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The Effects of a Task Analysis and Self-Evaluation on the Acquisition of Yoga Postures

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The Effects of a Task Analysis and Self-Evaluation on the Acquisition of Yoga Postures

by

Elizabeth Ortega

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

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Keywords: yoga, task analyses, skill acquisition, self-evaluation, sports, feedback, behavior analysis

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Dedication

I dedicate this manuscript to my husband, Raul, and to my parents, Reynaldo and Barbara. Thank you all for your help and support.
Acknowledgements

I would like to acknowledge my thesis advisor Dr. Raymond Miltenberger for his guidance, feedback, and time to ensure the successful completion of my thesis. I would also like to acknowledge Carolina Luque and Chelsea Car for all of their assistance in data collection. Finally, I would like to acknowledge Nikki Bennett and Karen Ellis for their assistance and time in ensuring that the yoga poses chosen were valid and accurate.
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Abstract

There is a growing amount of research evaluating behavioral approaches for skill acquisition in sports. Few of these studies have focused on yoga and skill acquisition. There is a need for a low effort yet effective way to teach yoga postures to individuals who do not take private yoga classes and may practice at home. This study evaluated the effects of using a picture-based task analysis and self-evaluation on the skill acquisition of yoga postures. A multiple baseline across yoga postures was used. During the task analyses intervention, the participants received a task analysis, performed the posture, and scored the task analysis upon the completion of the posture. Results showed that the task-analysis and self-evaluation increased the accuracy of all the poses.
Chapter 1: Introduction

Research evaluating behavioral approaches to skill acquisition in sports has targeted a variety of sports including swimming (e.g., Dowrick & Dove, 1980; Lao, Furlonger, Moore, & Busacca, 2016; McKenzie & Rushall, 1974), baseball (Heward, 1978; Osborne, Rudrud, & Zezoney, 1990), gymnastics (e.g., Baudry, Leroy, & Chollet, 2006; Boyer, Miltenberger, Batsche, & Fogel, 2009), martial arts (e.g., BenitezSantiago & Miltenberger, 2016; Louie, 2015), horseback riding (Kelley & Miltenberger, 2016), and football (Stokes, Luiselli, Reed, & Fleming, 2010) to name a few.

Although many sports have been studied, some have received little to no research. Yoga has been evaluated in two studies, only one of which is published (Andrews & Miltenberger, 2015; Downs, Miltenberger, Biedronski, & Witherspoon, 2015) and both of these studies have shown promising results of behavioral interventions. Downs et al. (2015) studied how video self-evaluation can be useful for skill acquisition in novice yoga practitioners. Andrews and Miltenberger (2015) showed that TAGteach, a technique using clickers for positive feedback, improved the postures of novice yoga practitioners. However, because yoga is increasing in popularity and most people practice either in large classes (20 students to 1 instructor) or at home, there is an increased risk for injury (Cramer, Krucoff, & Dobos, 2013). In a systematic review of case reports and case studies, Cramer et al. (2013) found the presence of adverse effects in the practice of yoga. Nonetheless, there are many health benefits that come from practicing yoga especially because it is a very low-impact form of exercise. In a study by Tran, Holly, Lashbrook, and Amsterdam (2001), all participants, after practicing yoga for 8 weeks, had
improvements in their muscular strength, endurance, and flexibility. Yoga is associated with great health benefits but there is still a risk of injury especially if the poses are not done with correct alignment and body control. The risk of injury can be reduced through proper instruction or coaching.

Traditional coaching usually involves live feedback while the athlete is performing the skill or right after the skill is performed. The feedback is usually corrective in nature, with emphasis on the parts of the skill that need improvement. Recent research has focused on giving feedback using video technology (e.g., Baudry et al., 2006; BenitezSantiago & Miltenberger, 2016; Downs et al., 2015). Video feedback involves watching a replay of the performance and providing praise for correct performance and corrective feedback for incorrect performance (e.g., Baudry et al., 2006; Boyer et al., 2009; Kelly & Miltenberger, 2016). Software analysis in the video can be extremely useful in targeting advanced skills which rely on certain body angles or speeds (e.g., Dyal & Miltenberger, 2017).

