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EVALUATION OF A NOVEL MYOELECTRIC TRAINING DEVICE

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Biomedical Engineering at Virginia Commonwealth University.

by

JOSHUA ARENAS B.S. in Mechanical Engineering, University of Virginia, May 2012

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List of Abbreviations

- BNC = British Naval Connector
- D = Digital
- EMG = Electromyography
- GEE = Generalized Estimated Equations
- MVC = Maximum Voluntary Contraction
- NASA TLX = National Aeronautics and Space Administration Task Load Index
- PL = Proportional Linear
- PNL = Proportional Non-Linear
- PWM = Pulse Width Modulation
- RMS = Root Mean Square

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<u>Abstract</u>

EVALUATION OF A NOVEL MYOELECTRIC TRAINING DEVICE

By Joshua Arenas, B.S. Mechanical Engineering

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Biomedical Engineering at Virginia Commonwealth University.

Virginia Commonwealth University, 2015

Director: Peter Pidcoe, PT, DPT, PhD, Associate Professor, Department of Physical Therapy Co-Director: Paul Wetzel, PhD, Associate Professor, Department of Biomedical Engineering

Recent technological developments have implemented the use of proportional control in prosthetic hands, giving rise to the importance of appropriate myoelectric control. EMG models in the past have assumed a linear proportionality to simplify the EMG-force relationships. However, it has been shown that a non-linear EMG-force relationship may be a more effective model. This study focused on evaluating three different control algorithms for a novel myoelectric training device, consisting of a toy car controlled by EMG signals from the distal muscles in the arm. Sixteen healthy adult subjects (5 male and 11 female) with an average age of 23.6 years (SD = 2.7) were asked to drive the car through a slalom course. Completion times as well as number of errors (wall hits, cone hits, and reversals) were recorded to evaluate performance. The NASA TLX was administered to evaluate psychometrics such as mental demand, physical demand, frustration, and overall workload. The average total errors per trial on the final day of testing using the linear proportional algorithm was found to be statistically significantly (p < 0.05) lower than digital and non-linear proportional. The average course

completion time per trial and overall workload using the non-linear proportional algorithm was found to be statistically significantly (p < 0.05) lower than digital and linear proportional. These results suggest that a non-linear algorithm would be most appropriate for myoelectric control in prosthetic hands.

Chapter 1: Introduction

Losing a limb severely changes a person's everyday life and functionality (27). Sadly, thousands each year lose limbs and have to cope with this loss. The majority of limb loss is due to congenital deficiencies. Congenital upper limb deficiency is most common and has been suggested that 75% of all congenital, unilateral upper-extremity amputees will be missing their left arm below the elbow (13). There have also been studies that project there to be 3.6 million amputations by the year 2050 (28). With such an increase in limb loss, the need for functional prostheses to replace these limbs is at an all-time high.

1.1 Prosthetics

The history of prosthetics dates back to the ancient Egyptians. These prostheses didn't hold much value other than cosmetic appearance and were made out of leather and wood. Over the years, different materials were put into use to make the prosthetics more durable. Metals, such as bronze, were used in conjunction with the leather and wood materials of old. In the 1800's, an improvement in functionality was seen as wooden legs were outfitted with catgut tendons to allow the foot to plantar and dorsiflex (26). As technology improved, prostheses became more advanced and more functional than their predecessors. The first powered prostheses appeared in 1915 and were pneumatically controlled. The growth of electronics resulted in the development of the first myoelectric prostheses in the 1940's. As electronic developments continued (such as the creation of the transistor), a Swedish research group created the SVEN hand in the 1960's. This was one of the first myoelectric hand prostheses that was multifunctional and has been used extensively in research (4).

Myoelectric prostheses are advanced prostheses, where movement of the artificial limb is controlled through the measurement of the electrical signal associated with muscle activation. Many of the commercial artificial limbs available today use surface electrodes to sense the electrical activity of the user's muscles. Surgery is sometimes required to bring the muscle nerves closer to the skin which improves the signal strength of the muscle and makes it easier for the prosthesis to sense. Studies have shown that myoelectric prostheses provide a higher grasping force, increased functional performance, and greater range of motion over conventional prostheses (e.g. cable prosthesis system). Users also preferred a myoelectric prosthesis because it looked more natural and it provided them with higher self-esteem (24, 27).

1.2 Control Algorithms

The most commonly used control scheme for myoelectric prostheses is the direct control scheme. Direct myoelectric control schemes map a single EMG control signal to a single control variable, such as motor speed. Several commercial devices, such as the Ottobock System Electric Hand use this type of control scheme. These devices have only one function, which is to open and close the hand. Pattern based control schemes are currently being developed to allow for more functionality of hand prostheses, including multiple grasps and increased articulation (22). Although devices that employ direct myoelectric control schemes are limited, they do increase the functional capability of the user. In the past, these devices implemented digital control (on/off) to operate the opening and closing of the hand. Today, many of these devices use proportional control to vary the speed of the opening and closing of the hand as well as the grasping force, which is more physiologic than digital control and gives users a variety of objects they can handle with their prosthesis (23, 29).

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It has been suggested since the 1950's, that in order to obtain a graded response from the myoelectric prosthesis, some form of proportional control would need to be implemented (2). Proportional control allows the user to perform small, precise movements as well as rapid, coarse movements. Since proportional control is currently available as a feature from all manufacturers of commercial myoelectric prostheses, appropriate myoelectric control has become increasingly important (3, 11). EMG models in the past have assumed a linear proportionality to simplify the EMG-force relationships. However, it has been shown that a non-linear EMG-force relationship may be a more effective model. Below is an equation that models the non-linear EMG-force relationship of the extrinsic muscles in the finger. EMG_N represents the non-linearly normalized to 100% of maximum, and C is a constant to describe the non-linear curvature. A range of values was found for this constant depending on the type of filter as well as activation condition (flexion or extension) (17).

$$EMG_N = F_m \frac{e^{(-0.001EMG_LC)} - 1}{e^{(-0.001F_mC)} - 1}$$

Before an amputee can obtain a myoelectric prosthesis, they need to complete a training phase that allows them to develop the skills necessary for controlling these types of prostheses (25, 9). This includes having to learn how to produce a specific myoelectric signal to control each function of the prosthetic (3). Often times, training systems are used that do not hold the attention of the user. With so many advancements being made to increase the functionality of myoelectric prosthetics, it is important that these training systems not only engage the user, but also be affordable, portable, and adaptable to conventional state of the art control schemes (7). In order to solve this problem, a novel myoelectric training device was developed and evaluated.

The device utilized a toy car controlled by an EMG system, with the goal to keep users better engaged during the necessary training phase. Initial testing showed that users were engaged when using the training system and thought it was "fun to use." However, limitations of the system included that it was not portable and only used a digital control algorithm (5).

1.3 Focus of Study

The overall goal of this research is to evaluate three different man-machine interface algorithms linking EMG to external device control. It is hoped that this understanding may lead to increased usability and an increased prosthesis acceptance rate (11). This study will follow the same concept of the training system mentioned in the previous section and utilize a toy car controlled through an EMG system to hold the user's attention. The system will use a dual site, three-state control scheme, which is



Figure 1: EMG Training System

a direct control scheme that is used in many commercially available myoelectric prostheses (18, 19). However, this version of the training system will be capable of proportional control, unlike the previous version, which was solely controlled digitally. Two separate proportional control algorithms will be implemented: a linear proportional control and a non-linear proportional control based off the exponential equation mentioned previously.

1.4 Specific Aims

With modifications to the previous myoelectric training device, this study will test three

hypotheses:

Hypothesis 1: A man-machine control interface that more closely mimics the EMG-muscle force generation relationship will provide more functional control.

<u>Specific aim 1(a)</u>: To compare the performance between day 1 and day 2 of EMG controlled steering and direction of a remote controlled car in a predefined course by measuring course completion time and cumulative errors.

Specific aim 1(b): To compare performance metrics with 3 different control algorithms;

(1) digital, (2) proportional linear, and (3) proportional non-linear.

Hypothesis 2: A man-machine control interface that more closely mimics the EMG-muscle force generation relationship will appear more natural, have the quickest acclimation time, result in the least frustration, and have the least overall workload for the user.

Specific aim 2a: To test the user's mental demand level using the NASA TLX.

Specific aim 2b: To test the user's physical demand level using the NASA TLX.

Specific aim 2c: To test the user's frustration level using the NASA TLX.

Specific aim 2d: To test the user's overall workload level using the NASA TLX.

<u>Specific aim 2e</u>: To evaluate the rate of learning for each algorithm by comparing the exponential regression for completion time, total errors, and overall workload of the three control algorithms.

Hypothesis 3: Subject capacity to learn, as elucidated by errors committed per unit time, will impact which control algorithm will produce the best results.

<u>Specific Aim 3a</u>: To see if high-capacity vs. low-capacity learning impacts the rate at which each algorithm can be mastered.

Chapter 2: Materials and Methods

The study included 16 healthy adult subjects (5 male and 11 female), with an average age of 23.6 years (SD = 2.7). Data collection took place during two sessions that lasted approximately an hour and a half each. Participants were asked to come back for their second session within 48 hours of their first. This was done to maximize training carryover from the previous session. During each session, subjects were asked to control a remote controlled car through a 40ft long by 4ft wide serpentine course, with 7 turns. Light gates were placed at the beginning and end of the course to measure completion time. Subjects were asked to reach the end of the course as quickly as possible, without hitting any obstacles. Course times as well as the number of obstacle hits were recorded. Control of the car required muscle activation signals from both of the user's forearms. The subject's dominant arm controlled the steering of the car, while the non-dominant arm controlled forward and reverse movement.

2.1 Experimental Design

The subjects were recruited via a sample of convenience from a college age population at Virginia Commonwealth University to participate in this experiment. Before arriving to the lab for the experiment, participants were asked not to wear lotion on their forearms because this could possibly interfere with the EMG signal and to dress in a way that allowed easy access to the muscle in their forearms (14). Following an introduction and consent process, block randomization was used to assign the control algorithm order. In the block randomization, there were six possible interface combinations used that included all three control algorithms, while not allowing an algorithm to be repeated on the same day. Subjects had a different combination each day. With the subject seated in a chair positioned at the end of the demarcated slalom course, four muscle sensing electrode pairs were placed over the muscle bellies of the extrinsic wrist muscle flexors and extensors on both arms (16). These muscles were chosen because they are normally used in the control of myoelectric prosthetic arms (12). Electrode placement was standardized with electrodes placed approximately 5cm distal to the elbow. Subjects were asked to flex and extend their wrist against resistance and the electrode pair was placed in the center of the muscle mass that emerged in line with muscle fiber orientation (6). Figure 2 shows the relative placement of the electrodes. A reference electrode was also placed on the bony part of the subject's left wrist for the ground lead.



Figure 2: Relative placement of EMG electrodes

After all electrodes were connected to the EMG leads, participants were asked to put their forearms in wooden braces mounted to a table top in front of them (Figure 3), making sure the only electrode located inside the brace was the ground electrode. This position minimized the potential of introducing a motion artifact in the EMG signal. The braces were then adjusted to the arm size of the individual to minimize muscle movement so that isometric contractions could be used to control the vehicle (12, 15). This also allowed a healthy subject to mimic the



Figure 3: Wooden braces used to obtain isometric contractions

type of contractions that an amputee would produce. In addition, participants were given instructions to flex with their fingertips and extend using their fingernails, but avoid curling their fingers in order to keep their hands as straight as possible (17). Again, this was to ensure that the subjects were giving the strongest EMG signal possible from the desired muscle groups by avoiding co-contraction and by activating muscles that crossed the most distal joints in the hand (12). Subjects then practiced producing maximum voluntary contractions (MVC) while watching an EMG signal magnitude on an oscilloscope screen. Calibration was performed by asking the subject to rest for two seconds and then perform a maximum contraction for two seconds with each muscle group independently. These values were used to normalize subsequent data by setting them equal to 0 and 100 percent respectively (resting and maximum) (20). This allowed the system controller to be scaled equally across users. Subjects were trained to a standardized level of control of the car by completing what was called a "square test". Participants' dominant arm controlled steering and their non-dominant arm controlled forward and backward movement of the car (9). The car was placed in a 3ft by 3ft square wooden box (Figure 4) and participants were allowed to briefly practice the aforementioned controls. After they had successfully moved the wheels left and right as well as moved the car forward and backwards, they were given two minutes to drive the car through a full 360°



Figure 4: Square test

of rotation in one direction to return to the original position. If they did not complete the task in less than two minutes, they were required to start over. Participants could not advance to the slalom course portion of the experiment until they successfully completed the square test.

