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Using Video Feedback to Improve Martial-Arts Performance

Angela Stefanie Benitezsantiago
University of South Florida, angela2@mail.usf.edu

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Using Video Feedback to Improve Martial-Arts Performance

by

Angela S. BenitezSantiago

A thesis submitted in partial fulfillment
of the requirements for the degree of
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Department of Child and Family Studies
College of Behavioral and Community Sciences
University of South Florida

Major Professor: Raymond G. Miltenberger, Ph.D.
Kimberly Crosland, Ph.D.
Timothy M. Weil, Ph.D.

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Abstract

Video feedback has great potential to enhance performance in many settings. The following study used video feedback to enhance the martial arts performance of capoeira, an Afro-Brazilian martial art that utilizes acrobatic movements (revesado, au de costa, and macaco). A multiple baseline across behaviors was used for 5 participants where baseline conditions consisted of standard coaching consisting of instruction, modeling, rehearsal, and feedback and continued throughout the study. The intervention consisted of video feedback, in which the participants were filmed attempting a movement and immediately viewed the video afterwards, while receiving positive and corrective feedback from the instructor, using the pause, slow motion, and replay controls. The participant was filmed at least a total of three times per session and each attempt was scored. The target behaviors were scored on a 15-item checklist, resulting in a percentage correct. A second video feedback condition similar to the first was also introduced to some participants, in which participants were able to practice the movements with live feedback before being filmed again. Results show gradual increases in baseline and a more rapid acquisition of the skills during the video feedback conditions.

Introduction

The use of video as a medium allows the benefit of preserving an audiovisual image of a performance, the ability to replay it at various speeds, and to stop or “freeze” an image in time. Video recording has been used in two ways in the skill learning process; first as feedback on a performance that has been completed and second to display a model of the correct performance to be completed (Dowrick, 1991). Research that has used video feedback as a means to improve a performance has targeted peer interactions (Dunlap, Dunlap, Clarke, Childs, White, & Stewart, 1992), parent training (Phaneuf, & McIntyre, 2007), medical teaching (Nilsen, & Baerheim, 2005; Roter, et al. 2004), social communication (Baily, Deardorff, & Nay, 1977; O’Reilly et al., 2005; Thiemann, & Goldstein, 2001), performance in work settings (Sigurdsson, & Austin, 2008), and performance in sports such as swimming (Hazen, Johnstone, Martin, & Srikaneswaran, 1990), gymnastics (Boyer, Miltenberger, Batsche, & Fogel, 2009), soccer (Zeigler, 1994), and tennis (Scott, Scott, & Howe, 1998).

The knowledge and proficiency an athlete has on performing a skill is “critical to the learning process and, in certain circumstances, a failure to provide such knowledge may even prevent learning from taking place” (Dowrick, 1991, p. 232). An athlete can acquire this knowledge from the performance of a skill through intrinsic feedback (information gained from the body’s receptors, such as muscle spindles, joint receptors, and so on) and through extrinsic information, such as the outcome of the action or knowledge of results (KR) and the patterns of actions used to complete the skill or knowledge of performance (KP) (Dowrick, 1991). Because there is little that can be done for the intrinsic feedback besides doing the actual movement, external feedback (for

example the use of video recording), can be used to provide additional information such as a medium for error correction, a reinforcer for a correct performance, and an antecedent for a correct performance.

Dowrick (1991) suggests that because novice athletes do not necessarily pay attention to the key elements of the performance, the early stages of learning a skill using videotape should be with the assistance of a coach who can draw their attention to the components of performance competency. Therefore, when using video, coaches should take into account the “critical elements” of successful athletic performance and develop a system that could provide fast and efficient feedback pertaining to those critical elements of the performance. Dowrick (1991) also lists problems associated with the comparison of the movement that is to be completed and the movement that was actually completed; “first, the criterion pattern should be a model movement pattern; second, the angle of viewing must be from a position that can pick up key points in the movement pattern; third, there should be a relatively short time delay between performing and viewing, and also between viewing and performing again; fourth, the athletes should have control over the videotape’s ‘slow motion,’ ‘pause,’ and ‘replay’ functions to allow them to fully analyze their performance; finally, the athletes must have some method of identifying the errors in their movement patterns so that changes can be made on subsequent attempts” (p. 237). These guidelines still present practical problems because these methods of comparative feedback have not been studied extensively. The following studies are a few examples of how video feedback can be utilized in a sports setting.

