Lab 2: Perceptual Motor Ability Lab

Name:_____ Date:_____

Introduction: Perceptual motor abilities testing is similar to physical fitness testing with one major difference we are identifying abilities related to motor skill performance proficiency not physical proficiencies such as strength, cardiovascular ability or flexibility. Perceptual motor ability testing is used for a variety of reasons. The two most common reasons are: 1) prediction of future performance of a motor skill and 2) evaluation of the client's or student's performance deficiencies. Motor ability testing for predicting future performance is an aptitude test. Industry uses a test of motor ability to select people to train for or work in specific jobs. Medical and dental schools often include motor abilities tests in the selection of students for admission into specific programs. Professional sports teams typically give motor abilities test as port of test batteries to select athletes for their team. The second use of motor abilities testing for evaluation is where one can evaluate a client's motor skill performance deficiencies. Therapists and athletic trainers use motor abilities tests to assess patient's rehabilitation progress and determine the types of functional activities the patient may be ready to undertake.

The following perceptual batteries of this tests are: 1) absolute haptic perception ability, 2) wrist, arm, and finger speed ability, 3) response orientation ability, 4) bimanual ability, 5) static balance ability, 6) control precision ability, and 7) reaction time. Each battery represents a different motor ability that is specifically related to the performance of motor and/or sport skills. The purpose of this lab is to engage the student in the testing of motor abilities studied in the class that related to motor skill or sports skill development.

Once you have completed all the tests, you and the other lab members will calculate the mean and standard deviation of each test battery (need to have all other members score for each battery). After the means and standard deviations of each test has been computed, calculate your Tscore for each test battery and record it in the composite table. Once you have all your Tscore for each battery then sum all your Tscores together determine your perceptual motor ability on this test.

Battery 1: Haptic Perception Ability

Absolute judgments involve the standard stored in memory with the comparison physically present. Absolute judgment is a common practice since it relies on memory. A set of weighted canisters that contain a series of light weights (75 to 125 grams) will be placed in front of you. You will be blindfolded during the trial. In the absolute judgment condition, the standard weight (100 grams) will be placed in the your preferred hand. He or she will "memorize" how heavy the weight feels, put it aside, then pick up each of the rest of the weights, at random, and judge whether the weight is lighter, heavier as the standard held from memory. Place them in order from the lightest to heaviest with the

100 gram canister in the middle. There should be 5 canisters below and above the 100 gram canister. Once you have determined the order turn the canister's over and score their order using the Light or Heavy set table below. Place an "X" in block where your order corresponds with the scale below . Then score how well you did using the formula below the scale and record the percentage of correct responses. Higher your percentage the better you did on this ability.

Light Set
ABSOLUTE JUDGMENT

75	80	85	90	95	100*	105	110	115	120	125
					X					

Number correct X 9 + 1 = _____% correct

Battery 2: Motor Speed or Wrist, Arm, and Finger Speed Ability

Finger trapping has contributed to the understanding of fine motor development. Finger tapping is an important index of fine motor coordination. Repetitive tapping is repetitions of the same movement, such as tapping the thumb and forefinger together as rapidly as possible. Tapping speed is usually measured every 10 seconds for a total of 30 consecutive seconds. The total number of taps across the three 10-second trials is then reported. A higher number of taps indicates a better motor speed in the individual.
You will be seated in front of the Moart front panel. The Moart multi operational apparatus has been developed for tapping and reaction time tests. In the repetitive tapping movement condition, you are to rapidly tap the button corresponding to your forefinger found in the middle of the Moart panel with your left forefinger for five 10-second trials. Record the number of taps for each 10 second trial. Then complete this same tapping exercise with the forefinger of the right hand using the button on the upper right side of the panel with your forefinger for another. The light above the button will appear which indicates when to start tapping. The Moart Apparatus has been preprogrammed for 10-second trials and has recorded the number of taps. Overall motor speed ability is determined by adding both the left and right forefinger tapping totals. A higher number of total taps indicate a faster motor speed in the individual.

Repetitive Tapping   **Grand Total:_____**

Right Fore finger

Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Total

Left Fore finger

Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Total

Battery 3: Response Orientation (Card Sorting Task)

Response orientation is the ability to make a rapid selection of control to be moved or the direction to move them in. Experimenter shuffles one deck of card several times. Subject sits or stands in front of the card-sorting box. Experimenter instructs the subject, "On the signal, "Ready? Go! The cards are individually turn over so your can see their faces and sort them into there proper compartments as fast as possible. Do not attempt to correct any errors you may make." Experimenter uses a stopwatch or clock to time the subject. After each trial has been timed & the number of errors counted, score each trial using the following formula:

Trial score =[(Total number of errors + total time in seconds)/1000]

The experimenter shuffles the card for trial and changes the board for the 2nd trial.

The subject attempts to sort the cards as *fast as possible.* Record each trial score on the table below then calculate the mean. The lower one's mean score the better one's response orientation perceptual ability.