After the participant successfully completed the first square test, a modified National Aeronautics and Space Administration Task Load Index (NASA TLX) survey was administered to determine the subject's overall workload for the task. It has been determined that the NASA TLX should be administered if the goal is to predict performance of a particular individual in a task. This is because the NASA TLX produces high correlations between workload and performance and has been applied successfully in different multitask contexts, such as using remote-control vehicles and human machine interfaces (1, 21). The participant was shown the survey and asked to rate their perceived experience on a scale of 1-20 for each of the six categories: mental demand, physical demand, temporal demand, performance, effort, and frustration level^{*}. The endpoint descriptors described the scale as very low (rating of 1) to very high (rating of 20), except for performance, which was described as perfect (rating of 1) to failure (rating of 20). For the second part of the survey, participants were randomly presented with 15 pairs of rating scale titles (e.g. Effort vs. Mental Demand) and asked which category was more important to their experience of workload in the task. This provided a weight for each category, which was used to find weighted ratings that were averaged to find the overall workload. The survey was taken after the first square test so participants could familiarize themselves with the rating scales and make sure they had developed a standard technique for dealing with the scales. After the first square test of the day, the NASA TLX was only administered after participants completed all trials of the slalom course for each control algorithm.

Following success in the square-test, participants were asked to drive the car through a slalom course as quickly as possible (Figure 5). The car was placed at the start line. The subjects were instructed to cross the start line (triggering the first light gate and automatically starting a course timer), pass through the slalom gates marked by white tape, avoid hitting the cones and the walls, and



Figure 5: Slalom Course

^{*} For a full description of the six categories, see Appendix.

to pass through the finish line at the end of the course (triggering the second light gate and stopping the course timer). They were informed that three seconds would be added to their total time if they hit a cone. Completion time, number of wall and cone hits, and direction reversals were recorded as they completed the task. A wall hit was defined as any contact with the wall that prohibited or slowed forward progress of the course. Reversals were defined as any motion that didn't result in forward progress. There were instances where the car would be oriented in a position that resulted in no change of position in the course whether the car itself moved forward or backward. No errors were counted when this occurred. In addition, some subjects completed part of the course by driving backwards. This meant that errors were counted when the car drove forward because it no longer resulted in forward progress in the course.

All three control algorithms were tested in one session: digital, linear proportional, and nonlinear proportional. After they completed six trials with one algorithm, participants were given a break and taken out of the wooden braces. During this time, the NASA TLX survey was administered to determine the overall workload of the task with the control algorithm they just used. Once the survey was completed, subjects were placed back into the wooden braces, the system was recalibrated, and the algorithm was switched. Participants were re-trained using the square test and, after successful completion, moved on to the slalom course. Again, the NASA TLX was only administered after the first square test and after all six trials of the slalom course were completed with one algorithm. This procedure was followed until the participant had tested all three algorithms, resulting in a total of 18 trials per day. The total time per session was about 2 hours and the subjects were asked to repeat the performance for 2 total sessions over 48 hours. Both sessions followed the same procedure.

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2.2 Experimental Details

Toy Car

A remote control car with proportional control capabilities was purchased for this experiment. Unfortunately, the car was only capable of proportional control when sent voltages between 5.7 and 7.2 V. The speed at this control voltage was too fast for the course, so the stock control electronics were removed and replaced with an Arduino microcontroller. With the Arduino, the voltage supplied to the car could be varied, giving it full range of proportional control. This was done by using the pulse width modulation (PWM) feature of the digital outputs on the microcontroller. The Arduino alone was enough to power the servo motor used for steering, but was not enough to supply the DC brush motor used to control forward and reverse motion. In order to supply the necessary current for the DC motor, a Pololu motor driver (Pololu High-Power Motor Driver 18v15) was added. Brackets were designed using Solidworks and printed using a Makerbot Replicator 2x 3D printer. These were used to hold the new servo motor in place to steer the car. A housing stand was also printed to hold the Arduino microcontroller on top of the car. The stock battery that came with the car did not provide a long enough run time for one subject to complete the entire experiment. It was rated at 7.2V and 1000mAh. Batteries rated at 7.2V and 2200mAh were used, which provided more run time. The wiring of the car was modified for the new batteries and industrial strength Velcro was used to hold them in place (Figure 6).



Figure 6: Toy Car

Data Processing: EMG Control Box

Since a new circuit was created for the toy car, the stock remote control was discarded and a new remote control was created. A multipurpose plastic enclosure was modified to serve as the new control box. It housed all of the necessary circuitry to process the EMG signal, calibrate the system to each individual user, and wirelessly control the car. The EMG amplification board from the previous study was modified to process integrated EMG signals instead of raw signals. The AD 524 precision instrumentation amplifiers were modified to create non-inverting amplifiers instead of inverting amplifiers. This was done because the integrated EMG signal from the Noraxon Myosystem 1200 is already rectified by using a 100ms root mean square (RMS) filter, which converts the negative voltage into positive voltage, so there was no need to invert the signal (15). The signal was then smoothed with a low pass filter RC filter having a cutoff frequency of 0.7875Hz. The time constant was set to 200ms because it has been shown

that large time constants produce significant controller delays (10). This resulted in smooth control of the car without any noticeable delay. Figure 7 shows the diagram for the EMG amplification board. Since the microcontroller from the previous study was not being used, the gain on the amplification board needed to be adjusted to the specifications of the current microcontroller. This adjustment maximized the sensitivity of the system.



Figure 7: EMG Amplification Board Diagram

The power supply for the control box needed to power the amplification board, as well as the Arduino microcontroller. The amplification board was powered with \pm 9V and the Arduino was powered with \pm 5V. A \pm 10V step down transformer along with a series of voltage regulators were used to obtain the necessary voltages. In order to achieve the \pm 9V needed for the EMG board, an LM2940T voltage regulator in combination with a 22 µF tantalum capacitor was used. The \pm 9V for the EMG board used a 7909A voltage regulator with a 1 µF tantalum capacitor. An LM7805C voltage regulator was used for the \pm 5V needed to power the Arduino microcontroller. Figure 8 illustrates the layout of the controller box.



Figure 8: EMG Box. Amplification board is below Arduino microcontroller.

Switches and LEDs were needed to both serve as a guide for participants as well as control aspects of the written code in order to tailor the system to each individual. Holes were drilled in the plastic enclosure to house the LEDs, switches, power supply cord, and BNC connections for use with an oscilloscope (Figure 8). A push-button switch was used to initiate the calibration phase of the program, which calibrated the system to each individual user to customize the controls for each person. The LEDs were used to guide the user through the calibration sequence. Two LEDs labeled Left and Right showed which arm was being calibrated. A yellow LED indicated the rest phase of the calibration, while green and red LEDs signaled the flexion and extension portion respectively. A toggle switch was used to differentiate between right and left hand dominance because the user's dominant hand controlled steering of the car. A push-button switch was also used as an emergency stop switch. In case the car wasn't responding correctly,

or the user needed to move their arms without a response from the car, the signal would not be sent as long as this button remained pushed down. A rotary-dial switch was used to move between the different algorithms to control the car. BNC connections were used to externalize the EMG data and were connected to an oscilloscope so the EMG signal could be seen (Figure 9). This allowed the user to see their max flexion during calibration and also showed any possible discrepancies that would

require a re-calibration.



Figure 9: EMG setup

Following low pass filtering of the EMG signal in hardware, the signal was sampled via the analog inputs of the Arduino at 2500 Hz. The signal was normalized via software based on the previously obtained calibration limits. The user's resting voltage was normalized to zero and their max flexion/extension voltages were normalized to 100. This ensured that the EMG controller sent only values to which the car could respond. Regardless of which algorithm was being used (digital, proportional linear, or proportional non-linear), the car initiated motion when the user performed an isometric contraction of 10% of their maximum value. Once this threshold was reached, the actions of the car depended on which control algorithm the system was set to. In the digital control mode, the car would move at full speed in the forward and reverse directions and reach the full left and right turn values for steering once the 10% threshold was met. With the proportional linear algorithm, the car would be proportionally controlled for both steering and speed. The proportionality followed a linear EMG-muscle force relationship. The proportional non-linear algorithm was also proportionally controlled, but it followed an exponential curve based on an equation found in literature known to relate EMG signal to muscle force production (17). The maximum exponential constant (C) of 46 was chosen, so the nonlinear curve would be as different from the proportional linear control algorithm as possible. The linearized EMG values were adjusted to the activation threshold and the max force variable was empirically found to fit the limits of the DC and servo motors. This resulted in the following equations for speed and steering:

Steering =
$$\pm 29.50 \frac{e^{(-0.001*(x-10)*46)} - 1}{e^{(-0.02950*46)} - 1} + 81$$

Speed = $61.02 \frac{e^{(-0.001*(x-10)*46)} - 1}{e^{(-0.06102*46)} - 1}$

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The differences in these control algorithms can be seen in Figures 10 and 11 below. The control value sent to the car computed for both speed and steering. The control box communicated with the car by using a pair of Xbee wireless communication chips. This communication stream was unidirectional, from the control box to the car only. The communication speed was set to a baud rate of 9600bps.



Figure 10: Digital, linear, and non-linear equations used for the speed of the car.



Figure 11: Digital, linear, and non-linear equations used for the steering of the car.

Chapter 3: Results

A Generalized Estimated Equations (GEE) test was run using IBM SPSS Statistics v23 to compare the means of time, total errors, and overall workload of each control algorithm across day 1 and day 2. The GEE test was also used to compare the means of time, total errors, and overall workload between the three algorithms on day 2. Tables 1-3 below show a summary of the data. A significance value (p<0.05) indicates that there is statistical significance between the data. The full set of data can be found in Appendices A, B, and C.

3.1 Time and Error Data: Day 1 vs. Day 2

Figure 12 below shows the average time per trial for each of the three algorithms (Digital (D), Proportional Linear (PL) and Proportional Non-Linear (PNL)) across both days. Trial number seven was the beginning of day 2, which is represented by the vertical dashed line. A GEE test showed that the mean time difference between day 1 and day 2 for each algorithm was statistically significant (p < 0.05). The times for all three algorithms showed a progressive decrease from the first trial on day 1 to the last trial on day 2. Note that D started out with the highest average start time and PNL was the lowest. Although the average times by trial 12 were relatively close to each other, D and PL remained with the highest and lowest average time, respectively. The improvement from the end of day 1 to the start of day 2 is due to memory consolidation, which is defined as "the progressive post acquisition stabilization of long-term memory" (8). This means that there won't be a decrease in performance from the last trial in day 1 to the first trial in day 2 because subjects retained the strategy of operating the toy car.



Figure 12: Graph of average course completion time per trial for all three equations on day 1 and day 2. Day 2 begins at trial number 7 and is represented by the red, vertical, dashed line.

Figure 13 below represents the average total errors (reversals, wall hits, cone hits) per trial for each of the three algorithms across both days. Average total errors per trial also steadily decreased like average time per trial. D again started with the highest average total errors, similar to average time per trial. However, PL began with the lowest average total errors. By trial 12, the average total errors decreased significantly for all three algorithms, and although PNL was not much different from PL, the original ranking remained the same. Statistical significance (p < 0.05) between both days was again seen by the GEE test that was performed.



Figure 13: Graph of average total errors per trial for all three algorithms on day 1 and day 2. Day 2 begins at trial number 7 and is represented by the red, vertical, dashed line.

The average time and error difference per day for each algorithm is represented by the bar graph in Figure 14 below. D shows the highest differences for both time and error with 39.30% and 43.61% decreases, respectively. PL has a 22.83% decrease in time and PNL has a 40.32% decrease in errors, both of which are the lowest in their respective categories.



Figure 14: Average time and error differences between day 1 and day 2 for each algorithm. Percentages represent a percent decrease in time and error.

3.2 NASA TLX: Day 1 vs. Day 2

Figures 15-17 below show the results from the NASA TLX survey for the three algorithms on both days. As with the average time and total errors per trial, the majority of the averages for day 2 were lower than day 1, with temporal demand and effort for PL being the only two exceptions. The variances for all three algorithms also decreased. Categories that had a statistical significant (p < 0.05) difference between day 1 and day 2 are marked with an asterisk. The only categories that were statistically significant between day 1 and day 2 for all three algorithms were mental demand and overall workload.



Figure 15: Average weighted ratings of NASA TLX for the digital algorithm on day 1 and day 2. Asterisk denotes statistical significance (p < 0.05).


Figure 16: Average weighted ratings of NASA TLX for the linear algorithm on day 1 and day 2. Asterisk denotes statistical significance (p < 0.05).



Figure 17: Average weighted ratings of NASA TLX for the non-linear algorithm on day 1 and day 2. Asterisk denotes statistical significance (p < 0.05).