Studies have shown that video feedback after the performance of the skill can substantially improve the acquisition rate of the skill (BenitezSantiago & Miltenberger, 2016; Boyer et al., 2009; Dyal & Miltenberger, 2017; Guadagnoli et al., 2002; Kelley & Miltenberger, 2016; Stokes et al., 2010). In addition to showing enhanced performance, studies which have evaluated video feedback have shown moderate to high scores on their social validity scales, indicating this is an intervention that is preferred or enjoyed by the participants and coaches (Boyer et al., 2009; Kelley & Miltenberger, 2016).

Video self-evaluation is a relatively new research area in sports in which the athlete or performer can evaluate his or her own performance from a video recording. Only one published study to date has looked at video self-evaluation as a form of feedback to improve sports
performance. Downs et al. (2015) studied the effects of video self-evaluation on the acquisition of different yoga postures. Video self-evaluation involved the participants watching a video of themselves after performing the yoga posture and then scoring themselves from the video using a task analysis. This study had some promising effects. For both participants, video self-evaluation showed substantial improvements from baseline levels for most of the yoga postures.

Video self-evaluation similar to the procedure by Downs et al. (2015) has also been studied outside of sports performance. Kern-Dunlap et al. (1992) used a video feedback package which involved a form of self-assessment to increase positive peer interactions with children with behavioral and emotional challenges. During intervention, the students watched themselves on a video interacting with their peers from the day before. From this video, they scored in consecutive intervals whether or not they had positive interactions with a peer. Results showed an increase in positive interactions amongst peers. Sigurdsson and Austin (2008) evaluated how a multi-component package which included discrimination training, real-time visual feedback, and self-monitoring could improve posture at computer workstations. The real-time feedback was a pop-up window that would appear on the screen which showed their current posture and seating position. The participants had to score whether their posture was safe or at risk. All participants’ postures improved and, for two participants, their posture remained at safe levels when intervention was withdrawn. These studies show some positive effects of video self-evaluation in other areas of research.

There are potential benefits to video self-evaluation as a form of feedback. For sports or performances in which one-on-one coaching is not necessary or feasible, self-evaluation could prove to be a viable option. With this type of feedback the only person needed would be the person performing the skill. This has the potential to be a cost effective and efficient way to
increase performance. Downs et al. (2015) described how efficient the procedure was with reference to the small amount of time a coach was needed and the relatively short session durations.

Task analysis is a process of breaking down complex skills into smaller more achievable steps to aid in the acquisition of these complex skills (Szidon & Franzone, 2009). Task analysis have been used in sports research as a method of data collection for researchers to visually represent the participant’s progress (e.g., Andrews & Miltenberger, 2015; BenitezSantiago & Miltenberger, 2016; Boyer et al., 2009; Stokes et al., 2010). Outside of sports, task analyses have been widely used in autism intervention as either a component of the intervention or an aid in the breakdown of complex skills. Matson et al. (1990) used a breakdown of complex skills such as shoe tying to aid in teaching these skills to children with autism. However, in this study, the steps in the task analyses were not given to the children but were used by the trainer to use during verbal, model and physical prompting. Downs et al. (2015) did give the task analyses to the participants as a way to self-evaluate their performance but it was used as a component of the intervention. The participants used the task analyses while watching a video recording of themselves. In the published literature, task analyses have not been evaluated as the sole intervention for skill acquisition and self-evaluation.

In a typical yoga practice, the practitioner receives very little feedback from the yoga instructor. With popularity increasing and the class sizes getting larger, instructors usually do not have the ability to provide one on one feedback during class. Due to this lack of feedback and the increase in online yoga instruction, finding a way for yoga practitioners to self-evaluate their performance to promote a safe and injury free practice is of importance. Although Downs et al. (2015) demonstrated the effectiveness of video self-evaluation; it is possible the self-evaluation
procedure could be made even more efficient. Downs et al. provided the participants with a task analysis that they used to evaluate their performance from video. It is possible that the use of a task analysis alone to analyze performance could be effective, even without the video of the performance. Using a task analysis with all the steps of a pose written out in clear terminology and shown in pictures may increase the acquisition of these skills more rapidly than typical instruction and video recording the pose may not be necessary. Therefore, the purpose of this study was to assess the effects of a picture-based task analysis and self-evaluation on the skill acquisition of yoga postures.
Chapter 2: Methods

Participants and Setting

This study included three participants, ages 34 (Gene), 23 (Autumn), and 28 (Robin). The participants were interested in improving their skill in yoga, had no injuries, and all had varying experiences with yoga. The experimental procedures were conducted in each participant’s home or in their local gym.

