Distance Thrown Between Baseline and Maintenance Phases	78

LIST OF FIGURES

Figure	Page
1. Athlete 1's mean shot put release point scores by phases and specific coaching techniques	40
2. Athlete 1's release point performance by phases and specific coaching techniques	41
3. Athlete 1's mean shot put distance thrown by phases and specific coaching techniques	42
4. Athlete 1's distance thrown by phases and specific coaching techniques	43
5. Athlete 2's mean shot put release point scores by phases and specific coaching techniques	44
6. Athlete 2's release point performance by phases and coaching techniques	45
7. Athlete 2's mean shot put distance thrown by phases and specific coaching techniques	46
8. Athlete 2's distance thrown by phases and specific coaching techniques	47
9. Athlete 3's mean shot put release point scores by phases and specific coaching techniques	48
10. Athlete 3's release point performance by phases and specific coaching techniques	49
11. Athlete 3's mean shot put distance thrown by phases and specific coaching techniques	50
12. Athlete 3's distance thrown by phases and specific coaching techniques	51
13. Athlete 4's mean shot put release point scores by phases and specific coaching techniques	52

14. Athlete 4's release point performance by phases and specific coaching techniques	53
15. Athlete 4's mean shot put distance thrown by phases and specific coaching techniques	54
16. Athlete 4's distance thrown by phases and specific coaching techniques	55
17. Athlete 5's mean shot put release point scores by phases and specific coaching techniques	56
18. Athlete 5's release point performance by phases and specific coaching techniques	57
19. Athlete 5's mean shot put distance thrown by phases and specific coaching techniques	58
20. Athlete 5's distance thrown by phases and specific coaching techniques	59
21. Athlete 6's mean shot put release point by phases and specific coaching techniques	60
22. Athlete 6's release point performance by phases and specific coaching techniques	61
23. Athlete 6's mean shot put distance thrown by phases and specific coaching techniques	62
24. Athlete 6's distance thrown by phases and specific coaching techniques	63
25. Athlete 7's mean shot put release point scores by phases and specific coaching techniques	64
26. Athlete 7's release point performance by phases and specific coaching techniques	65
27. Athlete 7's mean shot put distance thrown by phases and specific coaching techniques	66
28. Athlete 7's distance thrown by phases and specific coaching techniques	67

29. Athlete 8's mean shot put release point scores by phases and specific coaching techniques	68
30. Athlete 8's release point performance by phases and specific coaching techniques	69
31. Athlete 8's mean shot put distance thrown by phases and specific coaching techniques	70
32. Athlete 8's distance thrown by phases and specific coaching techniques	71
33. Athlete 9's mean shot put release point scores by phases and specific coaching techniques	72
34. Athlete 9's release point by phases and specific coaching techniques	73
35. Athlete 9's mean shot put distance thrown by phases and specific coaching techniques	74
36. Athlete 9's distance thrown by phases and specific coaching techniques	75

CHAPTER I

INTRODUCTION

Opportunities in sports by athletes with intellectual disabilities (ID) have improved largely due to the increase of sports organizations, such as the Special Olympics. Currently there are 2.5 million individuals with ID in more than 200 Special Olympics programs in over 180 countries (*Special Olympics Coaching Guide*, 2003). Special Olympics provides meaningful training and competition opportunities for individuals with ID including track and field. The standard events in the competition are: long jump, high jump, and shot put. Special Olympics believes people with ID can learn, enjoy, and benefit from participation and competition with proper instruction and coaching (*Special Olympics Coaching Guide*). One specific event within track and field that may benefit from coaching is the shot put throw. Proper instructional and coaching is a key to influencing a quality performance by the athlete (*Special Olympics Coaching Guide*).

Numerous references in the literature support the fact that utilizing proper instructional and coaching techniques will result in better outcomes in athletic performance (Agran, Cavin, Wehmeyer, & Palmer, 2006; Alberto, Cihak, & Gama, 2005; Bates, Cuvo, Miner, & Korbeck, 2001; Chen, Lange, Miko, & Zhang, 2001; Dever & Knapczyk, 1997; Eichstaedt, Wang, Polacek, & Dohrmann, 1991; Hoove & Horgan, 1990; Luftig, 1987; McDonnell, Horner, & Williams, 1984). Specifically, coaches who

work with individuals with ID face an additional challenge in that the instructor or coach must be able to recognize the athlete with ID individual learning ability.

Furthermore, literature documented by Browder, Wakeman, Spooner, Ahlgrim-DeLzell, and Algozzine (2006) and McDonnell, Johnson, Polychronis, and Risen (2002) has reported that students with ID can successfully participate, succeed, and benefit from various activities in general physical education to improve sport skills. In addition, evidence-based instructional strategies need to be developed to assist coaches with implementing the proper training techniques (Browder et al., 2007; Wehmeyer, 2006).

According to Heward and Orlansky (1998), an instructor must consider the following during the process of developing instructional techniques: (a) clearly define the skill to be taught, (b) provide a clear cue, (c) be able to measure the student's performance, and (d) provide feedback. As stated, one of the major components in order to provide meaningful instruction is the recognition of which cue on the hierarchy of cue provides the clearest message for learning a task such as the shot put throw.

The ability of a coach to present the most relevant aspect of learning a sport skill is critical to the success of the athlete's comprehension of the task. One model documented in the literature that has application to the presentation of instruction is the use of the hierarchy of cueing. Block (2005) and Dunn (1989) stated that there are three effective steps in giving instruction related to the types of cue; these types of cues and hierarchical order are: (a) verbal cue, (b) demonstration with a visual cue, and (c) physical

assistance with a visual cue. All of these types of cues were used in this study to facilitate proper coaching techniques.

Traditional coaching techniques used with able-bodied athletes might not be as effective when applied to athletes with ID. While not specific to coaching, some authors have suggested using multiple techniques to provide instructional information for a person with ID (Algozzine & Ysseldyke, 2006; Dever & Knapczyk, 1997; Luftig, 1987; McDonnell, Johnson, Polychronis, & Risen, 2002; Smith, Polloway, Patton, & Dowdy, 2008). These techniques should apply to coaching because coaching is a discipline that is based on providing clear instruction so that an athlete can produce meaningful outcomes. Therefore, the focus of this present investigation was to determine if different types of coaching techniques (i.e., cues) make a difference in performance of the shot put.

There are three major variables that affect the shot put throw: (a) height of release (release point), (b) speed of release, and (c) angle of release (*American Sport Education Program*, 2008; Bowerman & Freeman, 1990; Foreman, 1982). Čoh, Supej, Štuhec, and Smajlovi (2007) asserted that among the three variables mentioned, release point was most important in determining the distance of throw.

Within the current study, performance of the shot put release was recorded with two digital motion cameras (Sony, Digital Handycam). Nine athletes were involved in the study. Each of the athletes participated in three training sessions per week for 8 weeks. In addition, an alternating treatment design with baseline, intervention, and maintenance phases, which provided control for practice effect was used (Horner, et al., 2005; Portney

& Watkins, 2008) to answer the research questions and hypotheses. This research design was used with students with ID (Alberto & Troutman, 2006; Portney & Watkins), as it allows comparison in performance of two or more treatments of a single participant (Zhan & Ottenbacher, 2001).

Purpose of the Study

The purpose of this study was to determine the effects of three coaching techniques on the release point and distance thrown of the shot put by male athletes with mild through moderate intellectual disability (ID). The three coaching techniques used the following cues: (a) picture with verbal (PV), (b) demonstration with verbal (DV), and (c) physical assistance with verbal (PAV).

Delimitations

The study was subjected to the following delimitations:

1. Participants were 10 male athletes with mild through moderate ID, ages 14 to 19 years, from one high school in McKinney, Texas. One of the 10 participants was excluded from the study because of missing data during the baseline phase.
2. Participants used the same equipment (i.e., shot put) as used in their practices and competitions.
3. Participants performed the shot put in the same environment (outdoor field during all training sessions).

4. Coaches were asked by the researcher to not allow athletes to participate in shot put training for 8 weeks (during data collection).

Limitations

The study was subjected to the following limitations:

1. Daily living habits of the participants could not be controlled.
2. Involvement in different training and sport events with Special Olympics during the training period. Special Olympics athletes perform at least three different events, so they participated in different events during practice with their Special Olympics' coach; however, shot put was not allowed during their participation in this study.
3. Unrelated factors such as illness and medication might have negatively impacted the participants' performance.

Research Questions

The specific research questions in this study were:

1. Does the coaching technique effect the shot put release point for athletes with mild through moderate ID?
2. Does the coaching technique effect the shot put distance thrown for athletes with mild through moderate ID?

Hypotheses

There were three null hypotheses in the study. Significance was set at $p \leq .05$ (Portney & Watkins, 2008). The null hypotheses in this study were:

1. There is no significant difference in shot put release point during the intervention phase for athletes with mild through moderate ID.
2. There is no significant difference in shot put distance thrown during the intervention phase for athletes with mild through moderate ID.
3. There is no significant difference between baseline and maintenance phase for shot put release point and distance thrown for athletes with mild through moderate ID.

Definitions

Coaching Techniques: Coaching techniques in this study were picture with verbal, demonstration with verbal, and physical assistance with verbal while giving instruction to the athlete.

Content Validity: Content validity has been established as “the items that make up an instrument adequately sample the universe of content that defines the variable being measured” (Portney & Watkins, 2008, p. 82).

Demonstration: Demonstration is the act or performance of a skill by a coach presented to an athlete(s). Specifically related to this investigation, the demonstration with verbal (DV) coaching technique allows the athlete to see and hear about the proper release technique during the shot put.

Immediate Change: Immediate change is used to report and discuss the visual analysis results in the current investigation. Immediate change means that there is an increase performance from baseline to the first training session during intervention phase.

Intellectual Disability (ID): In 2002, the American Association on Mental Retardation (AAMR) defined ID as “A disability characterized by significant limitations both in the intellectual functioning and in adaptive behaviors as expressed in conceptual, social, and practical adaptive skills” (p. 8). Intellectual disabilities originate before age 18.

Mild Intellectual Disabilities: Mild ID has significant impairments in adaptive behavior with an approximate IQ range of 50 to 69. Most individuals with a mild ID have learning difficulties in school, but are able to work and maintain good social relationships and contribute to society (AAMR, 2002).

Moderate Intellectual Disabilities: Moderate ID has significant impairments in adaptive behavior with an approximate IQ range of 35 to 49. The majority of individuals with a moderate ID have some developmental delays in childhood, but most can learn to develop some degree of independence in academic skills, self-care, and also acquire adequate communication skills (AAMR, 2002).

Physical Assistance: Physical assistance refers to “teacher assistance that ensures a correct response” (Chen, Lange, Miko, & Zhang, 2001, p. 36). For example, in this study, the coach moved the athlete’s elbow and hand to the desired release point position of the shot put.

Quick Change: Quick change is referred to “when the behavior changes at the termination of one condition (i.e., baseline or intervention phase) and onset of another” (Tankersly, Harjusola-Webb, & Landrum, 2008, p. 87).

Release Point: Release point is the position of the hand following the release of the shot put.

Slow Increase: Slow increase refers to the time frame in which change occurs. For example, if athletes spent 30% or more time of the total intervention phase to show improvement in performance, the researcher considered this change as a slow increase.

Static Picture: When referring to a picture, the researcher used a static picture not animated (Mayer & Moreno, 2003). A static image was used to show the athlete the desired position of the hand and arm at the release point.

Support Levels: Support levels are the assistance levels needed to address adaptive skills across individuals’ life stages and life situations. Therefore, supports should be viewed as varying potentially in both intensity and duration. There are four support levels: (a) intermittent, (b) limited, (c) extensive, and (d) pervasive. Those support levels have value in the planning, implementation, and evaluation of assistance levels (Luckasson, Schalock, Snell, & Spitalnik, 1996).

Throwing Coach: The throwing coach is designated specifically to focus on the instruction of the shot put throw with emphasis on the variables of release point, speed of release, and angle of release.

Trial: The trial is an opportunity for the performance of a task. In this current study, the researcher asked the athlete to throw the shot put six times (six trials) per coaching technique.

Verbal Cue: The verbal Cue is a cue that includes all verbal instructions and commands used by the instructor (Caso, Vrij, Mann, & De Leo, 2006; Dunn, 1989). In the current study, a verbal cue was given to the athlete by this researcher only and was coupled with a picture, demonstration, or physical assistance.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this study was to determine the effects of three different coaching techniques on the shot put release point and distance thrown by male athletes with mild through moderate intellectual disabilities (ID). The following is a literature review to support the current study presented according to the following headings: (a) Individuals with an Intellectual Disability, (b) Hierarchy of Cueing Model, and (c) Shot Put Throwing Components.

Individuals with an Intellectual Disability

In 2002, the American Association on Mental Retardation (AAMR) stated that ID is defined as “a disability characterized by significant limitations both in the intellectual functioning and in adaptive behaviors as expressed in conceptual, social, and practical adaptive skills” (p. 8). Moreover, an ID is defined within the context of the environment in which the individual lives, learns, works, and plays.

According to the World Health Organization (WHO, 2008); and AAMR (2002), there are four categories of ID: (a) mild, (b) moderate, (c) severe, and (d) profound. The differences between the four categories are based on the individual’s intelligence quotient (IQ). Intellectual disability is the third largest disability after learning disabilities and speech or language impairments (Council for Exceptional Children, 2003).

Classification

There are numerous intelligence tests used to classify individuals with ID. The individual must score lower than 70 on an IQ test to be labeled ID (AAMR, 2002; WHO, 2008). The intelligence quotient tests score(s) are used to determine in which intellectual disability classification the individual would be placed: (a) mild IQ level 50 to 69, (b) moderate IQ level 35 to 49, (c) severe IQ level 20 to 34, and (d) profound IQ level below 20 (AAMR). Another part of the evaluation process is related to the individual's adaptive behavior. Significant limitations in adaptive behavior are indicated by a score which is two or more standard deviations below the mean on a standardized assessment measuring one of the three adaptive skill areas: conceptual, social, and practical (AAMR). For the purpose of this study, the focus was on individuals with mild through moderate ID based on IQ scores.

Learning

Individuals with mild through moderate ID need special assistance to learn different tasks (Algozzine & Ysseldyke, 2006). Teaching individuals with mild through moderate ID means addressing specific challenges which stem from varying limitations associated with: (a) cognitive, (b) academic, (c) physical, (d) behavioral, and (e) communication abilities. These limitations are:

1. Cognitive: Inattentive, inefficient learning style, difficulty communicating, prone to failure, and standard teaching practices are ineffective.

2. Academic: Limited attention, lack of organizational skills, questioning, behavioral problems, direction following, monitoring of time, and other school coping skills.
3. Physical: Performance is often less than expected, based on physical appearance.
4. Behavioral: Tardiness, complaints of illness, classroom disruptiveness, social isolation, and inappropriate activity.
5. Communication: Difficulty following directions, making requests, interacting, or communicating (Algozzine & Ysseldyke, 2006).

Coaches of athletes with mild through moderate ID may need to consider modifying or using other techniques (i.e., pictures), in determining their coaching instruction methods when working with this population in order to help their athletes learn. The use of different instructional methods is meant to reduce the learning time of the task and to help find effective instructional methods to include time spent providing instruction.

Specifically, the length of time information is provided might be inversely related to the amount of information retained by the individual with moderate ID (Hoove & Horgan, 1990). Information provided longer than 60s results in shorter retention, and information provided less than 60s results in longer retention. Therefore, the coach should consider techniques that present the most relevant information in the shortest amount of time.

According to Sanchez (1999), the time required for individuals with moderate ID to master a motor skill has been reported as ranging from 60 to 80 min which is 45.43 % more than individuals without moderate ID. Hoove and Horgan (1990) reported that the length of time spent providing information to a student with moderate ID will have a direct affect on his/her retention. In addition, Temple and Walkley (1999) investigated the engagement of students with mild ID and students without mild ID in regular physical activity. They reported that individuals with mild ID spent significantly less time (p is less than or equal to .01) learning a motor task or skill than individuals without mild ID. Leher (1985) reported that individuals with ID can improve their motor performance with repeated trials more than individuals without ID. Moreover, Thomas (1996) supported that individuals with ID need to practice more than individuals without ID to master a task. Using an instructional cue such as visual (i.e., picture) and verbal could provide sufficient time for learning. Cihak et al., (2006) and Hoove and Horgan have been successful when using a picture as a coaching cue. These researchers suggested that athletes with ID should look at the picture for at least 4s due to their short retention ability. The frequency of instructional cues is also important to consider when coaching an athlete with ID.

Perez-Turner (2005) addressed learning by investigating the number of cues needed for skill acquisition by individuals with moderate ID. The four cues were: (a) verbal, (b) verbal with gesture, (c) verbal with demonstration, and (d) verbal with physical assistance. Based on the results of this investigation, verbal with physical

assistance required more cues and verbal with demonstration which required less. Teachers and coaches should consider short instructional time while working with individuals with ID. Motor and learning characteristics are unique to those individuals with mild ID compared to those with moderate ID.

Characteristics

Mild. Individuals with mild ID, have an approximate IQ range from 50 to 69, with significant impairments in adaptive behavior (AAMR, 2002). The largest category of ID is mild ID, which constitutes about 85% of the entire population of individuals with ID. By adulthood, a person with mild ID has a mental age ranging from 9 to 12 years and children show some learning difficulties in school (WHO, 1993). During their adult years, they can usually live successfully in the community with limited support. They are also able to work and to contribute to society while maintaining proper social relationships.

Social and communication skills develop from birth to 5 years of age which results in cognitive impairments which distinguishes them from children without ID (AAMR, 2002). Children with ID can acquire academic skills up to approximately a 6th grade level. Sass (2001) stated that individuals with mild ID have many of the following characteristics: (a) are likely to need only intermittent to limited support, (b) typically do not "look" different from their non-disabled peers, (c) often have only mild or moderate developmental delays, except in academics, which is often the major area of deficit, (d) often not identified until they enter the school setting, and (e) many will marry, have

children, and blend into the community. For those who achieve total independence in adulthood, the label for any intellectually disabled person is no longer appropriate.

Moderate. Individuals with moderate ID have an approximate IQ range from 35 to 49, with significant impairments in adaptive behavior (AAMR, 2002). The second largest category of ID is moderate, which represented about 10 % of the entire population of individuals with ID (AAMR). During early childhood, individuals with moderate ID can acquire communication skills, profit from vocational training, and with moderate supervision attend to their personal care. Individuals with moderate ID are typically identified early (i.e., infants or toddlers) and begin receiving special education during their preschool years. They spend much of the school day in a separate classroom learning adaptive living skills, how to succeed in modified competitive employment situations; however, many will not achieve total independence. During adulthood, they can perform unskilled or semi-skilled jobs under supervision. Individuals with moderate ID will work in supported, non-competitive settings such as sheltered workshops (Sass, 2001).

Taylor, Richards, and Brady (2005) stated that individuals with moderate ID, in comparison to students with mild ID, had difficulties processing information using different instructional techniques (i.e., verbal, visual, and tactile) which is considered in the current study. Furthermore, individuals with moderate ID had significant deficits in the area of communication. According to the WHO (1993), individuals with moderate ID with a mental age from 6 to 9 years will be able to learn to develop some degree of

independence in communication. These deficits may cause difficulties in expressive language such as the articulation problems (Taylor et al.). Compared to individuals without disabilities, those with moderate ID develop significantly delayed gross motor skills.

Eichstaedt, Wang, Polacek, and Dohrmann (1991) reported individuals with moderate ID have delays in their motor and physical performance, and learn at different rates. Children with moderate ID have less strength, endurance, agility, balance, running speed, flexibility, and reaction time when compared to children without ID (Pitetti et al.). Tsimaras and Fotiadou (2004) stated that muscle strength, especially in relation to the lower-extremities of individuals with ID, is important to their overall health and their ability to perform daily activities.

Hierarchy of Cueing Model

Teaching students with disabilities requires careful planning; there are numerous components to consider in the process of developing instructional techniques to include cueing: (a) the skill to be taught must be clearly defined, (b) the instructor must provide a clear cue, (c) the student's performance must be measured and evaluated, and (d) the student must receive feedback or reinforcement from the instructor (Heward & Orlansky, 1998). The coach must understand cueing. According to Dunn (1989) "the cue is the sign, signal, request, or information that calls for the occurrence of a behavior" (p. 355). For example, in the current study, the researcher used "throw the shot put" as a verbal cue for the athlete to begin throwing the shot put.

Cues may be placed on continuum according to the: (a) task, (b) level of difficulty, and (c) individual level of disability; all three of these variables were addressed in this study. The coach's instructions must be specific and easy to understand (simple word use). Cues requiring a response can consist of verbal instruction, gestures, modeling, or physical assistance. The instructor can use cues separately or in combination (Wolery, Ault, Gast, & Doyle, 1990). In this study, a combination of picture with verbal, demonstration with verbal, and physical assistance with verbal coaching techniques was used. One consideration for providing clear cueing is to follow the hierarchy of cueing model which provides a continuum of verbal, model, and physical assist (Dunn, 1989).

Hierarchy of cueing is also known as the system of least to most cueing (Wolery et al., 1990). Dunn (1989) stated that there are three effective steps and order in giving instruction related to the types of cues: (a) verbal cue, (b) demonstration (visual cue), and (c) physical assistance (visual cue). In the first step, the instructor tells the student what to do, if the student does not respond correctly, the instructor should move to the next step. In the second step, the instructor uses modeling coupled with verbal cues; if the student does not respond correctly, the instructor moves to the last of the three steps of physical assistance. For example, in the present study the researcher told athletes to throw the shot put (during baseline and maintenance phase). During intervention the researcher provided randomly assigned cues from the hierarchy of cueing model (i.e., picture with verbal, demonstration with verbal, and physical assistance with verbal) or verbal, model,

physical assistance (Dunn). Block (2007) agreed that information presented from the hierarchy of cueing can be more effective when attention is given to the order of cues.

Dunn, Morehouse, and Fredericks (1986) mentioned that the instructor should not provide the learner with a second cue unless the learner fails to respond or he/she's response is incorrect. In addition, the cue should not be verbalized in a voice too low to be heard and the instructor should establish eye contact when providing all cues.

Wolery et al., (1990), Dunn (1989), and Dunn, et al., (1986) reported that hierarchy of cueing has been used effectively with students with moderate ID. Hill (1982) investigated the effectiveness of a hierarchy cueing model to teach three students with severe ID to operate an electronic pinball game. The researcher used verbal, modeling, gesture, and physical assistance as cueing. Based on results, hierarchy of cueing was effective; all participants reached performance level of 80%.

Collins, Branson, Hall, and Wheatly (2001) investigated the effectiveness of using five levels of hierarchy of cueing to teach students with moderate ID how to write a letter. The five cues in sequence were independent, verbal, gesture with verbal, modeling with verbal, and physical assistance with verbal. Based on the analysis of the data, hierarchy of cueing was effective in teaching students with ID. Peres-Turner (2005) stated that the hierarchy of cueing system has been effective in teaching individuals with moderate ID.

Application of the Hierarchy of Cueing Model

The use of coaching techniques or a combination of techniques, such as picture with verbal, might improve the athlete's shot put release point and distance. For instance, the most common form of coaching in a Special Olympics training program is verbal instruction. It is most often used when first introducing a new skill (*Special Olympics Coaching Guide*, 2003). The coach should use less direction (i.e., two points) with clear and consistent language and use uncomplicated key words; for example, a "throw" should always be a "throw" and not "putting" (*Special Olympics Coaching Guide*). Individuals with ID may not have the vocabulary capacity compared to their peers because of decreased IQ (lower than 70); therefore, instructions given to individuals with ID should be in simple language in order to increase their understanding (Korinek & Polloway, 1993). For the purpose of this investigation, verbal instruction was involved with all coaching techniques: (a) picture with verbal, (b) demonstration with verbal, and (c) physical assistance with verbal.

Picture with verbal cue. The use of static pictures with a verbal cue is supported in the literature as an effective instructional method for individuals with ID. Numerous researchers have reported that using visual instructional methods will help to maximize the learning for individuals with mild through moderate ID (Bates, Cuvo, Miner, & Korbeck, 2001; Cihak, Alberto, Kessler, & Taber, 2004). In particular, McDonnell, Horner, and Williams (1984) reported that picture cues have been evaluated as a form of visual support for individuals with disabilities and one type of visual instruction, the use

of a static picture, resulted in increased learning. In addition, static pictures were used in instruction to help develop a deeper understanding of the task being taught (Wetzel, Radtke, & Stern, 1994). Alberto, Cihak, and Gama (2005) stated that the use of static pictures increased the development of skills in individuals with moderate ID.

Mayer and Moreno (2003) reported that instructors should understand the learning relationship between verbal and visual cues as an aid in their instruction. The use of a static picture enabled students with mild through moderate ID to maximize their learning when given a new task (Wetzel, Radtke, & Stern, 1994).

It is documented in the literature that individuals with autism have been more successful with learning when using a picture cue as compared to other visual communication strategies (Bondy & Frost, 2001; Savner & Myles, 2000). This information has application to the current study as three athletes had a secondary disability of autism. Paivio (1986) suggested that there could be two channels for information processing by using picture cards with verbal input from the instructor (e.g., coach): auditory and visual channels.

In the present study, the researcher combined verbal with visual to increase task understanding (i.e., picture). Therefore, by using both channels (i.e., visual with auditory) an instructor could decrease the cognitive load of information and increase the working memory resources (Mayer & Moreno, 2003; Mousavi, Low, & Sweller, 1995). This instructional technique was appropriate for application to the athletes of this study.

According to Saloviita and Tuulkari (2000) when teaching a task to individuals with ID, one picture per task should be used to explain the task. In addition, Metzler (2005) relied on fewer cues and social reinforcement (i.e., throw the shot put) when applying the use of a picture while teaching individuals without ID. In the present study, the researcher used one picture to teach athletes the shot put release point without any cue or social reinforcement. No social reinforcement was used because the researcher's purpose was to investigate the effect of picture with verbal cue without teaching the skill. Using cueing with reinforcement is considered teaching which was beyond the scope of this study.

Smith, Polloway, Patton, and Dowdy (2008) stated that teachers should use modification strategies that facilitate learning, such as a picture because individuals with ID learn and understand differently. Similarly, Smith, DeMarco, and Worley (2009) stated a picture may help individuals with ID to facilitate learning with (a) organizational difficulties, (b) distractibility, (c) auditory processing difficulties, and (d) speech/language delays. Individuals with ID might have organizational difficulties such as an inability to organize fragmented pieces of instruction into a meaningful learning experience. Teaching thematically provides a whole picture into which small pieces may be placed in a meaningful way. Individuals with ID might be easily distracted by environmental stimuli: the use of pictures serves to maintain focus. Auditory processing difficulties appeared to be minimized in this study and oral communication was limited between the athletes and the researcher when using the picture with verbal cue.

Demonstration with verbal cue. Baker (2003) and Foss, Auty, and Irvin (1988) stated that demonstration is one of the most commonly used techniques to teach skills. In the current study using the demonstration with verbal technique, the researcher demonstrated the appropriate skill and then asked the athletes to replicate the skill. Yelon (1996) stated that there is a four step approach to use along with the demonstration technique that was also used in this study: (a) tell the athlete he was going to perform the skill when the demonstration was over, (b) tell the athlete what they should focus on in the demonstration, (c) state clearly each skill step before the athlete demonstrates the skill, and (d) the coach needs to help the athlete recall the steps before they attempt the skill. In the current study, the researcher used the first three steps in the approach; however, the fourth step was not applied.