3.3 Time and Error: Day 2 only

Since there was a significant difference for each algorithm between day 1 and day 2, only data from day 2 was analyzed to determine if there was a difference between the three algorithms. Figure 18 below shows the average course completion time per trial for day 2. The PNL time seems to have reached a plateau, but the PL and D times are still decreasing. There is a statistical significance (p < 0.05) between PNL and both PL and D, which is marked by an asterisk on the graph.



Figure 18: Average course completion time per trial on day 2 for all three algorithms. Asterisk denotes statistical significance (p < 0.05).

Figure 19 below shows the average total errors per trial for all three algorithms on day 2. None of these metrics appear to plateau within this timeframe. There is statistical significance (p < 0.05) between D and both PNL and PL, which is marked by an asterisk.



Figure 19: Average total errors per trial on day 2 for all three algorithms. Asterisk denotes statistical significance (p < 0.05).

3.4 NASA TLX: Day 2 only

Figure 20 shows the average weighted ratings on the NASA TLX for day 2. There is statistical significance (p < 0.05) between D and PNL for mental demand. The difference in physical demand was statistically significant (p < 0.05) between PL and both D and PNL. Performance showed statistical significance (p < 0.05) between D and PL. There was statistical significance (p < 0.05) between D and PL. There was statistical significance (p < 0.05) between D and PL. There was statistical significance (p < 0.05) between D and PNL when looking at frustration, with PNL having the lowest value. Overall workload showed a statistical significance (p < 0.05) between PNL and both D and PL.



Figure 20: Average NASA TLX weighted ratings for all three algorithms on day 2. Asterisk denotes statistical significance (p < 0.05).

3.5 Regression Equations

A graphical regression analysis was done to determine how many days it would take a given measurement metric reach a stable value. Figure 21 shows the course completion time regression for each of the three algorithms. The red dashed line represents the fastest theoretical time the car could complete the course if it were to go in a straight line at its fastest speed. The purple, vertical dashed lines represent the beginning of a new day, which are spaced every seven trials. Note that PNL has the fastest completion time on day 1. D and PNL are the first algorithms to reach the fastest time possible for the course by the end of day 4. L reaches the fastest time possible about a day after D and PNL.



Figure 21: Regression graphs for completion time. The horizontal, red, dashed line represents the fastest theoretical completion time if the car were to travel in a straight line down the course. The purple, vertical dashed lines represent the beginning of a new day (every 7 trials).

Figure 22 shows the total errors regression for each of the three algorithms. Note that both PL and PNL start out around the same value on day 1 and D starts at a much higher value. All three algorithms eventually converge to no errors, but PL is the first to reach it by the end of day 6. However, the pattern stays consistent throughout the plot, with PL improving slightly faster than PNL and D trailing behind both of them.



Figure 22: Regression graphs for total errors. The purple, vertical dashed lines represent the beginning of a new day (every 7 trials).

Figure 23 below shows the overall workload regression for each of the three algorithms. Note that the x-axis is labeled represented as days and not trials. Since a modified NASA TLX survey was used, 1 was the lowest possible number that could be obtained for overall workload. This is represented by the horizontal, red, dashed line and will be referred to as "zero overall workload." Although PNL starts out with the highest overall workload on day 1, it dramatically decreases and is the first algorithm to reach zero overall workload. D and PL do not reach zero overall workload until much later than PNL.



Figure 23: Regression graphs for overall workload. Note the x-axis is in days and not trials.

3.6 Learning: Time vs. Total Errors Correlation

To further evaluate the performance of each subject, it was assumed that if the subject truly learned the full capabilities of each control algorithm, they would commit the least amount of errors during their fastest completion times and commit the largest number of errors during their slowest completion times (3). Regression lines were calculated for each subject based on the correlation of time and total errors for each control algorithm on day 2. Based on the average slope of the regression lines, subjects were split into two groups. If a subject had an above average slope for all three control algorithms, they were classified as a high-capacity learner. If a subject had a below average slope for all three control algorithms, they were classified as a low-capacity learner (3). Figure 24 illustrates a hypothetical example of both a high-capacity and low-capacity learner using the same control algorithm.



Figure 24: High-capacity learner vs. low-capacity learner. Note that the high-capacity learner has a steeper slope than the low-capacity learner.

High Learners

Figures 25-27 show the time vs. total error correlation graphs of high capacity learners performing with all three control algorithms. Note that D has the steepest slope of the three algorithms. However, of the two proportional control algorithms, PNL has the steepest slope.



Figure 25: Time vs. Total Errors correlation for high-capacity learners with the digital control algorithm.



Figure 26: Time vs. Total Errors correlation for high capacity learners with the linear control algorithm.



Figure 27: Time vs. Total Errors correlation for high capacity learners with the non-linear control algorithm.

Low Learners

Figures 28-30 show the time vs. total error correlation graphs of high capacity learners in all three control algorithms. Note that PL has the steepest slope and PNL has the flattest slope out of the three algorithms.



Figure 28: Time vs. Total Errors correlation for low capacity learners with the digital control algorithm.



Figure 29: Time vs. Total Errors correlation for low capacity learners with the linear control algorithm.



Figure 30: Time vs. Total Errors correlation for low capacity learners with the non-linear control algorithm.

Chapter 4: Discussion

The overall goal of this research was to investigate the performance of three different manmachine interface algorithms linking EMG to external device control. These algorithms range from the simple on/off control strategy (D) to a more complex non-linear proportional (PNL) control that mimics the physiological relationship that exists between muscle electrical potential and muscle force generation. Each algorithm was introduced to subjects over the course of two days in a randomized fashion. Subjects were given adequate time to train and then tested by measuring time to task completion and errors during task performance. Psychometrics were also assessed using the NASA TLX to assess perceptions of mental demand, physical demand, frustration level, and overall workload. Three hypotheses were tested. Each is listed and discussed below.

4.1 Hypothesis 1

"Hypothesis 1: A man-machine control interface that more closely mimics the EMG-muscle force generation relationship will provide more robust control."

Course completion time and total errors for all three algorithms had statistically significant differences when comparing day 1 results with day 2 results (Figures 12 and 13). This demonstrates subject learning. The smaller variances from day 1 to day 2 showed that the subjects were becoming more consistent with how long it took them to finish and the amount of errors they made, which is also indicative learning. Further evidence of learning is demonstrated by the large average time and error differences per day (Figure 14). D had the largest percent decrease for both time and errors, while PL had the lowest percent decrease in time and PNL the

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lowest percent decrease in errors. Therefore, day 1 was considered training and it was assumed that subjects were fully trained on day 2. All subsequent analysis was performed on day 2 data only.

On day 2, PNL had a significantly faster time than D and PL (Figure 18) demonstrating that subjects were able to complete the course fastest using PNL. When looking at total errors, PL and PNL had a significantly lower amount of errors than D (Figure 19). This demonstrates that subjects were able to complete the course more accurately with PL and PNL. Although PL has a fewer amount of errors than PNL, the result is not statistically significant. The oscillatory shape that can be seen by PNL and PL in both time and errors can be attributed to overconfidence. Subjects performed well in the beginning and then stated they became overconfident, resulting in a spike of time and errors before continuing the decreasing trend. This artifact has been documented in similar research (3). The hypothesis was proven correct by the results, which demonstrated that D performed the worst compared to PL and PNL.

4.2 Hypothesis 2

"Hypothesis 2: A man-machine control interface that more closely mimics the EMG-muscle force generation relationship will appear more natural, have the quickest acclimation time, result in the least frustration, and have the least overall workload for the user."

Evidence of learning was supported when comparing the NASA TLX data between day 1 and day 2 (Figures 15-17). The test elements assessing Overall Workload and Mental Demand showed a statistically significant difference between all three algorithms when comparing results from day 1 to day 2. This suggests that on day 2, all three algorithms were easier to use overall

and required lower cognitive demand. PL showed a significant difference in performance from day 1 to day 2, demonstrating subjects felt they performed better on day 2 than on day 1. PNL had a significant difference in temporal demand and frustration, meaning subjects felt less rushed and less irritated/annoyed on day 2 than on day 1.

Day 2 NASA TLX data (Figure 20) revealed subjects felt the D algorithm was the most mentally demanding and frustrating out of the three. These results were also shown to be significantly higher than PNL. This meant they felt D required the most thinking. PL demonstrated a significantly higher physical demand than both D and PNL, indicating subjects felt PL required them to flex and extend their hardest, when compared to D and PNL. PNL had a significantly lower overall workload than D and PL. Subjects felt PNL required the least amount of work to control.

When looking at the average times and total errors per trial for both days (Figures 12 and 13), it can be seen that there is no clear plateau for any of the algorithms. All still show decreasing trends towards the end of day 2, indicating that the subjects were still learning and suggesting that they were not yet fully trained. If the subjects were to continue for multiple days, the average time and total errors per trial would be expected to eventually level out for each algorithm. This would likely affect overall workload for each algorithm and cause it to decrease over time as well. Learning is defined as an exponential improvement in metrics. A regression analysis was performed to determine how many days it would take for the subjects to reach the minimum value possible using each algorithm for average course completion time, average total

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errors, and average overall workload (Figures 21-23). By definition, the steepness of the negative slope indicates how fast the subjects were learning with that algorithm.

D had the largest negative slope out of all three algorithms, indicating subjects learned fastest with this algorithm. However, this assessment may be biased since D also began with the highest values out of the three algorithms in all categories. The regression graphs demonstrated that multiple days were required for all three algorithms to reach the minimum values possible in each category. A minimum of five days would be required for all three algorithms to reach the fastest completion time possible for the course, six to seven days for total errors to reach zero, and about 14 days for overall workload to reach the absolute minimum.

Although it appears that it would take multiple days for the three algorithms to converge to the same minimum value, the rank order of the algorithms does not change from the day 1 assessment to the final plateau day when looking at performance. PNL begins with the lowest average course completion time and, along with D, is the first to reach the fastest time to complete the course, with PL finishing about a day later. PL begins with the lowest value on day 1, with PNL beginning at about the same value. PL is the first equation to reach zero total errors, with PNL and D reaching the same value 1-2 days later. When looking at overall workload, PNL is the first equation to reach the minimum value. Although the data obtained did not reach a plateau, the regression analysis validates the primary objective of determining if there's a difference between the three equations. From this, it was concluded that the hypothesis was confirmed. PNL, which more closely matches the EMG-muscle force generation relationship, had the least amount of frustration and overall workload compared to D and PL. It also had the

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quickest acclimation time in terms of average course completion time as well as overall workload.

4.3 Hypothesis 3

"Hypothesis 3: Subject capacity to learn, as elucidated by errors committed per unit time, will impact which control algorithm will produce the best results."

When looking at learning capacity (Figures 25-30), all three control algorithms had steeper regression slopes for high-capacity learners than low-capacity learners, indicating that high-capacity learners were able to learn faster than low-capacity learners. The steeper regression slope of D for high-capacity learners (Figures 25-27), demonstrated they were able to learn this control algorithm fastest out of the three. This is likely due to the fact they were able to realize this was an on/off type control algorithm and had no further capabilities. Out of the two proportional algorithms, PNL had the steepest regression slope indicating they learned how to take full advantage of the proportional capabilities of this control algorithm.

Low-capacity learners (Figures 28-30) had a faster learning rate with PL than the other two algorithms. It seems that low-capacity learners weren't able to fully learn how to operate the D and PNL control algorithms, unlike the high-capacity learners. One explanation for low-capacity learners being unable to operate D despite its relatively simple control activation is that D is not as physiologic as PL or PNL. PNL may model the EMG-muscle force relationship so well that low-capacity learners weren't challenged enough and weren't as actively engaged in the learning process. However, this doesn't mean that low-capacity can't learn the D and PNL algorithms, or that it was more difficult. Over time, subjects could indeed learn how to operate the D and PNL

algorithms, but it would take longer than the two days used in this study. This proves hypothesis 3 correct since high-capacity learners and low-capacity learned faster with different control algorithms.

A training study found that some subjects were not able to fully "use the available options of the proportional control." The study went on to explain that if differences in learning capacity actually exist, this should be taken into account when determining the most appropriate control algorithm for a patient to increase the chances of acceptance. Their findings showed that a digital control algorithm may be more appropriate for those less proficient in myoelectric control (low-capacity learner) and a proportional algorithm would be more appropriate for high-capacity learners (3). Although the results in Figures 25-27 are in agreement with differences in learning capacity, the specific control algorithms suitable for each group are inconsistent with previous research.

