Investigating Expert-Rater Agreement and Inter/Intra-Rater Reliability of Two Fundamental Movement Skills for the Locomotor Subscale of the FG-COMPASS

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for the degree of Master of Science in Kinesiology

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Dedication

I dedicate my thesis to my parents, especially my mother, Juana Lucila Cuevas Felix. Without your continued support in my pursuit of a higher education, I would have never been able to achieve what I have today. Thank you for providing me with a better quality of life.
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Abstract

Investigating Expert vs. Rater Consensus Agreement, Inter and Intra-Rater Reliability of Two Fundamental Movement Skills for the Locomotor Subscale of the FG-COMPASS

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Master of Science in Kinesiology

The Furtado-Gallagher Computerized Observational Movement Pattern Assessment System (FG-COMPASS) is an observational rating scale using sequential decisions to assess fundamental movement skills. The current version of the test has 3 locomotor and 5 manipulative skills. This study aimed to assess expert-rater agreement and inter/intra rater reliability of two new scales to be added to the locomotor subtest. This study was divided into two phases. In Phase I, 60 children between the ages of 5 and 10 were filmed performing the skills of galloping and vertical jumping. An expert in motor behavior classified the videotapes using the newly created rating scales. Next, 8 video clips were selected for training purposes and 24 video clips for testing purposes. In Phase II, 30 undergraduate and graduate students served as raters and underwent a training session prior the testing session. Participants were instructed not to classify the video clips based on the apparent age of the children as skill levels were distributed across all age levels. Further, to avoid guessing, participants were not told how many videos of each level they would be rating. Unlike the training sessions, participants did not receive feedback during testing sessions. Weighted kappa ($K_w$) and Intraclass Correlation Coefficient (ICC) were used to analyze data. Results suggested a “very good” agreement between expert and rater consensus for vertical jumping ($K_w=.96$) and galloping ($K_w=.89$) and an “excellent” agreement for vertical jump (ICC = .98) and galloping (ICC = .95). Inter-rater reliability resulted in “very good” agreement for vertical jumping ($K_w=.92$) and a “good” agreement for galloping ($K_w=.78$), and an “excellent” agreement for vertical jumping (ICC = .98) and galloping (ICC = .95). Intra-rater reliability resulted in a “very good” agreement for both vertical jumping ($K_w=.96$) and galloping ($K_w=.85$) and an “excellent” agreement for vertical jumping (ICC = .98) and galloping (ICC = .92).
Introduction

Fundamental movement skills (e.g., running, jumping, throwing) are considered the foundation for future movement sequences required in physical activity throughout childhood and adolescence (Gallahue, 1982). During infancy, motor skill development allows children to explore their environmental context (Haywood & Getchell, 2014), and although children may reach a rudimentary level of fundamental movement skills (FMS), it is a common misconception that proficiency of FMS will be reached solely through maturation. Children must be taught how to optimize their movement patterns in order to attain proficiency (Clark, 2007), especially during elementary years of education, where concepts and mastery of fundamental movements are easier to attain than at any other stage of development (Colvin, Markos, & Walker, 2000). In addition, early mastery of FMS can lead to greater engagement in physical activity during adolescence and adulthood (Barnett, van Beurden, Morgan, Brooks, & Beard, 2009; Kuh & Cooper, 1992; Okely, Booth, & Patterson, 2001). Furthermore, children with lower FMS competence are less likely to engage in physical activity (Stodden et al., 2008) and have also been associated with childhood obesity (Cliff et al., 2012). Therefore, it is important to assess the development of FMS in children, whereas assessment tools can provide practitioners with an insight on motor skill proficiency, and whether a child is developing towards a positive or negative spiral of engagement.

Motor skill assessment tools are essential in the evaluation of motor skill development. Although many assessment tools have been developed, they are often designed for professionals in the field, such as kinesiologists, psychologists, and physical therapists, who often deal with gross and fine motor skills. In addition, many are comprised of quantitative measures (e.g., time to complete test, distance covered, etc.) as opposed to qualitative assessments (quality of
movement). The Furtado-Gallagher Computerized Observational Movement Pattern Assessment System (FG-COMPASS) is an observational assessment tool using sequential decisions to assess proficiency levels of fundamental movement skills (often referred to as fundamental movement patterns or fundamental motor skills). It can be easily used by elementary school educators, and it is divided in two subtests (or subscales). The manipulative skill subtest contains five skills, including batting, stationary dribbling, kicking, throwing, and catching. The locomotor skill subtest is comprised of three skills; skipping, hopping, and horizontal jumping. Although the test is functional with eight skills, adding two locomotor skills would result in a more balanced instrument. Therefore, the purpose of this study is twofold: 1) to develop composite-based observational rating scales for vertical jumping and galloping and 2) to investigate initial psychometric characteristics for the proposed scales by assessing expert-rater consensus agreement and inter/intra-rater reliability.

Assumptions

We assumed that the children observed in our research were be capable of performing basic levels of vertical jumping and galloping. A second assumption made in this study was that the vertical jumping and galloping scales served as good predictors of proficiency in these skills.

Limitations

The developmental sequences that were used to develop the rating scales were based on hypothesized developmental sequences. We could not rely on validated developmental sequences to propose scales for both skills.

Delimitations

A delimitation was the participants recruited and trained to use the FG-COMPASS. CSUN students were recruited, and therefore, they might have been more knowledgeable about
assessments on the two skills being analyzed than the average school educator. A second delimitation was that participants trained to use the FG-COMPASS were analyzing videos of children performing the skills and then assessing the children using the rating scale, as opposed to assessing them in a school setting.

**Operational definitions**

- **Expert rating**: Rating assigned by the researchers
- **Rating scale**: Scales created based on the combination of the observational-plan (completion of yes or no checkpoints) approach and the three-stage model (limiting classification of skill to three stages).
- **Assessment**: The classification of observed skills based on the scales created.
- **Motor skill competence**: Proficiency in fundamental movement skills

**Hypothesis**

We hypothesized that the decision trees created would be effective and practical in the analysis of the two proposed skills. Effectiveness was evaluated based on participant’s ability to categorize the observed skill into an appropriate classification level (expert rating) based on piloted criteria for the rating scales. Therefore, we hypothesized that consensus agreement between participant ratings and expert ratings, and inter/intra-rater reliability would be high ($K_w \geq .7$).