Gene had been practicing yoga occasionally for about 5 years, practicing three to five times a week. He took about five yoga classes but mainly did videos online. Gene wanted to participate in the study to learn new poses and become more comfortable in his practice. He continued to occasionally practice throughout the study. Autumn was a certified fitness coach and nutritionist who exercised almost every day of the week. She was certified in various fitness classes but said she was never comfortable teaching a yoga class because she felt uncomfortable doing most of the poses. Her yoga practice consisted of the occasional yoga class or online yoga videos done twice a month as a form of stretching. While in the study, Autumn continued an intense exercise regimen and taught a few yoga classes when substitutes were needed. Robin occasionally took part in free yoga classes available in the community. She wanted to participate in the study just to learn more about yoga. Robin did exercise throughout the study but did not practice yoga or the poses outside of session.

Recruitment and Consent

The researcher posted flyers around the university and sent the flyers to coworkers in an ABA clinic. All adults who showed interest were given a handout and asked if they would like
to learn more about the study and possibly participate. The potential participant then met with the researcher, heard a description of the study, and signed a consent form if interested.

**Materials**

The materials included an iPhone 8+ with a video camera, a tripod, a laptop, iTunes video playing software for feedback, and yoga mats available for the participants’ use. The phone was used to record the participants performing the pose. The laptop and video playing software were used to score the assessments. The yoga mats were available for the participants to use while performing the yoga postures. This was to mimic a standard yoga practice as well as to ensure comfort and safety while attempting the poses.

**Target Behaviors**

The target behaviors included the task analyses for three yoga poses for each participant (see Appendices A-D for the four yoga poses used during the study). The poses were chosen by the participant and researcher as poses that needed the most improvement and the low probability that the acquisition of one pose would influence another pose. Each task analysis given to the participant had pictures that correlated to each step of the task analysis. The yoga instructor working with the researcher confirmed that the yoga poses are appropriate for a healthy individual and the poses chosen have a low probability of influencing each other. The task analyses were reviewed by a certified yoga instructor who judged the task analyses to be an accurate depiction of the poses. The pictures used for the task analysis were of a person completing each individual step of the pose.

The poses included were ardha chandrasana (half moon pose), a modified natarajasana (dancer’s pose), a modified rajakapotasana (king pigeon pose), and eka pada rajakapotasana (mermaid pose). The task analyses for these poses had 20, 13, 20, and 22 steps, respectively.
Ardha chandrasana is a balancing pose in which you are bent at the waist, one hand on the floor, and your leg straight out behind you. The modified natarajasana is a balancing pose in which you lift your leg behind you at a 90 degree angle using your arm to lift it. The modified rajakapotasana pose is a floor pose where you grab your back leg behind you and hold it at an angle. Eka pada rajakapotasana is the more advanced version of the modified rajakapotasana in which you place your back foot in the crook of your elbow and clasp your fingers together.

Data Collection

During each phase of the intervention, data were collected using a video camera and scored by the researcher using the task analysis for each pose. Different angles for recording were chosen based on the given pose and what would be the best angle for scoring and feedback. Each behavior in the task analyses was scored as correct or incorrect during all assessment conditions. The task analyses was scored as percentage correct by dividing the number of correct steps by the total number of steps in the task analyses and multiplying by 100.

Inter-Observer Agreement

Forty-five percent of all sessions were observed by two independent observers who scored each participant’s video. Agreement was scored when both observers scored a step in the task analysis as correct or incorrect. The percentage of agreement for each task analysis scored will be calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100.