4.4 Summary

Although subjects learned quickest with the D and PL algorithms, as seen by the steeper slopes in the correlation between time and errors (Figures 32-37), the NASA TLX data (Figure 27) shows that these two equations had significantly (p < 0.05) higher overall workloads than PNL. D was also significantly (p < 0.05) more frustrating and mentally demanding than PNL. PL was significantly (p < 0.05) more physically demanding than PNL. In context of application, despite the difference in learning capacity, PNL would be more suitable than D or PL because of the lower overall workload. It would be inappropriate to assign a control algorithm to a patient that would require a high physical demand, workload, or frustration level. This would likely deter the patient from using the prosthesis and cause them to reject it altogether.

4.5 Future Work

A potential application of this study is to test the algorithms using a prosthetic hand. It is clear that D had the poorest overall performance out of the three. However, the results showed that subjects perform better using a proportional algorithm. The next steps in this line of research could be to develop a prosthetic hand that is controlled by the PL and PNL algorithms and have subjects perform tasks, such as object manipulation, to further evaluate differences between the two proportional algorithms in a more real-world setting.

Chapter 5: Conclusion

The primary objective of this experiment was to evaluate differences between D, PL, and PNL control during the performance of a novel task. A training device was modified to have proportional control capabilities. Hypotheses were constructed and tested revealing that a manmachine control interface that more closely mimics the EMG-muscle force relationship provides more robust control and appears more natural despite a longer rate of learning. There was statistical difference between the two days of trials, indicating that subjects learned over time with all of the algorithms. Analysis of day 2 data demonstrated PNL to be significantly different in course completion time, being faster than D and PL. D was shown to be significantly different in terms of total errors, having the most out of the three. PNL showed lower values that were statistically significant in physical demand, frustration, and overall workload. A regression analysis showed that even though subjects would be able to eventually achieve the same performance for all three algorithms, they would reach peak performance faster with PNL. Although there may be differences in learning capacity, the lower cognitive load gives evidence that a PNL algorithm is most appropriate for myoelectric control in prosthetic hands. Further work needs to be done in order to determine the efficacy of both the proportional algorithms when it comes to functional tasks using a prosthetic limb. In conclusion, there were differences found between the three control algorithms. A D equation does not match the EMG-force relationship of muscle and results in a higher mental demand and frustration for the user. Although PNL requires more time to fully learn, it has a significantly lower physical demand and overall workload than PL. Therefore, a PNL algorithm is more suitable for myoelectric control.

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Appendices

Subject 1							
Day 1							
Trial	Time (min)	Time (s)	Reversals	Hits	Cones	Total Errors	Final Time (s)
dig 1	2m 5.63s	125.63	22	9	2	33	131.63
dig 2	1m 45.09s	105.09	14	12	4	30	117.09
dig 3	0m 47.72s	47.72	8	9	2	19	53.72
dig 4	1m 11.40s	71.4	11	8	4	23	83.4
dig 5	0m 56.18s	56.18	8	6	1	15	59.18
dig 6	1m 7.60s	67.6	11	11	2	24	73.6
average		78.93667	12.33333	9.166667	2.5	24	86.43666667
lin 1	0m 40s	40	0	0	0	0	40
lin 2	0m 44.13s	44.13	0	0	0	0	44.13
lin 3	0m 45.22s	45.22	0	0	0	0	45.22
lin 4	0m 45.72s	45.72	0	0	0	0	45.72
lin 5	0m 41.62s	41.62	0	0	0	0	41.62
lin 6	0m 49.91	49.91	0	0	0	0	49.91
average		44.43333	0	0	0	0	44.43333333
non 1	0m 30.22s	30.22	0	1	0	1	30.22
non 2	0m 37.53s	37.53	0	0	1	1	40.53
non 3	0m 34.56s	34.56	0	0	0	0	34.56
non 4	0m 37.37s	37.37	0	0	0	0	37.37
non 5	0m 34.22s	34.22	0	0	0	0	34.22
non 6	0m 34.06s	34.06	0	0	0	0	34.06
average		34.66	0	0.166667	0.166667	0.33333333	35.16

Appendix A Individual Subject Time and Error Data

Day2							
Trial	Time (min)	Time (s)	Reversals	Hits	Cones	Total Errors	Final Time (s)
non 1	0m 58.41s	58.41	0	0	0	0	58.41
non 2	0m 49.97s	49.97	0	0	0	0	49.97
non 3	0m 45.62s	45.62	0	0	0	0	45.62
non 4	0m 39.84s	39.84	0	0	0	0	39.84
non 5	0m 36.44s	36.44	0	0	0	0	36.44
non 6	0m 43.66s	43.66	0	0	0	0	43.66
average		45.6567	0	0	0	0	45.65666667
lin 1	1m 20.78s	80.78	4	4	0	8	80.78
lin 2	0m 31.81s	31.81	0	0	0	0	31.81
lin 3	0m 41.94s	41.94	1	0	0	1	41.94
lin 4	0m 58.64s	58.64	4	4	0	8	58.64
lin 5	0m 55.19s	55.19	0	0	2	2	61.19
lin 6	0m 58.50s	58.5	0	0	0	0	58.5
average		54.4767	1.5	1.333333	0.3333333	3.16666667	55.47666667
dig 1	0m 40.09s	40.09	5	5	2	12	46.09
dig 2	1m 5.88s	65.88	13	11	1	25	68.88
dig 3	0m 27.28s	27.28	4	4	3	11	36.28
dig 4	0m 29s	29	5	6	2	13	35
dig 5	0m 42.37s	42.37	7	7	3	17	51.37
dig 6	0m 20.81s	20.81	2	3	2	7	26.81
average		37.5717	6	6	2.1666667	14.1666667	44.07166667

Total Averages	Time (s)	Errors
Digital	58.2541667	19.08333
Linear	49.455	1.583333
Nonlinear	40.1583333	0.166667