Hazen, et al. (1990) compared standard behavioral coaching to an individual feedback and a group feedback package for swimmers. Their study showed that

individual packages had the best effect on improving swimmers performance. The package included modeling and role-playing during the initial sessions and then symbolic modeling (i.e. peer modeling), videotape feedback (which consisted of watching themselves doing the movement after viewing the peer model), and verbal feedback. While the swimmer was watching his or her performance on tape, the experimenter provided positive feedback for correct components and corrective feedback for incorrect performances. The results from their study showed that an individual videotaping feedback package was effective for producing improvements in performance with young competitive swimmers.

Boyer, et al. (2009) examined the effectiveness of combining video modeling by experts with video feedback on the development of three complex gymnastic skills. The participants were four female competitive gymnasts with a few years of training and the target behaviors were backward giant circle to handstand, kip cast, and clear hip circle (routines on the uneven bars). This study used a multiple baseline across behaviors for each participant. The baseline condition for the target skills were taken under normal practice conditions which consisted of verbal feedback after dismount of the apparatus, while the video modeling by experts with video feedback condition consisted of the gymnast performing the skill, walking over to computer technician, watching an expert performance, and then viewing her own performance. Next the participant watched both performances side by side, freeze framing at five points in the performance, and repeated watching the expert then her own performance before attempting the skill two more times. The results show that exposure to the intervention improved skill performance more quickly than regular practice and coaching alone, but near-flawless performance

(80% - 100% correct) was seldom achieved by the gymnasts. The authors suggest that future research should use more advanced video technology to give clearer images and analyzing the effect of delayed video after practice.

Zeigler (1994) examined the effects of attentional shift training on the execution of soccer skills. The training procedures in this study included an information and application phase, a concentration grid (to assist the subjects in extending the amount of time they were able to focus on one task), watching videotapes of past performances (specifically of their teams performance in selected soccer matches), evaluating correct tactical decisions made in a limited amount of time, and applications of specific skill execution in a practice session. The first four components were evaluated in an office setting and the last component (application in a practice session) was in a field setting. Results of this study showed that an intervention that emphasized attentional shift training in office and field settings yielded improvement in the performance of soccer skills. The limitations were that it was not known if both office and applied interventions were needed to produce improvements and the effects were not examined in game performance.

Scott, et al. (1998) trained anticipation for intermediate tennis players using video training. They examined the direct effect that a prolonged period of progressive video training had on the ability of individual players to return on-court tennis serves. They did this by having the participant's view a prepared film of tennis serves at different speeds and asked them to verbally respond and physically act out what they believed was the correct response. This took approximately 10 minutes and after this training they participated in on-court intervention that was similar to baseline (returned or attempted to

return 20 serves per session). The results showed that the use of video can be of assistance in improving on-court tennis serve-return performance, as there were improvements in performance in the intervention phase compared to baseline.

Many studies have evaluated video feedback as a means to improve sports performance (Hazen, et al., 1990 & Zeigler, 1994). However, video feedback is part of an intervention package in this research; combined with other procedures such as expert video modeling (Boyer, et al., 2009), or video training (Scott, et, al, 1998). None of these studies has evaluated video feedback by itself as a means to improve a sports performance.

Capoeira is an Afro-Brazilian martial art, involving a complete system of self-defense that also has a dancelike, acrobatic movement style which, combined with the presence of music and song, makes the games into a kind of performance (Lewis, 1992). As Lewis (1992) describes it as “at once game, sport, mock combat and ritualized performance,” it involves two players who “play a game” (or exchange movements of attack and defense in a constant flow) within a ring of musicians and singers (also referred to as a roda). Considering that few studies that have evaluated video feedback for improving athletic performance, and the fact that no research has been conducted evaluating procedures for enhancing skills related to this type of martial arts, the following study would extend the literature in video feedback using acrobatic movements from this unique martial art.

Method

Participants and Setting

Five participants (capoeiristas, or practitioners of capoeira), two males and three females, ages ranging from 24 to 32, participated. Jay, Sarah, and Jane were not able to complete the interventions for all three movements for reasons unrelated to the study. The participants had at least five months of experience, where they had learned the basic movements of the art and had exposure to the target behaviors but had not yet mastered the skills. The participants were training consistently throughout the study, receiving at least four hours of training a week.

The intervention took place after the regular scheduled training sessions at the training center where the participants are members. The training center is an 8.84m x 12.19m, primarily empty, air conditioned room with the majority of wooden floors, with one section of blue matted floors (3.20m x 8.84m). The wall considered the front of the room consists of a mirror that covered the majority of the wall, so that practitioners could easily see themselves.

