

3-26-2014

# Using Auditory Feedback to Improve the Performance of Judokas during Uchi Komi

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Using Auditory Feedback to Improve the Performance of  
Judokas during Uchi Komi

by

Taylor Ferguson

A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Arts  
Applied Behavior Analysis  
Department of Child and Family Studies  
College of Behavior and Community Sciences  
University of South Florida

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Date of Approval:  
March 26, 2014

Keywords: Sports, Skill Acquisition, Performance, Martial Arts

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## **Abstract**

Auditory feedback has been shown to be highly effective at teaching new skills to athletes in a variety of sports. This method consists of targeting a routine, breaking down the specific skills required to complete the routine, and training an individual on those skills using an auditory device to provide feedback on correct responses. This study evaluated the effectiveness of auditory feedback for improving a judo technique. One set of techniques taught in judo are standing throws, which require a partner to receive the technique (uke.) These throws require specific skills to successfully implement the technique. Auditory feedback was evaluated within a multiple baseline across participants design to increase skills for one specific standing throw, ippon seoi nage (one armed shoulder throw.) The skills were scored on a seven item checklist. All participants improved their performance on ippon seoi nage at a quicker pace than what was observed during baseline.

## **Chapter One:**

### **Introduction**

In the United States 16% of individuals 15 years old or older participate in some form of sport or exercise (Bureau of Labor Statistics, 2013). Most sports require some level of training to improve and progress. Many of these sports have different milestones that can be achieved through practice and experience (e.g. junior varsity and varsity in K-12 programs, university clubs and teams at the collegiate level, amateur and pro levels in professional sports, and rankings in martial arts.) Judo is no exception, using a ranking system to mark experience and knowledge in the sport ("United States Judo Association," 2013). Interventions based off of the practice of behavior analysis have been shown to be efficacious at increasing specific skills related to athletic performance in a variety of sports (Martin, Thompson, & Regehr, 2004). There are a wide array of training methods to increase the performance of athletes such as; behavioral coaching (Allison & Ayllon, 1980); modeling (Boyer, Miltenberger, Batsche, & Fogel, 2009; Vintere, Hemmes, Brown, & Poulson, 2004); and using reinforcement (Kladopoulos & McComas, 2001).

Behavioral coaching has been used in a variety of studies to improve skill acquisition in sports (Allison & Ayllon, 1980; Stokes, Luiselli, Reed, & Fleming, 2010). Allison and Ayllon (1980) describe behavioral coaching as a five step procedure: 1) specific instructions to engage in correct behavior and any consequences; 2) evaluating the behavior for correctness and reinforcing correct behaviors; 3) specific feedback for an incorrect behavior; 4) modeling the

appropriate behavior; and 5) having the participant imitate the correct behavior. This study evaluated the effects of a behavioral coaching treatment package on skill acquisition in tennis, football, and gymnastics. All participants showed dramatic increases in the targeted skill when exposed to the intervention package. In order for behavioral coaching to be effective the instructor needs to have an understanding of the principles and basic skills required to train correctly in the sport. The multiple steps of behavioral coaching require the trainer stop practice in order to model and provide feedback effectively.

A component of behavioral coaching that has been specifically targeted is modeling the desired behavior for participants (Boyer et al., 2009; Vintere et al., 2004). Boyer et al. (2009) evaluated the effects of expert video modeling and corrective feedback on gymnastic sets. The procedure involved showing the participants a video of the expert engaging in the routine, followed by a video of the participants engaging in the behavior, and ending in both videos being viewed side-by-side on the same laptop. As a result of video modeling the participants were able to acquire the targeted skills. Modeling with praise was compared to modeling, praise, and self-instruction in the acquisition of specific dance routines in the Vintere et al. (2004) study. Both the Boyer et al. (2009) and Vintere et al. (2004) studies showed that modeling was an effective practice in acquiring or improving skills sets. The Vintere et al. (2004) study showed fewer sessions were needed to reach mastery of the skill for some of the participants when exposed to the modeling with praise and self-instruction condition. This method allows for a practitioner to compare their performance to an expert but requires the use of expensive technology and a lengthy time commitment.

Using reinforcement is another component of behavioral coaching. Kladopoulos et al. (2001) used this procedure with a women's basketball team to increase foul shot percentages. The procedure involved the instructor providing specific instruction for the target behavior prior

to the participant engaging in the behavior. After attempting the behavior the instructor provided positive praise for the correct form and restated the expectations, instead of providing corrective feedback. This study showed an increase in performance compared to baseline. This instructional method requires that the trainer be proficient in the steps necessary in completing the step and providing corrective feedback. To properly implement this method an instructor would need to interrupt an individual's performance in order to provide instruction and feedback.

Another common and effective method to increase sports performance, and the final component of behavioral skills training, is to provide feedback to the practitioner (Anderson & Kirkpatrick, 2002; Benitez-Santiago & Miltenberger, 2011; Boyer et al., 2009; Fogel, Weil, & Burris, 2010; Mononen, 2007; Scott, Scott, & Goldwater, 1997; Smith & Ward., 2006). Feedback can be delivered through multiple avenues such as; visually (Anderson et al, 2002); video (Benitez-Santiago et al., 2011; Boyer et al., 2009); verbal (Smith et al., 2006; Stokes et al., 2010); and cueing (Fogel et al., 2010; Scott et al, 1997). There are three different types of feedback; tactile (vibration on the skin,) visual (a blue light,) and auditory (a buzzer) (Cooper, Heron, & Heward, 2007).