**Significance**

The acquisition and mastery of FMS have been proposed to be the foundation of an active lifestyle. Thus, it is important to assess FMS development and to determine whether a child is on track to acquire such basic skills. For instance, the early detection of delays in FMS performance may lead to earlier and appropriate interventions. Moreover, it is critical to develop
an instrument that can be used by practitioners without the need for extensive training and to videotape skill performances. What follows is a review of literature in the proposed field of research. The following chapter will cover the stages of motor skill development, the relationship between FMS and physical activity, FMS and its association to health benefits, and FMS assessment.
Review of Literature

Stages of Motor Skill Development

Motor skill development can be thought of as a sequential process in which one step proceeds the next in an irreversible fashion. In other words, children must learn to crawl before they can walk, and walk before they can run and not vice versa. Newell (1986) proposed a model for the factors that influence development and suggested that motor skills develop through an interaction with the environment in which environmental, task, and individual constraints interact with each other. Based on this interaction, an individual adapts to create an optimal movement pattern for any goal. Clark (2007) identifies six important periods of development throughout a person’s lifespan, they are: 1) reflexive, 2) preadapted, 3) fundamental movement patterns, 4) context-specific, 5) skillfulness and 6) compensation.

The reflexive period is prevalent in the third gestational month, lasting until around the first two weeks of life. Reflexive (sucking, gaging, etc.) and spontaneous movements (supine kicking, arm flailing, etc.) fall into this period. Once goal-oriented movements start to emerge, the infant transitions into the preadapted stage, with the main purpose of this period being the achievement of independent function. Independent walking and self-feeding mark the end of the preadapted period and at this point, the child transitions to the fundamental movement patterns period (or FMS period)[Clark, 2007]. FMS give rise to advanced locomotion and object-control skills, and are the basis for context-specificity (e.g., running for a specific purpose) and skillfulness (e.g., sports requiring running; Clark & Metcalfe, 2002).

As mentioned, FMS are often divided into two categories: locomotor and object-control, with locomotor skills involving skills such as running, galloping, skipping, hopping, sliding, and leaping. Object-control skills include throwing, catching, bouncing, kicking, striking, and rolling.
Research has shown an association between FMS proficiency and physical activity participation in later years. In a 36 year longitudinal study, Kuh & Cooper (1992) found that children who were above average at “school games” were more likely to engage in sports during adolescence. The term “above average” may be interpreted as proficiency in FMS, with the assumption that higher FMS proficiency would result in above average ability at “school games.”

**FMS and Physical Activity**

Motor competence (proficiency) may be interpreted as proficiency in fundamental movement skills (locomotor and object control). A child’s perceived motor skill competence may drive the child to seek mastery in a skill and lead to task persistence, which may lead a child to pursue activities in which they perceive themselves as skillful in. It is possible that this perceived competence may then promote the acquisition of actual motor competence which, as suggested by Stodden et al. (2008), is driven by early childhood physical activity. Like Clark and Metcalfe (2002), Stodden et al. suggest that competence in FMS during childhood is needed to apply FMS to later activities requiring higher levels of motor competence, such as sports and games. In other words, proficiency in FMS is needed before an individual is able to apply them in different contexts. In turn, during adolescence, having higher motor competence (what Clark and Metcalfe define as skillfulness) will allow the individual to partake in higher levels of physical activity, whereas those with a lower competence will engage in lower levels of physical activity (Stodden et al., 2008).

Kambas et al. (2012) further support the link between motor proficiency and physical activity. The researchers assessed stability, locomotor, and object control skills using the Bruininks-Oseretsky Test of Motor Proficiency—Short Form (BOTMP-SF) and physical activity
was objectively measured using pedometer-based methodology. They found that 5-6 year old Greek children (N=232: 114 boys, 118 girls) with higher motor proficiency were significantly ($p<.05$) more active than those children with lower motor proficiency. In other words, those children who walked more steps and spent more time walking had higher scores on the BOTMP-SF. However, this study was done over a seven-day period. Okely et al., (2001) also sought to investigate the relationship between FMS and physical activity among adolescents, specifically, participation in organized and non-organized physical activity, whereas children with higher FMS were more likely to engage in organized physical activity.

Organized activities were defined as those activities belonging to a curriculum or having an instructor, whereas non-organized activity was defined as unstructured, or informal, without regular training. The researchers recruited male and female Australian participants in 8th grade (M= 13.3 years) and 10th grade (M= 15.3 years) from forty-five schools, and assessed running, vertical jumping, catching, overhand throwing, forehand striking, and kicking. The exact number of participants were unclear, but it was noted that one classroom was taken from each school for both school grades, therefore, a large sample size can be concluded. The researchers assessed FMS based on total number of components performed correctly for a particular skill. If the skill component was seen in four out of five trials, students were marked as possessing the skill component e.g., “knees bend at right angles during recovery phase” (Department of Education, Victoria, Australia [1996] as cited in Okely et al., 2001, p. 1900).

Physical activity was self-assessed by answering a pre-existing survey about weekly participation and frequency in activities. Inclusion criteria for physical activity included at least 10-minutes of participation, whereas a MET value (1 MET = 3.5mL of oxygen per kg of bodyweight per min) was assigned to each activity based on a compendium of physical activities.
Only those values suggesting vigorous activity (6 METs or >) were taken. Multiple regression analysis revealed no significant relationship between FMS and non-organized physical activity, however, the relationship between ability to perform FMS and organized physical activity was significant (\( p = <.001 \)). Although FMS only accounted for 3% of time spent in organized activity (\( R^2 = .03 \)), there was an evident association between proficient fundamental movement skills and organized activity. The small variance might be due to the self-report measure of physical activity. Second, the researchers conducted more object-control assessments than locomotor assessments. That is to say, the degree to which locomotor or object-control skills influenced physical activity participation was not measured. Furthermore, gender differences in physical activity participation were notable, whereas the relationship of FMS and organized physical activity suggesting a stronger relationship for females (Okely et al., 2001).

Female participants with higher proficiency of FMS participated in organized sport more so than males of the same level, however, differences were not statistically significant. On the other hand, girls with very low FMS spent significantly less time in organized activities than males with similar FMS scores (\( p < .05 \)). Therefore, efforts to increase organized physical activity in adolescent girls may be improved by enhancing their movement skills, with a possibility of greater results for females than males. In addition, the imbalance between object-control skills and locomotor skills in the test’s battery might be the reason for gender difference seen (Okely et al., 2001). The researchers did not mention the skills in which males exceeded over females or vice versa, whereas object-control skills have been associated with participation in vigorous physical activity (Barnett et al., 2009).