The mean IOA for the three participants was 89% (range = 69% - 100%). For Gene, the mean IOA in 30% of sessions across behaviors for baseline was 86% with a mean of 91% for half moon pose, 85% for modified dancer’s pose, and 83% for modified king pigeon. The mean IOA in 43% of sessions across behaviors for treatment were 99% with a mean of 99% for half
moon, 99% for modified dancer’s, and 100% for modified king pigeon. For Autumn, the mean IOA in 44% of sessions across behaviors for baseline was 92% with a mean of 92% for half moon pose, 100% for modified dancer’s pose, and 86% for mermaid pose. The mean IOA in 50% of sessions across behaviors for treatment was 87% with a mean of 90% for half moon, 86% for modified dancer’s, and 85% for mermaid. For Robin, the mean IOA in 33% of sessions across behaviors for baseline was 80% with a mean of 75% for half moon pose, 77% for modified dancer’s pose, and 85% for mermaid pose. The mean IOA in 67% of sessions across behaviors for treatment were 90% with a mean of 90% for half moon, 90% for modified dancer’s, and 90% for mermaid.

Social Validity

Two questionnaires were used to assess the social validity of the target behaviors chosen for the intervention and the outcome of the interventions. For one social validity measure, a certified yoga instructor reviewed and edited the task analysis for each of the yoga poses to socially validate the behaviors measured. The yoga instructor gave open-ended feedback on the task analyses written by the researcher, and the researcher edited the task analyses based on the feedback given. The final edit of the task analyses was then given to the instructor to rate on a 5-point Likert-type scale (see Appendix E). For the second social validity measure, all participants received a 5-point Likert-type scales assessing the ease and accessibility of the intervention (see Appendix F).

Treatment Integrity

Treatment integrity (TI) for the participants was assessed. The researcher observed whether the participant carried out the steps in the intervention procedures as prescribed. In the task analysis and self-evaluation phase, the participant must score each step in the task analysis
as correct or incorrect. To calculate TI, the researcher divided the steps completed correctly by the number of steps in the task analysis of the particular procedure (see Appendix H).

**Procedures**

A multiple baseline across behaviors design was used to assess the effects of the intervention for each participant’s poses. Data were collected on the poses throughout baseline, intervention, and maintenance phases. An assessment session was conducted during each meeting between the researcher and participants. In the assessment session, the participant executed each pose two to three times. Similar to a typical yoga class, the researcher lead the participants in a short vinyasa (yoga flow) at the beginning of each meeting to warm up the participants for at least 5 min before attempting any of the poses. The yoga flow included beginning in mountain pose (standing straight with feet hip-width apart), reaching arms up to the sky, folding down to touch the toes, then placing hands on the floor and moving feet into a plank position, a tricep pushup, then pushing up into upward facing dog (back is arched with arms straight, pushing with the toes, and hips lifting off the ground), pushing back into downward facing dog (an inverted V), then stepping back together and standing up straight. Each session was video recorded by the researcher to allow for independent scoring and treatment fidelity checks for the participant.

**Baseline.** During baseline, participants were instructed to demonstrate the target pose as they would typically do during a yoga class. The participants attempted each pose three times during each assessment session while being video recorded. The experimenter did not provide any feedback. If multiple assessment sessions occurred in a visit, assessment sessions were separated by at least 2 min.
Task analysis and self-evaluation (TASE). During this phase, the participants were given a task analysis for each of their target poses. The task analysis included pictures of each step as a visual representation for what each step should look like. The intervention was applied to one pose until increases were observed in that pose before moving on to the next target pose. During the first two executions of each pose, the researcher showed the participant how to evaluate him or herself using the task analysis. The participant attempted the pose, then the researcher scored the behaviors with the participant while discussing the scoring of the correct and incorrect steps observed. Each session after, the participant scored him or herself without feedback. In each TASE session, the participant attempted a pose and then scored the pose using the task analysis and repeated the process two times. After using the TA to score the pose three times, the participant participated in an assessment session in which they performed the pose three more times without the TA present.

Maintenance. To assess the maintenance of the TASE procedures, one participant, Gene, was assessed 2 weeks after the removal of the intervention for two of the poses. He was video recorded doing the poses and then scored on the task analysis by the researcher.
Chapter 3: Results

There was an immediate increase in the percentage correct for all poses across all participants once the TASE procedure was introduced. Results are shown in Figures 1, 2, and 3. Some increase in performance did occur in the longer baseline phase for some participants.

The TASE phase was effective for Gene for all three poses, as shown in Figure 1. The baseline mean for the half moon pose was 37%, and the mean for the last five data points of the TASE intervention was 100%. For modified dancer’s pose, the baseline mean was 44%, and the mean for the last five intervention data points was 92%. The baseline mean for modified king pigeon was 36%, and the mean for the last five intervention data points was 99%.