Materials

The materials that were used were a digital video camera, the Sony HD Bloggie™, to record the performance and a laptop computer, Acer Aspire 5515™, with software (Picture Motion Browser Sony PMB 2010™) to display the performance clip (including the use of pause, slow-motion, and replay).

Target Behaviors and Data Collection

The target behaviors that were assessed were the *revesado* (front walk-over), *au de costa* (cartwheel to the back), and *macaco* (back walk-over from the floor). *Revesado*

is a movement done from standing position, where the person uses momentum to place the hands on the floor (to the side of the body) as the legs come over the body. The back is arched, so that when the legs land on the floor (one leg after the other), the person can lift their body upright as the hands come off the floor. The *au de costa* is a movement similar to a cartwheel, but the person puts the hand on the floor behind the body (so that the back is arched), with the other arm swinging over, and the person's legs follow over the body, one leg at a time. It is also landed one leg at a time, as the arms come off the ground and the body comes upright again. The *macaco* starts from a squat position, when one hand is placed behind the body, as the back arches and the opposite arm is swung behind the body. The legs are straightened as they push off the floor to come over the body, one leg following the other, and landing as such as the hands come off the floor, bringing the upper body upright. Complete definitions of all three target behaviors are listed in the checklists (see appendixes A, B, and C).

Data were collected using a 15-item checklist for each skill; each component scored as correct or incorrect. A percentage of the target behavior completed correct was calculated for each trial. In baseline, the target behavior was attempted, videotaped, and scored three to six separate times. The observers were trained to become familiar with the target behaviors and how to score components on video as correct or incorrect. The training included exposure to the checklists and practice scoring actual videos. The observers also got feedback and had a chance to ask questions related to scoring. A criterion of at least 90% accuracy between observers was required before scoring.

Interobserver Agreement

IOA was conducted for 30% of all sessions, with three independent observers. The percent of agreement was calculated by dividing the number of agreements for the components on the checklist of a skill by the number of agreements plus disagreements. The percentage of IOA for Gary was 84%, 86% for Jay, 83% for Gloria, 82% for Sarah, and 85% for Jane.

Design and Procedure

A multiple baseline design across behaviors was used to evaluate the effects of video feedback for each participant.

Baseline. Baseline was taken after regular practice conditions at the training center which consisted of instruction, peer modeling, rehearsal, and verbal feedback. These conditions continued throughout the intervention phases. In a typical practice, the instructor modeled capoeira movements while giving instruction, allowed time for students to practice the movements following the instructor and/or on their own, and then receiving feedback on how well they are performing the movements. These practices were done either simultaneously (all students engaging in the same movements, lined up and facing a mirror) or one by one (in a manner of practicing the movement while going across the length of the practice floor).

Baseline was collected after class by having the participant attempt the movement three to six separate times. All attempts were filmed and scored.

Video Feedback. The intervention utilized was video feedback. The participant was filmed three separate times attempting the target behavior after the regular practice. Immediately after being filmed once, the participant watched the clip with the instructor.

The instructor then gave positive and corrective feedback while utilizing the pause, slow motion, and replay controls. The participant then attempted the skill two more times while being filmed and the instructor provided feedback in the same manner. The first attempt was not scored, but instead served as the first video to watch for the video feedback phase. The subsequent two attempts were videotaped for scoring.

This video feedback procedure was done separately for the second target behavior once an increase in correct performance was observed in the first target behavior. Video feedback was then applied to the third behavior after improvement was noted in the second behavior.

Video Feedback with Practice. This condition was the same as video feedback, with the added component of participants practicing the movement two to five times between videotaping. After they practiced the movement once, they received live feedback, where the coach described what the participant did correctly and what to improve on.

Social Validity Measures

A social validity measure, similar to one used by Boyer et al. (2009) consisted of a 5-point Likert-type scale. The participants were asked questions such as how much they liked the procedure, did it take much time out of class, how helpful it was, etc. (see Table 1 for the social validity survey).

Results

Results are shown in figures 1-5. After participating in the video feedback intervention, the acrobatic movements for all capoeiristas increased from baseline levels to consistently higher levels. Video feedback plus practice resulted in even higher levels of performance.