Barnett et al. (2009) conducted a follow-up longitudinal study based on a previous study done in 2000 where elementary school children had their motor skills assessed. FMS assessment
(in 2000) was based on the “Get Skilled Get Active” Australian resource containing validated fundamental motor skills (catch, overhand throw, kick, forehand strike, sprint run, leap, dodge, and vertical jump) with a strong reliability estimate for all (r=.7 or greater) except the leap and sprint run (r = .17, r=.13). Four additional skills (hop, static balance, skip, and slide) were validated in a subsequent test battery and researchers briefly mention it as having a good test-retest reliability for children; no coefficients were given for these four skills. Each of the mentioned skills had to meet a criteria of five or six features either marked as absent or present, similar to that of Okley et al., (2001). If all features were performed correctly, the researchers labeled it as “mastery” whereas if one feature was missing it was labeled as “near mastery.” These two categories were considered as “advanced skill proficiency”. If more than one feature was absent, it was labeled as “poor.” The researchers standardized each skill to a score of 5 for a total of 15 for three object control skills (kick, catch, and throw) and a total of 15 for locomotor skills (side gallop, hop, and vertical jump).

To measure adolescent physical activity, researchers used the Adolescent Physical Activity Recall Questionnaire (APRQ) which provided data on activity (organized or unorganized), frequency, and duration. Researchers briefly mentioned the assessment for test-retest reliability of the APARQ by looking for agreement on three category measures: vigorous, adequate, and inactive activity rather than assigning a MET value, as seen in the latter. Of the original 928 participants, 481 were located in different high schools, whereas 276 out of those students were surveyed. The follow up rate was 29% (279/928 original students). From the APRQ, linear regressions were used to assess relationship between 1) object control proficiency, 2) locomotor proficiency, 3) grade, 4) gender, and the time adolescents spent in moderate-to-vigorous or organized physical activity. Chi squares and t-tests were used and the researchers
controlled for gender and grade.

Object control was deemed as the only significant predictor of vigorous activity participation in adolescence (p<.01) with children who had advanced skill proficiency in object control skills (> 10) having a 20% greater chance of participating in some sort of vigorous activity during adolescence when compared to those with poorer object control skills (<5). Furthermore, males spent significantly more time in both organized and non-organized activities than females during adolescence, with males having higher object-control proficiency than females during childhood.

It is possible then, that female participants in the study conducted by Okely et al. (2001) had less proficient object-control skills than their male counterparts. As a result, the effect to which FMS impacted physical activity participation might have been more crucial in females, thus, resulting in lower organized (and vigorous, as was the criteria set by Okely et al.) physical activity. It is important to note that both of these studies measured FMS outcomes to vigorous activity, however, the term “vigorous” does not have a consensus measurable definition. Therefore, differences can be expected in terms of participation between organized and non-organized sport. Barnett et al., (2009) found that object control proficiency increased the likelihood of participation in any sort of vigorous activity, but not the probability of participating in any type of organized activity. In a later study, Barnett, Morgan, Van Beurden, Ball, & Lubans (2011) found a significant relationship between moderate-to-vigorous self-reported physical activity (MVPA) and locomotor skills when skills were the outcome. Locomotor skills, however, were not significant predictors of MVPA, and a weak correlation was found. However, MVPA did explain some of the variance (2%) in locomotor skills. In addition Barnett, Van Beurden, Morgan, Brooks, & Beard (2010) found that vertical jumping and side galloping were the most
improved locomotor skills in both genders from childhood to adolescence,

Furthermore Jaakkola and Washington (2013) found that Finnish adolescent boys with higher FMS had higher levels of physical activity and vice versa. This was not seen in girls. 152 males and females (age 13) were measured for FMS and and self-reported physical activity, similar to previous studies, from grades 7-9. For boys, physical activity was also a predictor of FMS. It was noted that boys’ FMS scores increased throughout junior high school, while girls’ FMS sum scores decreased. Moreover, physical activity tends to decrease throughout adolescence (Jaakkola & Washington, 2013) and may persist throughout adulthood (Kuh & Cooper, 1992) and therefore, it is important to assess FMS and maintain high levels of physical activity throughout adolescence.

FMS and Health Benefits

FMS has been proposed to be the basis for an active lifestyle (Stodden et al., 2008), and physical activity must be maintained throughout adolescence and adulthood for health benefits to occur (Kuh & Cooper, 1992). Stodden, Langendorfer, and Roberton (2009) found a strong relationship between motor competence and health related physical fitness in young adults (N=188: 79 women and 109 men) aged 18-25. Maximum jumping distance, kicking and throwing maximum ball speed were assessed and predicted 79% of the variance in overall fitness (12-min run/walk, percent body fat, curl-ups, grip strength, and maximum leg press) with jumping producing the most variance. It may be that these skills might be related to activities that may induce higher levels of cardiorespiratory fitness (soccer, basketball, softball, etc.). Additionally, the acquisition of competence in these three FMS during childhood may promote engagement in ballistic activities that may induce higher levels of muscular strength. In turn, these skills may transfer throughout adolescence and adulthood as shown in this study. However,
children who appear to be overweight may carry on with being over weight throughout adolescence, which might have an impact on FMS development.

Furthermore, children and adolescents who are overweight have been associated with poorer motor skill proficiency. After analyzing 12 FMS using the Test of Gross Motor Development – 2 (TGMD—2), Cliff et al. (2012) found that 8-10 year old overweight children were 40% less proficient in FMS when compared to those children who were not overweight. The intervention of physical activity programs fostering FMS development may very well lead acquisition of fundamental movement patterns involved in health related physical activity. This study shows that overweight children are not developing FMS which may be cause for less participation in physical activity (Okely et al., 2001), whereas physical activity may promote health related physical fitness (Stodden et al., 2009).

**FMS Assessment**

Olrich (2002) explains that children who do not master FMS will have no foundation to develop future advanced movement skills. Therefore, to ensure that these skills are developing properly, educators must perform assessments to evaluate children’s FMS. However, some educators might be unable to properly assess FMS in young children due to a lack of time. Olrich further explains that for an effective assessment for elementary, educators must use, “…clear, simple rubrics…using simple terminology,” and “pictorial representations of significant skill elements..” (Olrich, 2002, p. 28). Often times, FMS assessments are based on quantitative measures such as how fast, or distance covered (Gallahue, 1982) as opposed to quality of the movements, which might be impractical for younger children. Even then, some assessments have complex criteria, which may be difficult to interpret for the common educator, and require extensive training (Lander, Morgan, Salmon, & Barnett, 2016). There are two common
Product-Oriented vs Process-Oriented

Product oriented assessments revolve around quantitative measures (measurements of time, distance, successful attempts). Process oriented assessments, however, focus more on the quality of the skill performed (Burton & Miller, 1998). Examples of assessment tools using a process-oriented approach include the Test of Gross Motor Development (Ulrich, 2000) and the Motor Skills Inventory, which classifies FMS into three levels: rudimentary, functional, and mature (Werder & Bruininks, 1998). Although assessment tools might be validated and reliable, they reveal little about the development of a child, instead, these tests can reveal information about a child at a specific time in terms of criterion measures (Gallahue, 1982). The TGMD—2 compares student’s scores to a national norm for the student’s age and gender (norm-referenced test), whereas the Motor Skill Inventory compares student’s scores to a specific domain of behavior or a standard of performance (criterion-reference assessment). The two proposed rating scales developed for vertical jumping and galloping do not focus on individual comparison, but rather, performance over time. The proposed scales for the FG-COMPASS are concerned with quality of the skill performed. Hence, a process-oriented criterion-referenced assessment was considered the best approach.