Anderson et al. (2002) used visual feedback by providing speed skaters with their baseline rates of successful tags (i.e. when a replacement racer is tapped on the shoulder by the current racer as soon as they exit the relay box). After informing the participants on their baseline performance and then providing advice on how to improve their performances, participants were provided praise for correct tags during intervention and were shown their scores each day. The number of correct tags did increase for participants, but the results did not maintain. There were no clear reasons for why the results did not maintain, but the researchers hypothesized that fluctuations in the value of the researcher's praise and variables related to the

delay between experimental phases could have been a factor. In order for visual feedback to be effective the participant needs to shift focus to the visual display and away from practice.

Video feedback to increase proficiency of three martial arts techniques was evaluated by Benitez-Santiago and Miltenberger (2011). Participants were shown a video recording of their performance after completing the skill set and provided positive and corrective feedback. Participants showed an increase in fluency in the skills after implementation of video feedback. For one participant who did not show substantial increases, an additional phase that included live practice was implemented. Even with this additional phase, the participant was not able to reach 100% accuracy. A limitation of this study was the time it took to load a participant's video onto the computer, thus creating a substantial delay between the execution of the skill and feedback.

Smith et al. (2006) and Stokes et al. (2006) both used verbal feedback to increase the performance of high school and collegiate football players. Verbal feedback involved reviewing the criteria to be accomplished for a practice and then providing specific praise or corrective feedback on the participant's progress towards the goal. Some behaviors evaluated in these experiments were; successful pass blocking, blocking by the wide receiver, and correct routes ran. The procedure of this study combined feedback with posting the results of the day's practice, goal setting, and a combination of all three. With verbal feedback a person with extensive knowledge of the sport being practiced needs to be present in order to assure the accuracy of the feedback.

Behavioral coaching packages, its components, and visual/video feedback have been shown to be effective interventions for increasing skill acquisition though they do have limitations. These limitations include: requiring a person to shift their attention away from the practice in order to receive feedback, requiring the use of expensive technology, delayed

feedback on the performance, an expert practitioner needs to be present, and lengthy training procedures.

Auditory feedback has been shown to be an effective tool to increase sports performance (Fogel et al. 2010; Mononen, 2007; Scott et al., 1997). Mononen compared the use of an auditory signal with other interventions to improve participant's postural balance and rifle stability. The auditory feedback component of this study provided a continuous tone through the participant's headphone that would increase as the participant improved the targeted skills. The results showed that auditory feedback was effective at improving the targeted skills and was more effective than the other treatment options tested (such as; knowledge of results, visual feedback on performance for 50% of trials, and feedback on performance for 100% of trials).

Fogel et al. (2010) utilized auditory feedback to improve a participant's golf swing. In this study the researchers broke down the components of the golf swing into five steps of a chain; grip; address position; alignment; pivot; and arm position. The participant was trained on only one skill in the chain at a time. The researcher provided auditory feedback when the participant engaged in the current targeted skill while practicing the stroke. This procedure was done for every step on the chain and showed rapid gains in four of the five steps. The last step was the only skill that was not acquired. Fogel et al. also tested for generalization with another club, and showed that generalization did occur for the four skills that were previously acquired. Scott et al. (1997) also used a verbal cue in conjunction with a photoelectric beam tied to a beep to increase the maximum height of a pole vault. In this study the participant was informed what the necessary behavior was to increase the height of the vault, reaching to get a better pre-vault angle, and then prompted with "Reach" prior to planting the pole. If the participant reached the correct height the photoelectric beam was broken and a beep would sound. The height was gradually raised and the study showed a consistent increase in the participants vault height. With

auditory feedback the participant receives immediate confirmation on goal completion, it does not require the use of expensive equipment, and it is easy for a lay person to utilize once trained. While auditory feedback does not require an ongoing expert to implement, an expert is needed to create a task analysis to follow.

Currently, there are no known studies that have examined the effects of behavioral interventions for the sport of judo. Judo is a martial art founded by Jigoro Kano to develop a performance discipline while reducing the number of potential injuries that were seen in other hands-on martial arts (Kodokan Judo, Kano, 1994). Judo is a term that can be broken into *ju* meaning "gentleness," and *do* or "way" (Kodokan Judo, Kano, 1994). This translates to "the gentle way." The principle philosophy in judo practice and application is maximum efficiency with minimal effort. Judo practitioners (*judoka*) accomplish this by using the momentum, strength, and orientation of their opponent to complete a technique. Under these principles it is possible for a much smaller adult to throw a large adult effortlessly. Momentum uses the idea that an object in motion will not stop until an external force is applied. If a body is not in motion then a throw can be completed by first moving an object off balance (*kuzushi*). In this case a person is brought off their center of balance and the person executing the attack (*tori*) keeps them from returning to a balanced position and moving until execution. Strength involves utilizing an object's force during completion to eliminate the need to use physical power. A person's orientation is where they are in relation to an object and then using that position to aid in a technique. An example would be a person running at full speed towards a waist high fence. In that situation if the person did not stop they would hit the fence and summersault over. Some throws require the *tori* to use their body as a fulcrum, like the fence in the previous example. A successful technique will utilize all three of these principles (i.e., momentum, strength, and body orientation; Judo for High School, Toyosaburo, 1970). Typical training involves three types of

practice; uchi komi (repetition of the skill without throwing); yakusoku renshu (throwing practice with no resistance from the uke); and randori (throwing practice where both partners are attempting to throw) (Judo for High School, Toyosaburo, 1970). Uchi komi is a basic training form that allows for a student to learn the basics of a technique before engaging in any actual throwing. This helps to make the training environment safer for all participants in the sport.