This study, like Boyer et al., reports two types of baseline means; total baseline mean and the end of baseline mean. Total baseline mean consists of the average percentage of the movement performed correctly across the entire baseline phase and the end of baseline mean is the average of the second half of baseline or where an increase in percentage correct is sometimes observed. These end of baseline means are reported because some skills showed an increase during lengthy baseline periods, presumably due to regular practice conditions at the training center which consist of instruction, peer modeling, rehearsal, and verbal feedback.

Gary's revezado scores increased from a baseline mean of 48% to an intervention mean of 69%, and increased again during the video feedback with practice condition to a mean of 76%. The last 7 data points in the final phase leveled out at a mean of 81%. His means for macaco were 43% for baseline, and 68% for intervention, although the last 4 data points of the intervention phase were all at 80%. Gary's baseline mean for au de costa was 43%, his end of the baseline mean was 53%, and his intervention mean was 84%.

Jay's revezado scores increased from a baseline mean of 56% to an intervention mean of 75% (Figure 2). His scores for macaco increased from a mean of 48% in

baseline to a mean of 64% during intervention. Jay did not receive the intervention for the au de costa due to factors unrelated to the study.

Gloria's macaco scores (Figure 3) increased from a baseline mean of 35% to an intervention mean of 50%, to a video feedback with practice mean of 62%. In the last half of the second intervention phase the mean increased to 69%. Her revezado scores increased from a baseline mean of 48% to an intervention mean of 69%, to an end of intervention mean of 81%. Gloria's au de costa means were 39% for baseline, 47% for end of baseline, and 65% for intervention.

Sarah's macaco scores increased from a baseline mean of 56.5% to an intervention mean of 69%, and increased again during video feedback with practice to a mean of 81% (Figure 4). Her scores for revezado were a mean of 44% for baseline and a mean of 76% for intervention. Sarah did not receive the intervention for the au de costa due to factors unrelated to the study. However, her performance increased from a baseline mean of 42%, to a mean of 56% in her last 12 sessions.

Jane's au de costa scores increased from a baseline mean of 24% to an intervention mean of 46%, although the mean of the last 5 data points was 44% (Figure 5). Her revezado means were 35% for baseline and 70% for intervention. Jane did not receive the intervention for the macaco due to factors unrelated to the study.

The social validity questionnaire results only included Gary, Gloria, and Sarah, and can be found in Table 1. Overall, the participants liked using video feedback to learn the movements, found it to be helpful, and thought it took a fair amount of time to complete. Despite the increases to higher performance levels with the intervention,

participants did not feel like they could do the majority of the movements and did not feel comfortable doing the movements in the roda.

Discussion

The purpose of this study was to examine the effects of video feedback on the performance of three acrobatic movements unique to the martial art of capoeira. The results indicate that exposure to the intervention improved skill performance more rapidly than regular practice which included the unsystematic use of behavioral skills training. During the baseline phase, some skills were practiced as long as 45 sessions, under regular practice conditions and the skills stayed relatively stable or had gradual increasing trends in some cases. Each of the three skills for each capoeirista increased to levels above baseline, usually within the first few sessions of receiving the intervention for that skill. All participants showed improvement, and in some cases even doubled their baseline levels, following their first video feedback session. These results suggest that adding video feedback to typical coaching and practice techniques could reduce the number of practice sessions required to improve a difficult skill. Video feedback with practice also helped improve the percent of the movement completed correctly, either immediately (such as with Sarah) or gradually (such as for Gary and Gloria).

Although the video feedback intervention enhanced the skill performance to levels above baseline, near flawless skill performance (80-100% correct) was only occasionally achieved by the participants in this study, which was similar to the finding from Boyer et al. (2009). The skill checklists were designed so that a score of 100% would be equivalent to a perfect score for an expert capoeirista performing that skill. The data also showed a good amount of variability, with some capoeiristas dramatically improving in one movement while showing gradual improvement in another movement. This variability may be due to difficulty of the specific components of the movement or

the capoeirista's learning history of similar movements. Typically, these three skills required some level of mastering backbend movements, which could be physically limiting if the participant is not comfortable with that skill. It could be argued that some of the capoeiristas had not yet reached the level of physical conditioning to perform the skills to criterion due to strength limitations, which can account for some variability in the skill.

This study extends earlier research utilizing video feedback for improving athletic skills execution (Boyer et al., 2009; Hazen et al., 1990; Scott, Scott, & Howe, 1998; Zeigler 1994). Hazen, et al. (1990) compared standard behavioral coaching to an individual feedback and a group feedback package for swimmers. Their study showed that individual packages had the best effect on improving swimmers performance. This study singles out the video feedback component without the use of the other components of the package. Boyer et al. (2009) examined the effectiveness of combining video modeling by experts with video feedback on the development of three complex gymnastic skills, while the current study only examines the use of video feedback without video modeling.