Because athletes with ID might have difficulties remembering or focusing on the appropriate part of a demonstration, the coach should provide athletes with ID with more direction while demonstrating the skill (Yelon, 1996). A successful demonstration technique requires the coach to make sure the athlete pays attention and understands the skill being demonstrated (Yelon). There are many ways to provide coaching information to athletes: (a) during the movement in the form of concurrent augmented feedback (more information) and intrinsic feedback; (b) before the movement in the form of verbal instructions and model demonstrations; (c) after the movement in the form of intrinsic outcome feedback and augmented feedback; and (d) combinations of during, before, and after the movement (Magill, 1993; McCullagh & Weiss, 2001; Newell, 1981). The

researcher in this study used combinations of before, during, and after while using the demonstration with verbal coaching technique.

Physical assistance with verbal cue. Physical assistance occurs when the individual does part of a task with some degree of physical contact from a coach or instructor to complete the task (Stancliffe, Jones, Mansell, & Lowe, 2008). The physical assistance may help the athlete increase his/her understanding on a specific task (*Special Olympics Coaching Guide*, 2003).

Instructors use a combination of physical assistance (tactile, kinesthetic) and verbal (auditory) to increase students' understanding of the skills (Metzler, 2005). Specifically for athletes with mild through moderate ID, coaches may apply this technique to provide athletes with a better understanding of their shot put release point (*Special Olympics Coaching Guide*, 2003).

The physical assistance (e. g., tactile, kinesthetic, and auditory) with a verbal cue is used when all other techniques of instruction have been exhausted. This technique requires the coach to physically move the athlete into a specific position and to physically assist the athlete to complete the skill. This technique should be used with caution, especially if the athlete functions at a lower level and/or does not like to be touched (*Special Olympics Coaching Guide*, 2003). Coaches should determine if their athletes are tactilely defensive by meeting with classroom teacher if possible.

Shot Put Throwing Variables

There are three variables which determine the distances of the shot put throw:

(a) height of release, (b) speed of release, and (c) angle of release (*American Sport Education Program*, 2008; Bowerman & Freeman, 1990; Foreman, 1982). In the current investigation, only shot put release point and distance thrown were studied. Speed of release and angle of release were beyond the scope of the current study. The three variables together maximize the shot put performance distance (Čoh et al., 2007).

There are two shot put techniques used for throwing (rotation and standing); however, this study used only the standing technique. The standing technique focuses on: grip, position of the shot on the neck, standing position at the rear of the throwing ring, glide, position in the center of the ring, the put or throw, and follow through (*American Sport Education Program*, 2008; Dunn, 1989).

According to Linthorne (2001) release point and velocity of release influence the performance of the shot put. Together both variables contribute to greater distances thrown. Velocity of release was beyond the scope of this study.

Čoh et al., (2007) stated that the release point height was influenced by the athletes standing height and arm length. The athletes standing height and actual height of release were not measured in this study.

CHAPTER III

METHOD

The purpose of this study was to determine the effects of using three different coaching techniques (picture with verbal, demonstration with verbal and physical assistance with verbal) on the release point and distance thrown of the shot put by male athletes with mild through moderate intellectual disabilities (ID). Information regarding the methods is presented under the following headings: (a) Procedures and (b) Research Design and Analysis.

Procedures

Permission for Participation in the Study

Three steps were used to secure athletes' for this investigation. First, the researcher contacted a local Special Olympics coach at a high school in the North Texas region by e-mail and telephone to establish interest in participating in the study.

Second, after receiving the coach's response to participate, packets were sent for distribution to parents/guardians of the athletes. These packets contained consent (Appendix A) and media release forms (Appendix B). The Special Olympics coach contacted 15 parents/guardians and asked them if they would allow their children to participate by returning the packets within three days. Five parents/guardians did not respond to the coach; therefore, their children were not included in this study.

Third, 10 athletes' parents/guardians agreed to allow their children to participate in the study and were asked to attend a meeting. The researcher sent e-mails to parents/guardians one week before the meeting to identify: (a) location, (b) room number, and (c) time of meeting. The purpose of the meeting was to answer all questions and review the consent forms. If parents/guardians could not attend, they contacted the researcher by telephone or e-mail to get their questions answered. However after having many of their questions answered by the Special Olympics coach, none of the participants' parents/guardians elected to attend the meeting.

Participants

Participants were 10 male athletes with mild through moderate ID. Participants met the following inclusion criteria: (a) recognized as an official Special Olympics athlete, (b) had mild through moderate ID, IQ 49 to 69, (c) were between 14 to 19 years of age, and (d) competed in a shot put event at least one time in the past year at a Special Olympics competition. Individuals with Down syndrome were excluded from participation because of possible medical and/or health problems associated with this condition such as Atlantal axial instability, heart problems, and hypothyroidism (Eichstaedt & Lavay, 1992; Krebs, 2005; Sherrill, 2004).

Equipment

The following equipment was used in the current study: (a) three shot puts (one for throwing and two for backup), (b) two digital recording cameras, (c) two tripods, (d) one tape measure, (e) six trial cards, (f) one stopwatch, and (g) one 15.5 cm x 20 cm

release point picture. All equipment was transported to the location of the data collection each day by the researcher and two research assistants. According to Special Olympics specifications (2010), the official outdoor shots used in the study were made of iron and weighed 4.0 kg/8.8 lbs.

Setting

All shot put sessions were conducted at McKinney Boyd High School. Athletes used their regular practice and competition shot put. The training was conducted on an individual basis, and it took place on the practice field. Each of the athletes participated in three training sessions per week for 8 weeks (24 sessions). Athletes threw the shot put six times during each training session and all training sessions were scheduled in the morning for approximately 3 hours. Athletes performed warm up exercises with the researcher before throwing the shot put to prevent injury. The warm up exercises consisted of 8 to 12 min of total body stretching with emphasis on the shoulders, hips, and legs (e.g., arm circles, light jogging).

Performance of the shot put release was recorded with two digital motion cameras (Sony, Digital Handycam). Each was placed in the sagittal plane of movement on opposite sides of the athlete (see Appendix C). The athlete was centered between both cameras, and the angle for each camera was 90 deg in relation to the direction of the athlete's shot put release. Each camera was placed at the height of 1.10 m and the distance between cameras was 10.49 m perpendicular to the length of the shot put circle (Frossard, Smeathers, O'Riordan, & Goodman, 2007). The field of view of the camera

was the full-length (2.29 m) and full-width (1.68 m) of the shot put circle (Čoh, Supej, Štuhec, & Smajlovi, 2007; Frossard et al., 2007; Young & Li, 2005).

All trials were recorded on Sony Mini DVDs. A shot put release point scoring rubric (Appendix D) was used by the researcher to score the performance while watching on a computer in the Sherrill Teaching and Research Lab at Texas Woman's University following each data collection session. The maximum shot put release point score each athlete could achieve in one day's performance was 18.00 points (see Appendix D). Post session video analyses were completed by using slow motion (frame by frame) review for each trial. Digital recording started when the researcher handed the shot put to the athlete and ended after the shot put landed on the ground. All throwing distances were recorded by the researcher using a standard 100 m tape measure. The distance thrown was measured from the front of the competition circle to first point of ground contact made by the shot put. The researcher used iMovie 4.01 software developed for a Macintosh computer to evaluate all trials (Cihak, Alberto, Taber-Doughty, & Gama, 2006; Horner et al., 2005).

Research Assistants' Training

Five volunteer undergraduate students, from Texas Woman's University (TWU) and the University of North Texas (UNT), were recruited to serve as research assistants (RA). Two training sessions were conducted prior to the beginning of the study. Each session lasted approximately one hour. Training sessions consisted of viewing tapes from the researcher's pilot study and practicing equipment set-up using fellow RAs as control

samples to ensure proper setup. Research assistants were responsible for checking the camera battery charge, adjusting the field of view, and assisting with positioning of the athlete during performance. At least two RAs assisted the researcher during each training session.

Research Design and Analyses

Data were collected 3 days a week, 6 trials a day, for 24 days, for a total of 144 trials per athlete in 3 phases (1st week baseline; 2nd to 7th week intervention; and 8th week maintenance phases). The researcher allowed a 2 min rest between trials within each of the three phases. There were 2 weeks of rest (no contact by researcher) between the intervention and the maintenance phase.

Phases

Baseline phase. The baseline phase was videotaped and scored using only verbal cues and no coaching techniques (i.e., cues) during this phase. The researcher simply asked the athlete to “throw the shot put”; this phase was repeated for 3 consecutive days.

Intervention phase. The three different coaching techniques were randomly assigned during intervention phase (Alberto, Cihak, & Gama, 2005). Each day, the athlete picked one letter from a hat. The letters represented a different coaching technique using the following cues: (a) picture with verbal (PV), (b) demonstration with verbal (DV), and (c) physical assistance with verbal (PAV). There were 18 pieces of paper in the hat; six had character “a”, six had character “b”, and six had character “c”. After the

athlete selected a letter, the researcher discarded it immediately, to avoid reusing the same piece of paper.

Maintenance phase. The maintenance phase started 2 weeks after finishing the intervention phase. The maintenance phase was used to determine if the performances were maintained after completion of the intervention phase (Alberto, Cihak, & Gama, 2005; Cihak et al., 2006). The researcher used the same observational, non-interactive method with each athlete during this phase. Again, all performances were videotaped and scored following each session also during the maintenance phase.

Coaching Techniques

In the current investigation coaching techniques were used as independent variables. The three coaching techniques used in this study were:

Picture with verbal cue. A card measuring 15.5 cm x 20 cm showing the desired shot put release point was used as the picture (Saloviita & Tuulkari, 2000). The picture was of the 2009 World Youth Champion, Ryan Crouser (International Association of Athletics Federations World Youth Championships, 2009). The competition took place at Brixione Bressanone in Italy (see Appendix E). The picture was shown to the athlete before each trial for 4 s prior to throwing the shot put and the instructions (verbal) lasted less than 60 s (Cihak, et al., 2006; Hoove & Horgan, 1990). The verbal instructions were “look at the picture and throw the shot put like it is shown in the picture.” The athlete’s comprehension of the verbal instruction was checked by a “nod” from the athlete after the verbal cue was given and before his throw. If the athlete did not appear to understand and

failed to comply, the cue was repeated one time. If the athlete did not appear to comprehend after the second cue was given, it was marked as “No Attempt” (NA) and the next trial was given.

Demonstration with verbal cue. A demonstration of throwing the shot put was performed by the researcher to show the athlete the proper shot put release point (note: the researcher is a USA Track and Field Certified Coach, Level 1). The researcher demonstrated the skill saying, “I will show you how to throw the shot put, look at my hand and elbow; I want you to see how high I throw the shot put. Now, throw the shot put like I do.” The athlete’s comprehension of the verbal instructions was checked by a “nod” from the athlete after the verbal cue and before the throw. If the athlete did not appear to understand the cue, the same procedures as detailed in the picture with verbal coaching technique listed previously were followed.

Physical assistance with verbal cue. A mild physical assist was given to each athlete, before each trial, by gently guiding the elbow of his throwing arm prior to throwing the shot put. The researcher placed his hand on the athlete’s elbow to encourage elbow extension as the hand raised above head height while saying, “See how high the shot put is and how straight your elbow is? I want you to raise your hand that high and keep your elbow straight each time you release.” The same athlete comprehension procedures were followed and results recorded as previously stated.

Content Validity

The researcher used a rating scale to determine the content validity for the two items used in the picture with verbal coaching technique: (a) the shot put picture and (b) the shot put release point scoring rubrics. Content validity was selected because of the lack of an existing evaluation instrument. An existing instrument might have provided the opportunity to determine the criterion validity, but without an instrument, comparisons could not be made.

To establish content validity, the researcher sent scoring rubrics for the picture used for picture with verbal coaching technique and release point rating scale (Appendix D, E, & F) to five track and field coaches with experience in coaching shot put. Two coaches had no experience in coaching athletes with ID and three had experience coaching athletes with ID. The five coaches were: one high school coach, one university coach, and three Special Olympics coaches. The researcher visited each coach and provided each with the same instruction "I want you to view the shot put picture and read the shot put release point rubric than rate each item using the rating scale." There were four statements to evaluate the picture rating scale, and six statements to evaluate the release point scoring rubric. A rating scale of 0 to 5 points was used to score each statement on both rubrics. The highest score for validating the picture rating scale was 20 points, and the highest score for validating the scoring rubric was 30 points. Coaches' scores were used to determine a coefficient of agreement by using the following formula:

$$\text{Coefficient of agreement} = \frac{\text{Total item scores}}{\text{Total number of items}}$$

A minimum of .80 agreement was needed to establish content validity (Horner et al., 2005; Portney & Watkins, 2008).

Based on the results, the mean validity agreement of the shot put picture between the five throwing coaches was 0.90 (0.95, 0.1, 0.80, 0.80, and 0.95). The mean content validity agreement of the shot put scoring rubric between the five throwing coaches was 0.87 (0.96, 0.90, 0.80, 0.80, and 0.90). As a result, both the shot put picture and the shot put scoring rubrics were considered to have content validity.

Data Analyses

An alternating treatment design utilizing data from the baseline, intervention, and maintenance phases was used to determine the effects of the three different coaching techniques on the shot put release point and distance thrown (Horner et al., 2005; Portney & Watkins, 2008; Zhan & Ottenbacher, 2001). This design provided control for practice effect. The purpose of this design was to document whether a functional relationship existed between independent and dependent variables (Horner, et al., 2005; Tankersley, Harjusoly-Webb & Landrum, 2008). There are three advantages to using alternating treatment designs: (a) efficacy of treatment can be determined faster than with other designs, (b) baseline data does not need to be stable before intervention is implemented, and (c) withdrawal of the treatment is not necessary (Richards et al., 1999; Zhan & Ottenbacher).

In an alternating treatment design, results can also be examined by using two types of analyses: (a) visual analysis and (b) statistical analysis (Horner et al., 2005;

Richards et al., 1999). In the current investigation, both analyses were used to answer the research questions and null hypotheses.

Observational analysis. The observational analysis consisted of mean, level, trend, and latency of change. Explanations of each of the visual analyses as following:

1. Mean: The mean performance in each phase was calculated and compared to determine the change of the performance. If the mean performance during intervention phase was better compared to the baseline phase, the treatment shows evidence of effectiveness (Alberto & Troutman, 2006). For instance, if the mean throwing distance of the shot put increased from 3 m during the baseline phase to 6 m during intervention phase; there is reason to consider effect from intervention.
2. Level: The value of the dependent variables or magnitude of performance at the point of intervention is determined in two ways: (a) comparison of the value of target behavior at the last data point in one phase with that at the first data point of the next adjacent phase, and (b) using the mean of the target behavior within a phase and comparing across phases for a summary of change (Richards et al., 1999). The effectiveness of the response of the treatment is demonstrated when an immediate change occurs from the end point of baseline phase to the beginning point in intervention phase (Tankersley et al., 2008). Kazdin (1992) suggested that a positive change in level indicated an impact of treatments.

3. **Trend:** The trend or slope is the direction of change within a phase and refers to the tendency of a series of data points to systematically increase or decrease over time. The changes are accelerating, decelerating, stable, variable, linear, or curvilinear (Richards et al., 1999; Tankersley et al., 2008). For example, in a series of shot put trials, if the baseline data depicts a decreasing trend for throwing distance, followed by an increasing trend in throwing distance, this would be considered a positive trend. Such a change in trend for throwing distance would suggest minimal evidence of the intervention's effect.
4. **Latency of change:** The term latency of change referred to the quickness with which the performance changed at the termination of one phase to the next phase. The least amount of time spent before a performance change, the more clearly the effect of the treatment (Alberto & Trountman, 2006). For example, in the shot put release point or distance thrown performance, if there was a short time frame in which changes occurred between the first session to the next sessions in the same phase this showed an evidence that the treatment was effective.

Statistical analyses. Analysis of variance (ANOVA) was used to compare data individually within each athlete and between phases (Portney & Watkins, 2008; Richards et al., 1999). The baseline phase and maintenance phase were compared using an ANOVA with repeated measures. In the current investigation, three data points were measured at baseline as well as during the maintenance phase. The element of time (pre-

post) was assumed with the two phases of baseline (pre) and maintenance (post) allowing data treatment with repeated measures (Portney & Watkins).

In the current investigation, the researcher analyzed data by individual athlete as well as by group. Individual analyses were: (a) observational analysis for mean, level trend, and latency of change, (b) one way ANOVA (release point) x (coaching techniques) within intervention phase, and (c) one way ANOVA (distance thrown) x (coaching techniques) within intervention phase (Portney & Watkins, 2008). Group analysis was performed to identify differences between baseline and maintenance. A 2 x 2 ANOVA with repeated measures, release point and distance thrown x baseline and maintenance phases, was performed to determine the effect of intervention (Portney & Watkins).

CHAPTER IV

RESULTS

The effects of three different coaching techniques on shot put release point and distance thrown for athletes with mild through moderate intellectual disability (ID) were examined. The findings of this study are presented in this chapter under the following headings: (a) Athletes' Demographics, (b) Performance Results and Research Questions, (d) Null Hypotheses, and (e) Summary.

Athletes' Demographics

There were nine male athletes with mild through moderate ID from McKinney Boyd High School; one athlete was excluded from the study because of missing data during the baseline phase. The classroom teacher for all participants used limited support levels during academic instruction (AAMR, 2002). Descriptive information on each athlete is presented in Table 1 and Appendix G.

Table 1.

Athletes' Demographic Information

Athlete	Age/IQ	Primary/Secondary Disability	Other Special Olympics Sport (s)	Results of 2010 Regional Game
1	17 years/ 45	Moderate ID, attention deficit, hyperactivity disorder	Bowling, 200 m run, long jump, and basketball	3 rd place shot put
2	17 years/ 45	Moderate ID, speech impairment	Bowling and basketball	2 nd place shot put
3	18 years/ 45	Moderate ID, visual impairment, autism, and speech impairment	Bowling, 100 m run, long jump, and basketball	3 rd place shot put
4	16 years/ 68	Mild ID	Basketball, baseball, football, 400 m relay, 100 m run, and long jump	2 nd place shot put
5	17 years/ 64	Mild ID	Basketball, baseball, football, discus, 200 m run, and long jump	1 st place shot put
6	15 years/ 54	Mild ID, attention-deficit/hyperactivity disorder	Bowling, basketball, football, and track and field	1 st place shot put
7	16 years/ 68	Mild ID, autism, and speech impairment	Basketball, discus, 100 m run, and long jump	1 st place shot put
8	18 years/ 67	Mild ID, autism, and speech impairment	Basketball, baseball, soccer, discus, 200 m run, and long jump	2 nd place shot put
9	17 years/ 68	Mild ID and learning disability	Basketball, baseball, football, 400 m relay, shot put, discus, 200 m run, and long jump	1 st place shot put

Performance Results and Research Questions

There are two graphs used to present the results for each athlete: (a) bar graphs and (b) line graphs. The bar graphs represent the mean score of the shot put release point and distance thrown, and are presented according to the phases of the study (baseline, intervention, and maintenance) by the coaching techniques of picture with verbal (PV), demonstration with verbal (DV), and physical assistance with verbal (PAV).

There were two line graphs for each athlete: one for release point and one for distance thrown. The line graph representing the shot put release point used scores from the scoring rubric (see Appendix D). The data were again presented by phases and coaching techniques. Observational analyses of mean, level, trend, and latency of change are used to present results according to baseline, intervention, and maintenance phases over time. Baseline, intervention, and maintenance phases are represented on the x-axis, along with number of days and weeks per phase. For example, the baseline and maintenance phases were 3 days for each phase. The intervention phase is presented by number of weeks, with each week representing three days of data collection.

The numbers on the y-axis represent points calculated from the scoring rubric for release (highest possible score is 18.00 pts). Distance thrown on the y-axis represents the mean distance in meters for each of the six throws according to the coaching technique. One day represented six throws of one technique and there were 3 days for each week; therefore each week represents 18 throws per week. There were two research questions and three hypotheses developed to address the purpose of this study (see Chapter I).

Athlete 1: Shot Put Release Point Results

Athlete 1's shot put release point scores were evaluated based on mean, level, trend, and latency of change. Athlete 1 had an IQ score of 45 (moderate ID), and an attention deficit hyperactivity disorder (ADHD).

Mean. The mean shot put release point during the intervention phase (17.67 pts) was greater than during the baseline phase (11.30 pts). The DV coaching technique represented the highest mean shot put release point performance during the intervention. The PAV coaching technique represented the lowest shot put release point (see Figure 1). The maintenance phase indicated this athlete continued to perform at a high level.

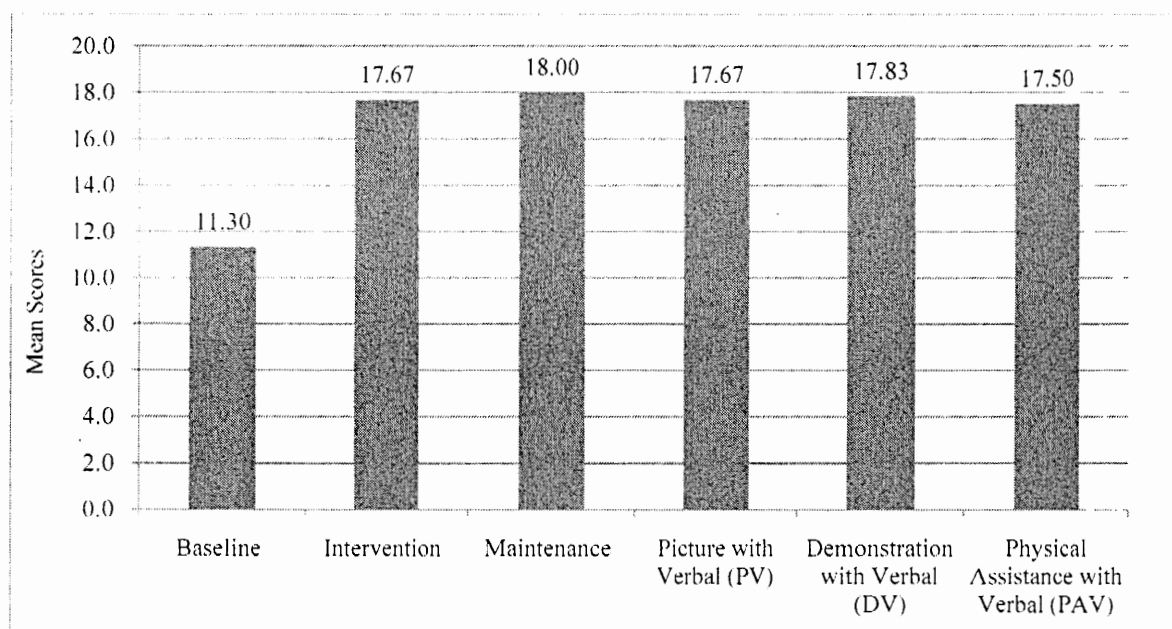


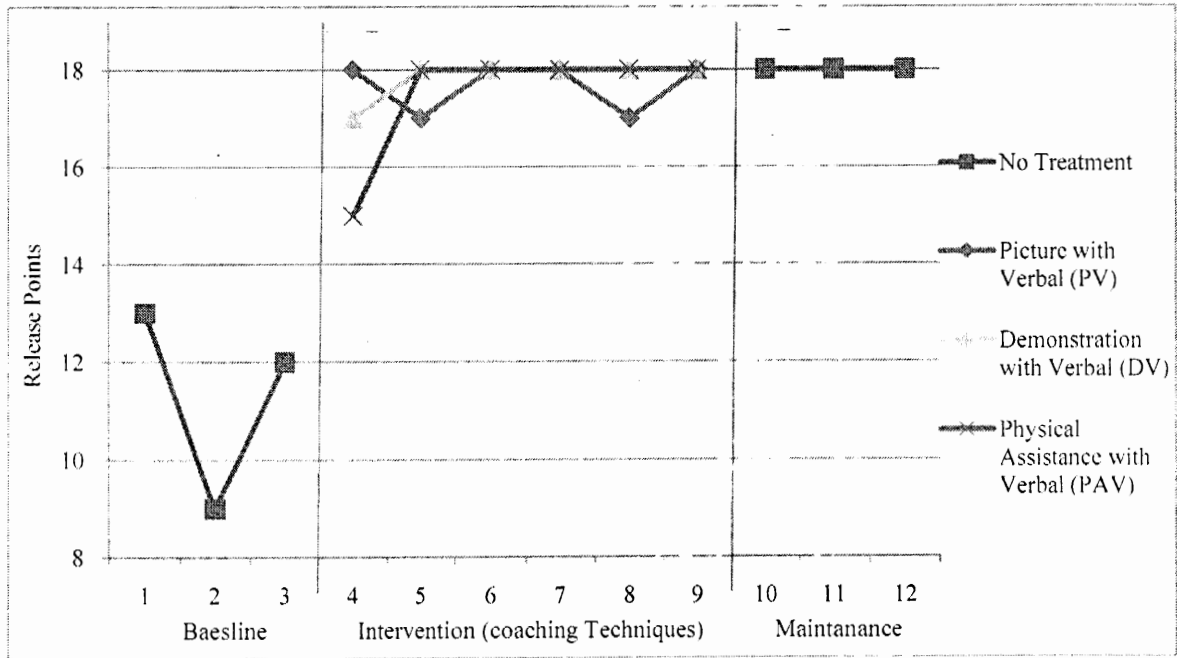
Figure 1. Athlete 1's mean shot put release point scores by phases and specific coaching techniques.

Level. There was an increase in shot put release point performance from the last data point in the baseline phase to the first data point in the intervention phase (PV). This

athlete increased from 12.00 to 18.00 points based on the scoring rubrics or a magnitude change of six points (see Figure 2).

Trend. The tendency of the data from the baseline to the first intervention was in a positive direction. All the coaching techniques during the intervention phases reported a positive direction (see Figure 2).

Latency of change. There was an immediate change after the first intervention session for the release point performance. This athlete's performance began to change between the 1st and 2nd week, or six coaching sessions, during the intervention phase (see Figure 2). The maintenance phase again indicated continuing high level performance.



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 2. Athlete 1's release point performance by phases and specific coaching techniques.

Athlete 1: Shot Put Distance Thrown Results

Distance thrown by athlete 1 was evaluated based on mean, level, trend, and latency of change. This athlete had an IQ score of 45 (moderate ID) with ADHD.

Mean. The mean shot put distance during the baseline phase (3.70 m) was slightly greater than the intervention phase (3.63 m). The mean shot put distance using the DV coaching technique (3.88 m) was greater than the PV and PAV coaching techniques (see Figure 3). Data gathered in the maintenance phase indicated this athlete continued to perform at a high level.