Subject 2										
Day 1										
Trial		Time (min)	Tim	ie (s)	Reversa	ls Hits	Cones	Total Errors	Final Time (s)
lin 1		0m 55	.08s	55	5.08	1	0	0	1	55.08
lin 2		0m 34	.53s	34	1.53	1	1	0	2	34.53
lin 3		0m 21	.43s	21	.43	0	1	1	2	24.43
lin 4		0m 56	.25s	56	5.25	8	6	0	14	56.25
lin 5		0m 50	.22s	50).22	8	6	2	16	56.22
lin 6		0m 31	.43s 31		.43	1	1	2	4	37.43
average			31.435		.49	3.16666	7 2.5	0.833333	6.5	43.99
						5.10000	., 2.3	0.0000000	0.5	10.00
dig 1		0m 55	.04s	55	5.04	11	11	3	25	64.04
dig 2		0m 53	.16s	53	8.16	18	4	5	27	68.16
dig 3		0m 42	.56s	42	2.56	12	5	2	19	48.56
dig 4		1m 5.	19s	65	5.19	11	6	5	22	80.19
dig 5		0m 43	.80s	4	3.8	9	6	1	16	46.8
dig 6		1m 40	.095	100	0.09	22	11	2	35	106.09
average				59 0	7333	13.8333	3 7,16666	7 3	24	68,97333333
						_0.0000				
non 1		1m 6.	69s	66	5.69	14	4	3	21	75.69
non 2		0m 28	.07s	28	3.07	2	0	2	4	34.07
non 3		0m 32	.97s	32	2.97	4	3	4	11	44.97
non 4		0m 26	.885	26	5.88	0	0	0	0	26.88
non 5		0m 28	035	28	8.03	4	1	3	8	37.03
non 6		0m 34	19s	26.05		1		2	0	42.10
			1.19s			4			Y	4519
average		011134	.155	36.1	3833	4.66666	∠ 7 1.66666	5 7 2.5	9 8.83333333	43.63833333
average Day 2		011 34	.153	36.1	.3833	4 4.66666	2 57 1.66666	7 2.5	9 8.83333333	43.63833333
average Day 2 Trial	Time	e (min)	Time	36.1 : (s)	.19 .3833 Rev	4.66666	67 1.66666 Hits	7 2.5 Cones	8.833333333 Total Errors	43.63833333 Final Time (s)
average Day 2 Trial non 1	Time Om 2	e (min) 27.16s	Time	36.1 e (s)	.3833 Rev	4.66666 ersals	1.66666 Hits 3	7 2.5 Cones 3	9 8.83333333 Total Errors 9	43.19 43.63833333 Final Time (s) 36.16
average Day 2 Trial non 1 non 2	Time Om 2 Om 2	e (min) 27.16s 21.37s	Time 27. 21.	36.1 • (s) 16 37	.3833 Rev	4.66666 rersals 3 0	Hits 0	7 2.5 Cones 3 1	8.83333333 Total Errors 9 1	43.63833333 Final Time (s) 36.16 24.37
average Day 2 Trial non 1 non 2 non 3	Time 0m 2 0m 2	e (min) 27.16s 21.37s 30.71s	Time 27. 21. 30.	36.1 • (s) 16 37 71	.3833 Rev	4.666666 ersals 3 0 4	Hits 0 4	7 2.5 Cones 3 1 2	9 8.83333333 Total Errors 9 1 10	43.63833333 Final Time (s) 36.16 24.37 36.71
average Day 2 Trial non 1 non 2 non 3 non 4	Time 0m 2 0m 2 0m 3	e (min) 27.16s 21.37s 30.71s 32.28s	Time 27. 21. 30. 32.	36.1 • (s) 16 37 71 28	.3833 Rev	4.666666 rersals 3 0 4 3	Hits 3 0 4	7 2.5 Cones 3 1 2 1	9 8.83333333 Total Errors 9 1 10 5	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28
average Day 2 Trial non 1 non 2 non 3 non 4 non 5	Time 0m 2 0m 3 0m 3 0m 3 0m 3	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s	Time 27.: 21.: 30.: 32.: 28.4	36.1 (s) 16 37 71 28 41	.19 13833 Rev	4 4.666666 3 0 4 3 3	Hits 3 0 4 1 3	7 2.5 Cones 3 1 2 1 1 1 1	9 8.83333333 Total Errors 9 1 10 5 7	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6	Time Om 2 Om 3	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s	Time 27.: 21.: 30.: 32.: 28.4 24.8	36.1 2 (s) 16 37 71 28 41 87	.13 13833 Rev	4 4.666666 3 0 4 3 3 0 4 3 0	Hits 3 0 4 1 3 1 1	7 2.5 Cones 3 1 2 1 1 1 0	8.833333333 Total Errors 9 1 10 5 7 1	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average	Time Om 2 Om 2 Om 3 Om 2 Om 2	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s	Time 27.: 21.: 30. ⁻ 32.: 28.4 24.8 27.4	36.1 (s) 16 37 71 28 41 87 667	2.166	4 4.66666 7 9 9 0 4 3 3 0 5 5 6 6 6 6 6 6 6 6 6 7	Hits 3 0 4 1 3 1 2	7 2.5 Cones 3 1 2 1 2 1 1 0 1.3333333	8.83333333 Total Errors 9 1 10 5 7 1 5.5	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average	Time Om 2 Om 3	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s	Time 27.: 21.: 30.: 32.: 28.4 24.3 27.40	36.1 (s) 16 37 71 28 41 87 667	2.166	4 4.66666 3 0 4 3 3 0 6666667	Hits 3 0 4 1 3 1 2	7 2.5 Cones 3 1 2 1 1 0 1.3333333	8.83333333 Total Errors 9 1 10 5 7 1 5.5	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.46666667
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average	Time Om 2 Om 2 Om 2 Om 2 Om 2 Om 2	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 28.97s	Time 27.: 21.: 30. 32.: 28.4 27.4 27.4 27.4	36.1 (s) 16 37 71 28 41 87 667 97	.13 3833 Rev 2.166	4 4.66666 3 0 4 3 3 0 56666667 4 7	Image: 2 Image: 3 Image: 0 Image: 4 Image: 3 Image: 1 Image: 3 Image: 1 Image: 2	7 2.5 Cones 3 1 2 1 1 0 1.3333333 2 2 2 2 2	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.04
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 2	Time Om : Om : Om : Om : Om : Om : Om :	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 28.97s 38.94s 31.31c	Time 27.: 21.: 30.' 28.4 24.3 27.40 27.40 28.9 38.9 38.9 31	36.1 2 (s) 16 37 71 28 41 87 667 97 94 31	2.166	4 4.66666 3 0 4 3 3 0 56666667 4 7 1	Image: 2 initial initiali initinitial initial initia initia initia initial initia initia	2.5 Cones 3 1 2 1 1 0 1.3333333 2 2 2 2 0	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4	Time Om : Om : Om : Om : Om : Om : Om : Om :	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 28.97s 38.94s 31.31s 27.69s	Time 27.: 21.: 30.: 32.: 28.4 27.4 27.4 27.4 28.9 38.9 31.: 27.4	36.1 2 (s) 16 37 71 28 41 87 667 97 94 31 69	2.166	4 4.66666 3 0 4 3 3 0 56666667 4 7 1 1 4	Image: 2 initial initiali initinitial initial initiali initinitia initial initia initia i	7 2.5 Cones 3 1 2 1 1 0 1.3333333 2 2 2 2 0 2	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 10	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5	Time Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 28.97s 38.94s 31.31s 27.69s 18 87s	Time 27.: 21.: 30.: 32.: 28.4 24.3 27.40 28.9 31.: 27.0 18.9	36.1 36.1 (s) 16 37 71 28 41 87 667 97 94 31 69 87	2.166	4 4.66666 7 9 9 0 4 3 0 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 7 4 7 1 4 0	Hits 3 0 4 1 3 1 2 5 0 4	7 2.5 ✓ Cones 3 1 2 1 1 2 1 1 0 1.33333333 2 2 2 2 0 2 2 1	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 1 10 1	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69 21.87
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6	Time Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 28.97s 38.94s 31.31s 27.69s 18.87s 32.03s	Time 27.: 21.: 30.: 32.: 28.4 24.3 27.40 28.9 31.: 27.0 18.3 32.0	36.1 36.1 (s) 16 37 71 28 41 87 667 97 94 31 69 87 87 03	2.166	4 4.66666 3 0 4 3 3 0 56666667 4 7 1 4 0 5	Image: 2 Image: 67 Image: 66	7 2.5 Cones 3 1 2 1 2 1 1 0 1.3333333 2 2 2 2 0 2 0 2 1 3 3 3 3 3 3 3 3 3 3 3 3 3	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 1 10 1 10 1 13	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69 21.87 41.03
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 28.97s 38.94s 31.31s 27.69s 18.87s 32.03s	Time 27.: 21.: 30.: 32.: 28.4 27.4 27.4 28.9 38.9 31.: 27.0 18.0 32.0 29.6	36.1 36.1 (5) 116 37 71 28 41 87 667 97 94 31 669 87 03 535	2.166	4 4.66666 3 0 4 3 3 0 6666667 4 7 1 4 0 5 3.5	Image: 2 Image: 3 0 4 1 3 1 2 2 5 0 4 0 2 5 0 4 0 5 2.6666667	7 2.5 Cones 3 1 2 1 2 1 1 0 1.3333333 2 2 2 0 2 2 0 2 1 3 1.66666667	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 1 10 1 10 1 3 7.83333333	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69 21.87 41.03 34.635
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time Om : Om : Om : Om : Om : Om : Om : Om :	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 28.97s 38.94s 31.31s 27.69s 18.87s 32.03s	Time 27.: 21.: 30. 32.: 28.4 24.: 27.4 27.4 38.9 31.: 27.6 18.8 32.6 29.6	36.1 ((s) (f) (f) (f) (f) (f) (f) (f) (f	2.166	4 4.66666 3 0 4 3 3 0 56666667 4 7 1 4 0 5 3.5	Hits 3 0 4 1 3 1 2 5 0 4 0 5 2.6666667	3 7 2.5 Cones 3 1 2 1 1 0 1.3333333 2 2 0 2 1.3333333 3 2 0 2 1 3 1.66666667	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 1 10 1 13 7.83333333	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69 21.87 41.03 34.635
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 28.97s 38.94s 31.31s 27.69s 18.87s 32.03s	Time 27.: 21.: 30.: 32.: 28.4 27.4 27.4 27.4 38.9 31.: 27.0 18.3 32.0 29.6 40.0	36.1 36.1 (5) 116 37 71 28 41 87 667 97 994 331 669 87 03 535 62	2.166	4 4.66666 3 0 4 3 3 0 56666667 4 7 1 4 0 5 3.5 0	Image: 2 Image: 3 0 4 1 3 1 2 5 0 4 0 2 5 0 4 0 5 2.6666667 0	3 Z.5 Cones 3 1 2 1 0 1.3333333 2 2 2 0 1.3333333 2 0 1.3333333 1.3333333 3 1.66666667 0 0	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 1 10 1 13 7.833333333	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69 21.87 41.03 34.635
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 24.87s 38.94s 31.31s 27.69s 18.87s 32.03s 40.62s 50.28s	Time 27.: 21.: 30.: 32.: 28.4 24.8 27.40 28.9 31.: 27.0 18.8 32.0 29.6 40.0 50.:	36.1 ((s) 116 337 71 28 41 28 41 87 667 97 94 31 669 97 03 335 62 28 42 42 43 43 43 43 43 44 44 44 44 44	2.166	4 4.66666 3 0 4 3 3 0 5 6666667 4 7 1 4 0 5 3.5 3.5 0 4	Image: 2 Image: 3 0 4 1 3 1 2 2 5 0 4 0 5 0 5 0 5 0 5 0 0 0	3 Z.5 Cones 3 1 2 1 0 1.3333333 2 2 2 0 1.3333333 1.66666667 0	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 1 13 7.83333333 0 4	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69 21.87 41.03 34.635 40.62 50.28
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 3 dig 4 dig 5 dig 6 average	Time Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 28.97s 38.94s 31.31s 27.69s 18.87s 32.03s 40.62s 50.28s 50.66s	Time 27.: 21.: 30.: 32.: 28.4 24.6 27.4 28.9 31.: 27.4 38.9 31.: 32.0 29.6 40.0 50.: 50.0	36.1 36.1 (s) 37 16 37 71 28 41 87 667 97 97 994 31 699 87 03 699 87 03 635 62 28 66 66 66 66 66 66 66 67 66 66	2.166	4 4.66666 3 0 4 3 3 0 66666667 4 7 1 4 0 5 3.5 0 4 3 3 5 3 3 5 0 4 3 3 5 3 3 5 3 3 5 3 3 5 3 5 3 3 3 3 3	Image: 2 Image: 3 0 4 1 3 1 2 2 5 0 4 0 2 5 0 4 0 5 2.6666667 0 1 1 1 2 1 2 1 2 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 Z.5 Cones 3 1 2 1 0 1.3333333 2 2 2 1.3333333 - 2 0 1.3333333 - 2 0 2 0 2 0 2 0 2 0 0 0 0 1.66666667 0 0 0 1.166666667	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 1 10 1 13 7.83333333 0 4 5	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69 21.87 41.03 34.635 40.62 50.28 53.66
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time Om 2 Om 3 Om 3 Om 2 Om 2 Om 2 Om 3 Om 3 Om 3 Om 3 Om 4 Om 4 Om 4 Om 4 Om 4 Om 4 Om 4 Om 4 Om 5 Om 5	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 24.87s 28.97s 38.94s 31.31s 27.69s 18.87s 32.03s 40.62s 50.28s 50.66s 43.31s	Time 27.: 30.: 32.: 28.4 24.3 27.4 28.5 31.: 27.4 38.5 31.: 27.6 18.6 32.6 29.6 40.0 50.: 50.0 43.:	36.1 36.1 (s) (s) 37 71 28 41 87 667 97 94 31 669 97 94 31 33 535 62 28 66 62 28 66 31	2.166	4 4.66666 3 0 4 3 3 0 4 3 3 0 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 7 4 7 1 4 0 5 3.5 3 5 0 4 3 3 1 1	Image: 2 Image: 3 0 4 1 3 0 4 1 3 1 2 5 0 4 0 5 2.6666667 0 1 0 1 0 1 0 1 0 1 0 0	3 7 2.5 Cones 3 1 2 1 1 2 1 1.3333333 3 2 2 2 2 0 2 1 3 1.66666667 0 0 1 0 1 0 1 0 0 1.66666667 1 0 0 1 0	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 1 10 1 10 1 13 7.83333333 0 0 4 5 1	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69 21.87 41.03 34.635 40.62 50.28 53.66 43.31
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 3 dig 4 dig 5 dig 6 average	Time Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2 Om 2	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 24.87s 24.87s 38.94s 31.31s 27.69s 18.87s 32.03s 40.62s 50.28s 50.66s 43.31s 40.13s	Time 27.: 30. 32.: 28.4 24.3 27.4 28.9 38.9 38.9 31.; 27.4 38.9 38.9 31.; 27.4 18.3 32.0 29.6 40.0 50.1 50.0 43.1 50.0	36.1 36.1 (s) 37 37 37 28 41 28 41 87 667 97 994 31 669 87 03 535 62 28 666 631 13	2.166	4 4.666666 3 0 4 3 3 0 66666667 4 7 1 4 0 5 3.5 0 4 3 3 0 0 4 3 3 1 3	Image: 2 Image: 3 0 4 1 3 1 3 1 2 2 5 0 4 0 2 5 0 4 0 5 2.6666667 0 1 0 1 0	3 Z.5 Cones 3 1 2 1 0 1.3333333 2 2 2 2 0 2 1 333333 1.3333333 1.3333333 0 2 0 1.66666667 0	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 1 10 1 13 7.83333333 7.83333333 0 0 4 5 1 3	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69 21.87 41.03 34.635 40.62 50.28 53.66 43.31 40.13
average Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6	Time Om 2 Om 2	e (min) 27.16s 21.37s 30.71s 32.28s 28.41s 24.87s 24.87s 38.94s 31.31s 27.69s 18.87s 32.03s 40.62s 50.28s 50.66s 43.31s 40.13s 41.44s	Time 27.: 30.: 32.: 28.4 24.3 27.4 28.9 38.9 31.: 27.6 18.8 32.0 29.6 40.1 50.1 50.1 50.1 40.1 41.4	36.1 36.1 ((s) 116 37 71 28 41 87 667 994 31 669 87 03 535 62 88 62 831 13 44	2.166	4 4.666666 3 0 4 3 3 0 56666667 4 7 1 4 0 5 3.5 0 4 3 3 0 5 6 6 6 6 6 6 6 6 6 7 1 4 0 5 3.5 0 4 3 3 2	Image: 2 Image: 3 0 4 1 3 1 3 1 3 1 2 5 0 4 0 5 2.6666667 0 1 0 </th <th>3 7 2.5 Cones 3 1 2 1 0 1.3333333 2 2 2 2 1 3 1.66666667 0 1 0 1.66666667 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</th> <th>8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 1 10 1 13 7.83333333 0 4 5 1 3 2</th> <th>43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69 21.87 41.03 34.635 41.03 34.635 40.62 50.28 53.66 43.31 40.13 41.44</th>	3 7 2.5 Cones 3 1 2 1 0 1.3333333 2 2 2 2 1 3 1.66666667 0 1 0 1.66666667 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	8.83333333 Total Errors 9 1 10 5 7 1 5.5 8 14 1 10 1 10 1 13 7.83333333 0 4 5 1 3 2	43.63833333 Final Time (s) 36.16 24.37 36.71 35.28 31.41 24.87 31.466666667 34.97 44.94 31.31 33.69 21.87 41.03 34.635 41.03 34.635 40.62 50.28 53.66 43.31 40.13 41.44