Unlike visual feedback, auditory feedback allows for immediate feedback that does not require the athlete to pivot their attention away from the practice. The sport of judo requires very fluid movements to successfully implement a throw, therefore auditory feedback may be a useful intervention to teach a technique without interrupting the steps of a throw. When utilizing auditory feedback an expert is required to create the target behaviors for improvement, but a lay person could implement the program once trained. Currently there is a paucity of research utilizing auditory feedback in sports (Fogel et al., 2010; Monomen, 2007; Quinn, 2013; Scott et al. 2006). This study aims to expand the literature on the use of auditory feedback to improve skill acquisition and performance in judo during uchi komi (repetition practice).

## **Chapter Two:**

### **Method**

#### **Participants and Setting**

A judo club located on a university campus was used as a site for this study. Four students, two male and two female, all 18 years old participated in the study. All participants had been learning judo for approximately 8 months prior to joining this study. Participants were recruited via fliers posted at the judo club. All trainings and direct observations occurred in the designated mat room at the university recreation center.

#### **Target Behavior**

The judo throw used for this study was ippon seo nagi or a one armed shoulder throw. An illustration of the throw can be viewed in Appendix A. This throw is one of the earlier throws taught to judokas and is used often in competitions. The throw involves specific body placements to execute correctly therefore the primary dependent variables for participants were; *Foot Placement 1; Arm Placement 1; Off-Balancing; Foot Placement 2; Body Orientation; Back Position; and Arm Placement 2*. A task analysis for the dependent variable was developed for the purpose of this study. The task analysis was reviewed and approved by a local judo instructor, and is located in Appendix B.

#### **Data Collection**

The researcher was the primary data collector for this study and one other data collector was trained for the purposes of inter-observer agreement (IOA). The data were collected through

direct observation of participants performing the behaviors and scored as either a yes or no for each target behavior for each trial with a maximum of 10 trials per day. A data collection sheet was used to record the steps within each trial (see Appendix C). The score was calculated by dividing the number of behaviors correct divided by seven (the total number of behaviors possible) to get a percentage of correct steps per trial.

**Inter-observer agreement (IOA).** The data collector was trained by reviewing the operational definitions for each target behavior. After she was able to recite the operational definitions accurately the data collector was shown eight videos of two confederates engaging in the full task analysis. The confederates engaged in all the correct steps in one video and in the remaining seven videos missed a different step in the task analysis. These videos were shown in a random order to the data collector. She was allowed to serve as an IOA data collector once she was able to correctly identify the steps with 100% accuracy for all target behaviors. In order to facilitate IOA every trial was recorded with a video camera. Agreement was defined as both observers independently recording the occurrence or non-occurrence of the target behaviors. The number of agreements was divided by seven (the total number of behaviors) and multiplied by 100. IOA was collected for 39% of the sessions. The percentage of IOA during baseline was 81% for Monica, 90% for Alice, 91% for Bill, and 87% for Lyndon. IOA collected during the auditory feedback phase resulted in a score of 81% for Monica, 80% for Alice, 80% for Bill, and 86% for Lyndon.

### **Experimental Design**

A non-concurrent multiple baseline across participants design was used to evaluate the effects of auditory feedback as an intervention to improve the target behaviors of ippon seoi nage.

## **Procedures**

Outside of the study participants engaged in typical practices at the judo club. Practices typically involved the coach explaining a technique, modeling the technique, and then uchi komi (repetition practice) of the technique with some corrective feedback and praise. During both baseline and the auditory feedback phases each participant was asked to engage in uchi komi. Uchi komi involves the participant performing the steps of the throw multiple times in quick succession, but the participant never completes the throw. All trials and training sessions were conducted on days when there was no scheduled judo class. Each assessment session contained five trials. The mean of the assessment session was calculated and each data point on the graph represents this mean.

During every session there was a confederate uke to receive the participant's technique. The uke allowed the tori to engage in the target behavior without resisting or engaging in the target behavior for the participant. A complete list of how the uke was trained to respond for each target behavior can be found in Appendix B. The uke was observed for every session throughout baseline and intervention, and fidelity data was collected using the list in Appendix B. Fidelity was always 100%.

**Baseline.** No instruction was provided during baseline. The participant was asked to engage in uchi komi for ippon seo nagi. No feedback was provided. The participant moved to intervention once stability in the data was observed.

**Auditory Feedback Training.** After baseline the participants were instructed on the components of the auditory feedback intervention. The experimenter stated that, "During this phase you will be given a specific step to work on, which I will instruct you on before moving forward." The instructions included informing the participant of the current step and what was required to complete it and modeling the step on the participant's uke

(partner). The training sessions lasted approximately 5 min. Feedback was provided by an auditory sound produced by a clicker device. The participant was told, "If you hear the click sound that means you have performed the step correctly. We will move on to the next step once you have engaged in the current step three consecutive times correctly." Instructions for the next step were given after each step was mastered (three consecutive completions on the current step correctly). The participant was trained on the first step shown in appendix B and each step was trained in ascending order. The minimum number of steps trained in a single auditory feedback session was one with a maximum of three consecutive steps. The number of steps trained in a single session was determined based on how quickly the participant was learning the target behaviors.