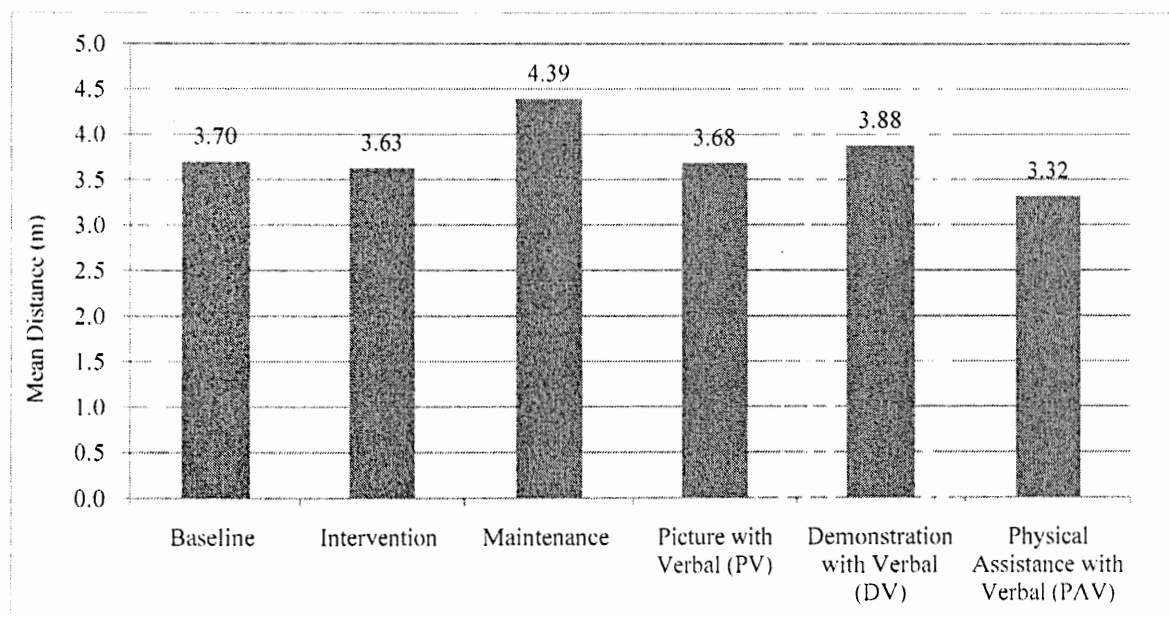
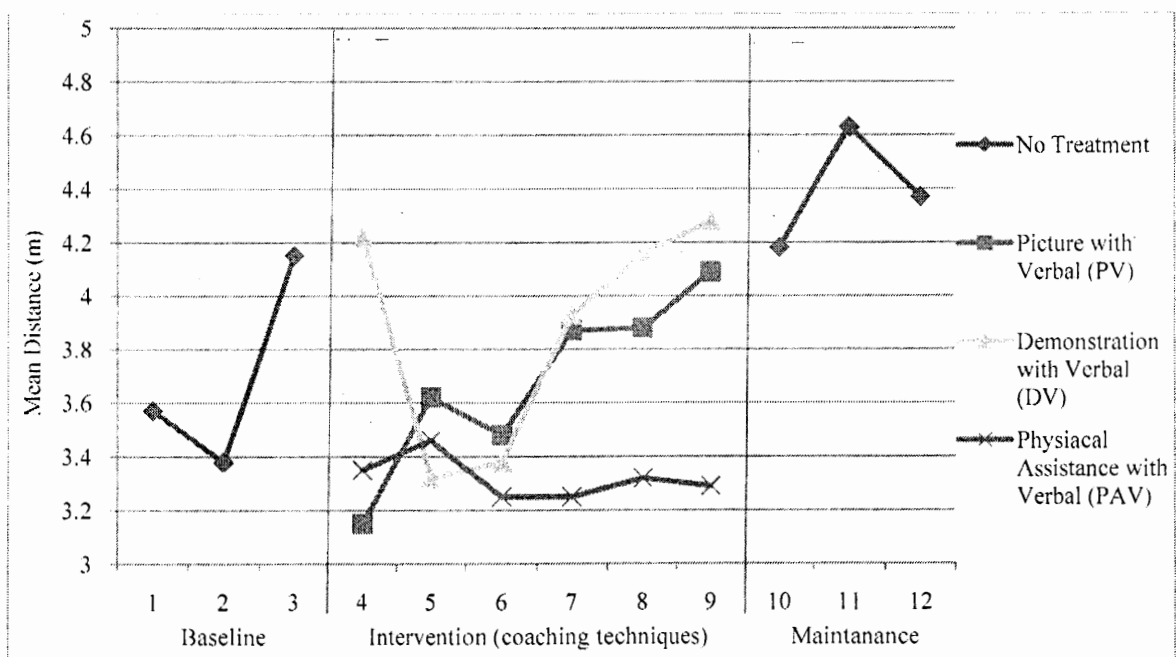


Figure 3. Athlete 1's mean shot put distance thrown by phases and specific coaching techniques.

Level. There was a decrease in shot put distance performance from the last data point in the baseline phase to the first data point in the intervention phase (PV) [see Figure 4].

Trend. The tendency of the data from the baseline to the first intervention was in a negative direction. The majority of distances thrown during the intervention phase sessions were slightly below in the baseline phase performance. This was interpreted as a trend in the negative direction (see Figure 4).

Latency of change. There was a slight decrease from the first intervention session for the distance thrown performance for the PAV and PV coaching techniques. The coaching technique of DV showed a slight increase from the last baseline measure (see Figure 4). The maintenance phase again indicated continuing high level performance.



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 4. Athlete 1's distance thrown by phases and specific coaching techniques.

Athlete 2: Shot Put Release Point Results

Athlete 2's release point scores were evaluated based on mean, level, trend, and latency of change. This athlete had an IQ score of 45 (moderate ID) and speech impairment.

Mean. The mean shot put release point during the intervention phase (17.78 pts) was greater than the baseline phase (14.00 pts). The DV coaching technique resulted in a slightly higher shot put release point (18.00 pts). The PV coaching technique represented the lowest shot put release point (see Figure 5). The maintenance phase indicated this athlete continued to perform at a high level.

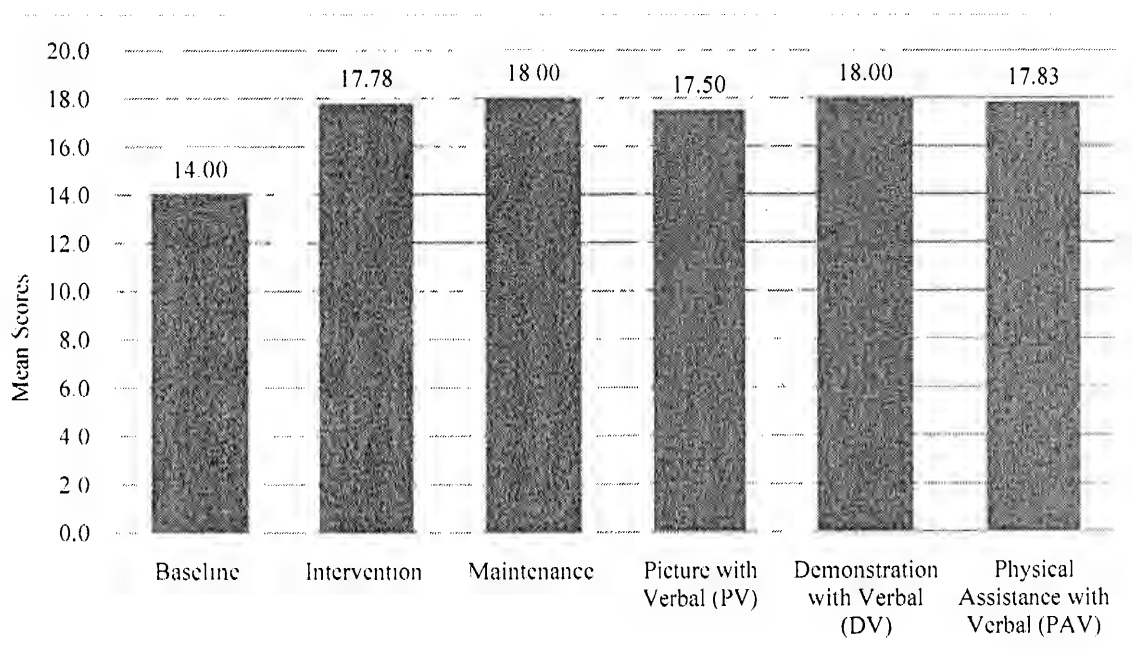


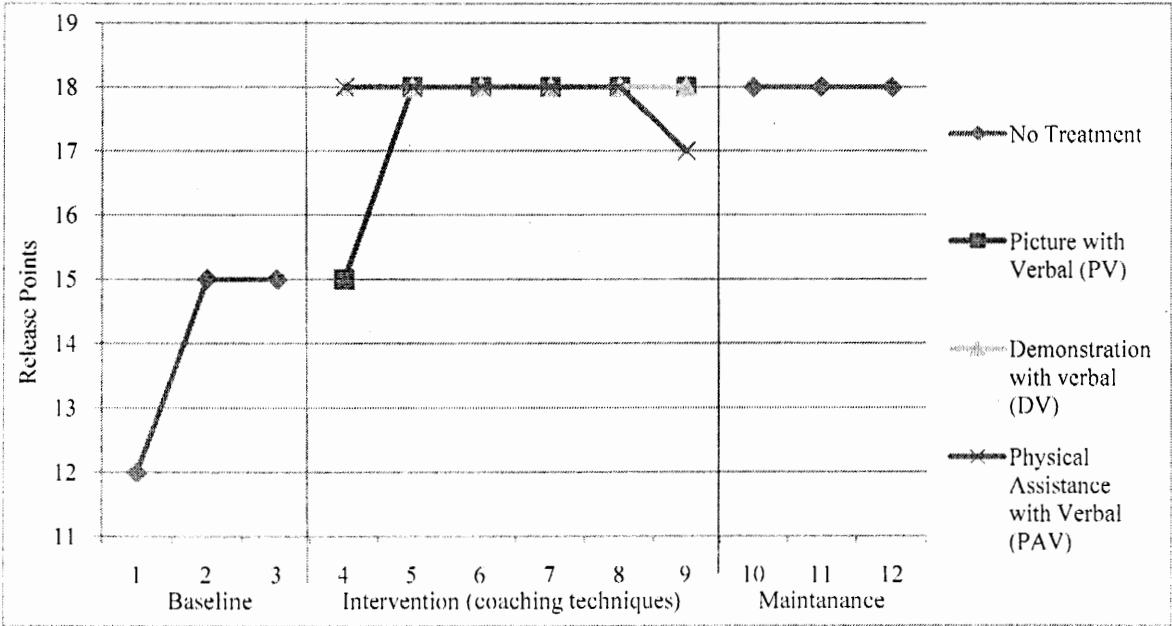
Figure 5. Athlete 2's mean shot put release point scores by phases and specific coaching techniques.

Level. There was no change in shot put release point performance from the last data point in the baseline phase to first data point in the intervention phase (PV). This

athlete increased from 15.00 to 18.00 points based on the scoring rubrics or a magnitude change of three points (see Figure 6).

Trend. The tendency of the data from the baseline to the first intervention was in a positive direction. All the coaching techniques during the intervention phase sessions except one were in a positive direction (see Figure 6).

Latency of change. There was a quick change after the second intervention session for the release point performance. This athlete's performance began to change during the 1st week, after two coaching techniques sessions, during the intervention phase (see Figure 6). The maintenance phase again indicated continuing high level performance.



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 6. Athlete 2's release point performance by phases and specific coaching techniques.

Athlete 2: Shot Put Distance Thrown Results

Athlete 2's shot put distance throws were evaluated based upon mean, level, trend, and latency of change. This athlete had an IQ score of 45 (moderate ID) and speech impairment.

Mean. The mean shot put distance performance during the intervention phase (3.36 m) was slightly greater than during the baseline phase (3.20 m). The mean shot put distance performance using the DV coaching technique was greater (3.62 m) than compared to PV and PAV coaching techniques (see Figure 7). The maintenance phase again indicated this athlete continued to improve clearly perform at a high level than in the other two phases.

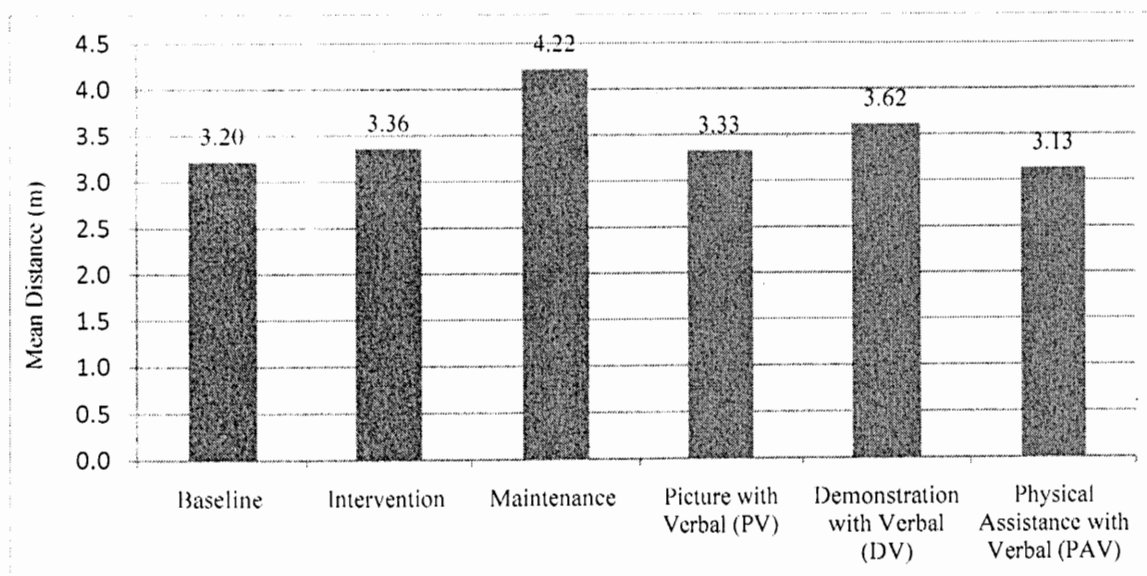


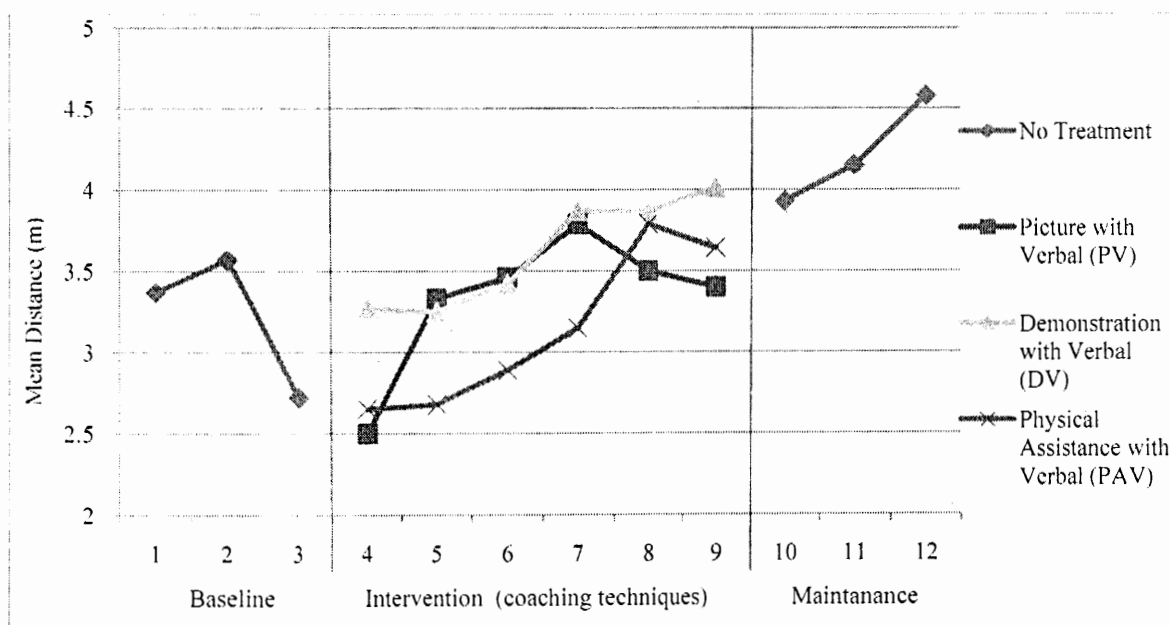
Figure 7. Athlete 2's mean shot put distance thrown by phases and specific coaching techniques.

Level. There was a decrease in distance thrown from the last data point in the baseline phase to the first data point during the intervention phase (PV). This athlete

slightly decreased from 2.72 m to 2.50 m or a magnitude change of 20 cm during the first exposure to a coaching technique (see Figure 8).

Trend. The tendency of the data from the baseline to the first intervention was in a negative direction. All 18 sessions distance throws except two during the intervention phase were in a negative direction (see Figure 8).

Latency of change. There was a positive change after the third day of coaching sessions for the distance thrown performance for PV and DV coaching techniques. The PAV coaching technique showed a positive change after 7 sessions of intervention (see Figure 8). The maintenance phase again indicated a higher level performance.



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 8. Athlete 2's distance thrown by phases and specific coaching techniques.

Athlete 3: Shot Put Release Point Results

This athlete had an IQ score of 45 (moderate ID) with autism and a speech impairment. His release point scores were evaluated based on mean, level, trend, and latency of change.

Mean. The mean shot put release point performance during the intervention phase (15.56 pts) was greater than the baseline phase (5.00 pts). The PV coaching technique represented the highest mean shot put release point performance during the intervention. The DV coaching technique represented the lowest shot put release point (see Figure 9). The maintenance phase indicated that athlete continued to perform at a high level.

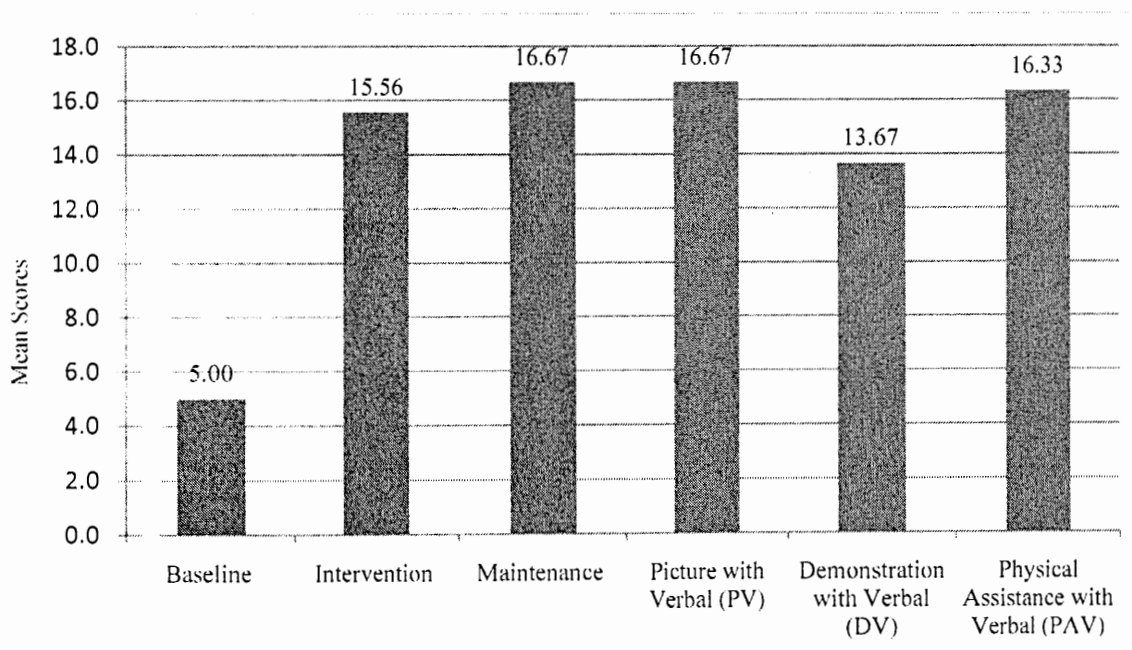


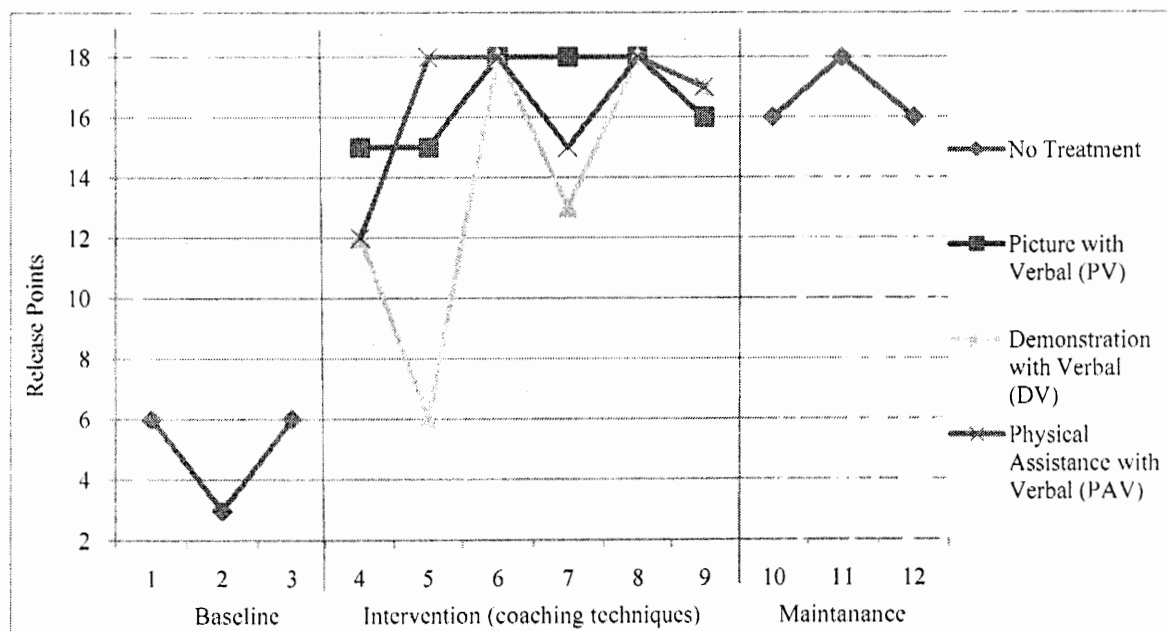
Figure 9. Athlete 3's mean shot put release point scores by phases and specific coaching techniques.

Level. There was an increase in shot put release point performance from the last data point in the baseline phase to the first data point in the intervention phase (PV). This

athlete increased from 6.00 to 15.00 points based on the scoring rubrics or a magnitude change of nine points (see Figure 10).

Trend. The tendency of the data from the baseline to the intervention phase was in a positive direction. All the coaching techniques during intervention phase sessions except one were in a positive direction (see Figure 10).

Latency of change. There was an immediate change after the first intervention session for the release point performance. This athlete's performance began to change during the 2nd week, after five coaching sessions, during the intervention phase (see Figure 10). The maintenance phase indicated this athlete continued to perform at a high level for one session of the three.



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 10. Athlete 3's release point performance by phases and specific coaching techniques.

Athlete 3: Shot Put Distance Thrown Results

Athlete 3's shot put distance throws were evaluated based on mean, level, trend, and latency of change. This athlete had an IQ score of 45 (moderate ID) with autism and a speech impairment.

Mean. The mean shot put distance performance during the baseline phase (3.10 m) was slightly greater than the intervention phase (3.04 m). The mean shot put distance performance for the PV coaching technique at the intervention phase was the greatest distance 3.09 m. The maintenance phase indicated this athlete continued to perform at a high level compared to baseline performance (see Figure 11).

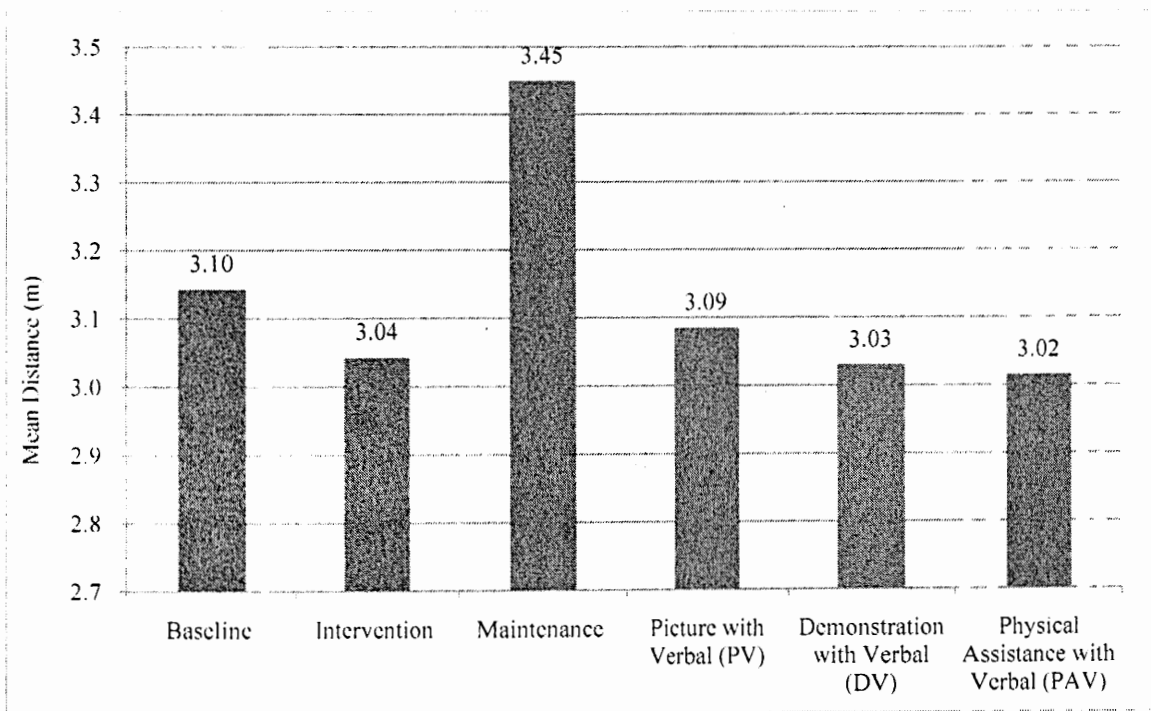
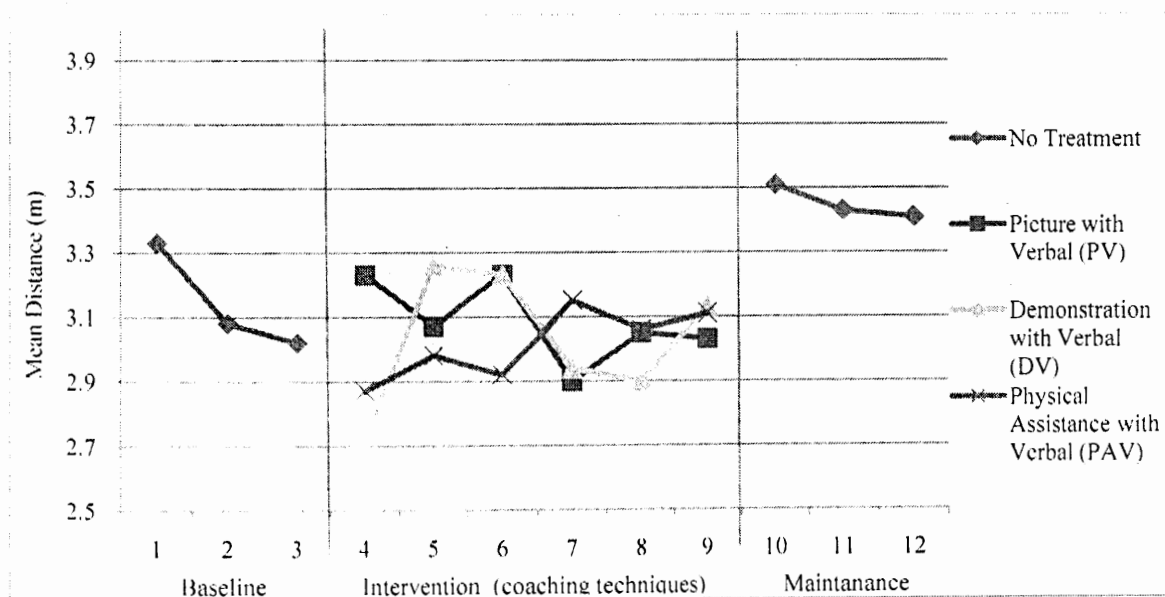


Figure 11. Athlete 3's mean shot put distance thrown by phases and specific coaching techniques.