As shown in Figure 2, the TASE phase was effective on all three poses for Autumn. The baseline mean for half moon pose was 28%, and the mean for the last five data points of the intervention was 94%. For modified dancer’s pose, the baseline mean was 55%, and the mean for the last five intervention data points was 77%. The baseline mean for mermaid pose was 46%, and the mean for the last five data points of intervention was 88%.

The TASE phase was effective for Robin for all three poses, as shown in Figure 3. The baseline mean for half moon pose was 36%, and the mean for the last five data points of the intervention was 94%. For modified dancer’s pose, the baseline mean was 53%, and the mean for the last five intervention data points was 88%. The baseline mean for mermaid pose was 40%, and the mean for the last five data points of intervention was 85%.

Treatment integrity averaged 96% for Gene and 100% for Autumn and Robin. The participants’ social validity data for the interventions are shown in Table 1. The task analyses for
each of the yoga poses were given high scores by a yoga instructor, which suggested that the task analyses were valid representations of the yoga poses.

Table 1. Social Validity Ratings of the Task Analysis for Gene, Autumn, and Robin.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am comfortable performing the half moon pose.</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2. I am comfortable performing the modified dancer’s pose.</td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I am comfortable performing the modified king pigeon/mermaid pose.</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4. I liked using the task analyses to self-monitor my poses</td>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I think my poses got better after using the task analyses.</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6. The task analyses did not take too much time to complete</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
Figure 1. Percentage correct on task analyses across trials for Gene.
Figure 2. Percentage correct on task analyses across trials for Autumn.
Figure 3. Percentage correct on task analyses across trials for Robin.
Chapter 4: Discussion

This study evaluated the effectiveness of a picture-based task analysis and self-evaluation (TASE) with three yoga poses for three participants. The TASE procedure increased the skills for all three yoga postures for all the participants. During baseline, all three participants had relatively low levels of performance for all of their poses. For Gene, the TASE procedure increased his performance levels to near 100% for all three poses. For Autumn, mermaid and half moon poses increased to close to 100%. Her dancer pose, while averaging near 85%, still had substantial increases. Robin had substantial increases for all three of her poses.

All three participants found the TASE procedure simple and easy to use and all felt more comfortable completing the pose on their own after using the procedure. The picture-based task analysis and self-evaluation is a relatively simple tool that can be utilized by people practicing at home or in a yoga studio who would want to improve how they get into the yoga pose without the aid of a one-on-one session with a yoga instructor. The results also suggest that using the TASE procedure can lead to skill acquisition regardless of the person’s history doing yoga. The three participants had varying histories with yoga, from one participant who practiced for 5 years to another participant who practiced once or twice a year. Before the first set of data in each TASE phase, the participant had already performed the pose three times during the training session in which the participant learned to use the TASE procedure.

The results of this study add to the literature that behavioral approaches are effective for skill acquisition in a variety of yoga postures (Andrews & Miltenberger, 2015; Downs et al.,
Past studies have used task analyses as a means of scoring skill acquisition or an intervention in conjunction with video or other modalities (i.e., Baudry et al., 2006; Downs et al., 2015; Kelly & Miltenberger, 2016). This study adds to the task analysis literature by using a pictorial task analysis as part of the intervention. Furthermore, the increases in performance seen in the study are comparable to the results seen in studies using video self-evaluation and video feedback (Downs et al., 2015). This suggests that the picture-based task analysis and self-evaluation might be an alternative to more intrusive and time-consuming coaching methods such as video feedback which requires a coach to video record and provide specific feedback as the video is being reviewed. The results also suggest the task analysis and self-evaluation could be a quicker alternative to video self-evaluation because there is no video to review. Although these results were positive, more research is needed to substantiate the robustness of the findings.