**Post-Training Assessment.** Immediately after the auditory feedback session the participant was asked to engage in uchi komi for ippon seoi nage five times with no other instructions or feedback given. If the participant failed to engage in a previously mastered step three consecutive times during this phase that participant was retrained until criteria was met for that step in the next auditory feedback session. After completing the retraining participants were asked to engage in repetition practice of the throw until mastery of the current step was met, then training for the next step occurred. These sessions were video recorded for data collection. The videos were reviewed following each session to determine if any steps were missed.

### **Social Validity**

Following completion of the study, participants and coaches were asked to complete different questionnaires to rate the extent to which they felt that: 1) the auditory cue was compatible with their environment, 2) the procedure was easy to implement, and 3) their overall satisfaction with the procedures (see Appendix D and E.) At the end of baseline (prior to intervention) and after the intervention was complete the participants were asked to engage in

uchi komi three times and an actual (not repetition practice) throw three consecutive times. Each repetition practice and actual throw was video recorded for a total of 12 videos per participant (6 baseline and 6 post intervention.) Two judo coaches from around central Florida were shown all 48 videos of the participants engaging in uchi komi and executing the throw. The coaches rated the uchi komi videos for the fluidity of the movement and quality of the repetition (see Appendix F.) The throws were rated by the quality of completion and ease of the throws through the use of a Likert scale (see Appendix G.) The videos were shown in random order and the coaches were unaware of the phase that the video was from.

## **Chapter Three:**

### **Results**

Results are shown in figure 1. After training with the auditory feedback component, performance of the targeted steps in ippon seoi nage increased from baseline for each participant.

During baseline participants engaged in low levels of the targeted behaviors of ippon seoi nage. Monica's mean level of engagement in the target behaviors during baseline was 27% (range = 23% - 29%). The mean level of performance in the targeted behaviors for Alice was 17% (range = 14% - 23%). Bill's mean level of performance during baseline was 14%. The mean level of correct steps for Lyndon during baseline was 21% (range = 14% - 34%).

After intervention was administered all participants showed an increase in performing the steps during uchi komi of ippon seoi nage. Monica took nine training sessions to increase to 94% of total steps completed with a mean of 79.3% (range = 46% - 94%). The mean score of Monica's stable intervention data were 94.8% across the last four sessions. After nine training sessions Alice increased the total number of steps completed to 86% with a mean of 74% (range = 31% - 91%). She received a mean score of 84.8% across the last five stable sessions in intervention. Bill required seven auditory feedback sessions to increase his performance to 89% with a mean of 74% (range 57% - 89%). His mean score of final stable intervention data were 89% across two sessions. After six auditory feedback sessions Lyndon increased his mean performance to 91% with a mean of 76% (range = 57% - 91%). During the last three stable data points of intervention he scored a mean of 88.7%.

Each of the four participants in this study completed a social validity questionnaire after finishing the program (Table 1). Overall, the participants felt the program increased their performance of ippon seoi nage. All the participants agreed that they learned the throw at a quicker pace because they were in the program. By breaking down the components of the throw the participants reported that they could better learn other throws. Participants also reported that they were more comfortable with the throw and would be more likely to use it in a competition. Three participants reported that they would like this procedure included in future practices, while one reported that they would not like this procedure included in future practices.

The coach of the judo club also completed a social validity questionnaire to rate the intervention (Table 2). He reported seeing a slight improvement in the execution of ippon seoi nage in practice. He strongly agreed that breaking down the components of the throw helped students better learn the throw. During competitions the coach agreed that his students might be better able to execute the throw after participating in this study. The coach stated that he would be hesitant to recommend this procedure to other coaches. He said that since the procedure required a coach to focus solely on one student it would not be feasible to implement in his typical judo class.

Two coaches viewed a total of 12 videos for each participant, six videos of uchi komi and six videos of throw completion, for a total of 48 videos. Overall the coaches rated most participant's uchi komi and actual throws slightly better after intervention. The coaches' mean scores can be seen in Table 3 and 4.

## **Chapter Four:**

### **Discussion**

The purpose of this study was to examine the effects of auditory feedback on the performance of judokas while performing ippon seoi nage during uchi komi (repetition practice). Participants increased their performance on ippon seoi nage when auditory feedback was provided. The target behaviors were learned more quickly with auditory feedback than with uchi komi with no instruction. Participants reported that they liked the program and that it was helpful in learning the throw. It was hypothesized that this intervention might be effective in improving skills in judo since auditory feedback could be provided immediately without interrupting the fluidity of the movements. This study found similar results to other research utilizing auditory feedback to improve the performance of athletes (Fogel et al., 2010; Monomen, 2007; Quinn, 2013; Scott et al. 2006). Fogel et al. and Quinn found that an auditory feedback intervention called TAGTeach was effective in increasing the performance of a golf stroke and specific dance moves. Monomen (2007) and Scott et al. (2006) also found auditory feedback improved other sports behaviors including target shooting and pole vaulting. In addition, Fogel et al. (2010) and Quinn (2013) collected social validity data from the participants, which indicated generally favorable results. Quinn also asked the participant's coaches to complete a social validity questionnaire. The two coaches rated the program favorably and would recommend the procedure to other coaches. The judo coach in the current study did not score the intervention as favorably as the coaches in the Quinn study. The coach reported that although he

felt that the intervention resulted in improved performance of the participants he had concerns about the feasibility of implementing auditory feedback given the sheer number of students in his class and the inability to work with students individually.