Level. There was a positive change from the last data point in the baseline phase to the first data point in the intervention phase for distance thrown. This athlete increased from 3.02 m to 3.32 m points or a magnitude change of 30 cm (see Figure 12).

Trend. The tendency of the data from baseline to first intervention was in a positive direction. All the distance throws except two, during the intervention phase were in a positive direction (see Figure 12).

Latency of change. There was a slight decrease from the first intervention session for the distance thrown performance for DV and PAV coaching techniques. The coaching technique of PV showed an increase from the first data point session for the distance thrown performance. The maintenance phase indicated a higher level performance (see Figure 12).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 12. Athlete 3's distance thrown by phases and specific coaching techniques.

Athlete 4: Shot Put Release Point Results

Athlete 4's shot put release point scores were evaluated based on mean, level, trend, and latency of change. This athlete had an IQ score of 68 (mild ID).

Mean. The mean shot put release point performance during the baseline phase (18.00 pts) was greater than during the intervention phase (16.89 pts). The mean shot put release point performances for the three coaching techniques during the intervention phase showed the greatest score using the DV coaching technique (18.00 pts). The PV coaching technique showed the lowest shot put release point. Performance during the maintenance phase indicated this athlete continued to perform at a high level compared to baseline phase (see Figure 13).

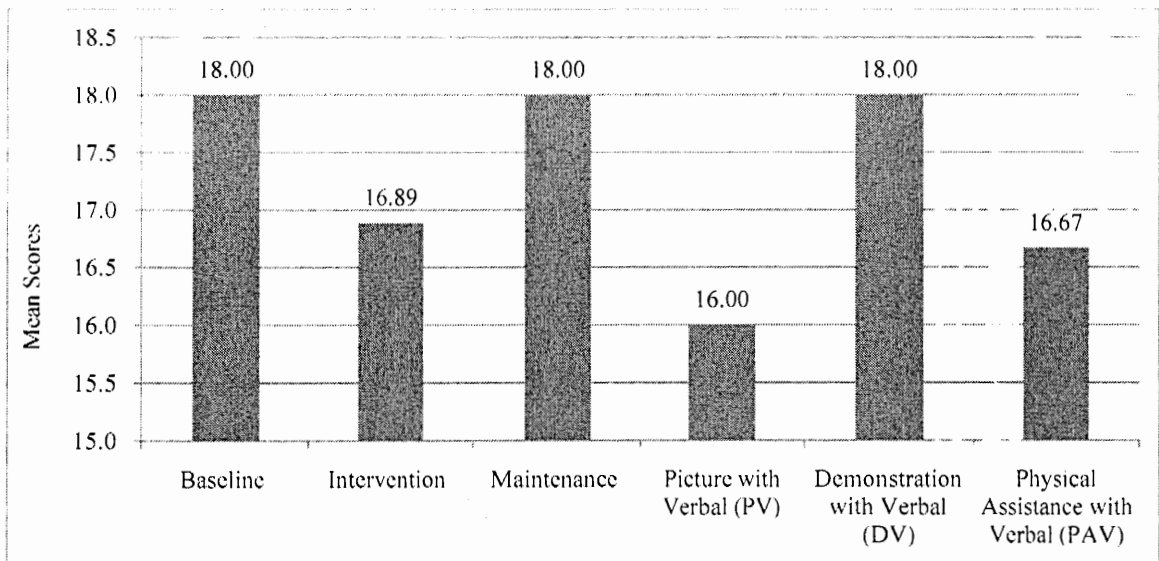


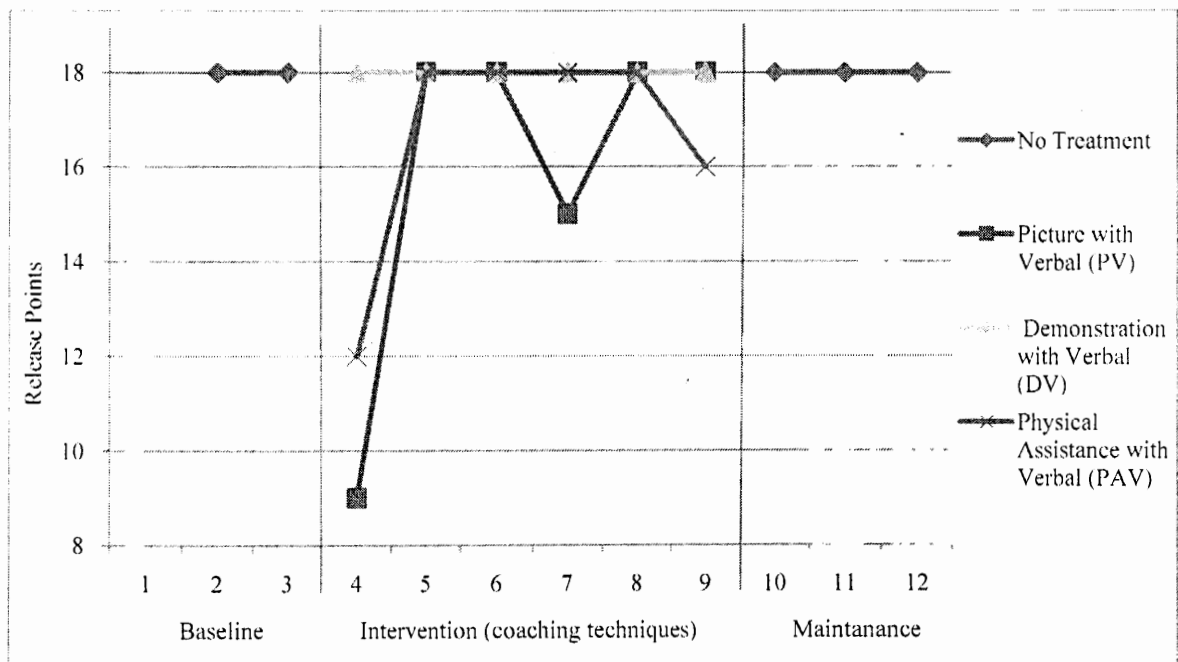
Figure 13. Athlete 4's mean shot put release point scores by phases and specific coaching techniques

Level. There was a decrease in shot put release point performance from the last data point in the baseline phase to the first data point in the intervention phase (PAV).

This athlete decreased from 18.00 to 9.00 points or a magnitude change of nine points (see Figure 14).

Trend. The tendency of the data from baseline to the intervention phase was in a negative direction. All the coaching techniques during the intervention phase were in a negative direction except four coaching sessions (see Figure 14).

Latency of change. There was an immediate drop after the first intervention session for the release point performance. This athlete's performance began a positive change after two coaching sessions, with a negative change at the 4th and 6th week. Performance during the maintenance phase again indicated continuing high level (see Figure 14).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 14. Athlete 4's release point performance by phases and specific coaching techniques

Athlete 4: Shot Put Distance Thrown Results

Athlete 4's shot put distance throws were evaluated based upon mean, level, trend, and latency of change. This athlete had an IQ score of 68 (mild ID).

Mean. The mean shot put distance performance during the baseline phase (6.95 m) was greater than the intervention phase (6.25 m). The mean shot put distance using the PAV coaching techniques was slightly greater (6.33 m) than compared to the other coaching techniques. Performance during the maintenance phase indicated this athlete continued to perform at a high level (see Figure 15).

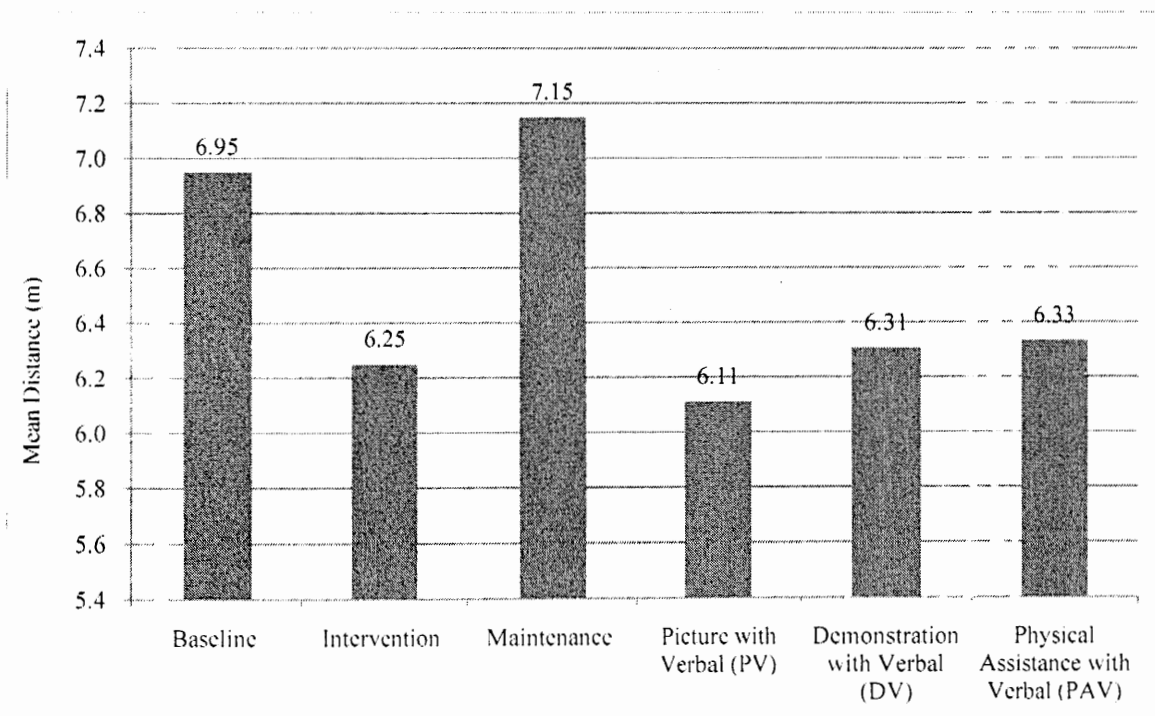


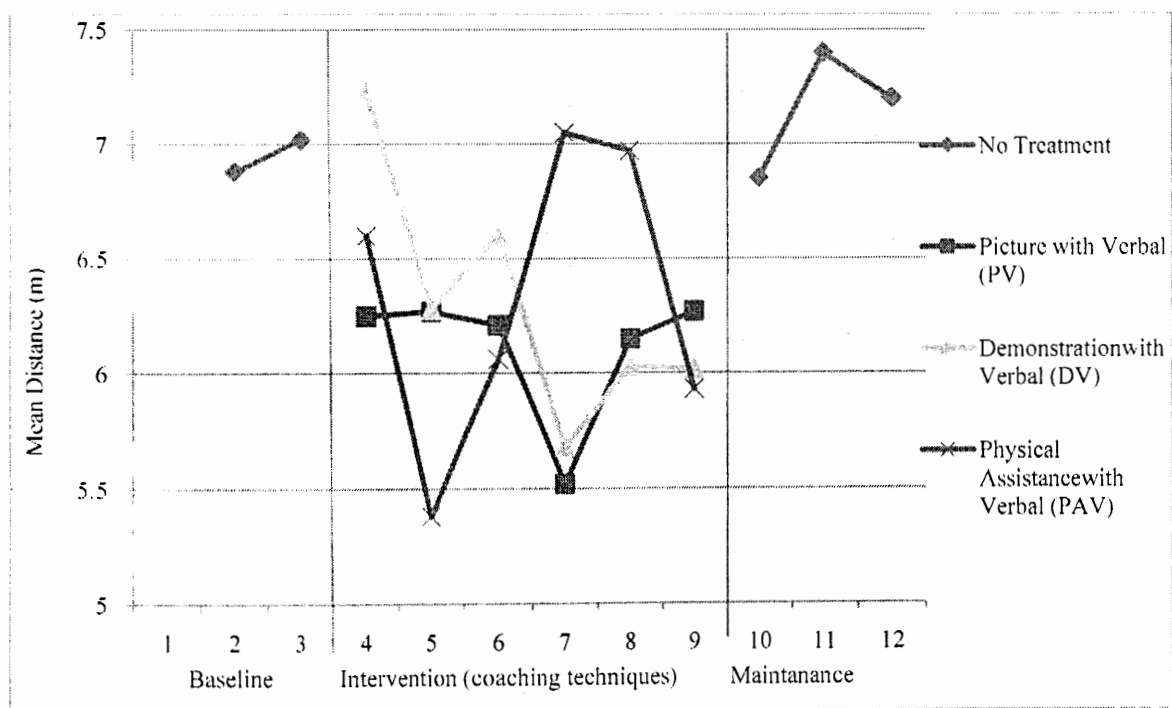
Figure 15. Athlete 4's mean shot put distance thrown by phases and specific coaching techniques.

Level. There was a negative change in shot put distance thrown performance from the last data point in the baseline phase to the first data point in the intervention phase

(PAV). This athlete decreased from 7.02 m to 6.60 m or a magnitude change of 42 cm (see Figure 16).

Trend. The tendency of the data from the baseline to the first intervention phase was in a negative direction. All the distance throws, except two during the intervention phase were in a negative direction (see Figure 16).

Latency of change. There was a decrease from the first intervention session for the distance thrown performance for the PV and the PAV coaching techniques. The DV coaching technique increased from the last baseline to first intervention measure. The maintenance phase again indicated continuing high level performance (see Figure 16).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 16. Athlete 4's distance thrown by phases and specific coaching techniques.

Athlete 5: Shot Put Release Point Results

This athlete had an IQ score of 64 (mild ID). His shot put release point scores were evaluated based on mean, level, trend, and latency of change.

Mean. The mean shot put release point during the intervention phase (17.44 pts) was greater than during the baseline phase (5.00 pts). The mean shot put release point performances for the three coaching techniques during intervention revealed the greatest score using the PV coaching technique (18.00 pts). The DV coaching technique was slightly lower than PV and PAV. Maintenance phase performance indicated this athlete continued to perform at a high level (see Figure 17).

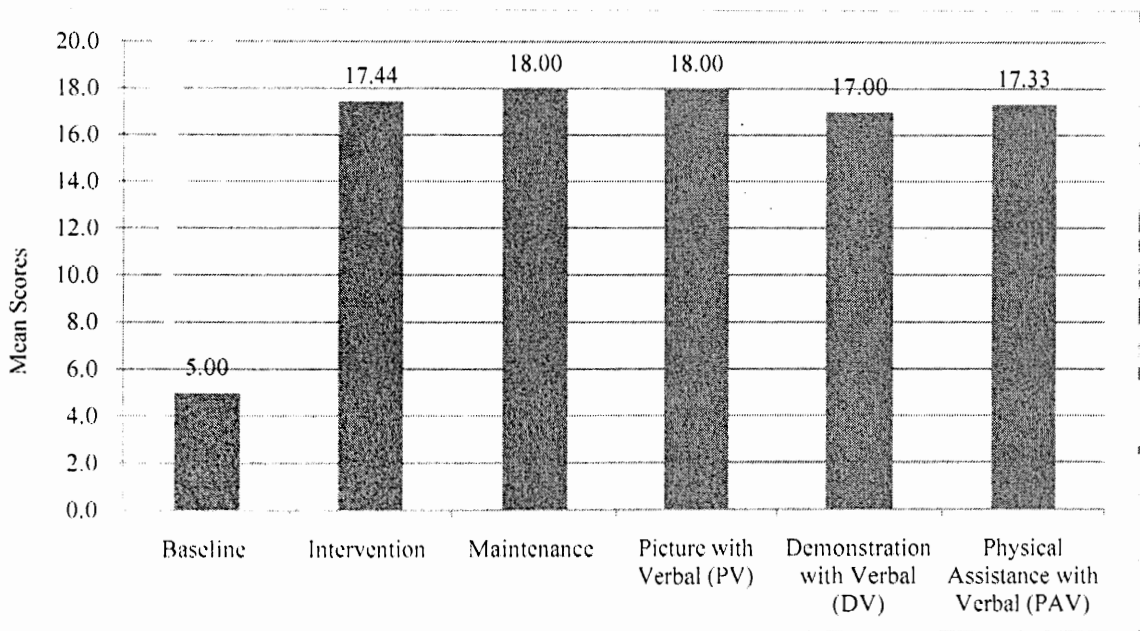


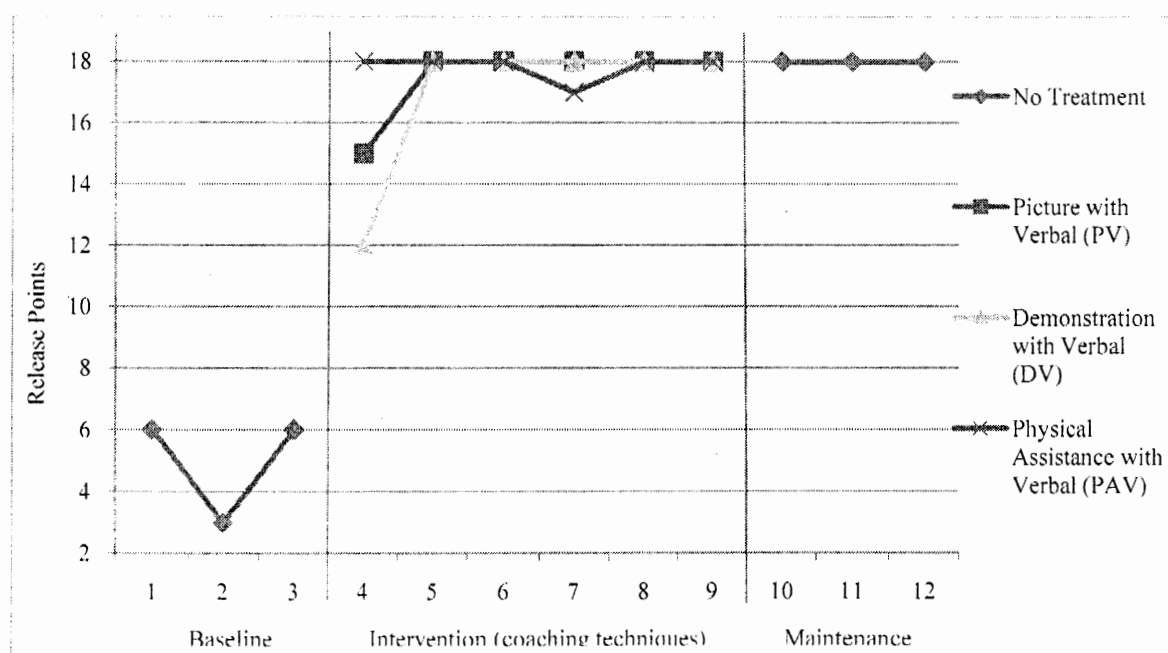
Figure 17. Athlete 5's mean shot put release point scores by phases and specific coaching techniques.

Level. There was an increase in shot put release point performance from the last data point in the baseline phase to the first data point in the intervention phase (DV). This

athlete increased from 6.00 to 12.00 points based on the scoring rubrics or a magnitude change of six points (see Figure 18).

Trend. The tendency of the data from the baseline to the intervention phase was in a positive direction. All the coaching techniques during the intervention phase were in a positive direction (see Figure 18).

Latency of change. There was an immediate change after the first intervention session for the release point performance. This athlete's performance began to change at the 1st week, first coaching session, during the intervention phase. Performance during the maintenance phase again indicated continuing high level (see Figure 18).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 18. Athlete 5's release point performance by phases and specific coaching techniques.

Athlete 5: Shot Put Distance Thrown Results

Athlete 5's shot put distance throws were evaluated based on mean, level, trend, and latency of change. This athlete had an IQ score of 64 (mild ID).

Mean. The mean shot put distance thrown during the baseline phase (12.10 m) was greater than intervention phase (10.97 m). The mean shot put distance thrown (11.14 m) using the PV coaching technique was greater than the other two coaching techniques. Performance during the maintenance phase indicated this athlete continued to perform at a high level (see Figure 19).

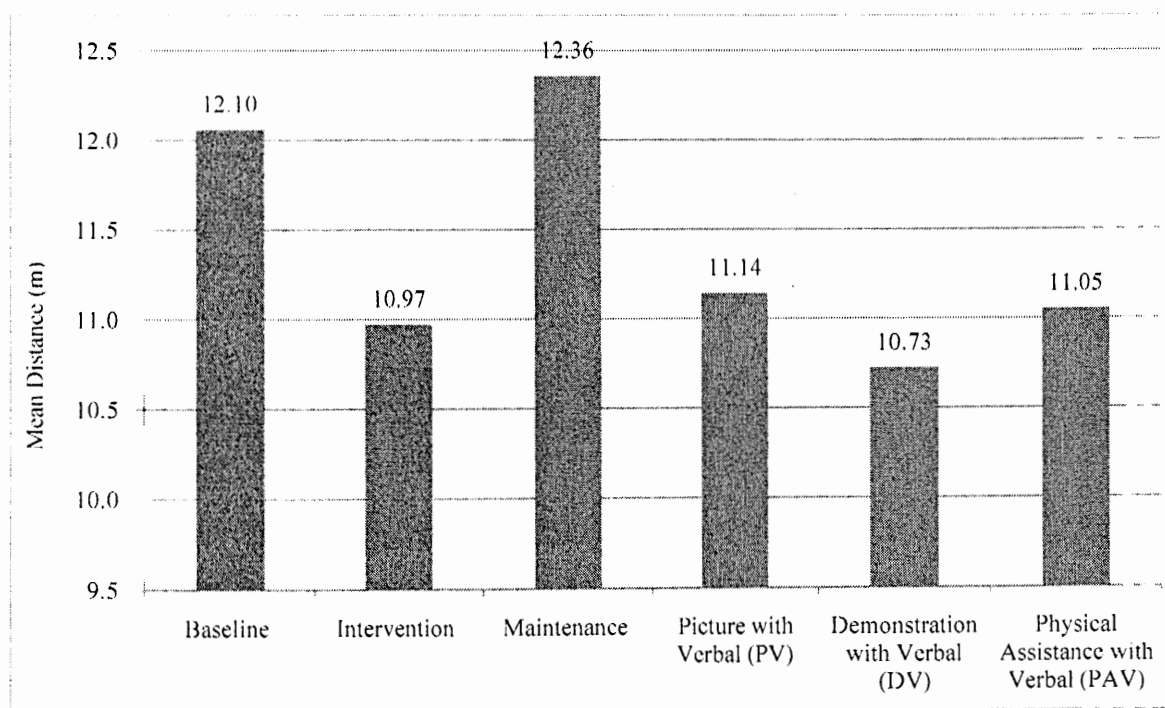


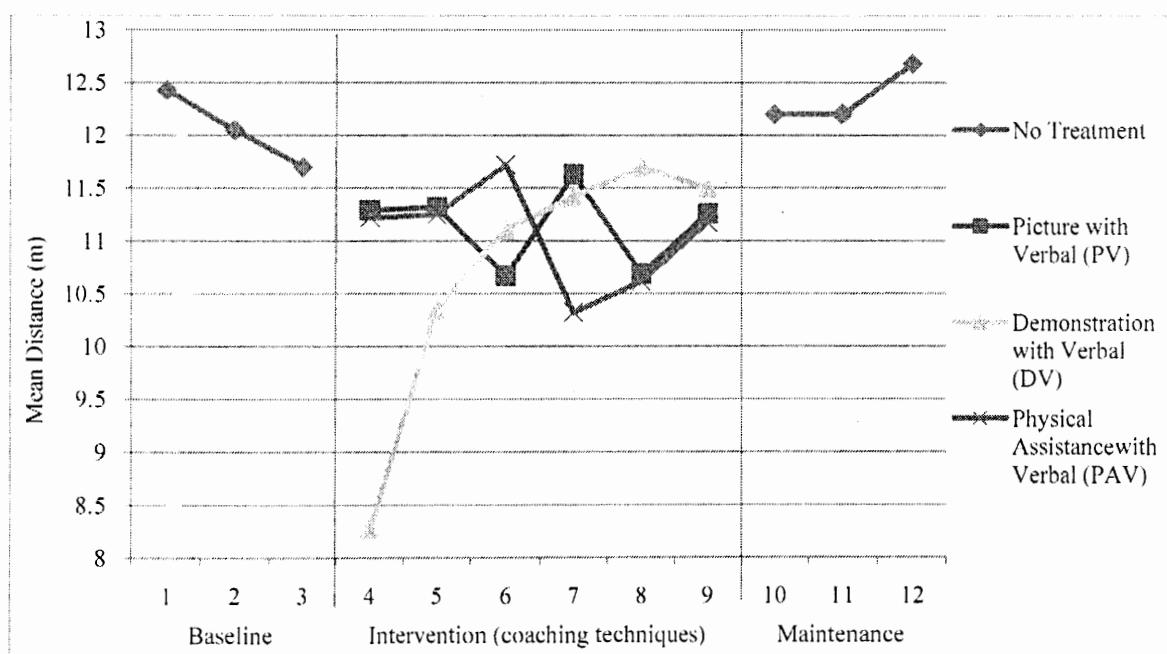
Figure 19. Athlete 5's mean shot put distance thrown by phases and specific coaching techniques.

Level. There was a negative change in shot put distance performance from the last data point in the baseline phase to the first data point in the intervention phase (DV). This

athlete decreased from 11.70 m to 8.27 m or a magnitude change of 2.70 m (see Figure 20).

Trend. The tendency of the data from the baseline to the intervention phase was in a negative direction. All the distance throws during the intervention phase were in a negative direction (see Figure 20).

Latency of change. There was an immediate decrease from the first intervention session for the distance thrown performance for the three coaching techniques. The DV coaching technique showed the shortest distance thrown. Performance during the maintenance phase again indicated continuing high level (see Figure 20).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 20. Athlete 5's distance thrown by phases and specific coaching techniques.

Athlete 6: Shot Put Release Point Results

This athlete had an IQ score of 54 (mild ID), and ADHD. His shot put release point scores were evaluated based on mean, level, trend, and latency of change.

Mean. The mean shot put release point during the intervention phase (17.67 pts) was greater than the baseline phase (8.00 pts). The mean shot put release point performances for the three coaching techniques at the intervention phase revealed the greatest score with the DV coaching technique (18.00 pts). The PAV coaching technique indicated the lowest shot put release point scores. The maintenance phase indicated this athlete continued to perform at a high level (see Figure 21).