Subject 3										
Day1										
Trial		Time (min)	Tim	1e (s)	Reversa	ls Hits	Cones	Total Errors	Final Time (s)
dig 1		1m 17	.07s	77	7.07	2	1	4	7	89.07
dig 2		2m 10	.34s	13	0.34	16	11	0	27	130.34
dig 3		1m 5	65 00	1	.16	14	7	1	22	119
dig 4		1m 23	.09s	83.09		5	4	1	10	86.09
dig 5		1m 3.	25S	63	3.25 D.F.C	4	3	1	8	66.25
dig 6		IM 0.	1m 0.56s		2.20 20E			1 222222	14 166667	03.30
average				00	.305	7.05555	5 5	1.5555555	14.1000007	92.365
lin 1		0m 3	395	-	39	1	1	0	2	39
lin 2		0m 45	.65s	45	5.65	1	1	1	3	48.65
lin 3		1m 9.	44s	69	9.44	8	1	2	11	75.44
lin 4		0m 48	.28s	48	3.28	4	3	0	7	48.28
lin 5		0m 47	.60s	4	7.6	2	1	0	3	47.6
lin 6		0m 46	.66s	46	5.66	2	1	1	4	49.66
average				49.4	13833	3	1.33333	3 0.666667	5	51.43833333
non 1		0m 32	.59s	32	2.59	0	1	0	1	32.59
non 2		0m 34	.28s	34	1.28	0	0	0	0	34.28
non 3		0m 34	.60s	3	4.6	0	0	0	0	34.6
non 4		0m 30	.34s	30).34	0	0	0	0	30.34
non 5		0m 32	.655	34	2.65	0	0	1	1	35.65
non 6		0m 30	.695	30	J.69	0	0 1666		0	30.69
				52	.525	U	0.10000	0.100007	0.555555555	55.025
Day Z	Time	(min)	Time	\ { ~ }	Pov	orcolo	Llite	Conoc	Total Errors	Final Time (c)
Trial	Time	e (min)	Time	e (s)	Rev	versals	Hits	Cones	Total Errors	Final Time (s)
Trial lin 1	Time Om 3	e (min) 39.88s	Time 39.	e (s) 88	Rev	versals 0	Hits 0	Cones 0	Total Errors 0	Final Time (s) 39.88
Trial lin 1 lin 2	Time 0m 3 0m 3	e (min) 39.88s 38.93s	Time 39.3 38.3	e (s) 88 93	Rev	versals 0 1	Hits 0 1	Cones 0 1	Total Errors 0 3	Final Time (s) 39.88 41.93
Trial lin 1 lin 2 lin 3	Time 0m 3 0m 3 0m	e (min) 39.88s 38.93s 34.81	Time 39.3 38.9 34.3	e (s) 88 93 81	Rev	versals 0 1 0	Hits 0 1 0	Cones 0 1 1	Total Errors 0 3 1	Final Time (s) 39.88 41.93 37.81
Trial lin 1 lin 2 lin 3 lin 4	Time 0m 3 0m 3 0m 0m 3	e (min) 39.88s 38.93s 34.81 36.46s	Time 39.3 38.9 34.3 36.4	e (s) 88 93 81 46	Rev	versals 0 1 0 0	Hits 0 1 0 0	Cones 0 1 1 0	Total Errors 0 3 1 0	Final Time (s) 39.88 41.93 37.81 36.46
Trial lin 1 lin 2 lin 3 lin 4 lin 5	Time 0m 3 0m 3 0m 3 0m 3	e (min) 39.88s 38.93s 34.81 36.46s 35.81s	Time 39. 38. 34. 36. 35.	e (s) 88 93 81 46 81	Rev	versals 0 1 0 0 0 1	Hits 0 1 0 0	Cones 0 1 1 0 0	Total Errors 0 3 1 0 1	Final Time (s) 39.88 41.93 37.81 36.46 35.81
Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6	Time 0m 3	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s	Time 39.3 38.9 34.4 36.4 35.3 36.9	e (s) 88 93 81 46 81 91	Rev	versals 0 1 0 0 1 1 1	Hits 0 1 0 0 0 1	Cones 0 1 1 0 0 0 0	Total Errors 0 3 1 0 1 2	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91
Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 0m 3	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s	Time 39.1 38.1 34.1 36.4 35.1 36.1 37.1	e (s) 88 93 81 46 81 91 333	Rev	versals 0 1 0 0 0 1 1 0.5	Hits 0 1 0 0 0 0 1 0.333333	Cones 0 1 1 0 0 0 0 0.3333333	Total Errors 0 3 1 0 1 2 1.16666667	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333
Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time Om 3 Om 3 Om 3 Om 3 Om 3	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s	Time 39.3 38.3 34.3 36.3 35.3 36.3 37.1	e (s) 88 93 81 46 81 91 333	Rev	versals 0 1 0 0 1 1 1 0.5	Hits 0 1 0 0 0 1 0.333333	Cones 0 1 1 0 0 0 0.3333333	Total Errors 0 3 1 0 1 2 1.16666667	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333
Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time Om 3 Om 3 Om 3 Om 3 Om 3	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s	Time 39. 38. 34. 35. 36. 37.1	2 (s) 88 93 81 46 81 91 333 82	Rev	2 2	Hits 0 1 0 0 0 1 0.333333	Cones 0 1 1 0 0 0 0.3333333 2	Total Errors 0 3 1 0 1 2 1.16666667	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333
Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time Om 3	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s	Time 39. 34. 36. 35. 37.1 37.1	e (s) 88 93 81 46 81 91 333 82 94	Rev	versals 0 1 0 1 0.5 2 1	Hits 0 1 0 0 0 1 0.333333 1 1	Cones 0 1 1 0 0 0 0.3333333 2 2 2	Total Errors 0 3 1 0 1 2 1.166666667	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94
Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3	Time Om 3	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s	Time 39. 34. 36. 35. 36. 37.1 36. 30. 27	2 (s) 88 93 81 46 81 91 333 82 94 .9	Rev	versals 0 1 0 1 0 1 0 1 0.5 2 1 0 1 0 0 0 0 0 0	Hits 0 1 0 0 0 1 0.333333 1 1 1 0	Cones 0 1 1 0 0 0 0 0.33333333 2 2 2 1	Total Errors 0 3 1 0 1 2 1.166666667 5 4 1	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94 36.94 30.9
Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4	Time Om 3 Om 4 Om 4 Om 4	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s	Time 39. 38. 34. 36. 35. 36. 37.1 36. 30. 27. 29.	2 (s) 88 93 81 46 81 91 333 82 82 94 .9 07	Rev	versals 0 1 0 1 1 0.5 2 1 0 2 1 0 2 2 2 2 2	Hits 0 1 0 0 0 1 0.333333 1 1 1 1 1 2 2	Cones 0 1 1 0 0 0 0 0.3333333 2 2 2 2 1 1 1	Total Errors 0 3 1 0 1 2 1.166666667 5 4 1 1 5	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94 30.9 30.9 32.07
Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5	Time Om 3	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s 32.41s	Time 39. 38. 34. 36. 35. 37.1 37.1 36. 30. 27 29. 32.	e (s) 888 93 81 46 81 91 3333 82 94 .9 94 .9 07 41	Rev	versals 0 1 0 1 0 1 0.5 2 1 0 2 1 0 2 4	Hits 0 1 0 0 1 0.333333 1 1 1 1 0 2 2 2	Cones 0 1 0 0 0 0.3333333 2 2 1 1 1 2	Total Errors 0 3 1 0 1 2 1.166666667 5 4 1 5 4 1 5 8	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94 30.9 32.07 38.41
Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6	Time Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 2 Om 2 Om 3	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s 32.41s 41.66s	Time 39. 38. 34. 36. 35. 37.1 36. 37.1 36. 30. 27 29. 32. 41.	e (s) 888 93 81 46 81 91 3333 82 94 .9 07 41 66	Rev	versals 0 1 0 1 0.5 2 1 0.5 2 4 5	Hits 0 1 0 0 1 0 333333 1 1 1 1 1 0 2 2 2 4	Cones 0 1 0 0 0 0.3333333 2 2 1 1 1 2 1 1 2 1 1 2 1	Total Errors 0 3 1 0 1 2 1.166666667 5 4 1 5 8 10	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94 30.9 32.07 38.41 44.66
Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average	Time Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 2 Om 2 Om 2 Om 3	(min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s 32.41s 41.66s	Time 39. 38. 34. 36. 35. 37.1 36. 37.1 36. 30. 27 29. 32. 41. 33.1	e (s) 888 93 81 46 81 91 3333 82 94 .9 07 41 66 3333	Rev	versals 0 1 0 1 0.5 2 1 0 2 1 0 2 1 0 2 4 5 333333333	Hits 0 1 0 0 1 0 333333 1 1 1 0 2 2 2 2 4 1.666667	Cones 0 1 0 0 0 0.3333333 2 2 1 1 1 2 1 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	Total Errors 0 3 1 0 1 2 1.166666667 5 4 1 5 8 10 5.5	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94 30.9 32.07 38.41 44.66 37.63333333
Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average	Time Om 3 Om 4 Om 4 Om 4	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s 32.41s 41.66s	Time 39. 38. 34. 36. 35. 36. 37.1 36. 30. 27 29. 32. 41. 33.1	e (s) 888 93 81 46 81 91 3333 82 94 .9 07 41 66 3333	2.333	versals 0 1 0 0 1 1 1 0 5 3333333	Hits 0 1 0 0 1 0 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Cones 0 1 0 0 0 0 0 0 0 1 2 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	Total Errors 0 3 1 0 1 2 1.166666667 4 1 5 4 1 5 8 10 5.5	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94 30.9 32.07 38.41 44.66 37.6333333
Trial Iin 1 Iin 2 Iin 3 Iin 4 Iin 5 Iin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1	Time Om 3 Om 4 Om 5 Om 4 Om 4 Om 5 Om 4 Om 5 Om 4 Om 5 Om 6 Om 7 Om 7 Om 8 Om 9 Om 9 <t< th=""><th>e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s 32.41s 41.66s 8.25s</th><th>Time 39. 38. 34. 36. 35. 37.1 37.1 36. 37.1 32. 41. 33.1</th><th>(s) (s) (s) (s) (s) (s) (s) (s) (s) (s)</th><th>Rev</th><th>versals 0 1 0 1 0 1 0.5 2 1 0 2 1 0 2 3333333 11</th><th>Hits 0 1 0 0 1 0 1 0 3 3 3 3 3 3 3 3 3 3 3 3 3</th><th>Cones 0 1 1 0 0 0 0 0 0 0 2 2 1 1 1 2 1 1 1 2 1 1 3 4</th><th>Total Errors 0 3 1 0 1 2 1.166666667 5 4 1 5 8 10 5.5</th><th>Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94 30.9 32.07 32.07 38.41 44.66 37.63333333</th></t<>	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s 32.41s 41.66s 8.25s	Time 39. 38. 34. 36. 35. 37.1 37.1 36. 37.1 32. 41. 33.1	(s) (s) (s) (s) (s) (s) (s) (s) (s) (s)	Rev	versals 0 1 0 1 0 1 0.5 2 1 0 2 1 0 2 3333333 11	Hits 0 1 0 0 1 0 1 0 3 3 3 3 3 3 3 3 3 3 3 3 3	Cones 0 1 1 0 0 0 0 0 0 0 2 2 1 1 1 2 1 1 1 2 1 1 3 4	Total Errors 0 3 1 0 1 2 1.166666667 5 4 1 5 8 10 5.5	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94 30.9 32.07 32.07 38.41 44.66 37.63333333
Trial Iin 1 Iin 2 Iin 3 Iin 4 Iin 5 Iin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2	Time Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 2 Om 2 Om 4 Om 3 Om 4 Om 3	 (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s 32.41s 41.66s 8.25s 34.88s 	Time 39. 38. 34. 36. 35. 37.1 36. 37.1 36. 30. 27 29. 32. 41. 33.1 33.1	(s) (s) (s) (s) (s) (s) (s) (s) (s) (s)	Rev	rersals 0 1 0 1 0 1 1 0 5 3333333 11 1 1	Hits 0 1 0 0 1 0 3 3 3 3 3 3 3 3 3 3 3 3 3	Cones 0 1 1 0 0 0 0 0 0 0 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	Total Errors 0 3 1 0 1 2 1.166666667 5 4 1 5 8 10 5.5 2 2 3	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94 30.9 32.07 38.41 44.66 37.63333333 44.66 37.63333333
Trial Iin 1 Iin 2 Iin 3 Iin 4 Iin 5 Iin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3	Time Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 2 Om 2 Om 3 Om 4 Om 3 Om 4 Om 3 Om 4 Om 3 Om 4 Om 3 Om 4 Om 4	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s 32.41s 41.66s 8.25s 34.88s 8.53s	Time 39. 34. 36. 35. 37.1 36. 37.1 36. 30. 27 29. 32. 41. 33.1 33.1	e (s) 888 93 81 46 81 91 3333 82 94 .9 07 41 66 3333 25 88 53	Rev	versals 0 1 0 1 0 1 0.5 2 1 0 2 1 0 2 4 5 3333333 11 1 5	Hits 0 1 0 0 1 0 1 0 1 1 1 0 2 2 4 1.666667 1 1 1 1 2 1 1 2 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	Cones 0 1 1 0 0 0 0 0 0 0 1 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	Total Errors 0 3 1 0 1 2 1.166666667 5 4 1 5 8 10 5.5 25 3 8 10 5.5	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94 30.9 32.07 38.41 44.66 37.63333333 44.66 37.63333333
Trial Iin 1 Iin 2 Iin 3 Iin 4 Iin 5 Iin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4	Time Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 2 Om 2 Om 3 Om 4 Om 3 Om 4 Om 3 Om 4	 (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s 32.41s 41.66s 8.25s 34.88s 8.53s 41.19s 	Time 39. 34. 36. 35. 37.1 36. 37.1 36. 30. 27 29. 32. 41. 33.1 68. 34. 34. 34.	e (s) 888 93 81 46 81 91 3333 82 94 .9 07 41 66 3333 25 88 53 19	Rev	versals 0 1 0 1 0 1 0.5 2 1 0 2 1 0 2 4 5 3333333 11 1 5 6	Hits 0 1 0 0 1 0 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Cones 0 1 1 0 0 0 0 0 0 0 1 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	Total Errors 0 3 1 0 1 2 1.166666667 4 1 5 4 1 5 8 10 5.5 8 10 5.5 8 10 5.5 8 10 5.5 8 10 10 5.5 10 10 10 10 10 10 10 10 10 10	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 42.82 36.94 30.9 32.07 38.41 44.66 37.63333333 44.66 37.88 280.25 37.88 47.153 47.19
Trial Iin 1 Iin 2 Iin 3 Iin 4 Iin 5 Iin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5	Time Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 2 Om 2 Om 2 Om 2 Om 2 Om 3 Om 4 Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 3	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s 32.41s 41.66s 8.25s 34.88s 8.53s 41.19s 29.57s	Time 39.3 34.3 36.3 37.1 36.3 37.1 36.3 37.1 33.1 33.1 33.1 33.1 33.1 33.1 33	e (s) 888 93 81 46 81 91 3333 82 94 .9 07 41 66 3333 25 88 53 19 57	Rev	versals 0 1 0 1 0 1 0.5 2 1 0 2 4 5 3333333 11 1 5 6 3	Hits 0 1 0 0 1 0 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Cones 0 1 1 0 0 0 0 0 0 0 1 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	Total Errors 0 3 1 0 1 2 1.16666667 4 1 5 4 1 5 8 10 5.5 8 10 5.5 8 10 5.5 8 10 5.5 8 10 5.5 8 10 5.5 8 10 5.5 8 10 5.5 8 10 10 10 10 10 10 10 10 10 10	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 36.94 30.9 32.07 38.41 44.66 37.63333333 80.25 37.88 71.53 47.19 32.57
Trial Iin 1 Iin 2 Iin 3 Iin 4 Iin 5 Iin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6	Time Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 3 Om 2 Om 2 Om 2 Om 3 Om 4 Om 3 Om 4 Om 2 Om 2 Om 3 Om 4 Om 3 Om 4 Om 3	e (min) 39.88s 38.93s 34.81 36.46s 35.81s 36.91s 36.82s 30.94s 27.90s 29.07s 32.41s 41.66s 8.25s 34.88s 8.53s 41.19s 29.57s 8.72s	Time 39. 38. 34. 36. 35. 36. 37.1 36. 37.1 36. 37.1 33.1 33.1 33.1 33.1 33.1 33.1 33.	(s) (s) (s) (s) (s) (s) (s) (s) (s) (s)	Rev	versals 0 1 0 1 0 1 0.5 2 1 0 2 1 0 2 4 5 3333333 11 5 6 3 11	Hits 0 1 0 0 1 0 1 0 1 1 1 0 2 4 1.666667 1 1 1 2 4 1.666667 1 1 1 1 1 1 1 1 1 1 1 1 1	Cones 0 1 1 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1	Total Errors 0 3 1 0 1 2 1.166666667 5 4 1 5 8 10 5.5 8 13 8 13 8 13 8 25 3 8 13 8 13 8 25 13 8 13 8 13 8 25 13 8 13 8 13 8 13 8 13 8 25 13 8 13 8 13 8 25 13 8 13 8 13 8 25 13 8 13 8 25 13 8 13 8 25 13 8 13 8 26 13 8 13 8 26 13 13 8 13 8 13 8 13 13 13 8 13 13 13 13 13 13 13 13 13 13	Final Time (s) 39.88 41.93 37.81 36.46 35.81 36.91 38.13333333 42.82 30.9 32.07 32.07 38.41 44.66 37.63333333 44.66 37.63333333 44.65 37.88 71.53 47.19 32.57 80.72