FG-COMPASS

The Furtado-Gallagher Computerized Observational Movement Pattern Assessment System (FG-COMPASS) is an assessment tool for fundamental movement skills (FMS). Often, assessment tools are based on a component (specific body part configurations) or composite (total body configuration) method. Alternative methods attempting to simplify the process of FMS assessment often use the three-stage model (restricting classification to three stages) and
other methods include a decision tree based on specific performance criteria, whereas observers can assess FMS based on ‘yes’ or ‘no’ checkpoints (observational plan approach). The FG-COMPASS was developed using the observational plan approach with a composite decision tree for each skill (Furtado, 2009). In a later study, Furtado and Gallagher (2012) sought to evaluate the reliability of classification decisions created for the FG-COMPASS by comparing participant results to a standard (those of the researchers’).

**Reliability of the FG-COMPASS**

To test for reliability, the study was divided into two phases. First, children were recorded performing eleven FMS; five locomotor (hopping, horizontal jumping, leaping, skipping, sliding) and six manipulative (batting, catching, kicking, striking, stationary dribbling, overhand throwing), whereas a decision tree was created for each skill. Second, the researchers trained participants to use the rating scale. The rating scale contained a discriminatory decision level containing a feature which would discriminate between two levels of proficiency (e.g. for hopping, “thigh of swing leg lifts with vertical thrust of support foot” [Furtado & Gallagher, 2012, p. 387]). Second, the rating scale contained a confirmatory decision level divided into an upper (e.g., “swing leg passes behind the support leg”) and lower confirmatory decision node (e.g., “swing leg is held in front of body” [Furtado & Gallagher, 2012, p. 387]). The third level was a score outcome level providing a final decision with and upper outcome node and middle outcome node (for upper confirmatory decision node) and a middle-low and lower outcome (for lower confirmatory decision node; see Appendix A) Weighted kappa was used to reduce the rater agreement that occurred by chance. Weighted kappa scores were considered good (Kw mean of .71). Furthermore, proportion of specific agreement (Ps) within categories that fell below .70 were analyzed again to investigate cause of disagreement. Six of the eleven rating scales (sliding,
horizontal jumping, leaping, kicking, stationary dribbling, and overhand throwing) proposed were modified while five remained unchanged (hopping, catching, side-arm striking, batting, and skipping). In essence, five decision trees proposed were reliable, whereas the other six needed further investigation in order to be considered for the test’s battery.

Currently, the manipulative skill subtest contains five skills, including batting, stationary dribbling, kicking, throwing, and catching. However, the locomotor skill subtest is only comprised of three skills; skipping, hopping, and horizontal jumping. The proposed rating scales for the locomotor subtest followed similar guidelines to those of Furtado and Gallagher (2012), with strong discriminatory decisions for the classification of skills. Investigating initial psychometric characteristics for the proposed scales of vertical jumping and galloping (by assessing expert-rater consensus agreement and inter/intra-rater reliability) will help in the advancement of the test’s battery, creating a more balanced assessment tool.
Methods

This study was divided into two parts: Phase I and Phase II. Phase I focused on collecting video footage of children performing locomotor skills of vertical jumping and galloping. Phase II focused on investigating initial psychometric characteristics for the proposed scales by assessing expert-rater consensus agreement and inter/intra-rater reliability.

Phase I

First, the literature was consulted and the rating scales for two new skills (galloping and vertical jump) were created (see Appendix A). Next, approval was attained from the California State University Northridge Committee for the Protection of Human Subjects committee and Los Angeles Unified School District Committee of External Research Review. The researchers evaluated the initial effectiveness of the two rating scales by conducting a pilot study and observing (without filming) children ages 5-10 performing the skills of vertical jumping and galloping. Following the pilot study, recruitment packets were created to distribute to classrooms in a K-5 school setting (see Appendix B). Children between the ages of 5 and 10 were then filmed performing the skills of galloping and vertical jumping. It is important to note that the children that were filmed were not our primary subjects. The footage obtained from Phase I was used to train participants in Phase II. After obtaining parental consent, children were given instructions as to how to perform the skills of vertical jumping and galloping followed by a demonstration. Multiple trials were performed comprised of practice trials and assessment trials. Videotapes were classified using the newly created rating scales.

Recruiting children. A total of 60 children were recruited from a K-5 Los Angeles Unified School District elementary school. An information packet was sent to the child’s household through their classroom teacher. The packet included a flyer with a description of our
study, a consent form for the parent/guardian as well as a child’s PAR-Q form (see Appendix B). All packets were returned to their teachers, who returned the packets to the school’s main office. All children under the age of 9 who had parent/guardian consent were required to provide verbal assent prior to the primary researcher before participating. An assent form was given for children who were 9-10 years old. The children were informed of the study in language he/she was capable of understanding.

The researchers randomly selected twelve children from each grade level (kindergarten through 4th grade) within the ages of 5-10 years. Five classrooms were chosen at random to distribute recruitment packets (one classroom per grade). If less than twelve children were recruited from a classroom, packets were distributed to another random classroom of the same grade level. Parents were informed that not all children would be selected to participate. Children were excluded from our study if they 1) had disabilities which may affect motor skills 2) had a recent surgery or had undergone surgery in the past six months 3) had been deemed ineligible based on PAR-Q responses (see Appendix B) 4) did not want to participate or be filmed. Children not selected in the study remained with the regular school curriculum during filming.

Filming. All children were given a code ranging from C01 to C60 to ensure confidentiality. Half of the classroom (consisting of 6-10 children) was filmed during recess and the other half was filmed during lunch hour. The PI called upon each child individually and demonstrated each skill and allowed for practice trials while the other children waited with an adult supervisor. Children were called individually and asked to perform five to six trials for each skill. A GoPro camera was used to film children with a 1080/50/wide recording setting. Children were filmed galloping a total of 20 feet with the camera placed 9 feet away. Cones were placed to indicate where children should begin and stop movement. To determine the lead foot,
children were asked to alternate between right and left feet during practice trials, and asked to use their preferred foot during filming. Children were asked not to switch feet during filming trials. For the skill of vertical jumping, tape markers were placed on a wall at 3 ½ feet, with a marker set at every half foot leading up to 7 feet. Children were asked to touch the highest marker with their dominant hand. When editing the videos, the best three trials were taken. The best trials were determined by consistency in performance from one trial to the next, whereas all three trials had to fall under the same outcome level in the proposed scales (levels 1-4). This procedure lasted an estimated time of 20-30 minutes per group of 6-10 children during recess/lunch. This procedure occurred one day out of the week over the course of seven weeks, with a different grade level filmed each week. Once a child had finished his/her testing, he/she returned to recess/lunch.