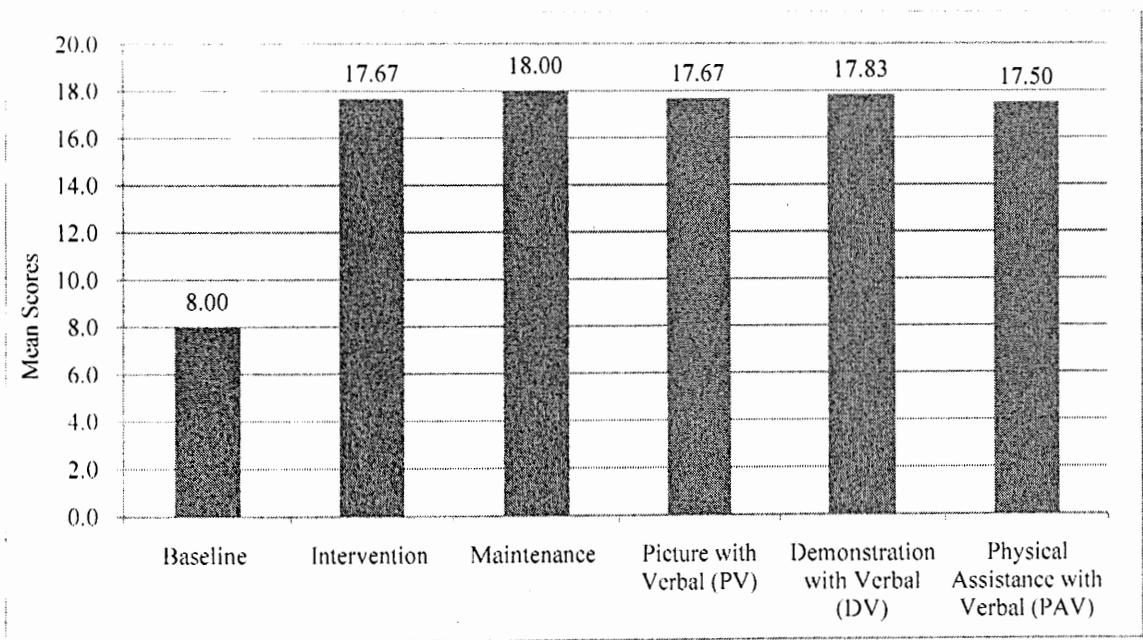


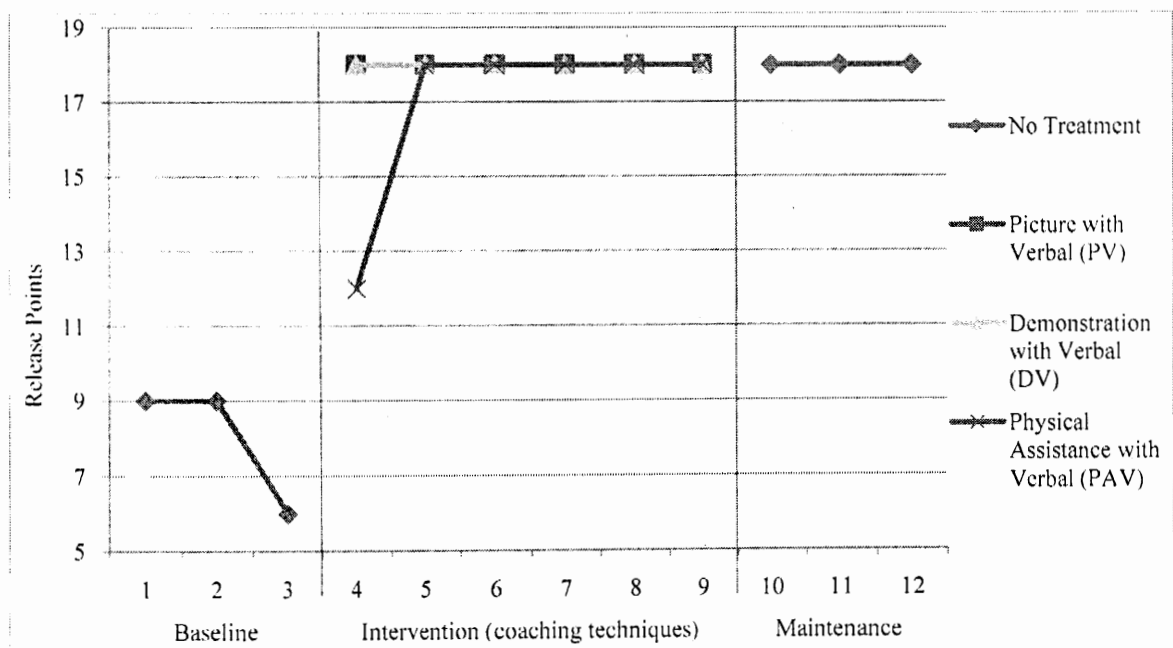
Figure 21. Athlete 6’s mean shot put release point by phases and specific coaching techniques.

Level. There was an increase in shot put release point from the last data point in the baseline phase to the first data point in the intervention phase (PV). This athlete

increased from 12.00 to 18.00 points based on the scoring rubrics or a magnitude change of six points (see Figure 22).

Trend. The tendency of the data from the baseline to the intervention phase was in a positive direction. All the coaching techniques during the intervention phase were in a positive direction (see Figure 22).

Latency of change. There was an immediate change after the first intervention session for the release point performance. This athlete's performance began to change at the first coaching session (PV) during the intervention phase. Performance during the maintenance phase again indicated continuing high level (see Figure 22).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 22. Athlete 6's release point performance by phases and specific coaching techniques.

Athlete 6: Shot Put Distance Thrown Results

Athlete 6’s distance throws were evaluated based on mean, level, trend, and latency of change. This athlete has an IQ score of 54 (mild ID) with ADHD.

Mean. The mean shot put distance thrown during the intervention phase (7.30 m) was greater than the baseline phase (5.30 m). The mean shot put distance thrown using the DV coaching technique was greater (7.71 m) than compared to the other two coaching techniques. The maintenance phase indicated that athlete continued to perform at a high level (see Figure 23).

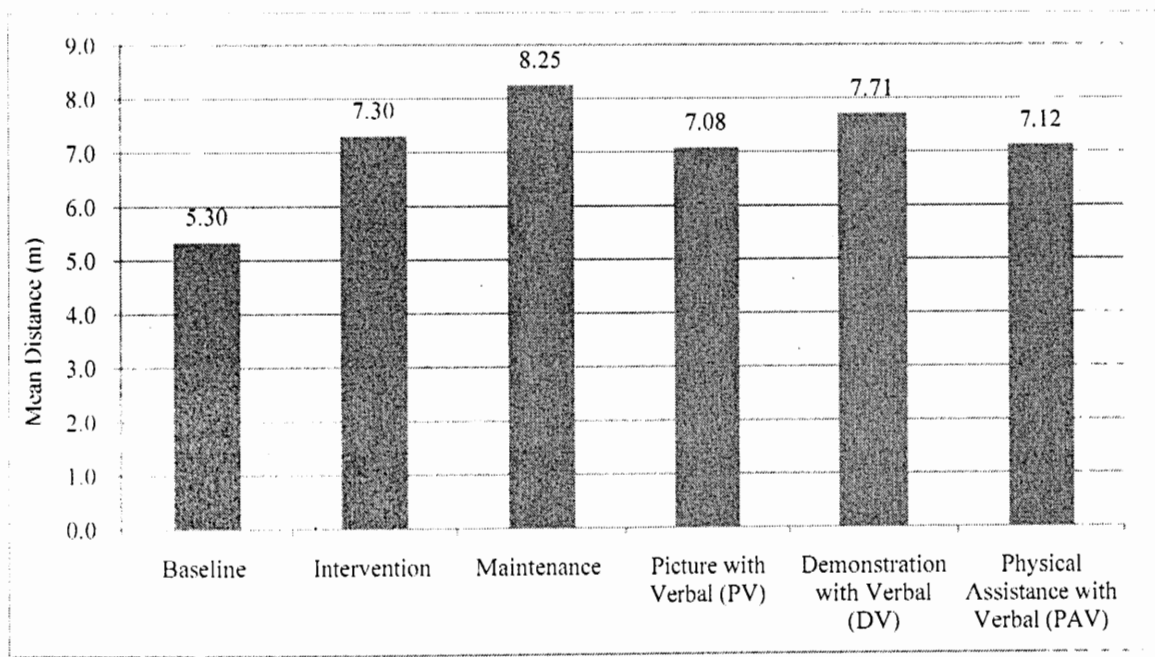
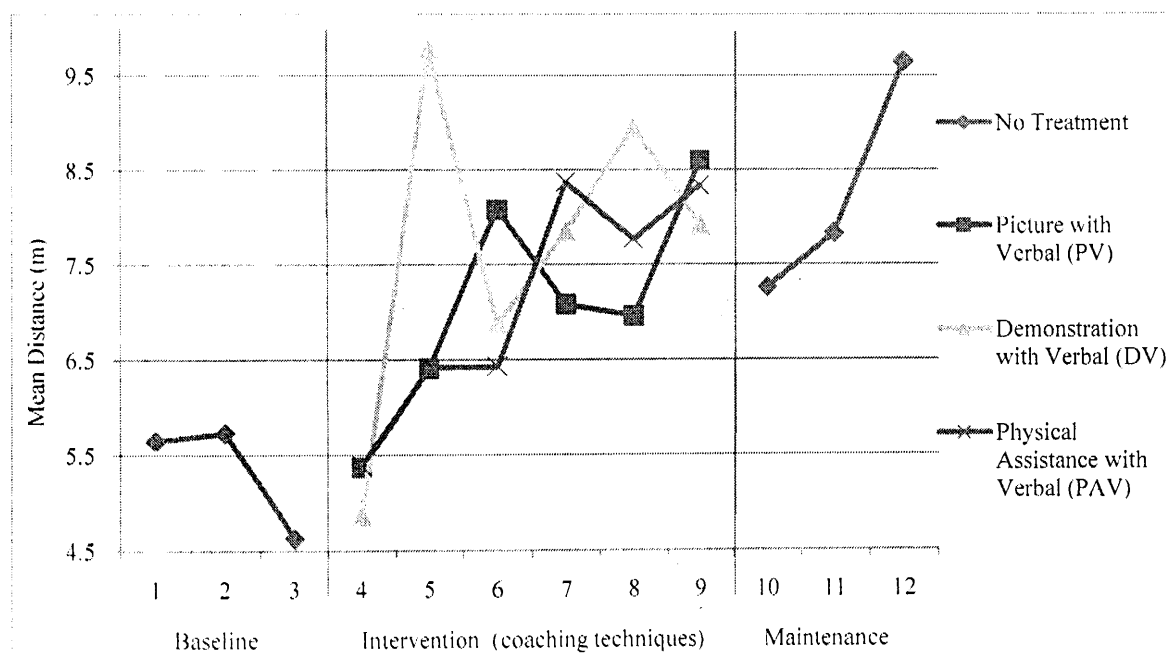


Figure 23. Athlete 6’s mean shot put distance thrown by phases and specific coaching techniques.

Level. There was an increase in shot put distance thrown from the last data point in the baseline phase to the first data point in the intervention phase (PV). This athlete increased from 4.63 m to 5.37 m or a magnitude change of 74 cm (see Figure 24).

Trend. The tendency of the data from the baseline to the intervention phase was in a positive direction. The majority of distances thrown during the intervention phase were in a positive direction (see Figure 24).

Latency of change. There was an immediate increase change after the first intervention session for the distance thrown performance for all coaching techniques. The DV coaching technique indicated the lowest distance thrown performance during the intervention phase. Performance during the maintenance phase indicated increasing distance thrown (see Figure 24).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 24. Athlete 6's distance thrown by phases and specific coaching techniques.

Athlete 7: Shot Put Release Point Results

This athlete had an IQ score of 68 (mild ID) with autism. His shot put release point scores were evaluated based on mean, level, trend, and latency of change.

Mean. The mean shot put release point during intervention phase (15.50 pts) was greater than the baseline phase (11.00 pts). The DV coaching technique represented the highest mean shot put release point performance during intervention. The PAV coaching technique represented the lowest shot put release point. The maintenance phase indicated this athlete continued to perform at a high level (see Figure 25).

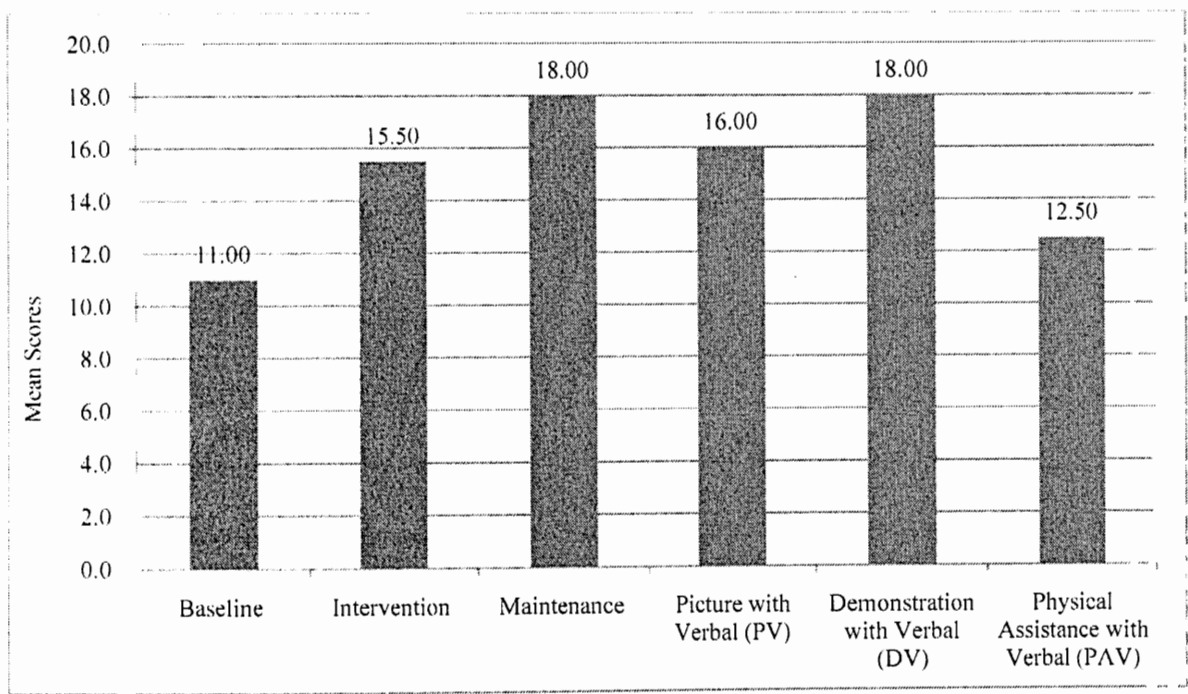


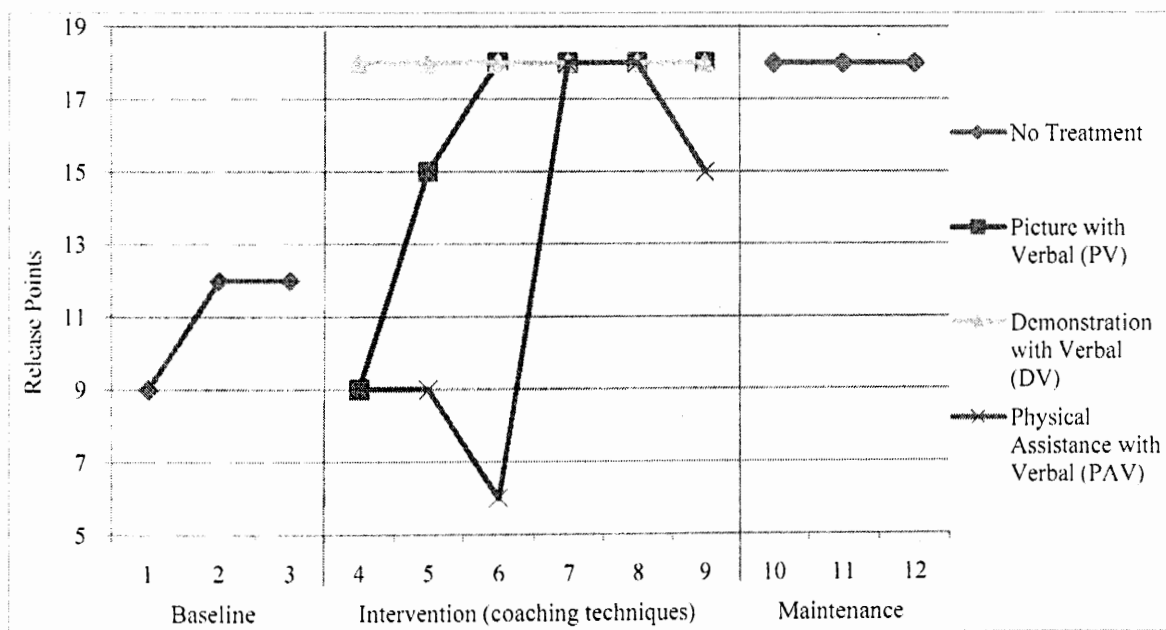
Figure 25. Athlete 7’s mean shot put release point scores by phases and specific coaching techniques.

Level. There was a decrease in shot put release point performance from the last data point in the baseline phase to the first data point in the intervention phase (PAV).

This athlete decreased from 12.00 to 9.00 points based on the scoring rubric or a magnitude change of negative three points (see Figure 26).

Trend. The tendency of the data from the baseline to the intervention was in a negative direction. Five coaching techniques during the intervention phase were in a negative direction (see Figure 26).

Latency of change. There was a decrease change after the first intervention session for the release point performance. This athlete's performance began to change between the 2nd week and 3rd week, after eight coaching sessions, during the intervention phase. The maintenance phase again indicated continuing high level performance (see Figure 26).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 26. Athlete 7's release point performance by phases and specific coaching techniques.

Athlete 7: Shot Put Distance Thrown Results

Athlete 7's shot put distance throws were evaluated based on mean, level, trend, and latency of change. This athlete had an IQ score of 68 (mild ID) with autism.

Mean. The mean shot put distance thrown during the intervention phase (4.30 m) was greater than the baseline phase (4.10 m). The PV coaching technique represented the greatest mean shot put distance thrown performance (4.40 m) during the intervention. The PAV coaching technique represented the shortest shot put distance thrown (4.23 m) during the intervention. Performance during maintenance phase indicated that athlete continued to perform at a high level (see Figure 27).

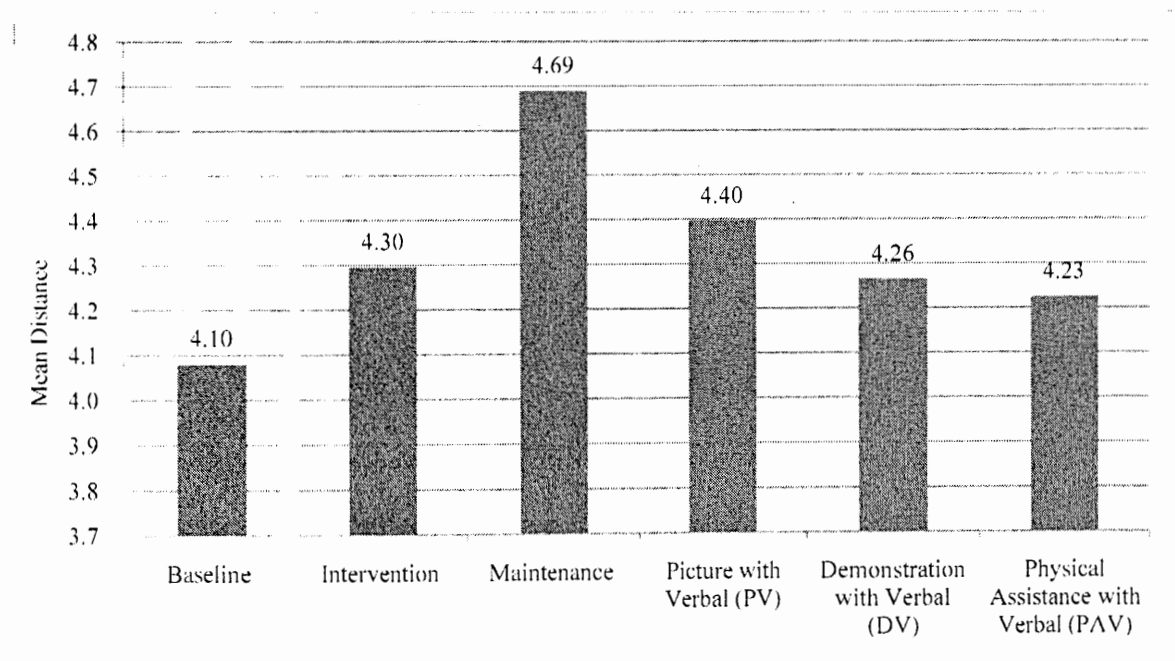
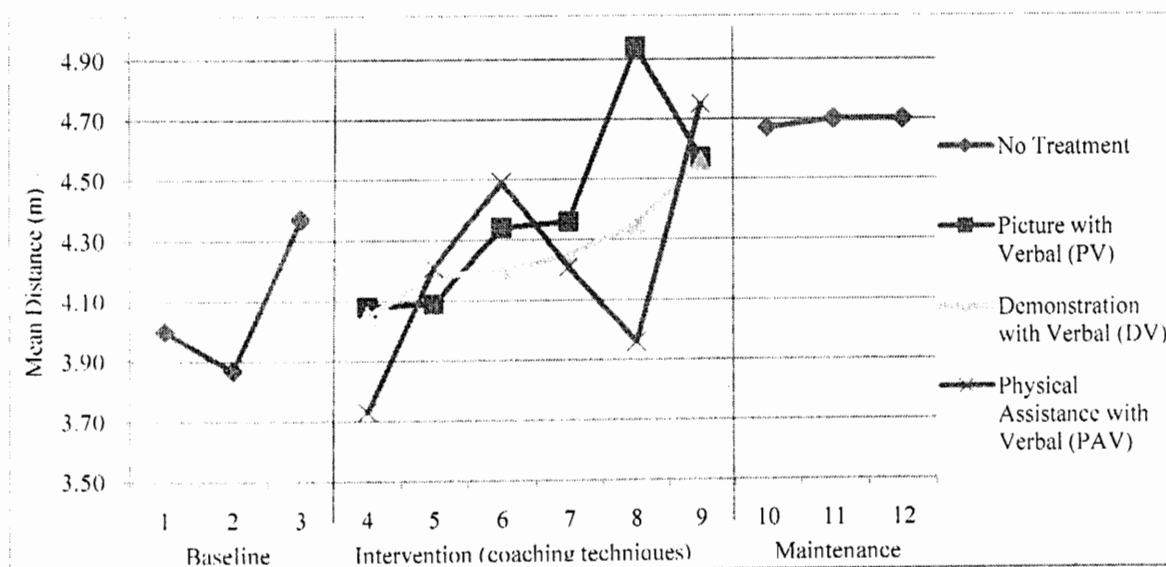


Figure 27. Athlete 7's mean shot put distance thrown by phases and specific coaching techniques.

Level. There was a decrease change from the last data point in the baseline phase to the first data point in the intervention phase (PAV). This athlete decreased from 4.37 m to 3.73 m or a magnitude change of 64 cm (see Figure 28).

Trend. The tendency of the data from the baseline to the intervention was in a negative direction. All the distances thrown during the intervention phase were in a negative direction except for two coaching techniques; one PV and one DV (see Figure 28).

Latency of change. There was a decrease change from the first intervention session for the distance thrown performance for PAV coaching technique. The PV and DV coaching techniques remained the same as the last baseline measure. The maintenance phase again indicated maintaining high level of performance (see Figure 28).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 28. Athlete 7's distance thrown by phases and specific coaching techniques.

Athlete 8: Shot Put Release Point Results

This athlete had an IQ score of 67 (mild ID) with autism and a speech impairment. His shot put release point scores were evaluated based on mean, level, trend, and latency of change.

Mean. The mean shot put release point performance during the intervention phase (15.78 pts) was greater than the baseline phase (10.00 pts). The PV coaching technique represented the highest mean shot put release point performance (17.83 pts) during the intervention phase. The DV coaching technique represented the lowest shot put release point (13.00 pts) during the intervention phase. The maintenance phase indicated this athlete continued to perform at a high level (see Figure 29).

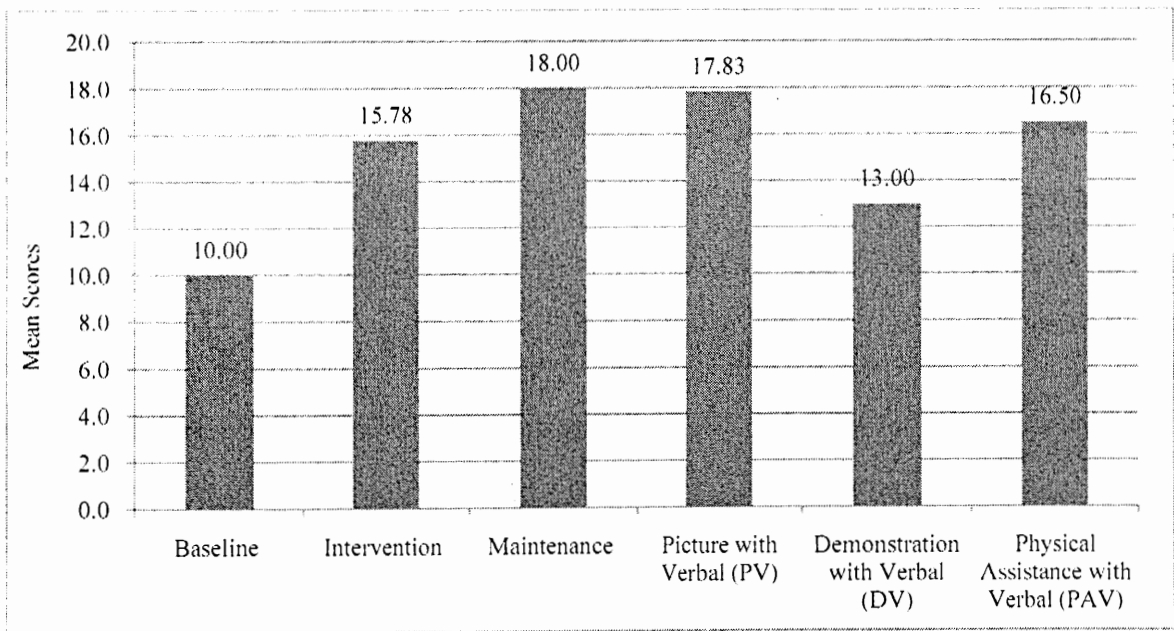
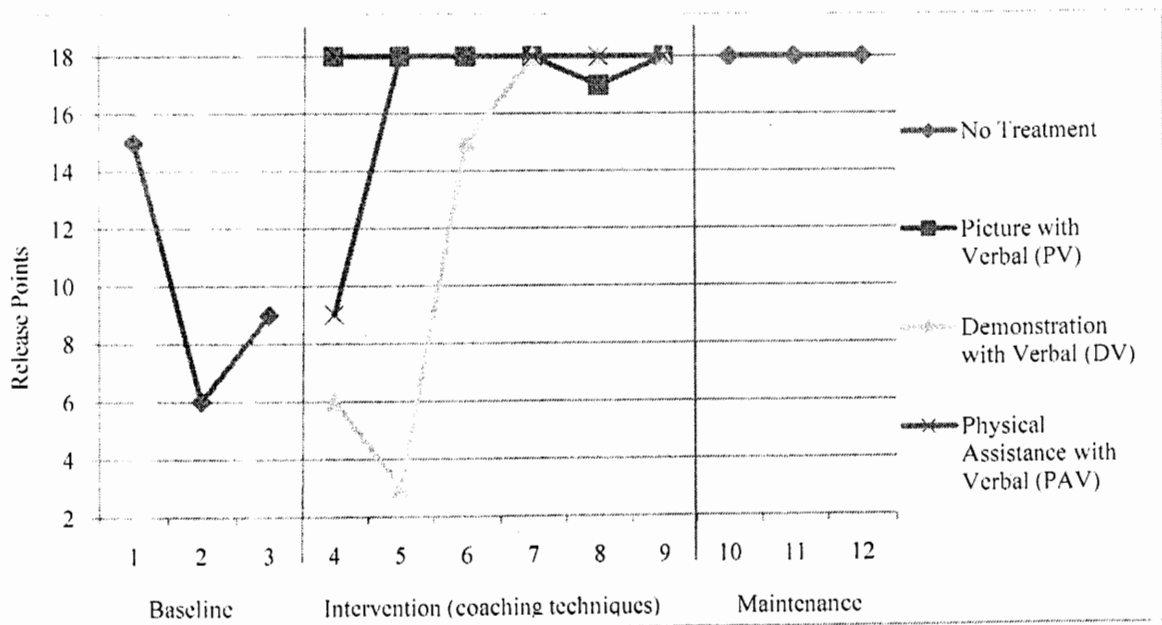


Figure 29. Athlete 8's mean shot put release point scores by phases and specific coaching techniques.