Subject 4										
Day1										
Trial		Time (min)	Tim	ne (s)	Reversal	s Hits	Cones	Total Errors	Final Time (s)
dig 1		1 m 59	.19 s	11	9.19	21	12	6	39	137.19
dig 2		0m 37	.04s	37	7.04	7	6	6	19	55.04
dig 3		0m 49	.68s	49	9.68	8	8	4	20	61.68
dig 4		0m 41	.53s	41	L.53	8	5	7	20	62.53
dig 5		1m 4.	87s	64.87		14	11	4	29	76.87
dig 6		0m 51	.97s	51	L.97	9	9	5	23	66.97
average			0111 91.973		71333	11.16667	7 8.5	5.333333	25	76.71333333
non 1		0m 24	.56s	24	1.56	0	0	2	2	30.56
non 2		0m 28	.19s	28	3.19	0	0	0	Ο	28.19
non 3		0m 33	.72s	33	3.72	1	1	0	2	33.72
non 4		0m 56	.34s	56	5.34	7	8	2	17	62.34
non 5		0m 30	.75s	30).75	2	1	1	4	33.75
non 6		0m 29	.43s	29	9.43	2	2	0	4	29.43
average				33.8	33167	2	2	0.833333	4.83333333	36.33166667
lin 1		0m 32	.63s	32	2.63	0	0	1	1	35.63
lin 2		0m 32	.16s	32	2.16	1	1	2	4	38.16
lin 3		0m 36	.69s	36	5.69	1	1	0	2	36.69
lin 4		0m 31	.07s	31	L.07	0	0	2	2	37.07
lin 5		1m 14	.16s	74	1.16	7	2	3	12	83.16
lin 6		0m 31	.88s	31	1.88	1	0	2	3	37.88
average				39	.765	1.66666	7 0.66666	57 1.666667	4	44.765
Day 2										
Trial	Time	e (min)	Time	e (s)	Rev	versals	Hits	Cones	Total Errors	Final Time (s)
lin 1	1m	3.50s	63	.5		6	3	1	10	66.5
lin 2	0m 3	33.06s	33.	06		1	1	1	3	36.06
lin 3	0m !	53.28s	53.	28		5	2	1	8	56.28
lin 4	0m 2	28.22s	28.	22		0	0	0	0	28.22
lin 5	0m 3	34.72s	34.	72		2	0	1	3	37.72
lin 6	0m 2	25.54s	25.	54		0	0	0	0	25.54
average			39.	72	2.333	3333333	1	0.6666667	4	41.72
non 1	0m 2	26.65s	26.	65		0	0	2	2	32.65
non 2	0m 2	28.13s	28.	13		1	1	0	2	28.13
non 3	0m 2	27.31s	27.	31		0	0	0	0	27.31
non 4	0m 2	27.03s	27.	03		0	1	0	1	27.03
non 5	0m 3	32.81s	32.	81		2	0	1	3	35.81
non 6	0m 2	26.87s	26.	87		1	1	1	3	29.87
average			28.1	333	0.666	5666667	0.5	0.6666667	1.83333333	30.13333333
dig 1	0m 3	34.90s	34	.9		4	3	2	9	40.9
dig 2	0m 3	33.72s	33.	72		4	4	3	11	42.72
dia 2		44 52-	74	53		4	2	0	7	74,53
aig 5	1m :	14.535	74.	55		4	5	Ū.		7
dig 3 dig 4	1m : 0m :	14.53s 31.53s	74. 31.	53		1	1	1	3	34.53
dig 5 dig 4 dig 5	1m : 0m : 0m :	14.53s 31.53s 29.69s	74. 31. 29.	53 69		4 1 3	1 4	1 1	3 8	34.53 32.69
dig 3 dig 4 dig 5 dig 6	1m : 0m : 0m : 0m :	14.53s 31.53s 29.69s 27.10s	74. 31. 29. 27	53 69 .1		4 1 3 1	3 1 4 3	1 1 2	3 8 6	34.53 32.69 33.1