**Phase II**

Once the PI recorded all 60 students, the researchers reached consensus on the outcome levels of all videos and selected 16 video clips for training purposes (2 video X 4 levels X 2 skills) and 24 video clips for testing purposes (3 videos X 4 levels X 2 skills); 12 videos for galloping and 12 videos for vertical jumping. In case of disagreement between the researchers’ classifications of a video, the video was replaced for one in which the researchers reached consensus. Following the classification of videos, a pilot study was done to strengthen the internal validity of the study. Ten CSUN students were recruited and trained on both skills, resulting in modifications made to the galloping scale. The researchers then recruited and trained undergraduate kinesiology students to serve as participants in the current research study.

**Recruiting participants.** Thirty participants were recruited from undergraduate classes via verbal announcements and flyers. A sign-up list provided the researchers with the name,
email, and phone number of participants. Participants were excluded from the study if 1) they were not enrolled in six or more units at CSU Northridge, and 2) were not enrolled in a motor development course (KIN 477).

**Procedures**

**Training session for vertical jumping.** As participants arrived at the lab, they were given general information about the project. Next, participants were asked to read and sign the research informed consent and asked to carefully study the scale for the skill of vertical jumping. The PI demonstrated the skill while emphasizing key points related to the skill performance for each level on the rating scale. Participants were then asked to sit in front of a portable (80 inches across) wide (16:9) projection screen. Participants then used a pencil and paper version of the scale to classify 8 video clips (2 videos of each stage level) at random depicting different children performing the skill of vertical jumping. Participants received feedback as to whether their classifications were correct and were encouraged to ask questions during the training session. Training was done with no more than three participants at a time and lasted about one hour.

**Testing session for vertical jumping.** The testing session was conducted no more than 48 hours after the training session. Participants were shown a practice video from their training session, and afterwards, each participant classified 12 video clips at random. Furthermore, participants were instructed to not classify the video clips based on the apparent age of the children, as skill levels are distributed across all age levels. Unlike the training session, participants did not receive feedback in the case of disagreement, and were not shown the PI’s classifications. Participants did not know how many videos of each level they were rating to prevent participants from engaging in guessing. Testing was done individually and lasted about
one hour. Raters returned one week after their initial assessment to reassess initial videos in a random fashion.

**Training and testing for galloping.** Training and testing sessions for galloping followed similar guidelines to that of vertical jumping. The total time commitment from the first visit to the last for our participants was approximately six hours (an hour per visit).

**Data Analysis**

Because a certain amount of agreement is expected to occur by chance (Fleiss, 1981), the *weighted* kappa ($K_w$) was calculated. Although kappa was originally established for nominal data, *weighted* kappa was created for categorical data with an ordinal structure. The FG-COMPASS is based on a 1-4 scale, with 1 being the lowest assessment score and 4 being the highest. Weighted kappa allows for different penalties to be assigned to different mismatches based on the magnitude of disagreement (Hallgren, 2012). In the case of the FG-COMPASS, if Rater A were to rate a child at a level of 1, and Rater B rated the same child at level of 2, that is less severe than a rating of 1 and a rating of 4. The values of weighted kappa were compared with the criteria suggested by Altman (1991): values equal or less than .20 = “poor”; .21 - .40 = “fair”; .41 -.60 = moderate; .61 -.80 = “good”; and .81-1.00 = “very good.” To be considered appropriate and fit to be used in school settings, the rating scales for the skills of galloping and vertical jump must have a kappa value of .7 or above. In addition, the intraclass correlation coefficient (ICC) can also be used to test reliability when dealing with ordinal data. A two-way random (consistency), average-measures was used and interpreted as follows: less than .40 = “poor”; .40-.75 = “fair to good”; >.75 = “excellent” (Fleiss, 2011). The following chapter will present the results.
Results

First, we present the degree of consensus agreement between combined expert and participant ratings. Then, inter-rater rater reliability will be presented, followed by intra-rater reliability data.

Expert-rater consensus agreement

Consensus agreement was assessed by comparing the ratings of all 30 participants with those of an expert with a PhD in the field. Consensus agreement was considered “very good” Altman (1991) for both vertical jumping ($K_w = .96$) and galloping ($K_w = .89$). In addition, ICC scores were considered “excellent” for both vertical jumping ($ICC = .98$) and galloping ($ICC = .94$; Fleiss, 2011). Table 1 presents the results for both skills.

Table 1. Weighted Kappa and ICC Statistics for the Expert-Raters Agreement – FG-COMPASS

<table>
<thead>
<tr>
<th>Skill</th>
<th>Statistic</th>
<th>95% CI</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$K_w(n)$</td>
<td>$ICC(n)$</td>
<td>$K_w$</td>
</tr>
<tr>
<td>Vertical Jump</td>
<td>.96(30)</td>
<td>.98(30)</td>
<td>[.939, .978]</td>
</tr>
<tr>
<td>Gallop</td>
<td>.89(30)</td>
<td>.94(30)</td>
<td>[.847, .926]</td>
</tr>
</tbody>
</table>

Notes. $K_w$ = weighted kappa. n = sample size. CI = confidence interval.

Inter-rater reliability

Inter-rater reliability was assessed by comparing the ratings of five raters chosen at random. Weighted kappa scores were computed for each rater pair and averaged to provide a single index of reliability. The weighted kappa values for vertical jumping ranged from .82 to 1.0 ($M = .92$). Weighted kappa values for the skill of galloping ranged from .57 to 1.0 ($M = .78$). These scores were considered “very good” for vertical jumping and “good” for galloping.
(Altman, 1991). Note that rater #2 fell below the expected agreement ($K_w \geq .7$) for the skill of galloping with all raters except rater #1. ICC scores were interpreted as “excellent” for both vertical jumping (ICC = .98) and galloping (ICC = .95; Fleiss, 2011). The results are presented in Tables 2 and 3.

Table 2. Weighted Kappa Statistics for Inter-Rater Analysis – FG-COMPASS

<table>
<thead>
<tr>
<th>Skill</th>
<th>1x2</th>
<th>1x3</th>
<th>1x4</th>
<th>1x5</th>
<th>2x3</th>
<th>2x4</th>
<th>2x5</th>
<th>3x4</th>
<th>3x5</th>
<th>4x5</th>
<th>$M_{kw}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Jump</td>
<td>.96</td>
<td>.93</td>
<td>.90</td>
<td>.93</td>
<td>.96</td>
<td>.82</td>
<td>.96</td>
<td>.85</td>
<td>1.0</td>
<td>.85</td>
<td>.92</td>
</tr>
<tr>
<td>Gallop</td>
<td>.73</td>
<td>.82</td>
<td>.82</td>
<td>.81</td>
<td>.63*</td>
<td>.63*</td>
<td>.57*</td>
<td>1.0</td>
<td>.91</td>
<td>.91</td>
<td>.78</td>
</tr>
</tbody>
</table>

Notes. $K_w$ = weighted kappa; 1x2, 1x3, … = rater pairs agreement; $M_k$ = arithmetic mean of rater pairs agreement; Asterisks indicate disagreement below expected.