Level. There was no change in shot put release point performance (9.00 pts) from the last data point in the baseline phase to the first data point in the intervention phase (PAV) (see Figure 30).

Trend. The tendency of the data from the baseline to the first intervention phase was in a positive direction. All the coaching techniques during the intervention phase were in a positive direction (see Figure 30).

Latency of change. There was a positive change during the intervention phase for the release point performance. This athlete's performance began to change between the 1st and 2nd week, after five sessions, during the intervention phase. The maintenance phase again indicated continuing high level performance (see Figure 30).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 30. Athlete 8's release point performance by phases and specific coaching techniques

Athlete 8: Shot Put Distance Thrown Results

Athlete 8's shot put distance throws were evaluated based on mean, level, trend, and latency of change. This athlete had an IQ score of 67 (mild ID), autism, and a speech impairment.

Mean. The mean shot put distance thrown during the baseline phase (5.00 m) was slightly greater than the intervention phase (4.80 m). The mean shot put distance thrown using the PV coaching technique was greater (5.01m) than compared to the DV and PAV coaching techniques. The maintenance phase indicated this athlete continued to perform at a high level (see Figure 31).

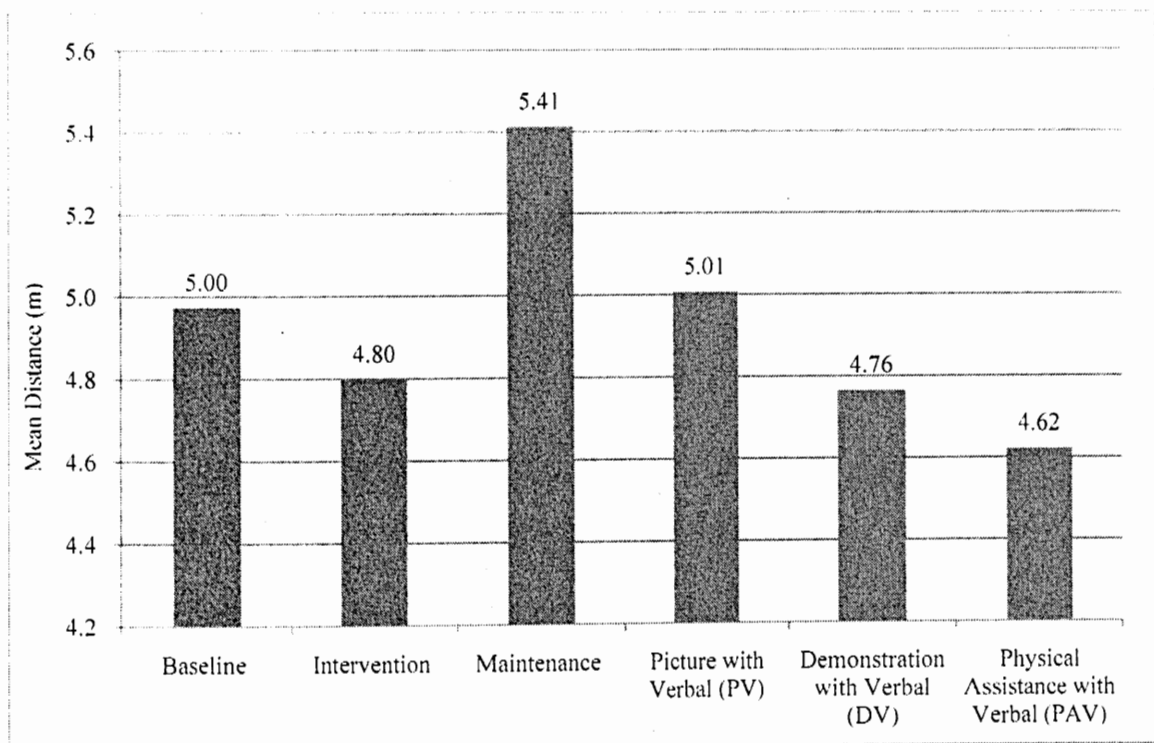
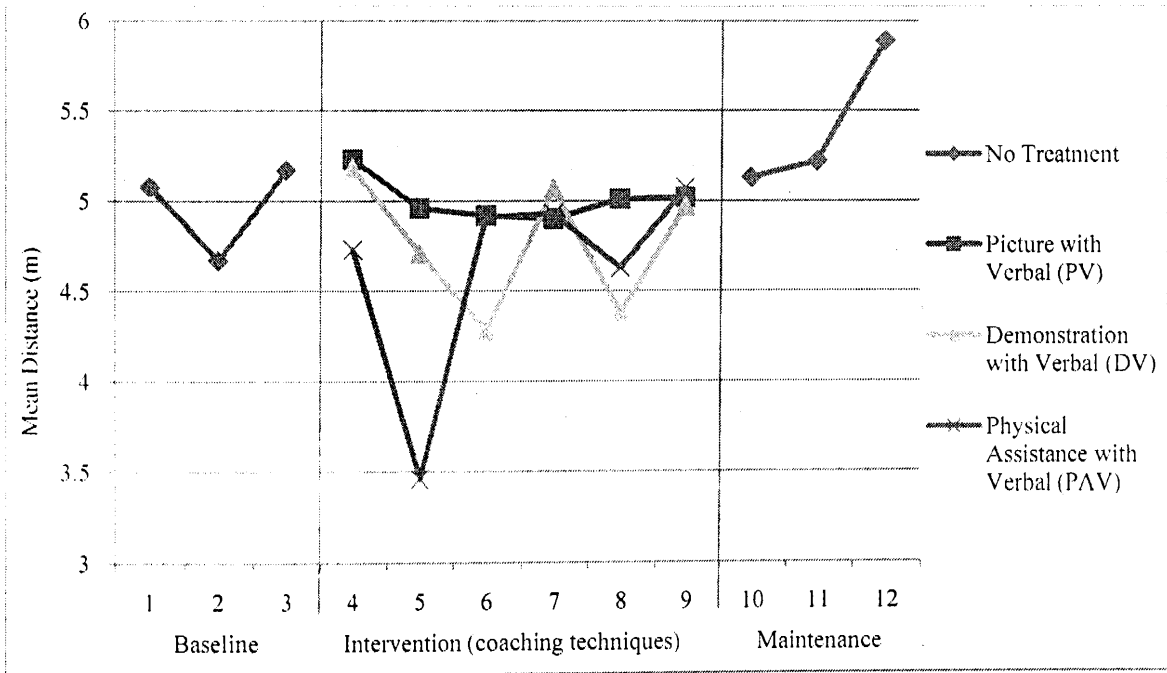


Figure 31. Athlete 8's mean shot put distance thrown by phases and specific coaching techniques.

Level. There was a negative change in shot put distance thrown from the last data point in the baseline phase to the first data point in the intervention phase (PAV). This athlete decreased from 5.17 m to 4.73 m or a magnitude change of 44 cm (see Figure 32).

Trend. The tendency of the data from the baseline to the intervention was in a negative direction. The majority of distances thrown during the intervention phase were in a negative direction except for five coaching techniques sessions (see Figure 32).

Latency of change. There was a decrease from the first intervention session for the distance thrown performance for all coaching techniques. Performance during the maintenance phase again indicated continuing high level performance (see Figure 32).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 32. Athlete 8’s distance thrown by phases and specific coaching techniques.

Athlete 9: Shot Put Release Point Results

This athlete had an IQ score of 68 (mild ID) with learning disabilities. His shot put release point scores were evaluated based on mean, level, trend, and latency of change.

Mean. The mean shot put release point performance during the intervention phase (18.00 pts) was greater than the baseline phase (15.00 pts). All three coaching techniques were at the highest mean shot put release point of performance (18.00 pts) during the intervention phase. The data in the maintenance phase indicated that athlete continued to perform at a high level (see Figure 33).

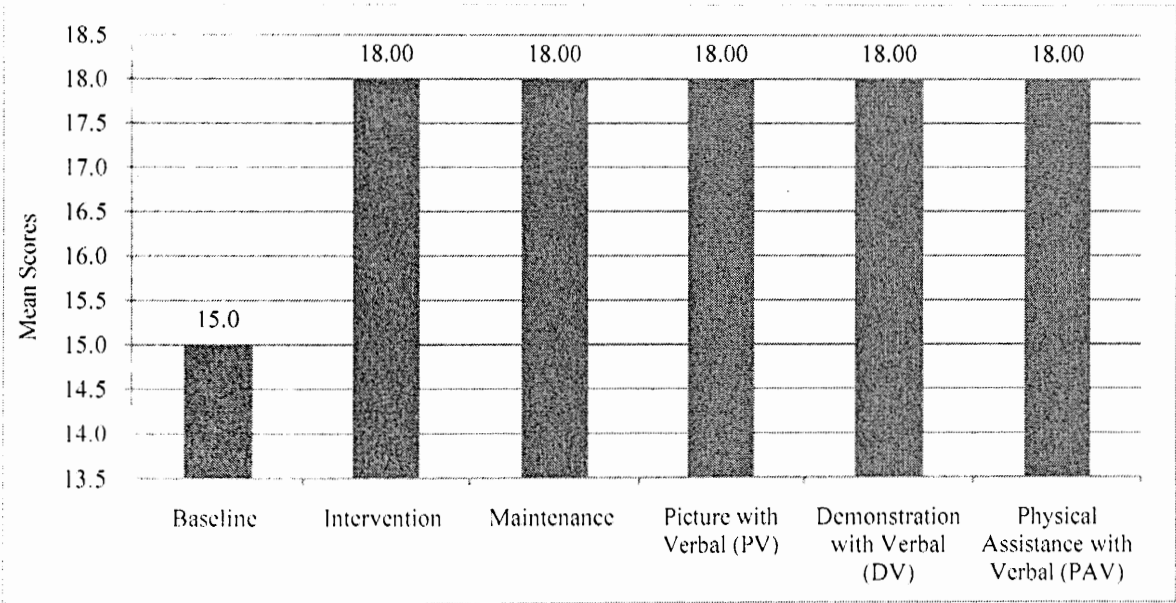


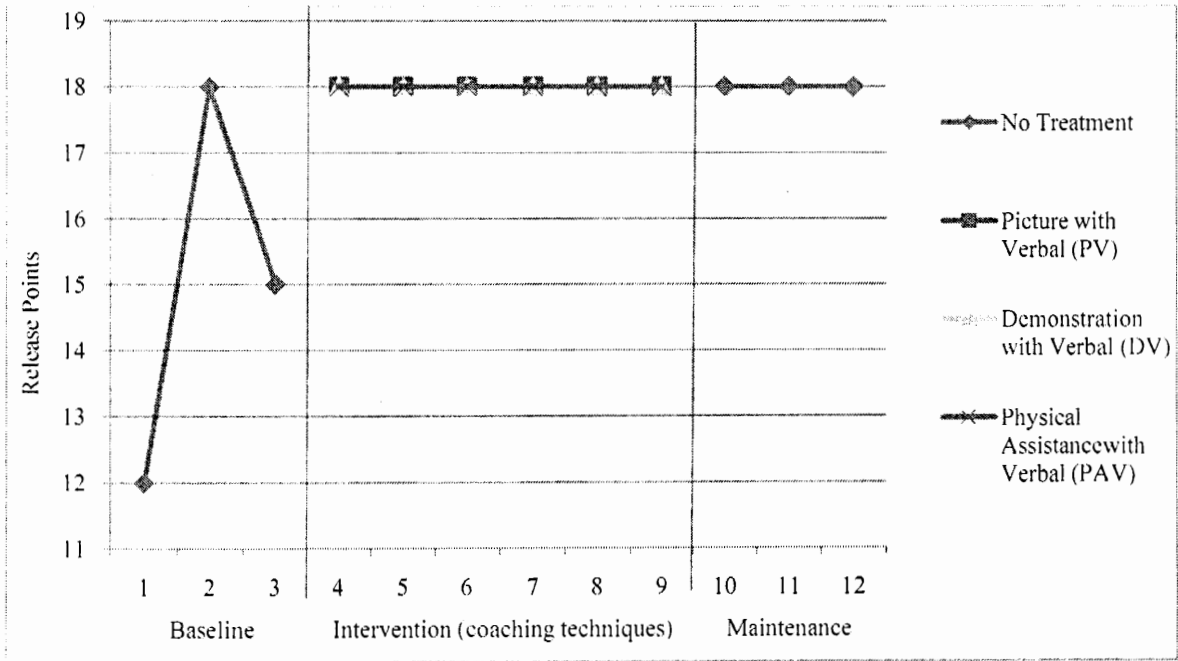
Figure 33. Athlete 9’s mean shot put release point score by phases and specific coaching techniques.

Level. There was an increase in shot put release point performance from the last data point in the baseline phase to the first data point in the intervention phase (DV). This

athlete increased from 15.00 to 18.00 points based on the scoring rubrics or a magnitude change of three points (see Figure 34).

Trend. The tendency of the data from the baseline to the intervention was in a positive direction. All the coaching techniques during the intervention phase were in a positive direction (see Figure 34).

Latency of change. There was an immediate change after the first intervention session for the release point performance. This athlete’s performance began to change from the first coaching session during the intervention phase. The maintenance phase performance indicated this athlete continued to perform at a high level (see Figure 34).



Note 2: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 34. Athlete 9’s release point by phases and specific coaching techniques.

Athlete 9: Shot Put Distance Thrown Results

This athlete had an IQ score of 68 (mild ID) with learning disabilities. Athlete 9’s distance throws were evaluated based on mean, level, trend, and latency of change.

Mean. The mean shot put distance performance during intervention phase (7.43 m) was slightly greater than the baseline phase (7.10 m). The mean shot put distance thrown using the DV coaching technique (7.47 m) was greater than compared to PV and PAV coaching techniques. The maintenance phase for distance thrown indicated this athlete decreased in performance (see Figure 35).

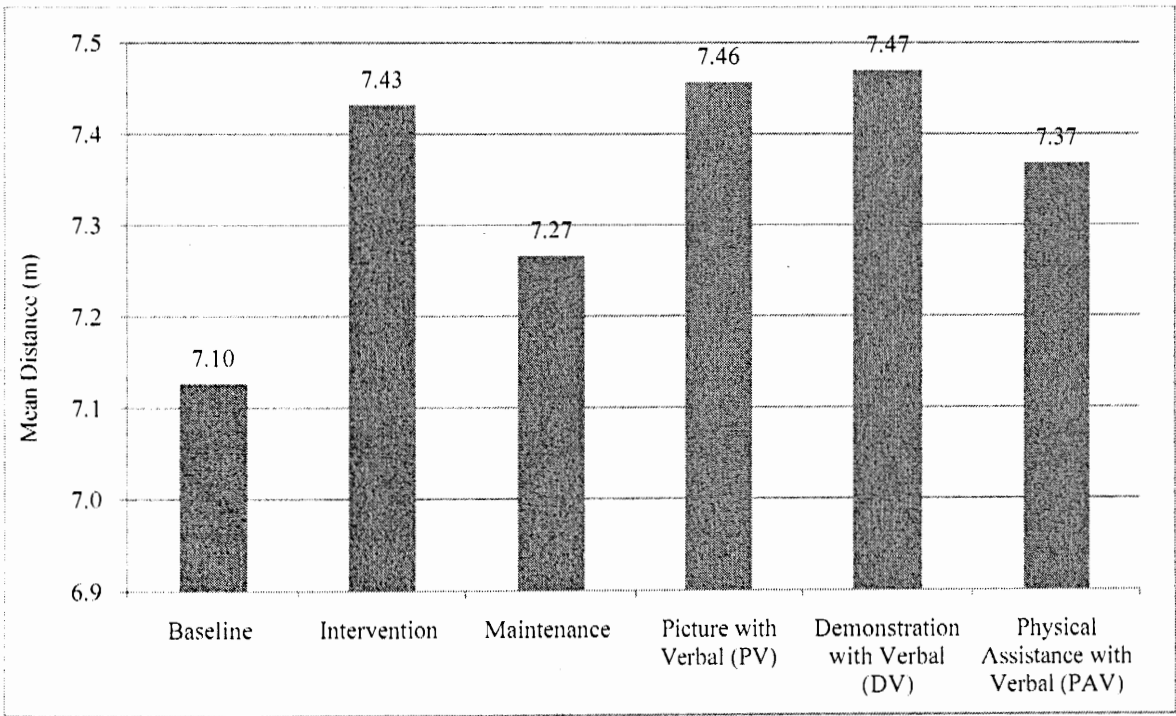


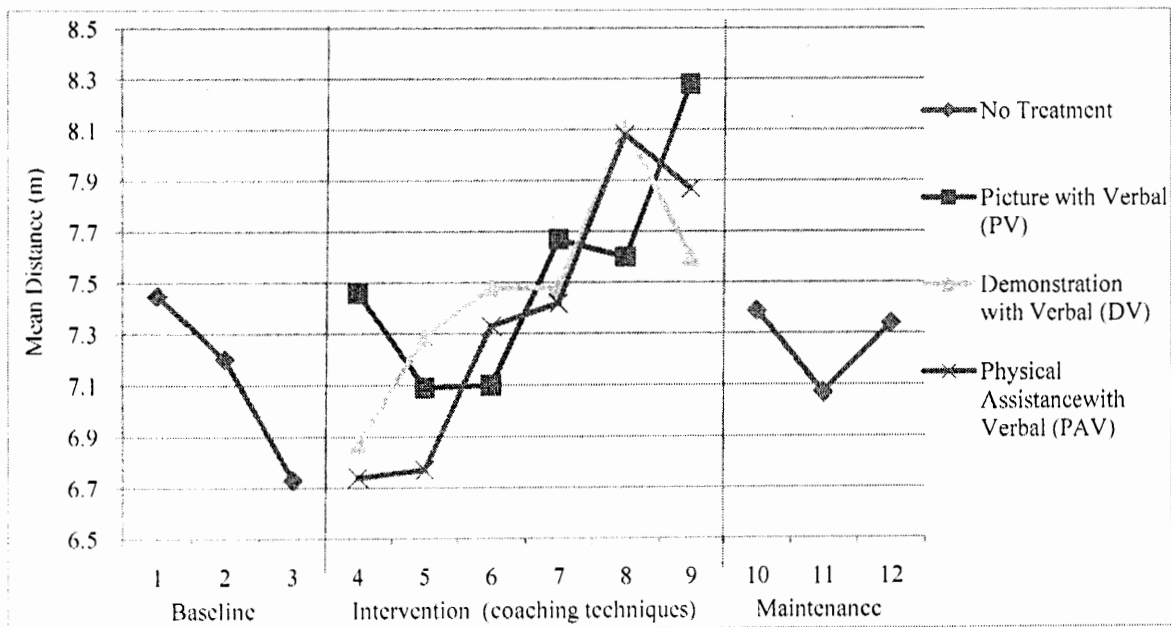
Figure 35. Athlete 9’s mean shot put distance thrown by phases and specific coaching techniques.

Level. There was a slight positive change in shot put distance thrown from the last data point in the baseline phase to the first data point in the intervention phase

(PAV). This athlete increased from 6.73 m to 6.74 m or a magnitude change of 1 cm (see Figure 36).

Trend. The tendency of the data from the baseline to the intervention was in a positive direction. The majority of distances thrown during the intervention phase were in a positive direction except five coaching technique sessions (see Figure 36).

Latency of change. There was an increase change from the first intervention session for the distance thrown performance for PV coaching technique. The PAV coaching technique indicated the shortest distance thrown at the first intervention session. The maintenance phase again indicated decreasing for distance thrown performance (see Figure 36).



Note: Baseline phase by days; intervention phase by weeks (3 days per week); maintenance phase by days

Figure 36. Athlete 9's distance thrown by phases and specific coaching techniques.

Null Hypotheses

The results related to each of the null hypotheses for the dependent variables (i.e., release point and distance thrown) are presented in this section (see Chapter I). The dependent variables were presented according to the independent variables of the three coaching techniques with the following cues: (a) picture with verbal, (b) demonstration with verbal, and (c) physical assistance with verbal.

First Null Hypothesis

To test the first null hypothesis, a one way ANOVA (release point by coaching techniques) was used to analysis the data for each athlete. Results were presented in Table 2 and Appendix H.

Table 2.

One Way ANOVA Release Point by Coaching Techniques

Athlete	PV	DV	PAV	<i>F</i>	<i>P</i>
	Mean (SD)	Mean (SD)	Mean (SD)		
1	17.67 (0.41)	17.83 (0.41)	17.50 (1.22)	0.40	0.70
2	17.50 (1.22)	18.00 (0.00)	17.83 (0.41)	0.70	0.51
3	16.67 (1.50)	13.67 (4.70)	16.33 (2.42)	1.30	0.31
4	16.00 (3.70)	18.00 (0.00)	16.67 (2.42)	0.63	0.55
5	18.00 (0.00)	17.00 (2.45)	17.33 (1.21)	0.63	0.55
6	17.76 (0.00)	17.83 (0.00)	17.50 (2.45)	1.00	0.40
7	16.00 (3.63)	18.00 (0.00)	12.50 (5.60)	2.60	0.11
8	17.83 (0.41)	13.00 (6.80)	16.50 (3.70)	1.90	0.20
9	18.00 (0.00)	18.00 (0.00)	18.00 (0.00)	-	-

* Significant = $\leq .05$

Data from none of the athletes had a statistically significant difference between the three coaching techniques during intervention phase for all nine athletes. Athlete 9's

results indicated a mastery of the release point level while using all three coaching techniques (18.00 out of 18.00 pts). Significance was set at $p \leq .05$.

Second Null Hypothesis

To test the second null hypothesis, a one way ANOVA (distance thrown by coaching techniques) was used to treat the data on each athlete. Results are presented in Table 3 and Appendix I. Significance was set at $p \leq .05$.

Based on the results for athlete 1 there was a significant difference between the three coaching techniques during intervention phase. the results performance of athlete 2 to 9 indicated no significant differences between the three coaching techniques during the intervention phase (see Table 3).

Table 3.

One Way ANOVA Distance Thrown by Coaching Techniques

Athlete	PV Mean (SD)	DV Mean (SD)	PAV Mean (SD)	<i>F</i>	<i>p</i>
1	3.68 (0.34)	3.88 (0.43)	3.32 (0.08)	4.80	0.02*
2	3.33 (0.44)	3.62 (0.34)	3.13 (0.45)	1.94	0.17
3	3.09 (0.13)	3.03 (0.21)	3.02 (0.11)	0.34	0.72
4	6.11 (0.30)	6.31 (0.55)	6.33 (0.65)	0.32	0.73
5	11.14 (0.38)	10.73 (1.30)	11.05 (0.50)	0.42	0.66
6	7.08 (1.16)	7.71 (1.71)	7.12 (1.21)	0.40	0.69
7	4.40 (0.32)	4.26 (0.17)	4.23 (0.36)	0.54	0.59
8	5.01 (0.12)	4.76 (0.37)	4.62 (0.60)	1.36	0.29
9	7.46 (0.44)	7.47 (0.40)	7.37 (0.55)	0.19	0.83

* Significant = $\leq .05$

Third Null Hypothesis

To test the third null hypothesis, a 2 x 2 ANOVA with repeated measures, release point and distance thrown x baseline and maintenance phases, was used to treat the data.

Table 4 reports mean and probability shot put release point and distance thrown between baseline and maintenance phases between athletes. A significant difference between the baseline and the maintenance phase for shot put release point and shot put distance was indicated. Athletes improved 10.74 pts (baseline) to 17.92 pts (maintenance) and distance thrown from 5.61 m (baseline) to 6.40 m (maintenance).

Table 4.

The Shot Put Release Point and Distance Thrown Between Baseline and Maintenance Phases

Dependent variables	Phase	Mean	<i>F</i>	<i>p</i>
Release Point	Baseline	10.74	25.131	0.001*
	Maintenance	17.92		
Distance (m)	Baseline	5.61	6.545	0.034*
	Maintenance	6.40		

* Significant = $\leq .05$

Summary

Results of data analysis related to the effect of using three different coaching techniques on shot put release point and distance thrown can be summarized as follows: (a) based on observational analysis of the data, and (b) based on statistical treatment of the data.

Based on the observational analysis of the data:

1. All 9 athletes were able to maintain mastery level 100% (18.00 out of 18.00 pts) of shot put release point during the maintenance phase.

2. All 9 athletes showed improvement in the shot put release point during the intervention phase compared to the baseline phase.
3. Athlete 9 showed improvement and maintained mastery level in his shot put release point by using the three different coaching techniques.
4. Four athletes (44.4 %) showed improvement in their shot put release point by using PV coaching techniques and four athletes (44.4 %) showed improvement in their shot put release point by using DV coaching techniques.
5. Eight out of nine athletes (88.9 %) were able to maintain a higher mean shot put release point during the maintenance phase compared to baseline (range 3 to 18.00 pts).
6. Four athletes out of nine (44.4 %) showed slight shot put distance thrown improvement during the intervention phase compared to the baseline phase (range 3.20 to 7.43 m).
7. Four athletes (44.4 %) showed improvement in their throwing distance by using PV coaching techniques (range 3.09 to 11.14 m); four athletes (44.4 %) in their throwing distance by using DV coaching techniques (range 3.62 to 7.71 m); and one athlete (11.1%) in his throwing distance by using PAV coaching techniques.

Based on the statistical treatment of the data:

8. There was no significant difference in the shot put release point using three coaching techniques during the intervention phase.

9. There was no significant difference in the shot put distance thrown using three coaching techniques in the intervention phase for eight athletes. Athlete 1 indicated significant difference in the shot put distance thrown during three coaching techniques in the intervention phase ($p = 0.02$)
10. There was a significant difference between the baseline and maintenance phases for shot put release point ($p = 0.001$) and distance thrown for all athletes ($p = 0.034$).