Although the data suggest that the TASE procedure can be effective for the skill acquisition of yoga postures, there are some limitations to the study. This study was effective for yoga postures, which are generally require slow-moving flows to get into the pose. The recall needed to score the TASE procedure was easier when the pose took on average 30 s or longer to get into the final pose. This intervention might not prove as effective with more rapid movements, such as dance moves or baseball pitches in which the entire movement occurs in just a few seconds. Recall for these types of movements might prove to be more difficult without having a video as an aid. Another limitation could be that scoring during the self-evaluation might not be as accurate as the scoring of the actual pose. The participants could be scoring themselves 100% on the task analysis while they are actually performing at 90%. Although this possibility would not have a negative effect on these individuals because yoga is not a competitive practice, this could affect more competitive sports in which accurate performance
plays a role in competition. Lastly, all three participants needed to be trained on how to score themselves on the task analysis. It is not clear if this training was absolutely necessary to score the TA or how other athletes doing yoga or other sports will need to be trained or if retraining will be necessary for competitive sports.

Overall, all three participants seemed to have enjoyed the benefits of the study. Gene continued to practice the poses outside of sessions and on the other side of his body. Even though the other side did not receive intervention, he said he felt improvements on both sides and felt a lot more comfortable completing the moves. Autumn took a yoga class while in intervention. She said that while in class, the instructor did one of the target moves. Based on the teacher’s instructions and her vantage point, she did not feel like she would have been able to get into the pose effectively had she not participated in the TASE procedure.

This study was the first study to asses a picture-based task analysis and self-evaluation on the skill acquisition of yoga. The three participants all had varying levels of experience with yoga. Future studies should replicate the study with novice practitioners and a variety of other poses. This study should also be replicated with more advanced practitioners and more advanced poses to see if the TASE procedure can elevate their performance. Furthermore, future research should replicate the study with other sports. The effectiveness of the intervention could be affected by the difficulty and speed of the target sport and these differences should be evaluated. If found to be effective in other sports, the intervention could be beneficial to athletes during home practices when their coaches are not available, thus leading to faster skill acquisition. Another area for future research would be to compare the use of a picture TA as an antecedent intervention to guide performance of the skill without the use of self-evaluation as a consequence component of the intervention. The question would be whether the picture task analysis could be
effective in the absence of self-evaluation. If so, it makes the procedure even more efficient.

Finally, the necessity of the pictures used in the task analysis should be evaluated. Future studies should assess whether the picture component of the task analysis is an essential component of the task analysis and self-evaluation procedure or whether the same results could be achieved with a written TA and self-evaluation procedure.
References


Appendices
### Appendix A: Task Analysis for Ardha Chandrasana

<table>
<thead>
<tr>
<th>Ardha Chandrasana (Half Moon pose)</th>
<th>(+) correct</th>
<th>(-) incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session #</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Stand at the center of your yoga mat

2. Turn to the side of your mat and step your feet wider than hip width apart
3. Rotate right foot, knee, and thigh 90 degrees, while keeping right heel on the mat

4. Raise your arms out to your sides, perpendicular to the floor
5. Keep arms straight

6. Tilt your hips out to your left arch

7. Begin leaning torso over right leg, keeping chest facing the side of the mat
8. Lean forward until you can place your right hand on your shin, ankle, floor, or block

9. Bend your right leg
10. Rest your right elbow on your right thigh

11. Place your left arm on your left hip

12. Step left foot forward about 6 inches
13. Bending legs as necessary, place right fingertips on the mat, 6 inches in front of pinky toe

14. Straighten right leg, lifting left leg off the floor

15. Flex left foot
16. Keep back straight, head in line with the spine

17. Lift left leg until perpendicular to the floor, toes facing your left
18. Twist torso to the left

19. Straighten left arm up, in line with your right arm

20. Hold for 3 seconds
<table>
<thead>
<tr>
<th>Number of Steps Completed Correctly</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of Steps Completed Correctly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: Task Analysis for Natarajasana

<table>
<thead>
<tr>
<th>Natarajasana (Modified Dancer’s pose)</th>
<th>(+) correct</th>
<th>(-) incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session #</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Stand facing the front of your mat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Lift right foot off of the floor towards your chest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Place hands at chest center

4. Extend right arm straight out in front of you, perpendicular to the floor
5. Lower right arm to grab right ankle/foot

6. While holding your foot, move your knee back until it is in line with your standing leg, square off your hips
7. Flip your grip of your right hand so it is grabbing the inside of your foot, thumb facing up towards your toes.