While auditory feedback greatly enhanced and expedited skill increases, compared to baseline, no participant performed at 100% accuracy. Above 90% accuracy was only achieved by two participants due to common mistakes made by most participants. The progression of targeted behaviors was designed so that each skill had to be present in order to obtain 100%. All of the participants missed the target behavior Foot Placement 1 at least once during every session. This skill was consistently missed even after training. A reason for the repeated failure to complete this step could relate to the typical practice of the participants. When performing uchi komi in a typical practice many students are taught to begin pivoting into the throw as soon as the technique begins. When pivoting from the beginning of uchi komi a judoka will his or her their pivot foot, the foot stepping in, angled to assist the pivot motion. This study aimed to have the judoka have a proper foot placement first before pivoting. In order for a proper body placement, in relation to the uke, a correct foot placement is needed. Many times when a judoka is initially learning a throw he or she will either step too close, making it difficult to keep the uke off balance, or step too far away, making it difficult to throw the uke. During baseline sessions of this study many of the participants had their pivot foot too close to the uke. After the auditory feedback phase the participants tended to have the foot in the proper location, but failed to get the angle correct.

Another common mistake participants made was an improper Arm Position 2. This step requires the participant to have the uke's left armpit locked into the participant's left upper arm. The participant's left arm should make a 90° angle with their torso. The participant's right arm is also pulling the uke's left arm diagonally across their chest. When this skill was missed it was

typically because the participant's failed to have the correct angle of their left arm. The angle is important to the throw because when a tori attempts to throw the uke and the angle is not correct the uke will be pulled around the tori's torso instead of thrown over his or her shoulder.

When pivoting, Monica and Bill would often step out instead of stepping into the uke. While this is not an incorrect form of pivoting it did require the participant to make additional steps in order to get the correct position. For this study the participants were learning how to perform ippon seoi nage if they were walking towards the uke. Stepping back and pivoting is used when a tori is moving away from the uke. The initial foot position for a person stepping away from the uke is different than when walking towards thus the extra steps were needed to compensate.

There were some limitations to this study. One limitation was the limited ability to provide instruction during uchi komi. Instruction was only provided to teach or re-teach the necessary step. Both the coach and participants expressed a disappointment that specific verbal feedback was not provided while engaging in uchi komi. Since instructions were based off the task analysis the researcher was unable to provide participant specific feedback. For example, the participants would initially raise the uke off balance, but would put the uke back on balance when performing later steps. While they correctly performed off balancing they would find throwing the uke difficult in a actual situation. This could have been resolved if some of the participants were to step slightly farther away from the uke when performing Foot Position 1 and if they continued to pull the uke throughout the repetition. Future research can address this limitation by adding flexibility in the instruction to allow for modifications based on the participants needs and by providing in-situ corrective feedback to allow for immediate and specific verbal feedback.

Although the uke was an experienced judo practitioner and was provided additional training before the study began, fidelity measures were difficult to develop and score due to the subjective nature of the guidelines. For example, "Allow the tori to manipulate your arms without moving for them," was difficult to objectively measure. If the uke began to deviate from the guidelines he would have been reminded of the expectations by the researcher after a session. The researcher did not need to restate the expectations during the course of this study. Future studies could implement a self-monitoring questionnaire where the uke could evaluate his own performance and receive instruction on what they rated as low. This would also allow for some form of data to be collected to increase treatment integrity.

Based on the scores provided by area coaches the auditory feedback resulted in slight improvement to no effect on the participant's ability to complete the throw. The training sessions taught the participants every step of the throw up to lifting the uke up and body torque to reduce the likelihood the uke would be thrown during uchi komi. This step is necessary to complete the throw as it allows for the tori to completely lift the uke off the ground and turn in a manner that assists the technique. Future studies could resolve this by teaching every step of the throw including the lift and torque. In judo competitions the uke will rarely stand still to be thrown. Instead both the uke and tori are moving when a throw is performed. Future studies could include training the throw while both the participant and confederate are in motion.

Video recording was a limitation in this study. In order to easily score all seven skills targeted multiple angles would have been helpful. Since only one camera was used for this study some steps were difficult to observe for collecting IOA. The IOA scores were adequate for this study, but could be improved with additional cameras or having additional data collectors present for the sessions.

Future studies should evaluate the effectiveness of video feedback and modeling on skill acquisition in judo. The instructor appreciated that the procedure broke down the skills of ippon seoi nage although he felt that auditory feedback may not be the most feasible procedure. He stated that the students might benefit from learning how to recognize their mistakes and make corrections with the assistance of a more experienced practitioner. This would be easier if the students were able to watch themselves perform the throw utilizing technology that allowed for some form of video feedback.

## Tables and Figures

Table 1

*Social Validity of Participants for the Procedure*

	Monica	Alice	Bill	Lyndon
This procedure improved my throw at a faster rate than typical practices	5	5	4	4
Breaking down the components of the throw will help me learn other more complex throws	5	6	5	6
I am more comfortable with executing this throw in practice	6	5	4	6
I am more likely to use this throw in a competition	3	4	4	4
I would like my coach to include this procedure in future practices	3	4	5	4

*Note.* A score of 3 = Slightly Disagree, 4 = Slightly Agree, 5 = Agree, 6 = Strongly Agree.