CHAPTER V

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this investigation was to examine the effects of three coaching techniques using the following cueing: (a) picture with verbal (PV), (b) demonstration with verbal (DV), and (c) physical assistance with verbal (PAV) on the shot put release point and distance thrown by male athletes with mild through moderate intellectual disabilities (ID). This chapter is presented under the following headings: (a) Discussion, (b) Conclusions, and (c) Recommendations.

Participants were 9 male athletes, from a high school in the North Texas region (six athletes with a mild ID and three with a moderate ID). An alternating treatment design with baseline, intervention, and maintenance phases was used (Horner, et al., 2005; Portney & Watkins, 2008). Observational and statistical analysis (ANOVA) were used to analyze data. Baseline and maintenance phases were three sessions each; while the intervention phase was 18 sessions (3 days per week for 6 weeks). Six trials per day for each of the three different coaching techniques were implemented during intervention and the maintenance phase was conducted 2 weeks following intervention.

Discussion

The study was designed to determine if three different coaching techniques would effect the shot put performance of athletes with mild through moderate ID. The results of the study clearly documented that performance of shot put release point and distance

thrown were affected. All 9 athletes were able to maintain the highest level of performance for the shot put release point during the maintenance phase which followed the intervention phase. Specifically, it appeared that two coaching techniques had the greatest influence on this performance documented in the maintenance phase. Four athletes showed improvement in their shot put release point performance when provided the picture with verbal coaching technique and four different athletes showed improvement in their shot put release point performance when given the demonstration with verbal coaching technique. These two techniques could be considered modeling which is supported in the literature related to instructional effectiveness.

While not directly applied to coaching, modeling the appropriate skill has been reported to improve performance and instructional effectiveness (Bandura, 1977; Kerr & Nelson, 1989; Morgan & Jensen, 1988; Schumaker et al., 1983; Yoder & Forehand, 1974). Apparently, within the current study the picture with verbal and demonstration with verbal techniques were more effective than physical assistance with verbal for release point performance. All athletes responded with better performances using a visual cue from the researcher than when a physical assist was used. Modeling is considered a higher ordered cue within the hierarchy of cueing model (Dunn, 1989). According to the hierarchy of cueing model, the progression of cueing is verbal, model, and physical assist. These athletes appeared to be able to process and interpret visual cues (either static with a picture or dynamic with a demonstration) better than physical assistance cues. While not a finding from this study but offered as a discussion point, coaches might

consider both forms of modeling using visual cueing during training sessions. If static and/or dynamic modeling is not being used then it should be brought into the coaches' techniques more frequently. If these two cues are being used then perhaps they should be emphasized more by the coach of athletes with an ID.

Athletes receiving physical assistance experienced a decrease or had no change from baseline to intervention phase for release point performance. Coaches should consider using techniques that produce the best performance from their athletes (i.e., a decision using visual or physical assistance techniques). The athletes within this study could process information at a higher level of cueing (i.e., visual) and maintain performance beyond the conclusion of the intervention phase.

The other shot put performance being investigated was the distance of the throw. This research was interested in the effects of the same three coaching techniques on the change in how far the athlete threw the shot put. Once again, the same two coaching techniques using modeling (picture with verbal and demonstration with verbal) impacted the distance thrown performance. Eight out of 9 athletes were able to maintain a higher mean shot put distance thrown after the intervention and the maintenance phase. Use of demonstration techniques was supported by Perez-Turner (2005) studying athletes with a moderate ID, when demonstration (e.g., a form of modeling) was more effective than physical assistance in skill acquisition and generalization. The use of demonstration by an instructor or a coach allows students or athletes to view and hear (i.e., visual and auditory input) the desired skill or movement. Coaches of athletes with an ID can use this

technique to provide the athletes with a better understanding and reference regarding their shot put performance.

While it recognized that a combination of using a picture with a demonstration was beyond the scope of this study such a combined cue might have had a greater effect on athletes with an ID. By combining a static (picture) with a dynamic (demonstration) modeling cue in the same coaching technique might provide the athlete with a more lasting image. The combination of picture and demonstration as a single coaching technique is worth considering for further research. It would appear that combining these two techniques might help address efficiency of practice time.

Paivio (1986) suggested that there could be two sensory input channels for information processing by using visual cue (picture or demonstration) with verbal input from the coach. The auditory channel is responsible for verbal input processing and the visual channel is responsible for pictorial representations processing. By using both channels in that investigation instead of one, an instructor could decrease the cognitive load of information and increase the working memory resources (Mayer & Moreno, 2003; Mousavi, Low, & Sweller, 1995). Coaches of athletes with moderate ID may need to consider modifying or using different techniques that utilize a specific sensory input system (i.e., cues that use picture and demonstration combined with auditory) and at the same time pay attention to the amount of information provided to the athlete during any one coaching session (Hoove & Horgan, 1990).

The shorter amount of instructional time spent teaching/coaching individuals with a mild through moderate ID can result in desired performance (Alberto & Trountman, 2006; Temple & Walkley, 1999). Coaches of athletes with ID might need to consider the category of ID (i.e., mild, moderate) and the athletes' learning time when planning efficient practice sessions. Within this study the coaching techniques that involved a picture with verbal and demonstration with verbal resulted in the shortest amount of time to change performance in a positive direction. The use of picture with verbal and demonstration with verbal impacted a positive change in both shot put release point and distance thrown. Three athletes demonstrated positive change in both performances after one session as evidenced by latency of change. It would appear that using coaching techniques that bring about a positive change in performance within the shortest amount of time, would contribute to an efficient practice session. According to Sanchez (1999), the time required for individuals with moderate ID to master a gross motor skill ranged from 60 to 80 min which is 45.43 % more time than individuals without ID. Coaches of athletes with an ID need to plan their practice sessions with this in mind.

Surprisingly, the athletes' performance did not return to the baseline level once the interventions were withdrawn as expected when implementing an alternative treatment design (Satake, Jagaroo, & Maxwell, 2008). In fact, all athletes' performances maintained above baseline performance for both dependent variables (e.g., release point and distance thrown). Speculation would be that learning had taken place, since the maintenance phase was observed 2 weeks following the completion of the intervention

phase without any known practice. Coaches of athletes with an ID should consider how their athletes learn and what coaching method brings about sustainable desired performance. When considering those athletes with an ID, alternative cueing should be applied related to cognitive function. The coach should make sure he or she clearly understands the intellectual abilities associated with each level of intellectual quotient (i.e., mild with 50-69 IQ). Performance (i.e., outcomes) will be dependent on aligning the proper coaching technique (e.g., use of appropriate cues) with level of intelligence (*Special Olympics Coaching Guide*, 2003). Within this study, release point performances were measured using a three point rubric that could have created scores reflective of a ceiling effect.

The scoring rubric for release point may not have been sensitive enough to address the ceiling (i.e., scoring from 0 to a maximum of 3 points per performance). It is possible these athletes could have shown a higher level of performance and skill acquisition had the rubrics been designed with greater specificity (i.e., additional points for hand and finger position at and following release point) which was not measured. Future research should consider this limitation and use a more sensitive measurement scale.

The current investigation could not provide quantifiable information to identify which coaching technique was more effective on either shot put performance. Individual one way ANOVAs were performed on each athlete to determine if a statistically significant difference existed between the two dependent variables and the three coaching

techniques; no differences were identified for 8 of the 9 athletes (see Chapter 4) [Satake, Jagaroo, & Maxwell, 2008].

A two way ANOVA with repeated measure (release point and distance x baseline and maintenance phases) was conducted (Portney & Watkins, 2008) and a significant difference was identified (see Chapter 4). It would appear that two coaching interventions positively impacted learning, however, the researcher could not identify which specific technique was related to the change; more research is needed. While it was documented that both performances (release point and distance thrown) maintained or continued to improve from baseline through the maintenance phase, an additional generalization phase might have provided an explanation (Horner, et al., 2005). A generalization phase implemented 2 to 3 weeks after the maintenance phase might have demonstrated sustainable results and provided more information on the athletes' ability to learn from the interventions.

Conclusions

Within the limitations of this investigation, four conclusions can be made:

1. Coaching techniques positively influenced shot put release point and distance thrown during intervention.
2. Some coaching techniques appeared to result in quicker changes of performance (latency of change) according to category of ID. Athletes with a mild ID demonstrated shorter time frames for increasing release point and distance thrown compared to athletes with a moderate ID.

3. The coaching techniques positively effected shot put performance over time. All athletes improved or maintained their performance from baseline through maintenance phase.
4. The coaching techniques may have impacted learning as performance continued at a higher level 2 weeks after the conclusion of the study.

Recommendations

The following recommendations are suggested for further investigations:

1. Determine if similar results would occur when female athletes with ID are included.
2. Use research designs that incorporate a larger sample size to determine the effect of individual coaching techniques on athletes' performance. Larger sample size would allow for the generalization of the finding within this population.
3. Conduct kinematic studies to consider the effect of coaching techniques on angle of release, height of release, and speed of release.

REFERENCES

- A guide to disability rights laws (2005). Retrieved September 5, 2010, from: <http://www.ada.gov/cguide.pdf>.
- Agran, M., Cavin, M., Wehmeyer, M., & Palmer, S. (2006). Participation of students with moderate to severe disabilities in the general curriculum: The effects of the self-determined learning model of instruction. *Research and Practice for Persons with Severe Disabilities*, 31, 230-241.
- Alberto, A., Cihak, F., & Gama, I. (2005). Use of static picture prompts versus video modeling during simulation instruction. *Research in Developmental Disabilities*, 26, 327-339.
- Alberto, P., & Troutman, A. (2006). *Applied behavior analysis for teachers* (7th ed.). Upper Saddle River, NJ: Merrill Prentice Hall.
- Algozzine, B., & Ysseldyke, J. (2006). *Teaching students with mental retardation: A practical guide for every teacher*. Thousand Oaks, CA: Corwin.
- American Association on Mental Retardation (AAMR). (2002). *Mental retardation: definition, classification, and system of support* (10th ed.). Washington, DC: Author.
- American Sport Education Program. (2008). *Coaching youth track and field*. Champaign, IL: Human Kinetics.
- Baker, J. (2003). *Social skills training: For children and adolescents with Asperger Syndrome and social-communication problems*. Shawnee Mission, KS: Autism Asperger.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bates, E., Cuvo, T., Miner, A., & Korbeck, A. (2001). Simulated and community-based instruction involving persons with mild and moderate mental retardation. *Research in Developing Disabilities*, 22, 95-115.
- Baturay, H. (2008). Characteristics of basic instructional design models. *Ekev Academic Review*, 12(34), 471-482.

- Block, M. (2005). *A teacher's guide to including students with disabilities in general physical education* (3rd ed.). Baltimore, MD: Brookes.
- Bondy, A., & Frost, L. (2001). *A picture's worth: PECS and other visual communication strategies in autism*. Bethesda, MD: Woodbine House.
- Bowerman, W., & Freeman, W. (1990). *High-performance training for track and field* (2nd ed.). Champaign, IL: Leisure Press.
- Browder, M., Wakeman, S., Flowers, C., Rickelman, J., Pugalee, D., & Karvonen, M. (2007). Creating access to the general curriculum with links to grade-level content for students with significant cognitive disabilities: An explication of the concept. *Journal of Special Education, 41*, 2-16.
- Browder, M., Wakeman, S., Spooner, F., Ahlgrim-Dezell, L., & Algozzine, B. (2006). Research in reading instruction for individuals with significant cognitive disabilities. *Exceptional Children, 72*, 392-408.
- Carr, G. (2004). *Sport mechanics for coaches* (2nd ed.). Champaign, IL: Human Kinetics.
- Caso, L., Vrij, A., Mann, S., & De Leo, G. (2006). Deceptive responses: The impact of verbal and non-verbal countermeasures. *Legal and Criminological Psychology, 11*(1), 99-111.
- Chen, S., Lange, E., Miko, P., & Zhang, J. (2001). Progressive time delay procedure for teaching motor skills to adults with severe mental retardation. *Adapted Physical Activity Quarterly, 18*(1), 35-48.
- Cihak, F., Alberto, A., Kessler, K., & Taber, A. (2004). An investigation of instructional scheduling arrangements for community-based instruction. *Research in Developmental Disabilities, 25*, 67-88.
- Cihak, D., Alberto, A., Taber-Doughty, T., & Gama, I. (2006). A comparison of static picture prompting and video prompting simulation strategies using group instructional procedures. *Focus on Autism and Other Developmental Disabilities, 21*(2), 89-99.
- Čoh, M., Supej, M., Štuhec, S., & Smajlovi, N. (2007). Biodynamic analysis of the rotational shot put technique. *Track Coach, 18*(1), 5769-5775.

- Collins, B., Branson, T., Hall, M., & Rankin, S. (2001). Teaching secondary students with moderate disabilities in an inclusive academic classroom setting. *Journal of Developmental and Physical Disabilities*, 13(1), 41-59.
- Council for Exceptional Children. (2003). *What every special educator must know: The standards for preparation and licensure of special educators* (5th ed.). Arlington, VA: Author.
- Dever, R., & Knapczyk, D. (1997). *Teaching persons with mental retardation: A model for curriculum development and teaching*. Boston, MA: McGraw Hill.
- Dunn, F. (1989). *Special physical education: Adapted, individualized, developmental* (6th ed.). Dubuque, IA: Brown.
- Dunn, G. (1989). *The shot put* (2nd ed.). In V. Gambetta (Ed.), *Track and field coaching manual* (pp.153- 164) Champaign, IL: Leisure Press.
- Dunn, J., Morehouse, W., & Bud Frederichs, D. (1986). *Physical education for the severely handicapped: A systematic approach to a data based gymnasium*. Austin, TX: Pro.ed.
- Eichstaedt, B., & Lavay, L. (1992). *Physical activity for individuals with mental retardation: Infance through adulthood*. Champaign, IL: Human Kinetics.
- Eichstaedt, B., Wang, Y., Polacek, J., & Dohrmann, F. (1991). *Physical fitness and motor skill levels of individuals with mental retardation: Mild, moderate, and individuals with Down syndrome: ages 6 to 21*. Normal, IL: Illinois State University Printing Services.
- Foreman, K. (1982). *Coaching track and field techniques* (4th ed.). Dubuque, IA: Brown.
- Frossard, L., Smeathers, J., O'Riordan, A., & Goodman, S. (2007). Shot trajectory parameters in gold medal stationary shot-putters during world-class competition. *Adapted Physical Activity Quarterly*, 24, 317-331.
- Foss, G., Auty, P., & Irvin, K. (1988). A comparative evaluation of modeling, problem-solving, and behavior rehearsal for teaching employment-related interpersonal skills to secondary students with mental retardation. *Education and Training for the Mentally Retarded*, 17-27.
- Graziand, A. (2002). *Developmental disabilities*. Boston, MA: Allyn and Bacon.

- Heward, L., & Orlansky, D. (1998). *Exceptional children: An introductory survey of special education* (4th ed.). Columbus, OH: Charles E. Merrill.
- Hill, J. (1982). Toward generalization of appropriate leisure and social behavior in severely handicapped youth: pinball machine use. *Research & Practice for Persons with Severe Disabilities*, 6(4), 38-44.
- Hoove, H., & Horgan, S. (1990). Short-term memory for motor skills in mentally retarded persons: Training and research issues. In G. Reid (Ed.), *Problems in movement control* (pp. 217-239). Amsterdam: North-Holland.
- Horner, H., Carr, G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*, 71(2), 165-179.
- International Association of Athletics Federations World Youth Championships. (2009). Ryan Crouser. Retrived October 11, 2009 from <http://www.zimbio.com/pictures/-ReEWlkgg4/IAAF+World+Youth+Championships+Day+Four/TusE9ewOcwN/Ryan+Crouser>.
- Kazdin, E. (2002). *Research design in clinical psychology* (4th ed.) Boston: Allyn & Bacon.
- Kerr, M., & Nelson, M. (1989). *Strategies from managing behavior problems in classroom* (2nd ed.). Columbus, OH: Merrill.
- Krebs, L. (2005). Intellectual disabilities (4th ed.). In J. Winnick (Ed.), *Adapted physical education and sport* (pp. 134-153). Champaign, IL: Human Kinetics.
- Korinek, L., & Polloway, A. (1993). Social skills: Review and implications for instruction for students with mild mental retardation. In R. A. Weber & S. F. Gable. (Eds.), *Strategies for teaching students with mild to severe mental retardation* (pp. 71-97). Baltimore: Paul H. Brookes.
- Lehr, D. (1985). Effect of opportunities to practice on learning among students with sever handicaps. *Education and Training of the Mental Retardation*, 20(4), 268-274.
- Linthorne, N. (2001). Optimum release angle in the shot put. *Journal of Sports Sciences*, 19(5), 359-372.

- Luckasson, R., Schalock, L., Snell, E., & Spitalnik, D. (1996). The 1992 AAMR definition and preschool children: A response from the Committee on Terminology and Classification. *Mental Retardation*, 34, 247-253.
- Luftig, R. (1987). *Teaching the mental retardation students: Curriculum, methods, and strategies*. Newton, MA: Allyn & Bacon.
- Magill, A. (1993). Modeling and verbal feedback influences on skill learning. *International Journal of Sport Psychology*, 24, 358-369.
- Mayer, E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational Psychologist*, 38, 43-52.
- McCullagh, P., & Weiss, R. (2001). Modeling: Considerations for motor skill performance and psychological responses. In R. Singer, H. Hausenblas, & C. Janelle (Ed.), *Handbook of sport psychology* (pp. 205-238). New York: Wiley.
- McDonnell, J., Horner, H., & Williams, A. (1984). Comparison of three strategies for teaching generalized grocery purchasing to high school students with severe handicaps. *The Journal of the Association for Person with Severe Handicaps*, 9, 123-133.
- McDonnell, J., Johnson, W., Polychronis, S., & Risen, T. (2002). Effects of embedded instruction on students with moderate disabilities enrolled in general education classes. *Education and Training in Mental Retardation and Developmental Disabilities*, 37, 363-377.
- Metzler, M. (2005). *Instructional models for physical education* (2nd ed.). Scottsdale, AZ: Holcomb Hathaway.
- Morgan, P., & Jensen, R. (1988). *Teaching behaviorally disordered students preferred practices*. Columbus, OH: Merrill.
- Mousavi, Y., Low, R., & Sweller, J. (1995). Reducing cognitive load by mixing auditory and visual presentation modes. *Journal of Educational Psychology*, 87, 319-334.
- Newell, M. (1981). Skill learning. In D. Holding (Ed.), *Human skills* (pp. 203-226). New York: Wiley.
- Paivio, A. (1986). *Mental representation: A dual-coding approach*. New York: Oxford University Press.

- Peres-Turner, G. (2005). *Effects of three instructional schedules on skill acquisition and generalization in the use of two-way radios to report task completion by high school students with moderate intellectual disabilities* (unpublished Doctoral dissertation). University of Central Florida, Orlando.
- Portney, L., & Watkins M. (2008). *Foundation of clinical reseach* (3rd ed.). Upper Saddle River, NY: Prentice Hall.
- Richards, B., Taylor, L., Ramasamy, R., & Richards, Y. (1999). *Single subject research: Applications in educational and clinical settings*. San Diego, CA: Singular.
- Rimer, H., & Braddock, D., & Fujiura, G. (1993). Prevalence of obesity in adults with mental retardation: Implications for health promotion and disease prevention. *Mental Retardation*, 31(2), 105-110.
- Saloviita, T., & Tuulkari, M. (2000). Cognitive-behavioural treatment package for teaching grooming skills to a man with an intellectual disability. *Scandinavian Journal of Behaviour Therapy*, 29(3/4), 140-147.
- Sanchez, C. (1999). *Instructional time necessary to learn a tennis forehand groundstroke for children with and without moderate mental retardation* (unpublished Master thesis). Texas Woman's University, Denton.
- Santake, E., Jagaroo, V., & Maxwell, D. (2008). *Handbook of statistical methods. Single subject design*. San Diego, CA: Plural Publishing.
- Sass, E. (2001). *Mental Retardation: Typical Characteristics*. Retrieved October 5, 2009 from <http://www.cloudnet.com/%7Eedrbsass/mrcharacteristics.htm>.
- Savner, L., & Myles, S. (2000). *Making visual supports work in the community: Strategies for individuals with autism and Asperger syndrome*. Shawnee Mission, KS: Autism Asperger.
- Schumaker, B., Pederson, S., Hazel, S., & Meyen, L. (1983). Social skills curricula for mildly handicapped adolescents. *Exceptional children*, 16(4), 1-16.
- Sherrill, C. (2004). *Adapted physical activity, recreation, and sport* (6th ed.). New York: McGraw Hill.

- Smith, T., DeMarco, J., & Worley, M. (2009). *Literacy beyond picture books: Teaching secondary students with moderate to severe disabilities*. Thousand Oaks, CA: Corwin.
- Smith, T., Polloway, E., Patton, J., & Dowdy, C. (2008). *Teaching students with special needs in inclusive setting* (5th ed.). Boston, MA: Pearson.
- Special Olympics. (2010). Retrieved January 7, 2010, from <http://www.specialolympics.org>.
- Special Olympics Coaching Guide: Principle of Coaching. (2003). Retrieved February 1, 2010, from: <http://www.somo.org/Document.Doc?id=59>
- Stancliffe, J., Jones, E., Mansell, J., & Lowe, K. (2008). Active support: A critical review and commentary. *Journal of Intellectual & Developmental Disability*, 33(3), 196-214.
- Tankersley, M., Harjusola-Webb, S., & Landrum, T. (2008). Using single-subject research to establish the evidence based of special education. *Intervention in School and Clinic*, 44 (2), 83-90.
- Taylor, L., Richards, B., & Brady, P. (2005). Education, psychological, and behavioral characteristics. In V. Lanigan (Ed.) *Mental retardation. Historical perspectives, current practices and future directions* (pp. 166-198). Boston: Pearson.
- Temple, V., & Walkley, J. (1999). Academic learning time -- physical education (ALT-PE) of students with mild intellectual disabilities in regular Victorian schools. *Adapted Physical Activity Quarterly*, 16(1), 64-74.
- Thomas, E. (1996). *Teaching students with mental retardation*. Englewood Cliffs, NY: A Simon & Schuster.
- Tiong, J., Blampied, M., & Le Grice, L. (1992). Training community-living, intellectually handicapped people in fire safety using video prompting. *Behavior Change*, 9, 65-72.
- Wehmeyer, L. (2006). Universal design for learning, access to the general education curriculum and students with mild mental retardation. *Exceptionality*, 12, 225-235.
- Wetzel, D., Radtke, H., & Stern, W. (1994). *Instructional effectiveness of video media*. Hillsdale, NJ: Lawrence Erlbaum.

- Wolery, M., Ault, M., Gast, D., & Doyle, P. (1990). Comparison of constant time delay and the system of least prompts in teaching chained tasks. *Education & Training in Mental Retardation*, 25(3), 243-257.
- World Health Organization. (1993). *International statistical classification of diseases and related health problems* (10th ed.). Geneva: Author.
- World Health Organization. (2008). *Mental Health and Substance Abuse*. Retrieved February 1, 2010, from <http://www.searo.who.int/en/Section1174/Section1199/Section1567/Section18258084.htm>.
- Yelon, L. (1996). *Powerful principles of instruction*. White Plains, NY: Longman.
- Yoder, P., & Forehand, R. (1974). Effects of modeling and verbal cues upon concept acquisition of nonretarded and retarded children. *Education and Training in Mental Retardation*, 78(5), 566-570.
- Young, M., & Li, L. (2005). Determination of critical parameters among elite female shot putters. *Sports Biomechanics*, 4(2), 131-148.
- Zhan, SU., & Ottenbacher, J. (2001). Single subject research designs for disability research. *Disability and Rehabilitation*, 23(1), 1-8.

Appendix A

Consent to Participate in Research

TEXAS WOMAN'S UNIVERSITY
CONSENT TO PARTICIPATE IN RESEARCH

Title: The Effect of Different Coaching Techniques on the Shot Put Release Point of Athletes with Intellectual Disabilities.

Principal Investigator (PI): Hisham Mughrabi..... 940-230-4515
Advisor: Ronald Davis, Ph.D..... 940- 898-2589

Explanation and purpose of the research

Your child is being asked to participate in a research study conducted by Hisham Mughrabi for the completion of dissertation.

The purpose of this study is to determine the effect of using three different coaching techniques on shot put release point for athletes with moderate to mild intellectual disabilities (ID). Athletes with ID have delays in their motor and physical performance because of the limited attention to the skill or the task that is given to them by their coach or teacher. Athletes with ID want to improve skills and their coaches should consider alternative methods to meet these goals. Athletes with ID cognitively learn slowly and process less information and need alternative coach techniques. This research will apply three different coaching techniques to determine which technique will provide the coach with the best results on the shot put point of release. The three coaching techniques are the use of: (1) picture and verbal, (2) demonstration and verbal, and (3) physical assistance and verbal.

Research procedures

Ten athletes will participate in the study. This data will be collected during three phases of performance: (a) baseline, (b) intervention, and (c) generalization. Participants in this study must meet the following inclusion criteria: (a) recognized as official Special Olympics (SO) athletes with moderate to mild ID, (b) between 14 to 19 years of age, (c) have no sensory deficits, (d) enrolled in high school, and (e) have competed in the shot put event at least one time in the past year with SO.

An alternating treatment design will be used in this study and has three phases: baseline, intervention, and generalization. This design will be used to determine the effect of using three different coaching techniques on the shot put release point for athletes with ID.

Baseline phase: No special technique will be given to athletes in this phase. The principal investigator (PI) will ask the athletes to "throw the shot put." The baseline phase will be for 6 performance days. Maximum score for each day could be 30 points. All performances will be digitally recorded and scored at a later time by the PI.

Intervention phase: The three different coaching techniques will be randomly assigned. Each day the athlete will pick one number from a hat that represents a different coaching technique: (1)



Parents/guardians
Page 1 of 3

picture and verbal, (2) demonstration and verbal, and (3) physical assistance and verbal.

Generalization phase: Two weeks after finishing the intervention phase, the PI will start the generalization phase in a different environment (i.e. indoor gym) to check if the same results occur by applying the same baseline phase.

Total time commitment will be 300 minutes.

The PI will lead the coaching techniques. Athletes will be throwing the shot put 10 times each day. All trials will be recorded on Sony Mini DVs. Each performance day will take 10 minutes to practice throwing the shot put using each coaching technique. The purpose of videotaping your child is to allow the PI to view the shot put release point with slow motion for scoring purposes. The media release form is to inform you that your child will be videotaped for scoring purposes only. The PI will instruct each athlete separately from other athletes and groups. The PI will not list your child's name on the scoring rubrics. A code number in each scoring rubric will be used instead of your child's name for identification privacy. Your child will be allowed to drop out of the study at any time without any penalty.

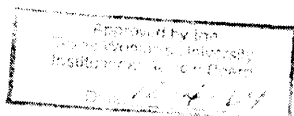
Potential Risks

The risks involved in this study are loss of confidentiality, loss of anonymity, coercion, emotional discomfort, and loss of time. Confidentiality will be protected to the extent that is allowed by law. All PI data will be stored in a locked filing cabinet in the investigator's office. There is a potential risk of loss of confidentiality in all email, downloading, and internet transactions. The PI and SO coach are the only persons who know the identification of your child by name. The computer where your child's data will be stored will be password protected and the data cannot be accessed by anyone else. The data will be erased and hard copies of the scoring rubric documents will be shredded within 5 years of completion of the research. The consent forms will be turned into the IRB office at the completion of the study. It is anticipated that the result of this research will be published in one of the APE journals. No participants' names will be included in the study.