8. Begin to lean forward at the hips, pressing your right leg into your hand.
9. Lift your right leg until it is perpendicular to the floor

10. Straighten your left arm in front of you until it is perpendicular to the floor

11. Bend your left elbow until your forearm is at a 45 degree angle
12. Bend left index finger and thumb until they are touching to form a circle

13. Hold pose for 3 seconds

<table>
<thead>
<tr>
<th>Number of Steps Completed Correctly</th>
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</thead>
</table>

| Percentage of Steps Completed Correctly |  |  |  |
Appendix C: Task Analysis for Rajakapotasana

<table>
<thead>
<tr>
<th>Rajakapotasana (Modified King Pigeon pose)</th>
<th>(+) correct</th>
<th>(-) incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session #</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Start in downward facing dog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Lift left leg off of the mat, keeping it straight</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Bend your left leg

4. Move bent left leg forward in front of your stomach

5. Bring shoulders over your wrists
6. Lower left knee behind your left hand

7. Place right knee on the mat

8. Have your left toes face towards your right palm
9. Straighten back right leg, toes pointed

10. Move torso back over your hips, squaring hips front

11. Place fingertips at your sides on the floor for balance
12. Puff your chest out

13. Bend right leg, keeping knee on the floor

14. Point your right foot
15. Reach right arm back towards your right foot

16. Grab the top of your right foot, palm facing top of your foot

17. Lift your left arm up straight above your head
18. Spread your left fingers wide

19. Look up at your left hand

20. Hold pose for 3 seconds
<table>
<thead>
<tr>
<th>Number of Steps Completed Correctly</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of Steps Completed Correctly</td>
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Appendix D: Task Analysis for Eka Pada Rajakapotasana

<table>
<thead>
<tr>
<th>Eka Pada Rajakapotasana (Mermaid pose)</th>
<th>(+) correct</th>
<th>(-) incorrect</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Session #</td>
<td></td>
</tr>
<tr>
<td>1. Start in downward facing dog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Lift left leg off of the mat, keeping it straight</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Bend your left leg

4. Move bent left leg forward in front of your stomach

5. Bring shoulders over your wrists
6. Lower left knee behind your left hand

7. Place right knee on the mat

8. Have your left toes face towards your right palm
9. Straighten back right leg, toes pointed

10. Move torso back over your hips, squaring off your hips

11. Place fingertips at your sides on the floor for balance
12. Puff your chest out

13. Bend right leg, keeping knee on the floor

14. Point your right foot
15. Reach right arm back towards your right foot

16. Grab the top of your right foot, palm facing your foot
17. Lift your left arm up straight above your head

18. Move right foot into the bend of your right elbow
19. Bend your left arm back towards your right hand

20. Grab your left fingers with your right fingers

21. Look back at your right foot
22. Hold pose for 3 seconds

<table>
<thead>
<tr>
<th>Number of Steps Completed Correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Percentage of Steps Completed Correctly</th>
</tr>
</thead>
<tbody>
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<td></td>
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</tbody>
</table>
Appendix E: Instructor Task Analyses Rating Scale (adapted from Downs et al., 2015)

Please carefully read and answer the questions. Please circle the one that best indicates your opinion to the question.

1. The task analysis of _______________ is indicative of the original pose.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

2. I believe the task analysis is easy to understand.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

3. I believe the task analysis is capable of testing the true form of a pose.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree
Appendix F: Participant Rating Scale

Participant #_______

Please read carefully and answer the six questions independently. Please circle the one that best indicates your opinion to the question.

1. I am comfortable performing the __________.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

2. I am comfortable performing the __________.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

3. I am comfortable performing the __________.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

4. I liked using the task analyses to self-monitor my poses.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

5. I think my poses got better after using the task analyses.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree

6. The task analyses did not take too much time to complete.
   - Strongly disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly agree
### Appendix G: Treatment Integrity for TASE Phase

<table>
<thead>
<tr>
<th>TA Phase</th>
<th>(+) if correct</th>
<th>(-) if incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session #</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Researcher gives participant task analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Participant reads over the task analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Participant performs the yoga posture</td>
<td></td>
<td></td>
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<tr>
<td>4. Within one minute of completing pose, the participant scores him or herself as correct or incorrect on each step of the task analysis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