Table 2

*Social Validity Score for Participant's Coach*

	Coach
My student's ability to use the targeted throw has improved following the procedure	3
Breaking down the components of a throw will help my students better understand other throws	6
I see myself incorporating this procedure into daily practices	1
My students will be better able to execute the targeted throw in a competition	5
I would recommend this procedure to other coaches	2

*Note.* A score of 1 = Strongly Disagree, 2 = Disagree, 3 = Slightly Disagree, 5 = Agree, 6 = Strongly Agree

Table 3

*Social Validity of Area Coaches for Uchi Komi*

	Monica	Alice	Bill	Lyndon
	Mean Instructor Score	Mean Instructor Score	Mean Instructor Score	Mean Instructor Score
Fluidity				
Coach 1				
BL	3	4	2	3.67
AF	4	4	3.33	4.33
Coach 2				
BL	3.67	4	1.67	4
AF	4	3.33	3.67	4.67
Quality of Repetition				
Coach 1				
BL	3.33	3	2	3.33
AF	3.67	2.67	2.67	5
Coach 2				
BL	3.33	3.33	2.67	4.33
AF	4	4.33	4.33	5

*Note.* BL = Baseline. AF = Auditory Feedback

Table 4

*Social Validity of Area Coaches for Throws*

	Monica	Alice	Bill	Lyndon
	Mean	Mean	Mean	Mean
	Instructor	Instructor	Instructor	Instructor
	Score	Score	Score	Score
Quality of Completion				
Coach 1				
BL	3	3.67	2.33	3.67
AF	3.67	4.67	4	4.67
Coach 2				
BL	3.33	4.33	2	4.67
AF	3.67	3.67	3.67	5
Ease of Throw				
Coach 1				
BL	3.33	5	2.33	4.33
AF	3.67	4.66	3.66	5
Coach 2				
BL	4.33	4	1.67	4.33
AF	3.33	4	3.33	4.66

*Note.* BL = Baseline. AF = Auditory Feedback

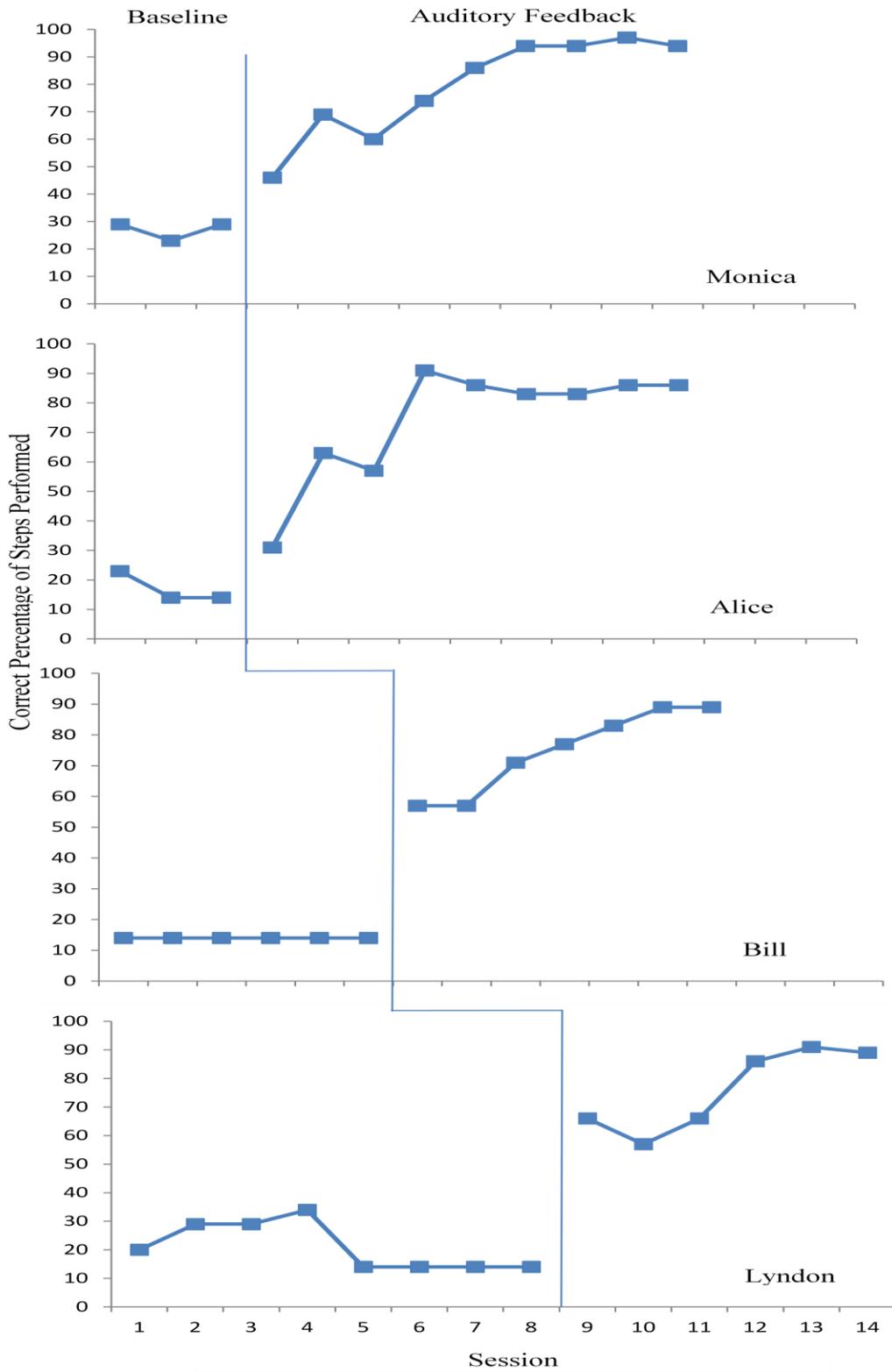


Figure 1. This figure shows the percentage of correct behaviors engaged in by the participants for each trial.