The PI will try to prevent any problem that could happen because of this research. You should let the PI know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

Participation and Benefits

Your child's involvement in this research is completely voluntary, and they may discontinue their participation at any time without penalty. In the end of the study, the PI will explain the results to the participants and their parents. The participants' parents can ask questions and the PI will answer all questions. The parents and participants will receive access to information about their personal results in this study.



Parents/guardians
Page 2 of 3

The study results will be provided to both parents/guardians and coaches. This may help the coaches determine effective techniques to use when coaching the shot put. The parents and participants can contact the PI for further questions and more explanations.

Confidentiality & Withdrawal

Your child's identity will be held confidential. If at any time your child objects to any aspect of the study, he/she may withdraw consent of participation. After your child withdraws from the study his/her data will be erased and hard copies of the scoring rubric will be shredded. Any publications resulting from this study will contain data which are anonymous and do not disclose the identity of your child.

Questions regarding the study

If you have any questions about the research study, you may ask the PI or advisor; their phone numbers are at the top of this form. If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs at 940-898-3378 or via e-mail at IRB@twu.edu. You will be given a copy of this signed and dated consent form to keep.

Participant Name: _____

Parent Name Printed: _____

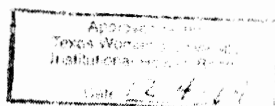
Date: _____

Parent's Signature: _____

Date: _____

Participant Signature: _____

Date: _____



Appendix B
Media Release Form

I hereby consent to the use, reproduction, editing and/or broadcast by Hisham Mughrabi of any and all photographs, and video recordings of my son taken by or on behalf of Hisham Mughrabi, from this day, without compensation to me. All negatives and positives, prints, video-recorded images and audio recordings shall constitute the property of Hisham Mughrabi solely and completely. The purpose of video recordings your son is allowing the researcher the opportunity to watch the throwing performance to determine the shot put point of.

Participant Name: _____

Parent Name Printed: _____

Date: _____

Parent's Signature: _____

Date: _____

Participant Signature: _____

Date: _____

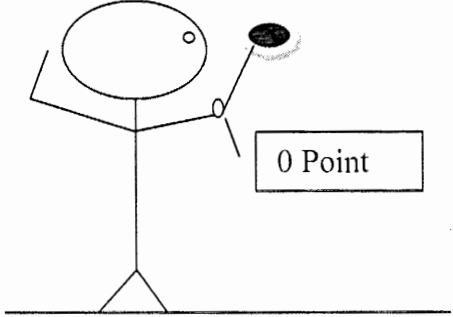
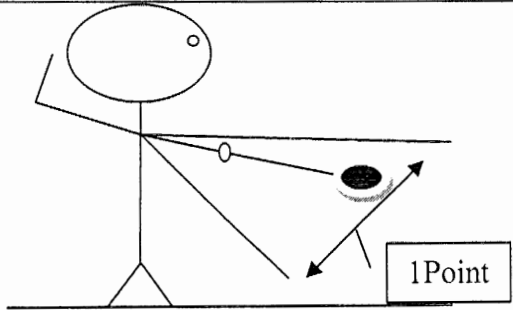
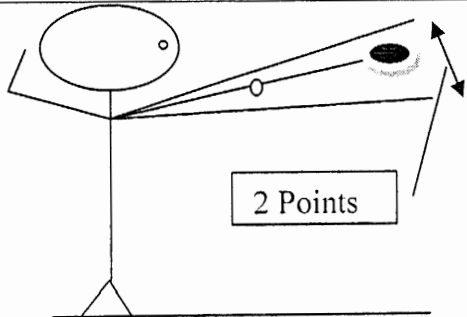
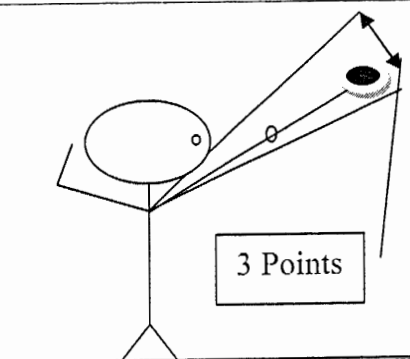
Appendix C

Camera Set-up



Appendix D

Shot Put Release Point Scoring Rubric

Point	Description	Diagram
0	No full elbow extension.	
1	The shot put release point is at or below shoulder level with full elbow extension.	
2	The shot put release point is above shoulder and at forehead with full elbow extension.	
3	The shot put release point is above forehead level and the elbow does not exceed forehead level.	

Appendix E

Shot Put Release Point Picture



Appendix F

Shot Put Picture and Scoring Rubrics Rating Scale

Name: _____ Date: _____ Position: _____

Purpose of this form

To help determine the shot put release point for athletes with intellectual disabilities (ID) by using a scoring rubric of three points (0 to 3) after observing a video of throwing performance. This rating scale is subdivided into two parts:

- Part 1: Contains of four statements to establish variability of the picture.
- Part 2: Contains of six statements to establish variability of the scoring rubrics.

Please rate each of the statements described within the scoring rubrics for Part 1 (picture) and Part 2 (scoring rubrics) using the following 1 to 5 scoring system.

5 = Strongly Agree (SA) 4 = Agree (A) 3 = No Opinion (NO) 2 = Disagree (D) 1 = Strongly Disagree (SD)

Additional space is given at the end of the rating scale to add comments or make suggestions for rescaling, or rewriting of scoring rubrics, etc. Please provide feedback for any statement receiving a rating of 3 or below.

Part 1: Picture Rating Scale

Statement	SA (5)	A (4)	NO (3)	D (2)	SD (1)
1. The picture has a clear shot put release point.					
2. The picture shows the shot put release point is above forehead level.					
3. The picture shows a clear view of hands, arms, shoulders, elbow, and head.					
4. The picture shows the optimum shot put release point.					

Part 2: Shot Put Release Point Scoring Rubric

Statement	SA (5)	A (4)	NO (3)	D (2)	SD (1)
1. The scoring rubric is an effective way to gain the information the researchers want to obtain.					
2. The scoring rubric is clear and well designed.					
3. In the scoring rubric it is clear that 0 is the lowest point; 1 is higher than 0, but lower than 2 or 3; 2 is higher than 0 or 1, but lower than 3; 3 is the highest point value.					
4. The scoring rubric can enhance the shot put coach's understanding of athletes with intellectual disabilities improvement of the point of release.					
5. The scoring rubric is consistent at all trials and with all athletes.					
6. The scoring rubric is an accurate measure of shot put release point.					

Comments:

Appendix G
Athletes' Information

Athlete 1

He was a 17 year-old male with an IQ score of 45. The athlete's primary disability was moderate ID and secondary was attention deficit hyperactivity disorder. Athlete 1 is currently working in a restaurant two days a week. He participated in the Special Olympics track and field six times. This participant had different interests in sports. He participated in Special Olympics, bowling, basketball, and track and field. He won third place at shot put in his group at McKinney Special Olympics regional district 2010.

Athlete 2

Athlete 2 was a 17 year-old male with an IQ score of 45. His primary disability was moderate ID, and secondary was speech impairment. He loved to make friends and help other students. He participated in the Special Olympics track and field seven times. In spring 2010, he participated at the McKinney Special Olympics regional district in different sports (i.e., basketball, bowling, 200m run, long jump, and shot put). In the shot put event, athlete 2 won first place in his group.

Athlete 3

Athlete 3 was an 18 year-old male with an IQ score of 45. His primary disability was moderate ID, with a secondary disability of autism, visual impairment, and speech impairment. He loves to make friends with other teachers and staff at the school. This athlete liked to help teachers in many actions, such as organizing the classroom; prepare lunch, and waste disposal. He participated in Special Olympics in different events such as

basketball, bowling, and track and field. In spring 2010, he participated at the McKinney Special Olympics regional district in 100m run, shot put, and long jump. In the shot put event, he won third place in his group.

Athlete 4

Athlete 4 was a 16 year-old male with an IQ score of 68. His disability was mild ID. This athlete loved different sports such as basketball, baseball, football, and track and field. He was always carrying a softball or tennis ball in his pocket to play catch with other students. He participated in Special Olympics in different events for the past 4 years (i.e., 400m relay, shot put, 100 m run, and long jump). He participated at the Special Olympics regional district at the McKinney Spring 2010 and won second place in his group.

Athlete 5

Athlete 5 was a 17 year-old male with an IQ score of 64. He is working at a restaurant two days a week. He participated in the Special Olympics track and field three times. This participant loved sports (i.e., 400m relay, shot put, discus, 200 m run, and long jump). He participated at the Special Olympics regional district at the McKinney Spring 2010 and won first place in his group for shot put event.

Athlete 6

Athlete 6 was a 15 year-old male with an IQ score of 54. His primary disability was mild ID, and secondary was attention-deficit/hyperactivity disorder. He participated in the Special Olympics track and field five times. This athlete had different interest in

sports such as bowling, basketball, and track and field and he is currently plays football at McKinney Boyd High School. He won first place in the shot put for his group at the McKinney Special Olympics regional district 2010.

Athlete 7

Athlete 7 was a 16 year-old male with an IQ score of 68. His primary disability was mild ID, secondary autism, and speech impairment. This athlete loved sports such as basketball, and track and field. Moreover, he loves computers and playing games. He participated in the Special Olympics track and field three times in different events(i.e., shot put, discus, 100m run, and long jump). He participated at the Special Olympics regional district at the McKinney Spring 2010. In the shot put event, he won first place in his group for shot put event.

Athlete 8

Athlete 8 was an 18 year-old male diagnosed as disabled with a 67 IQ score. He has three disability mild ID, autism, and speech impairment. He is working at a restaurant two days a week. This athlete loved different sports such as basketball, baseball, soccer, and track and field. He participated in the Special Olympics track and field five times in different events (i.e., shot put, discus, 200m run, and long jump). He participated at the Special Olympics regional district at the McKinney Spring 2010 and won second place in his group for shot put event.

Athlete 9

Athlete 9 was a 17 year-old male with an IQ score of 68. He has two disability mild ID and learning disability (LD). This athlete loved different kind of sports such as basketball, baseball, football, and track and field. He participated in the Special Olympics track and field six times in different events (i.e., 400m relay, shot put, discus, 200 m run, and long jump). He participated at the Special Olympics regional district at the McKinney Spring 2010 and won first place in his group for shot put event.

Appendix H

Athletes' Release Point by Coaching Techniques

Athlete 1

Reported in Table H1, the three coaching techniques appeared to influence his release point performance. However, no significant difference was reported between the three coaching techniques during intervention phase. According to results and using the scoring rubric (Appendix A), this athlete reached maximum of mastery level at all three coaching techniques (mastery level is 18 out of 18 pts).

Table H1.

Athlete 1 difference between points of release according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	17.0	18.0	17.8	0.41	0.40	0.70
Demonstration with Verbal	17.0	18.0	17.8	0.41		
Physical Assistance with Verbal	15.0	18.0	17.5	1.22		

Athlete 2

Reported in Table H2, the coaching techniques of picture with verbal appeared to have the lowest minimum release point performance. However, no significant difference was reported between the three coaching techniques during intervention phase.

According to results and using the scoring rubric, this participant reached maximum of mastery level at all three coaching techniques (mastery level is 18 out of 18 pts).

Table H2.

Athlete 2 difference between points of release according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	15.0	18.0	17.5	1.22	0.70	0.51
Demonstration with Verbal	18.0	18.0	18.0	0.00		
Physical Assistance with Verbal	17.0	18.0	17.8	0.41		

Athlete 3

Reported in Table H3, the coaching techniques of demonstration with verbal appeared to have the lowest minimum release point performance. However, no significant difference was reported between the 3 coaching techniques during intervention phase. According to results and using the scoring rubric, this athlete reached maximum of mastery level at all three coaching techniques (mastery level is 18 out of 18 pts).

Table H3.

Athlete 3 difference between points of release according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	15.0	18.0	16.7	1.50	1.30	0.31
Demonstration with Verbal	6.0	18.0	14.0	4.70		
Physical Assistance with Verbal	12.0	18.0	16.7	2.42		

Athlete 4

Reported in Table H4, this athlete showed the lowest shot put release point at picture with verbal technique. The coaching technique of demonstration with verbal appeared to maintain mastery level at all time (18 out of 18 pts) at release point

performance. However, no significant difference was reported between the three coaching techniques during intervention phase. According to results and using the scoring rubric, this athlete reached maximum of mastery level at all three coaching techniques (mastery level is 18 out of 18 pts).

Table H4.

Athlete 4 difference between points of release according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	9.0	18.0	16.0	3.70	0.63	0.55
Demonstration with Verbal	18.0	18.0	18.0	0.00		
Physical Assistance with Verbal	12.0	18.0	16.7	2.42		

Athlete 5

Reported in Table H5, the coaching techniques of demonstration with verbal appeared to score the lowest minimum release point performance compared to other coaching techniques. The coaching technique of picture with verbal appeared to maintain mastery level at all time (18 out of 18 pts) at release point performance. However, no significant difference was reported between the three coaching techniques during intervention phase. According to results and using the scoring rubric, this athlete reached maximum of mastery level at all three coaching techniques (mastery level is 18 out of 18 pts).

Table H5.

Athlete 5 difference between points of release according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	18.0	18.0	18.0	0.00	0.63	0.55
Demonstration with Verbal	12.0	18.0	17.0	2.45		
Physical Assistance with Verbal	15.0	18.0	17.3	1.21		

Athlete 6

Reported in Table H6, the coaching techniques of physical assistance with verbal appeared to score the lowest minimum release point performance. The coaching technique of picture with verbal, and demonstration with verbal appeared to maintain mastery level at all time (18 out of 18 pts) at release point performance. However, no significant difference was reported between the three coaching techniques during intervention phase. According to results and using the scoring rubric, this athlete reached maximum of mastery level at all three coaching techniques (mastery level is 18 out of 18 pts).

Table H6.

Athlete 6 difference between points of release according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	18.0	18.0	18.0	0.00	1.00	0.40
Demonstration with Verbal	18.0	18.0	18.0	0.00		
Physical Assistance with Verbal	12.0	18.0	17.0	2.45		

Athlete 7

Reported in Table H7, the coaching techniques of physical assistance with verbal appeared to score the lowest minimum release point performance. The coaching technique of demonstration with verbal appeared to maintain mastery level at all time (18 out of 18 pts) at release point performance. However, no significant difference was reported between the 3 coaching techniques during intervention phase. According to results and using the scoring rubric, this athlete reached maximum of mastery level at all three coaching techniques (mastery level is 18 out of 18 pts).

Table H7.

Athlete 7 difference between points of release according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	9.0	18.0	16.0	3.63	2.60	0.11
Demonstration with Verbal	18.0	18.0	18.0	0.00		
Physical Assistance with Verbal	6.0	18.0	13.0	5.60		

Athlete 8

Reported in Table H8, the coaching techniques of demonstration with verbal appeared to score the lowest minimum release point performance. The coaching techniques of picture with verbal appeared to have the highest minimum release point performance. However, no significant difference was reported between the three coaching techniques during intervention phase. According to results and using the scoring rubric, this athlete reached maximum of mastery level at all three coaching techniques (mastery level is 18 out of 18 pts).

Table H8.

Athlete 8 difference between points of release according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	17.0	18.0	17.8	0.41	1.90	0.20
Demonstration with Verbal	3.0	18.0	13.0	6.80		
Physical Assistance with Verbal	9.0	18.0	16.5	3.70		

Athlete 9

Reported in Table H9, the three coaching techniques reported perfect shot put release point at all days (18 out of 18 pts). According to results and using the scoring rubric, this athlete reached mastery level at all three coaching techniques.

Table H9.

Athlete 9 difference between points of release according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	18.0	18.0	18.0	0.00	-	-
Demonstration with Verbal	18.0	18.0	18.0	0.00		
Physical Assistance with Verbal	18.0	18.0	18.0	0.00		

Appendix I

Athletes' Distance Thrown by Coaching Techniques

Athlete 1

Reported in Table I1 that athlete improved his shot put distance between from baseline to intervention and to maintenance phases. According to results and using the scoring rubric, he improved 3.38 m (baseline) to 4.63 m (maintenance). Moreover, a significant difference was reported between the 3 phases.

Table I1.

Athlete 1 difference between distances thrown according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	3.15	4.09	3.68	0.34	4.80	0.02
Demonstration with Verbal	3.32	4.28	3.88	0.43		
Physical Assistance with Verbal	3.15	4.28	3.32	0.08		

Athlete 2

Reported in Table I2 that athlete improved his shot put distance from baseline to intervention and to maintenance phases. According to results and using the scoring rubric, he improved 2.72 m (baseline) to 4.58 m (maintenance). Moreover, a significant difference was reported between the 3 phases.

Table I2.

Athlete 2 difference between distances thrown according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	2.50	3.79	3.33	0.44	1.94	0.17
Demonstration with Verbal	3.25	4.01	3.61	0.34		
Physical Assistance with Verbal	2.65	3.78	3.13	0.45		

Athlete 3

Reported in Table I3 that athlete improved his shot put distance from baseline to intervention and to maintenance phases. According to results and using the scoring rubric, he improved 3.02 m (baseline) to 3.51 m (maintenance). Moreover, a significant difference was reported between the 3 phases.

Table I3.

Athlete 3 difference between distances thrown according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	2.90	3.23	3.08	0.13	0.34	0.72
Demonstration with Verbal	2.72	3.26	3.03	0.21		
Physical Assistance with Verbal	2.87	3.15	3.01	0.11		

Athlete 4

Reported in Table I4 that athlete improved his shot put distance from baseline to intervention and to maintenance phases. According to results and using the scoring rubric, he improved 6.60 m (baseline) to 7.40 m (maintenance). Moreover, a significant difference was reported between the 3 phases.

Table I4.

Athlete 4 difference between distances thrown according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	5.52	6.27	6.11	0.30	0.32	0.73
Demonstration with Verbal	5.68	7.23	6.31	0.55		
Physical Assistance with Verbal	5.38	7.05	6.33	0.65		

Athlete 5

Reported in table 5 that athlete improved his shot put distance from baseline to intervention and to maintenance phases. According to results and using the scoring rubric, he improved 9.50 m (baseline) to 12.68 m (maintenance). Moreover, a significant difference was reported between the 3 phases.

Table I5.

Athlete 5 difference between distances thrown according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	10.67	11.63	11.14	0.38	0.42	0.66
Demonstration with Verbal	8.27	11.70	10.72	1.30		
Physical Assistance with Verbal	10.32	11.72	11.05	0.50		

Participant 6

Reported in Table I6 that athlete improved his shot put distance from baseline to intervention and to maintenance phases. According to results and using the scoring rubric, he improved 4.63 m (baseline) to 9.78 m (intervention). Moreover, a significant difference was reported between the 3 phases.

Table I6.

Athlete 6 difference between distances thrown according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	5.37	8.60	7.08	1.16	0.40	0.69
Demonstration with Verbal	4.86	9.78	7.71	1.71		
Physical Assistance with Verbal	5.39	8.37	7.12	1.21		

Athlete 7

Reported in Table I7 that athlete improved his shot put distance from baseline to intervention and to maintenance phases. According to results and using the scoring rubric, he improved 3.87 m (baseline) to 4.94 m (intervention). Moreover, a significant difference was reported between the 3 phases.

Table I7.

Athlete 7 difference between distances thrown according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	4.08	4.94	4.39	0.32	0.54	0.59
Demonstration with Verbal	4.05	4.56	4.26	0.17		
Physical Assistance with Verbal	3.73	4.75	4.22	0.36		

Athlete 8

Reported in Table I8 that athlete improved his shot put distance from baseline to intervention and to maintenance phases. According to results and using the scoring rubric, he improved 4.67 m (baseline) to 5.89 m (maintenance). Moreover, no significant difference was reported between the 3 phases.

Table I8.

Athlete 8 difference between distances thrown according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	4.90	5.23	5.01	0.12	1.36	0.29
Demonstration with Verbal	4.28	5.18	4.76	0.37		
Physical Assistance with Verbal	3.46	5.07	4.62	0.60		

Athlete 9

Reported in Table I9 that athlete improved his shot put distance from baseline to intervention and to maintenance phases. According to results and using the scoring rubric, he improved 6.73 m (baseline) to 8.28 m (intervention). Moreover, no significant difference was reported between the 3 phases.

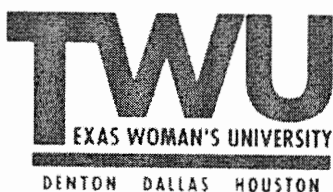
Table I9.

Athlete 9 difference between distances thrown according to three coaching techniques

Coaching Technique	Minimum	Maximum	Mean	SD	<i>F</i>	<i>P</i>
Picture with Verbal	7.09	8.28	7.53	0.44	0.19	0.83
Demonstration with Verbal	6.87	8.10	7.47	0.40		
Physical Assistance with Verbal	6.74	8.08	7.36	0.55		

Appendix J

Institution Review Board Approval Letter



Institutional Review Board

Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX 76204-5619
940-898-3378 Fax 940-898-3416
e-mail: IRB@twu.edu

February 19, 2010

Mr. Hisham Mughrabi
501 Withers St., Apt. #1
Denton, TX 76209

Dear Mr. Mughrabi:

Re: The Effect of Different Coaching Techniques on the Shot Put Release Point of Athletes with Intellectual Disabilities

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and appears to meet our requirements for the protection of individuals' rights.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data collection at that agency. A copy of the approved consent form with the IRB approval stamp and a copy of the annual final report are enclosed. Please use the consent form with the most recent approval date stamp when obtaining consent from your participants. The signed consent forms and final report must be filed with the Institutional Review Board at the completion of the study.

This approval is valid one year from December 4, 2009. According to regulations from the Department of Health and Human Services, another review by the IRB is required if your project changes in any way and the IRB must be notified immediately regarding any adverse events. If you have any questions, feel free to call the TWU Institutional Review Board.

Sincerely,

Dr. Kathy DeOrnellas, Chair
Institutional Review Board - Denton

c/c

c/c Dr. Charlotte Sanborn, Department of Kinesiology
Dr. Ronald Davis, Department of Kinesiology
Graduate School

Appendix K

Raw Data

All raw data were presented in three tables. These three tables were:

Table K1.

Mean Shot Put Release Point Score Results

Sessions	A1	A2	A3	A4	A5	A6	A7	A8	A9
1	13	12	6	-	6	9	9	15	12
2	9	15	3	18	3	9	12	6	18
3	12	15	6	18	6	6	12	9	15
4	18	15	15	12	12	18	9	9	18
5	17	18	15	9	18	18	9	6	18
6	17	18	12	18	18	18	9	3	18
7	15	18	12	18	18	12	6	15	18
8	18	18	6	18	12	18	15	18	18
9	18	18	18	18	18	18	18	18	18
10	18	18	18	18	18	18	18	18	18
11	18	18	18	18	18	18	18	18	18
12	18	18	18	18	18	18	18	18	18
13	18	18	18	18	18	18	18	18	18
14	18	18	15	15	18	18	18	18	18
15	18	18	13	18	18	18	18	18	18
16	18	18	18	18	18	18	18	18	18
17	18	18	18	18	18	18	18	18	18
18	17	18	17	18	17	18	18	17	18
19	18	18	17	18	18	18	18	18	18
20	18	17	18	16	18	18	15	18	18
21	18	18	16	18	18	18	18	18	18
22	18	18	16	18	18	18	18	18	18
23	18	18	18	18	18	18	18	18	18
24	18	18	16	18	18	18	18	18	18

Note: Sessions 1-3 (baseline), 4-21 (intervention), and 22-24 (maintenance)

Table K2.

Mean Shot Put Distance Thrown Results

Sessions	A1	A2	A3	A4	A5	A6	A7	A8	A9
1	3.57	3.37	3.33	6.60	12.43	5.65	4.00	5.08	7.45
2	3.38	3.57	3.08	6.88	12.05	5.73	3.87	4.67	7.20
3	4.15	2.72	3.02	7.02	11.7	4.63	4.37	5.17	6.73
4	3.15	2.50	3.23	6.60	8.27	5.37	3.73	4.73	6.74
5	3.62	2.65	3.07	6.25	10.35	6.41	4.21	5.18	7.46
6	4.22	3.27	2.87	7.23	11.11	4.86	4.08	4.71	6.87
7	3.35	2.68	2.72	6.28	11.29	5.39	4.49	4.28	7.29
8	3.46	3.25	3.26	6.60	11.22	8.08	4.09	3.46	7.09
9	3.25	2.89	3.23	6.27	11.32	6.42	4.05	5.23	7.48
10	3.25	3.33	3.23	6.21	10.67	7.08	4.34	5.07	6.77
11	3.32	3.15	2.98	5.38	11.63	6.43	4.21	4.96	7.33
12	3.32	3.46	2.92	5.68	11.42	6.96	4.36	4.91	7.1
13	3.38	3.42	2.90	6.03	11.25	8.37	3.96	4.92	7.48
14	3.48	3.79	3.15	5.52	11.72	9.78	4.18	4.9	7.67
15	3.87	3.50	2.94	6.06	11.70	7.77	4.20	4.38	7.42
16	3.93	3.40	2.90	7.05	11.50	6.88	4.94	4.97	7.6
17	3.29	3.87	3.06	6.97	10.69	8.34	4.25	4.93	8.08
18	3.88	3.87	3.11	6.02	10.32	8.6	4.35	5.01	8.10
19	4.09	3.79	3.13	6.15	10.62	7.85	4.57	4.63	7.87
20	4.16	3.64	3.05	5.93	11.26	8.95	4.75	5.07	8.28
21	4.28	4.01	3.03	6.27	11.18	7.92	4.56	5.02	7.60
22	4.18	3.93	3.51	6.85	12.20	7.26	4.67	5.13	7.39
23	4.63	4.15	3.43	7.40	12.20	7.83	4.70	5.22	7.07
24	4.37	4.58	3.41	7.20	12.68	9.65	4.70	5.89	7.34

Note: Sessions 1-3 (baseline), 4-21 (intervention), and 22-24 (maintenance)

Table K3.

Cueing Order by Sessions during Intervention Phase

Athlete	Sessions (18)																	
1	1	1	2	3	3	3	3	2	3	2	1	1	2	3	1	1	2	2
2	1	3	2	3	2	3	1	3	1	2	1	1	1	2	2	3	3	2
3	1	1	3	2	2	1	2	3	3	1	3	2	2	3	3	2	1	1
4	3	1	2	2	2	1	1	3	2	2	1	3	3	3	2	1	3	1
5	2	2	2	1	3	1	1	1	2	3	3	2	2	1	3	3	1	3
6	1	1	2	3	1	3	1	3	1	3	2	3	2	3	1	2	2	2
7	3	3	1	3	1	2	1	3	1	3	2	2	1	2	1	2	3	2
8	3	2	2	2	3	1	2	1	3	1	1	2	2	3	1	3	3	1
9	2	1	2	2	1	3	3	3	1	2	1	3	1	3	2	3	1	2

- 1= Picture with verbal
- 2= Demonstration with verbal
- 3= Physical assistance with verbal