Table 3. Intraclass Correlation Coefficient Statistics for Inter-Rater Analysis – FG-COMPASS

<table>
<thead>
<tr>
<th>Skills</th>
<th>ICC</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Jump</td>
<td>.98</td>
<td>[.963, .995]</td>
</tr>
<tr>
<td>Gallop</td>
<td>.95</td>
<td>[.890, .984]</td>
</tr>
</tbody>
</table>

Notes. $n = 5$. Values computed using two-way random, average measures ICC (2,1).

Intra-rater reliability

Intra-rater reliability was assessed by having raters reassess the same videos in a random fashion one week after initial assessment of the proposed skill. Original scores were compared to scores provided on the second visit. Intra-rater reliability was considered “very good” for both vertical jumping ($K_w = .96$) and galloping ($K_w = .85$). ICC scores were interpreted as “excellent” for vertical jumping (ICC = .98) and galloping (ICC = .92; Fleiss, 2011). The results are presented in Table 4.
### Table 4. Weighted Kappa and ICC Statistics for Intra-Raters Agreement – FG-COMPASS

<table>
<thead>
<tr>
<th>Skill</th>
<th>Statistic</th>
<th>$K_w(n)$</th>
<th>ICC</th>
<th>$K_w(n)$</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Jump</td>
<td></td>
<td>.96(30)</td>
<td>.98(30)</td>
<td>[.940, .976]</td>
<td>[.974, .983]</td>
</tr>
<tr>
<td>Gallop</td>
<td></td>
<td>.85(30)</td>
<td>.92(30)</td>
<td>[.795, .895]</td>
<td>[.897, .932]</td>
</tr>
</tbody>
</table>

Notes. $K_w =$ weighted kappa. n = sample size. CI = confidence interval.
Discussion

The main purpose of the study was to develop composite-based (total body configuration) rating scales for the skills of vertical jumping and galloping. Second, the researchers aimed to collect inter/intra-rater reliability, as well as consensus agreement between expert and participant ratings to determine the effectiveness of the proposed rating scales. The results supported the hypotheses that inter/intra-rater reliability and consensus agreement would be high ($K_w \geq .7$).

Expert-rater consensus agreement

Consensus agreement between participant raters and expert raters were considered “very good” and “excellent” for both vertical jumping ($K_w = .96$; ICC = .98) and galloping ($K_w = .89$; ICC = .94). Painter (1994) suggested that only the most crucial features to movement proficiency should be selected from developmental sequences. The high agreement observed may be attributed to the performance criteria selected for the rating scales of both galloping and vertical jumping. When developing the scales, we followed Painter's suggestion in which only the critical performance criteria of the skill were selected. This might have helped raters in the current study.

Inter-rater reliability

ICC scores yielded a score of .98 for vertical jumping and .95 for galloping when the individual scores for each of the five raters were averaged out. These scores are interpreted as “excellent”. Weighted kappa values for vertical jumping averaged a score of .92, while values for the skill of galloping averaged a score of .78. Weighted kappa scores were considered “very good” for vertical jumping and “good” for galloping (Altman, 1991). The difference between the two skills is worth exploring further. Even though the researchers assessed and reached consensus when classifying all video clips, some borderline performances might have contributed to disagreement between raters. Borderline performances refer to performances in
which the performer is transitioning between levels, making it difficult to classify. Thus, some raters could have scored a video higher and some might have opted for the lower score in these borderline performances, which might have caused a lower score for the galloping scale. In addition, Rater 2 fell below ($K_w < .7$) the expected agreement for the skill of galloping when compared with all the other raters, except Rater #1. When looking at absolute agreement between Rater #2 and expert classifications, there was a 67% agreement compared to an 83% agreement by Rater #1, 100% agreement by Rater #3, 100% agreement by Rater #4, and 75% agreement by Rater #5. If Rater #2 is removed, weighted kappa scores increase to .88, suggesting a “very good” agreement. One possibility is that poor understanding of the performance criteria might have led to more guessing by Rater #2 when classifying the video clips.

**Intra-rater reliability**

Intra-rater reliability was assessed by having raters reassess the same videos in a random fashion one week after initial assessment of the proposed skill. ICC scores yielded an “excellent” agreement for vertical jumping (ICC = .98) as well as galloping (ICC = .92). Weighted kappa scores were considered “very good” for both vertical jumping ($K_w = .96$) and galloping ($K_w = .85$). These scores were above the hypothesized value set by the researchers ($K.w ≥ .7$) and are in accordance with previous research assessing inter and intra-rater reliability, whereas intra-rater scores have shown to be higher than inter-rater agreement (Stanek, Smith, & Petrie, 2017; Rogers, McKeown, Parfitt, Burgess, & Eston, 2017). Although the agreement for both skills was considered “very good,” the intra-rater score was higher for the skill of vertical jumping. It may be that the skill of galloping had more difficult performance criteria to assess than that of vertical jumping. For example, the discriminatory criteria for the scale of galloping asked, “Is the action smooth, rhythmical, and executed at a moderate tempo?” whereas raters might have had
difficulties determining a “smooth,” “rhythmical,” and “moderate tempo.” Although training was provided and examples were given of each performance criteria, performances varied across children. That is, no two children displayed each criteria in the same manner. Although the same holds true for the skill of vertical jumping, it may be that raters found it easier to assess the skill of vertical jumping because the criteria might have been more objective in nature than that of galloping. The vertical jumping scale’s discriminatory criteria asked, “Do the arms move towards the rear during the preparatory phase?” Compared to that of galloping scale, it is possible that raters found this performance criteria easier to assess. The skill of galloping might have had more variability when determining the performance criteria, whereas variability in vertical jumping might have been easier to detect.