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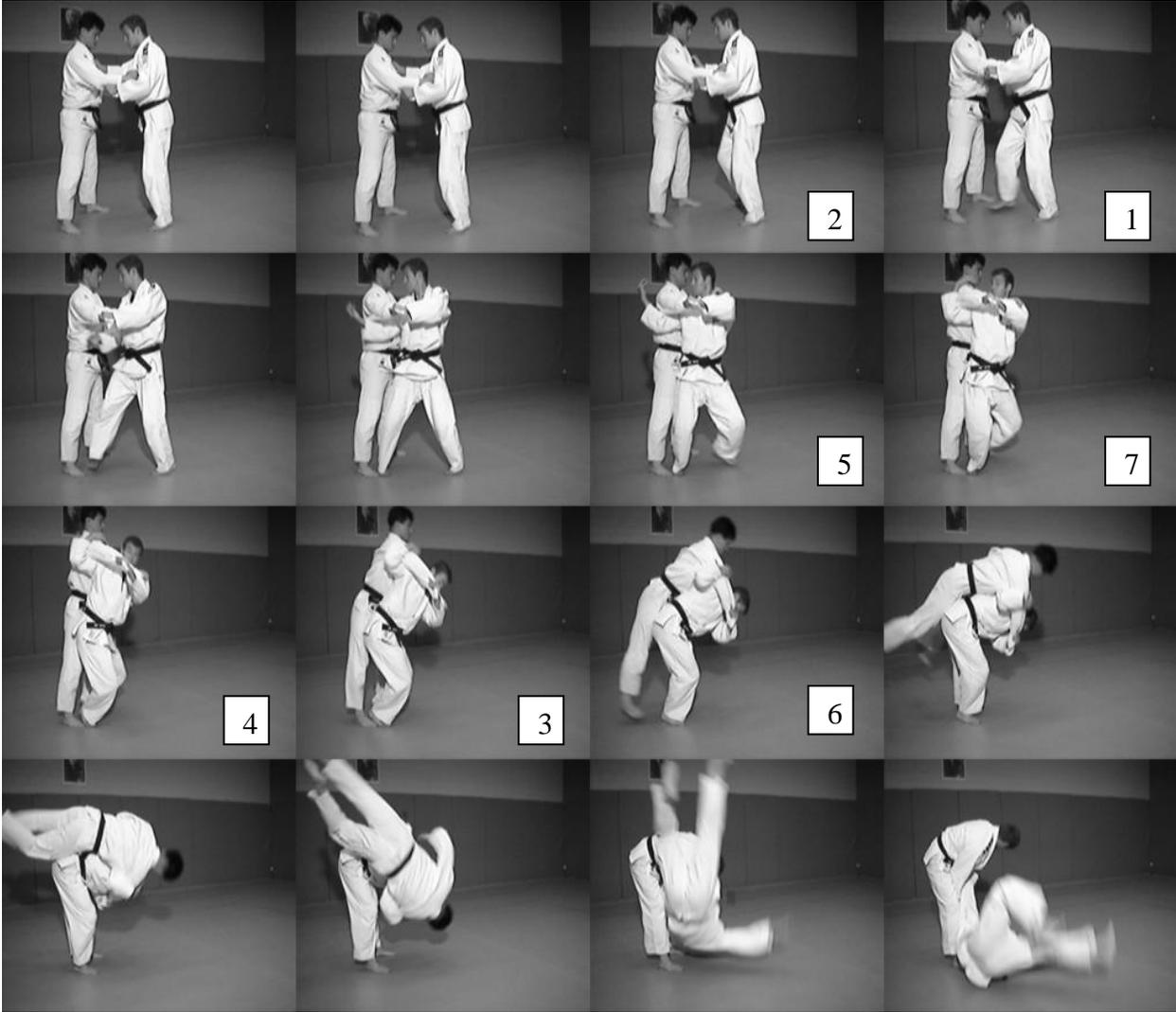
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## **Appendices**

**Appendix A- Visual Representation of Throw**



## Appendix B- Task Analysis

<b>Ippon Seoi Nage - Tori</b>	
<b>Target</b>	<b>Step</b>
1. Foot Placement 1	Have the toe's of the right foot in line with the toes of uke's (person being thrown) right foot, about two inches in front, inside their gait.
2. Arm Placement 1	Have the right forearm placed vertically on the uke's left side upper chest with the right elbow under the uke's armpit and the left arm parallel to the ground with the left hand on the same plane as the left ear.
3. Off-Balancing	The uke's waist over or past their toes, towards the thrower.
4. Foot Placement 2	Have the right foot and left foot between the uke's left and right foot and under their waist.
5. Body Orientation	Have the back facing towards the uke's chest, with hips below uke's hips
6. Back Position	Have back at slight angle to the left from hips.
7. Arm Placement 2	Have the right arm parallel to the ground, have the uke's right armpit sitting between the right elbow and shoulder, and the left hand holding the uke's left arm (between the elbow and wrist) across the chest angled from the right shoulder to the left thigh.

<b>Ippon Seoi Nage - Uke</b>	
<b>Target</b>	<b>Step</b>
1. Foot Placement 1	Stand still.
2. Arm Placement 1	Allow the tori to manipulate your arms without moving for them.
3. Off-Balancing	Allow for the tori to pull you to the balls of your feet.
4. Foot Placement 2	Stand still without resisting the tori. Avoid sticking out your hips.
5. Body Orientation	Stand still.
6. Back Position	Stand still.
7. Arm Placement 2	Allow the tori to manipulate your arms without moving for them.