There were a few limitations in this current study. First, the amount of time it took to do video feedback for all three movements in the same session was 45 minutes to an hour. This lengthy period of time may be due to the time it took to upload the video onto the laptop, watch the video once, then watch the video using the other controls (such as pause), the actual verbal feedback, and repeating this process multiple times for each movement. Also, there may have been some distractions from other students staying after class to practice other movements. Future researchers should utilize technology that could

upload the video more quickly and conduct the video feedback free from potential distractions. Second, some minor and major injuries were attained from doing other skills related to capoeira, but not necessarily as a result of the study, which may have impaired the performance of some skills being measured or have taken the participants out of the study altogether. As a result, intervention could not be evaluated for all three behaviors for three of the five participants. Fortunately intervention showed an effect with all behaviors for which it was implemented. Furthermore, the behaviors with which the intervention was not implemented served as control behaviors showing the natural course of training as usual. These results allowed us to see that some improvement occurred over time, but that the improvement was small and gradual in comparison to improvements seen with the intervention.

Another limitation is that interobserver agreement was low. Because research assistants weren't familiar with the acrobatic movements from capoeira, a substantial amount of training and supplemental aides were utilized to increase IOA. Interobserver agreement may be low because the research assistants were unfamiliar with this form of martial arts, the descriptions in the checklists may not have been specific enough to control for observer drift, and/or an accurate score could not be obtained at the angle the movement was filmed.

Finally, follow-up assessment of the movements were not collected due to time restraints and injuries incurred by the participants and generalization probes could not be conducted due to the lack of opportunities to record training rodas in which these movements would be utilized.

Although the video feedback intervention was implemented with certain movements after baseline was collected for the other two movements, there is a curious increase in baseline of the au de costa and/or macaco when treatment is implemented in the revesado (for participants Gary, Jay, and Gloria). Subsequently though, there is a decrease in percentage for those behaviors, presumably because they are not coming in contact with the video feedback, or the reinforcer of getting told that the movements are being done correctly. This increase in baselines following intervention for another skill is interesting because the au de costa and the macaco are behaviors that start with a backbend, with the body following afterwards, and the revesado starts going “forward” (or to the side) with the body following over before the back bends. We would have expected instead to see carry-over effects between the au de costa and the macaco because their similarity topographies are much more similar than those movements and the revesado. It is possible though, that coming in contact with the back bend in the revesado made it more likely for participants to attempt more similarities in the topographies of the backbend in the au de costa and macaco, as Dowrick (1991) explains acquiring “this knowledge from the performance of a skill through intrinsic feedback (information gained from the body’s inceptors, such as muscle spindles, joint receptors, and so on).”

It is also interesting to see in Jane’s data, the sudden increase and then gradual decrease for the revesado movement during the video feedback phase. Although she was receiving video feedback that she was performing certain movements correctly, she also engaged in overt self-talk, for example saying things such as, “Is that what I look like?; Ugh, I don’t like the way I look on video.” These self-statements may have served as an

abolishing operation to performing the movements correctly, and reassurance from the coach served as a reinforcer for performing the movements incorrectly.

Future research should utilize video feedback for more experienced capoeiristas who have nearly mastered the movement, to see if it can bring un-mastered skills to criteria. Also, generalization should be probed to see if the participants can successfully execute the skills in a game of capoeira. Lastly, a follow-up assessment should be conducted to evaluate whether the improvements are maintained over time.

The present study evaluated the effects of using video feedback to improve three acrobatic movements unique to the Brazilian martial art, capoeira. This study demonstrated that the capoeiristas improved their skill performance percentage for each movement when the video feedback intervention was used in addition to regular practice conditions. The participants learned the movements more quickly with video feedback than with regular practice conditions. Video feedback was liked by the participants and was found to be helpful in learning these movements. Based on these results, it is hypothesized that this intervention has the potential to improve other skills for other sports as well.

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Appendices

Appendix A

Results for Gary

Figure 1. Percentage correct skill performance across revesado, macaco, and au de costa for Gary.

Appendix A (Continued)

Results for Jay

Figure 2. Percentage correct skill performance across revesado, macaco, and au de costa for Jay.

Appendix A (Continued)

Results for Gloria

Figure 3. Percentage correct skill performance across macaco, revesado, and au de costa for Gloria.