**Conclusion**

FMS have been proposed to be the foundation of an active lifestyle (Gallahue, 1982; Clark, 2007). Early detection of delays in FMS performance may lead to earlier and appropriate interventions. Having a practical FMS assessment tool such as the FG-COMPASS may facilitate the detection motor skill development of children in school settings where time may be of conflict. Existing assessment tools are often comprised of complex criteria, requiring extensive training (Lander et al., 2016). By using simple terminology, and limiting classifications from 1 (being the lowest developed) to 4 (being the highest developed), the FG-COMPASS may serve as a more practical tool for the average K-5 educator who might only get a limited amount of time with a surplus of students (Olrich, 2002). The development of such tools may lead to enhancement of physical education programs, which would allow educators to tailor plans according to children’s developmental levels. Thus, children with higher FMS are more likely to participate in physical activity, which may allow for continued participation in an active lifestyle.
later in life (Cliff et al., 2012). The results of this study provide evidence of rater-expert agreement and inter/intra-rater reliability for two rating scales to be added to the locomotor subtest of the FG-COMPASS. These results show that the proposed rating scales are reliable in the assessment of vertical jumping and galloping. Future studies should focus criterion-related validity and reliability evidence from live performances.
References


https://doi.org/10.1080/1091367X.2015.1095758


https://doi.org/10.1080/07303084.2002.10607843


## Appendix A: Proposed Scales for the FG-COMPASS

<table>
<thead>
<tr>
<th>VERTICAL JUMP</th>
<th>Question</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do the arms move to rear during the preparation phase?</td>
<td>Y</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Y</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GALLOPING</th>
<th>Question</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the action smooth, rhythmical (not choppy/stiff) and executed at a moderate tempo?</td>
<td>Y</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Y</td>
<td>1</td>
</tr>
</tbody>
</table>
Appendix B: Recruitment Packet

Help us complete our research study!

Graduate student Lino Perez and thesis chair advisor Dr. Ovande Furtado Jr., are creating rating scales to assess the skills of vertical jumping and galloping.

Your child will be asked to perform the movement skills of vertical jump and gallop.

Your child will perform these skills during recess/lunch so no class time is missed!

**Will you be helping us?**
If interested, please fill out the Parent Consent Form, the Child PAR-Q form, and Video Image Release Form which are attached in this packet and return to the Calahan’s main office no later than 03/17/2017.

Lino Perez is a graduate student at Cal State Northridge working towards the completion of his thesis for his Master’s degree in Kinesiology.  
Phone: (213) 999-49-14  
Email: lino.perez.689@my.csun.edu

Dr. Ovande Furtado Jr. is a professor at Cal State Northridge with a specific focus in children’s motor skills. He developed the assessment tool for which the two rating scales are being developed. Phone: (818) 677-5968  
Email: ovande.furtado@gmail.com
California State University, Northridge
PARENT OR GUARDIAN CONSENT FOR CHILD PARTICIPATION IN RESEARCH

You are being asked to consent for your child to participate in a research study. This study is being conducted by Lino Perez as part of the requirements for the M.S. degree in Kinesiology (Motor Behavior). Participation in this study is completely voluntary. Please read the information below and ask questions about anything that you do not understand before deciding if you want to allow your child to participate. The researchers listed below will be available to answer your questions.

RESEARCH TEAM
Primary Researcher:
Lino Perez
Department of Kinesiology
18111 Nordhoff St.
Northridge, CA 91330-8287
(213) 999-4914
lino.perez.689@my.csun.edu

Co-PI and Faculty Advisor:
Dr. Ovande Furtado Jr.
Department of Kinesiology
18111 Nordhoff St.
Northridge, CA 91330-8287
(818) 677-5968
ovande.furtado@csun.edu

PURPOSE OF STUDY
The purpose of this research study is to develop a rating scale that assess the skills of vertical jumping and galloping. Therefore, we would record your child performing these two skills to develop the rating scales and try to facilitate the assessment of these skills.

SUBJECTS
Inclusion Requirements
Your child is eligible to participate in this study if he/she is 5-10 years old.

Exclusion Requirements
Your child is not eligible to participate in this study if he/she
  a) Has any disabilities which may affect motor skills
  b) Has sustained an injury or undergone surgery in the past 6 months
  c) Has been deemed as ineligible by researchers based on PAR-Q form responses.
d) Does not want to participate/ get filmed

**Time Commitment**
This study will involve approximately 20-30 minutes of your child’s recess/lunch time once a week. Once your child has been filmed vertical jumping and galloping, your child will have completed participation.

**PROCEDURES**
The following procedures will occur:

Your child will be assigned a code to keep your child’s information confidential. Your child will then be given instructions as to how to perform the skill of vertical jumping followed by a demonstration from a graduate student and a Cal State Northridge professor with an expertise in this field. The same will be done for galloping. All sessions will be video recorded for the purpose of assessing vertical jumping and galloping. We will then use the footage to develop two rating scales, and then train undergraduate CSUN students on how to use these two rating scales. Footage will only be shared amongst researchers, and those CSUN students who will be trained to use the developed rating scales. This will take place during recess/lunch to avoid missing any class time.

**RISKS AND DISCOMFORTS**
The possible risks and/or discomforts associated with the procedures described in this study are the same as those movement patterns children are taught in PE classes. This includes: possible fatigue, broken bones, and those risks found in a regular physical activity curriculum (e.g., falling, bruising, sprains). This study involves no more than minimal risk. Instructions given and necessary breaks will be overseen by an expert, which will ensure minimal risks. Your child will perform the two skills in a large open space, free of any objects to ensure safety of your child.

**BENEFITS**

**Subject Benefits**
Your child may not directly benefit from participation in this study.

**Benefits to Others or Society**
This research will help assess and instruct children. Research may assist in the improvement of an existing assessment tool by adding two new skills (vertical jumping and galloping) to the assessment tool. In addition, the assessment tool will eliminate the need to videotape students during assessment practices in physical education settings. This may allow PE teachers to assess individuals on a regular basis. By conducting assessments regularly, teachers will likely have more opportunities to detect abnormal movement patterns in children.

**ALTERNATIVES TO PARTICIPATION**
The only alternative to participation in this study is not to participate.
COMPENSATION, COSTS AND REIMBURSEMENT

Compensation for Participation
Your child will not be paid for his/her participation in this research study.

Costs
There is no cost to you for your child’s participation in this study.

Reimbursement
You will not be reimbursed for any out of pocket expenses, such as parking or transportation fees.

WITHDRAWAL OR TERMINATION FROM THE STUDY AND CONSEQUENCES

You are free to withdraw your child from this study at any time. If you decide to withdraw your child from this study you should notify the research team immediately. The research team may also end your child’s participation in this study if he/she, misses scheduled visits, or if his/her safety and welfare are at risk.

CONFIDENTIALITY

Subject Identifiable Data
All personal information (such as your child’s name, birth date, sex, etc) that will be collected about your child will be removed and replaced with a code (ranging from C01 to C60). A list linking the code and your child’s personal information will be kept separate from the research data.

All personal information that will be collected about your child will be kept with the research data for five years before deleting. Your child’s personal data will only be available to the primary (Lino Perez) and secondary researcher (Dr. Ovande Furtado Jr.).