**Appendix C- Data Sheets**

<b>Data Collection - Ippon Seoi Nage</b>	
<b>Participant/Date:</b>	
<b>Trial:</b>	
<b>Target</b>	<b>Completed? yes=✓, no=X</b>
1. Foot Placement 1	
2. Arm Placement 1	
3. Off-Balancing	
4. Foot Placement 2	
5. Body Orientation	
6. Back Position	
7. Arm Placement 2	
<b>Trial:</b>	
<b>Target</b>	<b>Completed? yes=✓, no=X</b>
1. Foot Placement 1	
2. Arm Placement 1	
3. Off-Balancing	
4. Foot Placement 2	
5. Body Orientation	
6. Back Position	
7. Arm Placement 2	
<b>Trial:</b>	
<b>Target</b>	<b>Completed? yes=✓, no=X</b>
1. Foot Placement 1	
2. Arm Placement 1	
3. Off-Balancing	
4. Foot Placement 2	
5. Body Orientation	
6. Back Position	
7. Arm Placement 2	
<b>Trial:</b>	
<b>Target</b>	<b>Completed? yes=✓, no=X</b>
1. Foot Placement 1	
2. Arm Placement 1	
3. Off-Balancing	
4. Foot Placement 2	
5. Body Orientation	
6. Back Position	
7. Arm Placement 2	

**Appendix D- Participant Social Validity**

Participant Satisfaction Survey

1. What did you like most about this procedure?
  
2. Would you recommend this procedure to another student or friend?
  
3. How did this procedure compare to your typical practice?
  
4. Was there anything you disliked about the procedure? (Please explain)
  
5. What, if anything, would you change about the procedure?

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
This procedure improved my throw at a faster rate than typical practices						
Breaking down the components of the throw will help me learn other more complex throws						
I am more comfortable with executing this throw in practice						
I am more likely to use this throw in a competition						
I would like my coach to include this procedure in future practices						

**Appendix E- Coach Social Validity**

Coach Satisfaction Survey

1. How did this procedure compare to your typical practice?

2. What did you like most about this procedure?

3. If you were to use this procedure again, what if anything would you change?

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
My student's ability to use the targeted throw has improved following the procedure						
Breaking down the components of a throw will help my students better understand other throws						
I see myself incorporating this procedure into daily practices						
My students will be better able to execute the targeted throw in a competition						
I would recommend this procedure to other coaches						

## Appendix F- Area Coaches Social Validity Uchi Komi

### Quality of Throw Rated by Coaches

Please rate the following videos of ippon seoi nage to the best of your ability.

On a scale of 1-10, please circle the number that best identifies how well the repetitions were executed and the ease of which the tori threw the uke.

The video clips have been placed in random order and are not in the order in which the study was conducted.

### Ippon Seoi Nage

**Fluidity of Motion-** A 10 represents repetitions that were in one fluid motion with no breaks in between, A score of 5 represents repetitions that were mostly fluid but had some breaks. A score of 1 should be awarded to repetitions that were broken into several different steps.

Clip 1	1	2	3	4	5	6	7	8	9	10
Clip 2	1	2	3	4	5	6	7	8	9	10
Clip 3	1	2	3	4	5	6	7	8	9	10
Clip 4	1	2	3	4	5	6	7	8	9	10
Clip 5	1	2	3	4	5	6	7	8	9	10
Clip 6	1	2	3	4	5	6	7	8	9	10

**Quality of Repetition -** A 10 will represent high quality repetitions, a 1 represents repetition that does not resemble the throw.

Clip 1	1	2	3	4	5	6	7	8	9	10
Clip 2	1	2	3	4	5	6	7	8	9	10
Clip 3	1	2	3	4	5	6	7	8	9	10
Clip 4	1	2	3	4	5	6	7	8	9	10
Clip 5	1	2	3	4	5	6	7	8	9	10
Clip 6	1	2	3	4	5	6	7	8	9	10

## Appendix G- Area Coach Throw Social Validity

### Quality of Throw Rated by Coaches

Please rate the following videos of ippon seoi nage to the best of your ability.

On a scale of 1-10, please circle the number that best identifies how well the throw was executed and the ease of which the tori threw the uke.

The video clips have been placed in random order and are not in the order in which the study was conducted.

### Ippon Seoi Nage

**Quality of Completion-** A 10 represents a perfect completion of the throw, this throw would be awarded an ippon if judged during a competition. A score of 1 represents a poor completion of the throw, this throw would be awarded a yuko or no points.

Clip 1	1	2	3	4	5	6	7	8	9	10
Clip 2	1	2	3	4	5	6	7	8	9	10
Clip 3	1	2	3	4	5	6	7	8	9	10
Clip 4	1	2	3	4	5	6	7	8	9	10
Clip 5	1	2	3	4	5	6	7	8	9	10
Clip 6	1	2	3	4	5	6	7	8	9	10

**Ease of throw-** A 10 will represent a throw that is effortless while a score of 1 will represent a strained throw.

Clip 1	1	2	3	4	5	6	7	8	9	10
Clip 2	1	2	3	4	5	6	7	8	9	10
Clip 3	1	2	3	4	5	6	7	8	9	10
Clip 4	1	2	3	4	5	6	7	8	9	10
Clip 5	1	2	3	4	5	6	7	8	9	10
Clip 6	1	2	3	4	5	6	7	8	9	10