Appendix A (Continued)

Results for Sarah

Figure 4. Percentage correct skill performance across macaco, revesado, and au de costa for Sarah.

Appendix A (Continued)

Results for Jane

Figure 5. Percentage correct skill performance across au de costa, revesado, and macaco for Jane.

Appendix B

Table 1: Social Validity Results

Questions and Responses on the Social Validity Measures for Gary, Gloria, and Sarah

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	I liked the procedure.			1		2
2.	The procedure took too long.		1	1	1	
3.	I felt the procedure was helpful in learning the movements.				1	2
4.	I liked using video feedback to learn the movements.					3
5.	I can do the revesado.		1	2		
6.	I feel comfortable doing the revesado in the roda.	1		1	1	
7.	I can do the au de costa.	1		1	1	
8.	I feel comfortable doing the au de costa in the roda.	1		2		
9.	I can to the macaco.		2	1		
10.	I feel comfortable doing the macaco in the roda.	1	1	1		

Note: The numbers represent the number of participants endorsing each item.

Appendix C

Table 2: Revesado Checklist

Revesado: Was this behavior completed correctly?	Correct	Incorrect
1. Start from the base position (left leg back)		
2. Move into center position		
3. Simultaneously bend the left leg and straighten the right leg (so that the upper body is leaning towards the left),		
4. The left arm reaches for the ground, next to the left leg,		
5. Right arm also reaches to the ground, parallel to the left hand.		
6. The right leg lifts off the ground as the left hand touches the floor (flat palm)		
7. The right leg lifts (slightly bent) over the body as the left leg pushes off the ground (goes from bent to straight)		
8. The right hand prepares to touch the ground (flat palm)		
9. As the right leg continues to go over the body, the left leg lifts off the ground		
10. The right hand lands on the floor, next to the left hand		
11. As the right leg goes over the body and starts returning to the ground, the back begins to arch		
12. The left leg goes over the body and the left hand begins to lift off the ground.		
13. When the right leg lands, the back is arched, the right hand begins to lift off the ground,		
14. The left leg begins returning to the ground, passing the right leg so that it lands behind the body, raising the upper body, with arms to the side		
15. Back to the base position.		

Appendix C (Continued)

Table 3: Au De Costa Checklist

Au de costa: Was this behavior completed correctly?	Correct	Incorrect
1. Start from the base position (left leg back)		
2. Move into center position		
3. Bring the right leg next to the left so that the right leg passes the left and is placed on the floor		
4. As the right leg is placed (and is slightly bent), the left leg lifts to the front of the body		
5. The right arm stays straight as it reaches towards the floor behind the body (and the palm is flat on the floor), so that the back arches		
6. The left arm is opposite of the right arm (in the air to the front)		
7. The left arm is swung back, behind the body		
8. As the left leg begins to swing over the body, the right leg pushes off the ground (goes from bent to straight) and lifts from the floor, beginning to follow the left leg over the body.		
9. The left hand reaches behind the body and is placed on the ground in a 45 degree angle from the right hand		
10. The legs follow over the body, the left leg leading the right leg		
11. The left leg is straightened as is lands parallel to the right hand		
12. The right hand comes off the ground as the right leg is parallel to the ground,		
13. The left hand comes off the ground right before the right leg reaches the ground and is parallel to the left leg		
14. The upper body comes off the ground and moves to the right until it is upright		
15. The body is now back in the center position		

Appendix C (Continued)

Table 4: Macaco Checklist

Macaco: Was this behavior completed correctly?	Correct	Incorrect
1. Start from the base position (left leg back)		
2. Move into center position		
3. Bring the right leg next to the left so that both feet are facing to left		
4. Bend knees so that the body is close to the floor		
5. The right arm stays straight as it reaches towards the floor behind the body (and the palm is flat on the floor),		
6. The left arm is opposite of the right arm (in the air to the front)		
7. The left arm is swung back,		
8. Simultaneously, the legs are straightened so that the back is arched and the feet push off the ground.		
9. The left hand reaches behind the body and is placed on the ground in a 45 degree angle from the right hand		
10. The legs follow over the body, the left leg leading the right leg		
11. The left leg is straightened as is lands parallel to the right hand		
12. The right hand comes off the ground as the right leg is parallel to the ground,		
13. The left hand comes off the ground right before the right leg reaches the ground and is parallel to the left leg		
14. The upper body comes off the ground and moves to the right until it is upright		
15. The body is now back in center position		