Data Storage
The personal information will be completed on a handout and stored in a locked file cabinet in Dr. Ovande Furtado Jr.’s office. A separate digital password-protected file in Dr. Furtado’s office computer will contain the code information assigned to your child linking the two. Only the researchers (Lino Perez and Dr. Furtado) will have access to the personal information. No CSUN participants trained to use the rating scales will have access to this information, they will only know your child by code. The personal information will be kept until data has been collected, scored, and analyzed; it will be deleted after five years.

Code Information: Children will receive a code ranging from C01 to C60. CSUN participants trained to use the rating scales will only be given the code. All video footage will identify children by code and not name. A spreadsheet with the all personal information, such as your
child’s name, code, age, and gender will be kept locked in Dr. Furtado’s office. This information will be transferred to a digital password-protected file in Dr. Furtado’s computer. Video footage will then be transferred to a computer in the research lab and used for analysis. This is a password protected computer, separate from the one in Dr. Furtado’s office, and only those CSUN students serving as participant raters will have access to the password in order to ensure that only the researchers and raters have access to the videos. Memory drives containing footage will be stored and locked in Dr. Furtado’s office.

**Data Access**
The researcher and faculty advisor named on the first page of this form will have access to your child’s study records. Any information derived from this research project that personally identifies your child will not be voluntarily released or disclosed without your separate consent, except as specifically required by law. Publications and/or presentations that result from this study will not include personal information about your child.

**Data Retention**
The researchers intend to keep the research data for approximately 5 years and then it will be destroyed.

**Mandated Reporting**
Under California law, the researcher is required to report known or reasonably suspected incidents of abuse or neglect of a child, dependent adult or elder, including, but not limited to, physical, sexual, emotional, and financial abuse or neglect. If any researcher has or is given such information, he may be required to report it to the authorities.

**IF YOU HAVE QUESTIONS**
If you have any comments, concerns, or questions regarding the conduct of this research please contact the research team listed on the first page of this form.

If you have concerns or complaints about the research study, research team, or questions about your child’s rights as a research participant, please contact Research and Sponsored Projects, 18111 Nordhoff Street, California State University, Northridge, Northridge, CA 91330-8232, or phone 818-677-2901.

**VOLUNTARY PARTICIPATION STATEMENT**
You should not sign this form unless you have read it and been given a copy of it to keep. **Participation in this study is voluntary.** Your child may refuse to answer any question or discontinue his/her involvement at any time without penalty or loss of benefits to which you and your child might otherwise be entitled. Your decision will not affect your relationship with California State University, Northridge. Your signature below indicates that you have read the information in this consent form and have had a chance to ask any questions that you have about the study.
We will obtain a verbal consent from your child with an explanation of our study in language understandable to your child. Your child will be asked if he/she would like to participate in the study. If your child does not wish to be in the study he/she will not be asked to participate. In addition, if after attaining verbal consent your child changes his/her mind your child is free to discontinue his/her participation at any time.

I agree to allow my child to participate in the study.

___ My child may be video recorded.
___ My child may not be video recorded.

___________________________________________________  __________________
Parent or Guardian Signature                         Date

___________________________________________________
Printed Name of Parent or Guardian

___________________________________________________  __________________
Researcher Signature                         Date

___________________________________________________
Printed Name of Researcher
California State University, Northridge
PARENT OR GUARDIAN VIDEO RELEASE FORM FOR MINORS PARTICIPATING IN RESEARCH

“Investigating expert vs. rater agreement for two proposed rating scales”

This research project includes video footage. These videos may be used in scholarly works that may be available to the public, such as a research publication or presentation. If you have any questions, the researcher named below will be available to answer them.

I, the undersigned, hereby give Lino Perez specific permission to display video footage of my child’s likeness that have been created as part of the study referenced above under the following conditions (please provide your initials alongside each condition):

1. _______ The videos/images can be shown to those participating in the research study.

2. _______ The videos/images can be shown at scientific conferences or meetings.

You are free to withdraw your permission to use your child’s likeness/image at any time without penalty. If you decide to withdraw this usage, you should notify the researcher immediately.

By signing below, I acknowledge that: 1) I have read this agreement carefully; 2) any questions I have about the use of my child’s image have been answered to my satisfaction; 3) any additional changes or restrictions that I have requested have been added in writing to this document; AND that 4) I have been given a copy of this form, including any changes or restrictions, initialed by me.

I understand and agree to the conditions outlined in this video/image release form. I have read the above information and give my consent for the use of video and/or images of my child by initialing in the selected sections above.

___________________________________________________   ________________
Parent or Guardian Signature                                      Date

___________________________________________________
Printed Name of Parent or Guardian
Child’s PAR-Q Screening Form

Child’s Name: ______________

Parent/Guardian Name: ______________

Child’s Date of Birth: ______________

Emergency Contact Details

Home: ______________

Name and relationship to child: ______________

Work: ______________

Name and relationship to child: ______________

Mobile: ______________

Name and relationship to child: ______________

Health Questions:

<table>
<thead>
<tr>
<th>Item #</th>
<th>Does your child have or has he or she ever experienced any of the following?</th>
<th>Please Circle</th>
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<tbody>
<tr>
<td>1</td>
<td>Chest pains brought on by physical exertion</td>
<td>Y/N</td>
</tr>
<tr>
<td>2</td>
<td>Any sustained injuries or illness</td>
<td>Y/N</td>
</tr>
<tr>
<td>3</td>
<td>High or Low Blood Pressure</td>
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</tr>
<tr>
<td>4</td>
<td>Diabetes</td>
<td>Y/N</td>
</tr>
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<td>5</td>
<td>Childhood epilepsy</td>
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<td>Dizziness or fainting</td>
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<td></td>
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<td>Asthma or respiratory Problems</td>
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<td>9</td>
<td>Elevated blood cholesterol</td>
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<td>Any allergies</td>
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<td>Is your child taking any medication</td>
<td>Y/N</td>
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<td>12</td>
<td>Has your doctor ever advised your child to exercise</td>
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</tr>
<tr>
<td>13</td>
<td>Disabilities (physical or mental) that may interfere with physical activity</td>
<td>Y/N</td>
</tr>
<tr>
<td>14</td>
<td>Surgery in the past 6 months</td>
<td>Y/N</td>
</tr>
<tr>
<td>15</td>
<td>Is there any reason not mentioned above why any type or physical activity may not be suitable for your child</td>
<td>Y/N</td>
</tr>
</tbody>
</table>

If answered “yes” to any of the above questions please give full details here:

In signing this form, I the parent/guardian of the aforementioned child, affirm that I have read this form in its entirety and I have answered the questions accurately and to the best of my knowledge.

Parents Signature: ______________

Date: ______________