Score Trial 1	Score Trial 2	Mean

Battery 4: Bimanual Ability

Bimanual ability is a very important ability that required both limbs in performing a motor skills. Grasp each handle and attempt to move the stylist around the star counter clockwise while looking into the mirror as fast as you can with out making an error. Attempt to move the stylists as *fast as possible and record the time it takes you in nearest second and the number of times you touched the sides (errors).* Score each trial using the following formula:

Trial score =[(Total number of touches + total time in seconds)1000]

Record the trial score on the table below and calculate the mean for bimanual perceptual ability.

Trials	Score
1	
2	
3	
Mean	

Battery 5: Static & Dynamic Balance

Researchers have studied static balance by using a stabilometer. With a stabilometer, the subject must balance on a platform suspended on a single axis across its midline. The subject places one foot one each side of this axis, similar to attempting to balance on the center of seesaw. You will attempt to balance for 30 seconds. The number of seconds that you are in balance will be your score. You will be given to two attempts with eye's open. The highest or best score is considered to be your static balance score for this perceptual ability. The longer one can stay in balance the better one's static balance ability.

Static

	Static
Trial 1	
Trial 2	
Best Score	

Battery 6: Control Precision Ability

Control precision is the ability to make rapid and precise movement adjustments of control devices involving single arm-hand or leg movements to visual stimuli. Subject keeps a hand-held stylus in the non-dominate hand and tracks the lighted disk embedded in a phonograph-like turntable (pursuit rotor) as it rotates at 60 rpm in counter clockwise direction. The subject is give 2 trials that each last 45 seconds. The total time they are on the lighted disk is recorded on the table below. A higher mean represents a better control precision ability.

Trial	Score
1	
2	
Mean	

Battery 7: Reaction Time Ability

Reaction time is the ability to respond rapidly to a signal when it appears. The subject will be presented a visual stimuli (e.g., light) signal then upon seeing he stimuli tap the small disk on the reaction time apparatus as quick as possible. The experimenter will set the reaction time so the foreperiod prior to the presentation of the visual stimuli is random. The subject will be given 4 trials or responses. Each trial or response will be recorded in Msec (e.g. 340 or 15 ms). A lower mean reaction time represents a better reaction time ability on this test.

Record the reaction time scores in the table below:

Reaction Time Trials	Score (Msec)
1	
2	
3	
4	
Mean	

How Well Did You Do On This Test??

One cannot compute an overall score for this test by just adding up the means or total score for each test. The reason is there are some tests where the high score is the best score and other where the lowest score is best score. One needs to convert their means or total scores on all the test to a standard score. Once a standard score has been compiled then they can add all their score together to determine how well they did overall on this test.

T-scores is one popular standard score that can be calculated so one can combine the different batteries together to determine the overall composite Tscore. Tscores are used when tests or batteries have different units of measure. It enables the teacher, physical therapist, or exercise specialist, to determine what client or student scored the best and worst on the test.

Converting your mean or total scores to a standard score (Tscore):

In order to calculate a Tscore, one needs to know and/or calculate the following:

1) If the measurement for the test is a positive (+) or negative (-) scale. A positive scale is where the higher the score the better you did where as the negative scale is where the lower the score the better you did.
2) The standard deviation (s) is derived from the distribution of scores from all the members of the each test.
3) The mean (m) derived from all the other member's scores for each test.
4) Your raw score (x) of that test.

The formula used to calculate Tscores for a test that has a (+) scale of measurement is:

$T = ((10(X-M)/s)+50)$.

For example, your score on the static balance was 20 second or X in formula. Everyone scores were recorded and the mean calculated for the scores was 15 seconds or M in the formula. From everyone's scores one can calculate the text standard deviation which in this case was 1.23 or s in the formula.

$T = ((10(20-15)/1.23) + 50) = ((10(5)/1.23)) + 50 = ((50/1.23)) + 50 = (40.6 + 50) = 90.6$

The formula used to calculate Tscore for a test that has a (-) is:

T= ((10(M-X)/s)+50).   Use these formulas to calculate your Tscore for each battery in this test.

For example, your score on the reaction time was 350 ms or X in formula. Everyone scores were recorded and the mean calculated for the scores was 200 seconds or M in the formula. From everyone's scores one can calculate the text standard deviation which in this case was 100.3 or s in the formula.

T = ((10 (200-350)/100.3) + 50) = (-14.9 + 50) = 35.1

Individual Composite Tscore

Battery	Mean or Total Score	Scale*	Overall Mean of Test (m)	Standard Deviation of the Test (s)	Your Tscore
1)Haptic Perception		+			
2)Motor Speed		+			
3)Response Orientation		-			
4)Bimanual ability		-			
5)Static Balance		+			
6)Control Precision		+			
7)Reaction time		-			
				Your Overall Tscore	

*Scales: Negative scale of measure is where the best score is a low score where as a positive scale of measure is where the best score is the highest score.

Once all the Tscores have been calculated then all one needs to do is to sum their Tscore to determine their overall Tscore. Tscores fall from 0 to 100 and represent one's overall percent rank on the test as compared to other who have taken it. For example, your overall Tscore was 80 then this represents 80% on the test or overall, which means that 79% of the other class members fell below you on this test or overall.   If an employer was attempting to determine what applicant was better on any test or overall all they need to do look at their Tscores on the test of interest or overall. Same thing goes for a teacher who want to determine where any student performance was on a test or overall.