Subject 5										
Day1										
Trial		Time (min)	Tim	ne (s)	Reversa	ls Hits	Cones	Total Errors	Final Time (s)
lin 1		3m 34	.90s	21	L4.9	25	22	1	48	217.9
lin 2		1m 12	.63s	72	2.63	8	8	0	16	72.63
lin 3		1m 3	30s	9	90	11	7	2	20	96
lin 4		1m 43	.53s	10	3.53	12	7	1	20	106.53
lin 5		1m 29	.75s	89.75		10	2	1	13	92.75
lin 6		1m 8.53s		68	3.53	5	3	1	9	71.53
average				106	.5567	11.8333	3 8.16666	7 1	21	109.5566667
dig 1		2m 23	.50s	14	13.5	17	15	2	34	149.5
dig 2		1m 52	.54s	11	2.54	16	15	1	32	115.54
dig 3		1m 7.	97s	67	/.9/	6	4	2	12	/3.9/
aig 4		1m 30	.975 1-	90	J.97	15	11	1	27	93.97
aig 5		2m 1m 47	100	10	.21	18	15	3	36	130
dig 6		1111 43	. 105	106	5.1 5122	12	10 1666	∠ 7 1 000000	25	112 0122222
average				100.	.5133	13	10.1000	1.033333	25	112.0133333
non 1		0m 51	79c	51	1 79	1	2	1	7	5/1 79
non 2		0m 55	.755 07s	51	5.07	- 4	1	0	11	55.07
non 3		0m /3	.073 93c	13	2 93	, 2	2	0	1	/3.93
non 4		1m 25	.555 87s	85	5.87	11	5	2	18	91 87
non 5		0m 38	.073 44s	38	R 44	2	1	1	4	41 44
non 6		1m 2.	. 1 13 78s	62	2.78	9	5	1	15	65.78
average				56.3	31333	5.83333	3 3.16666	7 0.833333	9.83333333	58.81333333
	_									
Day 2										
Day 2 Trial	Time	(min)	Time	s (s)	Rev	versals	Hits	Cones	Total Errors	Final Time (s)
Day 2 Trial	Time	e (min)	Time	e (s) 18	Rev	versals	Hits	Cones	Total Errors	Final Time (s)
Day 2 Trial non 1	Time 1m	e (min) 5.18s	Time 65.	e (s) 18	Rev	ersals 8	Hits 7	Cones	Total Errors 16	Final Time (s) 68.18
Day 2 Trial non 1 non 2	Time 1m 0m	e (min) 5.18s 56.09s	Time 65. 56.	e (s) 18 09	Rev	ersals 8 7	Hits 7 5	Cones 1 0	Total Errors 16 12 °	Final Time (s) 68.18 56.09
Day 2 Trial non 1 non 2 non 3	Time 1m 0m	e (min) 5.18s 56.09s 51.59s	Time 65. 56. 51.	e (s) 18 09 59	Rev	versals 8 7 6	Hits 7 5 2	Cones 1 0 0 2	Total Errors 16 12 8	Final Time (s) 68.18 56.09 51.59
Day 2 Trial non 1 non 2 non 3 non 4	Time 1m 0m 0m	e (min) 5.18s 56.09s 51.59s 56.09s	Time 65. 56. 51. 56.	e (s) 18 09 59 09	Rev	versals 8 7 6 7	Hits 7 5 2 4	Cones 1 0 0 2	Total Errors 16 12 8 13	Final Time (s) 68.18 56.09 51.59 62.09
Day 2 Trial non 1 non 2 non 3 non 4 non 5	Time 1m 0m 0m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s	Time 65. 56. 51. 56. 47	e (s) 18 09 59 09 .1	Rev	ersals 8 7 6 7 4	Hits 7 5 2 4 3	Cones 1 0 2 0	Total Errors 16 12 8 13 7	Final Time (s) 68.18 56.09 51.59 62.09 47.1
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6	Time 1m 0m 0m 0m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s	Time 65. 56. 51. 56. 47 46.	e (s) 18 09 59 09 .1 06	Rev	ersals 8 7 6 7 4 5	Hits 7 5 2 4 3 1	Cones 1 0 0 2 0 0 0 0 0	Total Errors 16 12 8 13 7 6	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average	Time 1m 0m 0m 0m 0m 0m 0m 0m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s	Time 65. 56. 51. 56. 47 46. 53.6	(s) 18 09 59 09 .1 06 585	Rev	ersals 8 7 6 7 4 5 5 6666667	Hits 7 5 2 4 3 1 3.666667	Cones 1 0 0 2 0 0 0 0.5	Total Errors 16 12 8 13 7 6 10.3333333	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average	Time 1m 0m 0m 0m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s	Time 65. 56. 51. 56. 47 46. 53.6	e (s) 18 09 59 09 .1 06 585	Rev	ersals 8 7 6 7 4 5 5 6666667	Hits 7 5 2 4 3 1 3.666667	Cones 1 0 0 2 0 0 0 0.5	Total Errors 16 12 8 13 7 6 10.3333333	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1	Time 1m 0m 0m 0m 0m 1m 0m 1m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s	Time 65. 56. 51. 56. 47 46. 53.6	e (s) 18 09 59 09 .1 06 585 03	Rev	ersals 8 7 6 7 4 5 5 6666667 11	Hits 7 5 2 4 3 1 3.666667	Cones 1 0 0 2 0 0 0 0 0 0 5 2	Total Errors 16 12 8 13 7 6 10.3333333	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2	Time 1m 0m 0m 0m 0m 0m 0m 0m 1m 1m 1m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62.	e (s) 18 09 59 09 .1 06 585 03 65	Rev	rersals 8 7 6 7 4 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 7 1 1 8	Hits 7 5 2 4 3 1 3.666667 4 4 6	Cones 1 0 0 2 0 0 0 0 0 0 0 0 2 3 3	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3	Time 1m 0m 0m 0m 0m 0m 0m 1m 1m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62. 44	(s) 18 09 59 09 11 06 585 03 65 .6	Rev	rersals 8 7 6 7 4 5 5 6666667 11 8 7	Hits 7 5 2 4 3 1 3.666667 4 6 5	Cones 1 0 0 2 0 0 0 0 0 5 2 3 0	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17 12	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 69.03 71.65 44.6
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4	Time 1m 0m 0m 0m 0m 1m 1m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s 47.09s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62. 44 47.	2 (s) 18 09 59 09 .1 06 685 03 65 .6 09	Rev	Persals 8 7 6 7 4 5 5 6 6 6 6 6 7 11 8 7 6 7 6 7 11 8 7 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7	Hits 7 5 2 4 3 3 1 3.666667 4 6 5 5 2	Cones 1 0 0 0 2 0 0 0 0 0 0 2 3 0 0 5	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17 17 12 13	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 69.03 71.65 44.6 62.09
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5	Time 1m 0m 0m 0m 0m 1m 1m 0m 0m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s 44.60s 47.09s 58.18s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62. 44 47. 58.	e (s) 18 09 59 09 .1 06 585 03 65 .6 09 18	Rev	ersals 8 7 6 7 4 5 5 6 6 6 6 6 6 7 6 7 7	Hits 7 5 2 4 3 1 3.666667 4 6 5 5 2 1	Cones 1 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17 12 13 8	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 69.03 71.65 44.6 62.09 58.18
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6	Time 1m 0m 0m 0m 0m 1m 1m 0m 0m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s 47.09s 58.18s 48.31s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62. 44 47. 58. 48.	e (s) 18 09 59 09 .1 06 585 03 65 .6 09 18 31	Rev	ersals 8 7 6 7 4 5 5 6 6 6 6 6 7 6 7 8	Hits 7 5 2 4 3 1 3.666667 4 6 5 5 2 1 1 8	Cones 1 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17 17 12 13 8 20	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 69.03 71.65 44.6 62.09 58.18 60.31
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s 47.09s 58.18s 48.31s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62. 44 47. 58. 48. 53.9	e (s) 18 09 59 09 .1 06 585 09 03 65 65 .6 09 18 31 27 67	Rev 6.166	rersals 8 7 6 7 4 5 5 6 6 6 6 7 8 8 3333333	Hits 7 5 2 4 3 1 3.666667 4 6 5 4 6 5 2 1 2 1 8 8 4.333333	Cones 1 0 0 2 0 0 0 0 0 0 5 0 0 5 0 0 4 2.3333333	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17 17 12 13 8 20 14.5	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 69.03 71.65 44.6 62.09 58.18 60.31 60.97666667
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s 47.09s 58.18s 48.31s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62. 44 47. 58. 48. 53.9	e (s) 18 09 59 09 .1 06 585 03 65 .6 09 18 31 767	Rev 6.166	rersals 8 7 6 7 4 5 6 6 6 7 8 7 8 3 3 3 3 3 3 3 3 3 3 3 3 3	Hits 7 5 2 4 3 3 3.666667 4 6 5 2 4 6 5 2 1 1 8 4.333333	Cones 1 0 0 2 0 0 0 0 5 0 5 0 4 2.3333333	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17 12 13 8 20 14.5	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 69.03 71.65 44.6 62.09 58.18 60.31 60.97666667
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m 1m 1m 1m 1m 1m 1m 1m 1m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s 47.09s 58.18s 48.31s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62. 44 47. 58. 48. 53.9	e (s) 18 09 59 09 .1 06 585 03 .6 09 18 31 .767 888	Rev 6.160	rersals 8 7 6 7 4 5 6 6 6 6 6 6 7 8 3 3 3 3 3 3 3 3 3 3 3 3 3	Hits 7 5 2 4 3 3 1 3.666667 4 6 5 2 1 4 3 4 3 3 3 6 6 5 2 1 8 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Cones 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17 17 12 13 8 20 14.5	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 (69.03 71.65 44.6 62.09 58.18 60.31 60.97666667
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m 0m 0m 0m 1m 0m 0m 0m 0m 0m 0m 0m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s 47.09s 58.18s 48.31s 24.88s 58.22s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62. 44 47. 58. 48. 53.9	e (s) 18 09 59 09 .1 06 585 03 65 .6 09 18 31 767 888 22	Rev 6.166	rersals 8 7 6 7 4 5 5 6 6 6 6 6 6 7 8 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Hits 7 5 2 4 3 1 3.666667 4 6 5 2 1 4 5 2 1 8 4.333333	Cones 1 0 0 2 0 0 0 0 0 2 3 0 2 3 0 1 2 3 0 4 2.33333333	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17 17 12 13 8 20 14.5 21 7	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 (69.03 71.65 44.6 62.09 58.18 60.31 60.97666667 87.88 61.22
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m 0m 0m 0m 1m 0m 0m 0m 1m 0m 2m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s 47.09s 58.18s 48.31s 24.88s 58.22s 15.63s	Time 65. 56. 51. 56. 47 46. 53.6 62. 44 47. 58. 48. 53.9 84. 53.9	e (s) 18 09 59 00 10 03 65 03 03 65 09 18 31 767 88 88 22 .63	Rev 6.166	rersals 8 7 6 7 4 5 6 6 6 7 11 8 7 6 7 8 3 3 3 3 3 3 3 3 3 3 3 3 3	Hits 7 5 2 4 3 3 1 3.666667 4 6 5 2 1 5 2 1 8 4.333333 4.333333	Cones 1 0 0 2 0 0 0 0 1 2 3 0 2 3 0 5 0 4 2.3333333 1 1 1 4	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17 17 12 13 8 20 14.5 21 7 27	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 (69.03) 71.65 44.6 62.09 58.18 60.31 60.97666667 87.88 61.22 147.63
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m 0m 0m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s 47.09s 58.18s 48.31s 24.88s 58.22s 15.63s 36.31s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62. 44 47. 58. 48. 53.9 84. 53.9 84. 53.9	e (s) 18 09 59 09 .1 06 585 09 03 .6 09 18 31 767 88 82 .63 31	Rev 6.166	rersals 8 7 6 7 4 5 6 6 6 6 6 7 8 3 3 3 3 3 3 3 3 3 3 3 3 3	Hits 7 5 2 4 3 3 1 3.666667 4 3 4 3 6 5 1 2 1 8 4.33333 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Cones 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17 17 12 13 8 20 14.5 21 7 27 10	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 (69.03) 71.65 44.6 62.09 58.18 60.31 60.97666667 (7) 87.88 61.22 147.63 39.31
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4 lin 5	Time 1m 0m 0m 0m 0m 1m 0m 0m 0m 0m 0m 0m 0m 0m 0m	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s 47.09s 58.18s 48.31s 24.88s 58.22s 15.63s 36.31s 31.19s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62. 44 47. 58. 48. 53.9 84. 53.9 84. 53.9	e (s) 18 09 59 00 .1 06 585 03 65 .6 09 18 31 18 88 22 .63 31 19	Rev 6.166	rersals 8 7 6 7 4 5 6 6 6 7 8 7 6 7 8 3 3 3 3 3 3 3 3 3 3 3 3 3	Hits 7 5 2 4 3 3 1 3.666667 4 3.666667 2 4 3.666667 4 5 4 3.666667 8 4 3.666667 8 4 3.666667 8 4 3.666667 8 4 3.666667 1 4 5 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Cones 1 0 0 2 0 0 0 0 2 3 0 2 3 0 5 0 4 2.3333333 1 1 1 1 4 1 0	Total Errors 16 12 8 13 7 6 10.3333333 17 17 17 12 13 8 20 14.5 21 7 27 10 1	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 69.03 71.65 44.6 62.09 58.18 60.31 60.97666667 87.88 61.22 147.63 39.31 31.19
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6	Time 1m 0m 0m 0m 0m 1m 1m 0m 0m 0m 0m 0m 0m 0m 0m 0m 0	e (min) 5.18s 56.09s 51.59s 56.09s 47.10s 46.06s 3.03s 2.65s 44.60s 47.09s 58.18s 48.31s 24.88s 58.22s 15.63s 36.31s 31.19s 32.69s	Time 65. 56. 51. 56. 47 46. 53.6 63. 62. 44 47. 58. 48. 53.9 84. 53.9 84. 53.9	e (s) 18 09 59 00 10 65 65 65 65 65 18 31 767 88 88 22 .63 31 19 69	Rev 6.160	ersals 8 7 6 7 4 5 6 6 6 6 6 6 7 8 3 3 3 3 3 3 3 3 3 3 3 3 3	Hits 7 5 2 4 3 3 1 3.666667 4 3 6 5 2 1 4 3 4 3 3 3 3 5 5 4 3 3 3 3 3 3 3 3 3 3	Cones 1 0 0 2 0 0 0 0 0 2 0 0 1 2 3 0 0 4 2.3333333 1 1 1 1 1 1 1 1 0 0 0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Errors 16 12 8 13 7 6 10.3333333 17 17 12 13 8 20 14.5 21 7 21 7 27 10 1 27 10 1 2	Final Time (s) 68.18 56.09 51.59 62.09 47.1 46.06 55.185 () 69.03 71.65 44.6 62.09 58.18 60.31 60.97666667 () 87.88 61.22 147.63 39.31 31.19 32.69


Subject 6											
Day 1											
Trial		Time (min)	Tim	ne (s)	Reversa	ls Hits		Cones	Total Errors	Final Time (s)
dig 1		2m 37	.68s	15	7.68	16	5		1	22	160.68
dig 2		2m 50	.07s	17	0.07	21	11		2	34	176.07
dig 3		2m 22	.69s	14	2.69	14	2		2	18	148.69
dig 4		2m 43	.68s	16	3.68	18	11		4	33	175.68
dig 5		1m 42	.97s	16	2.97	13	1		1	15	165.97
dig 6		1m 39	.90s	15	59.9	11	4		0	15	159.9
average				159	.4983	15.5	5.66666	67 1.	.666667	22.8333333	164.4983333
non 1		0m 45	.22s	45	5.22	2	0		2	4	51.22
non 2		1m 1.	.87s	61	1.87	6	0		1	7	64.87
non 3		0m 46	.44s	46	5.44	4	2		1	7	49.44
non 4		0m 54	.62s	54	1.62	5	4		0	9	54.62
non 5		1m 46	.47s	10	6.47	18	11		1	30	109.47
non 6		1m 6.	.19s	66	5.19	3	0		2	5	72.19
average				63.4	16833	6.33333	3 2.83333	3 1.	.166667	10.3333333	66.96833333
lin 1		1m 21	.72s	81	1.72	7	0		0	7	81.72
lin 2		1m 15	.25s	75	5.25	7	2		0	9	75.25
lin 3		1m 39	.88s	99	9.88	10	4		1	15	102.88
lin 4		1m 2.	.13s	62	2.13	6	1		0	7	62.13
lin 5		1m 3.	.97s	63	3.97	5	0		0	5	63.97
lin 6		1m 19	.43s	79	9.43	11	6		0	17	79.43
average				77.0				7 0	166667	10	
				77.0	J6333	7.66666	2.16666	57 U.	.100001	10	//.56333333
Day 2				//.(16333	7.66666	2.16666	57 U.	.100007	10	77.56333333
Day 2 Trial	Time	e (min)	Time	e (s)	Rev	7.66666 versals	Hits	с С	Cones	Total Errors	Final Time (s)
Day 2 Trial non 1	Time 1m 1	e (min) 26.50s	Time 86	e (s)	Rev	7.66666 versals 9	Hits 1	с.	Cones	Total Errors 10	Final Time (s) 86.5
Day 2 Trial non 1 non 2	Time 1m 2 0m 2	e (min) 26.50s 50.47s	Time 86 50.	(s) .5 47	Rev	7.66666 ersals 9 3	Hits 1	C	Cones 0 1	Total Errors 10 5	Final Time (s) 86.5 53.47
Day 2 Trial non 1 non 2 non 3	Time 1m 2 0m 2	e (min) 26.50s 50.47s 10.09s	Time 86 50.	(s) .5 47 09	Rev	7.66666 versals 9 3 5	Hits 1 1 2	C	Cones 0 1 0	Total Errors 10 5 7	Final Time (s) 86.5 53.47 70.09
Day 2 Trial non 1 non 2 non 3 non 4	Time 1m 2 0m 2 1m 2	e (min) 26.50s 50.47s 10.09s 51.17s	Time 86 50. 70. 51.	2 (s) .5 47 09 17	Rev	7.666666 9 3 5 3	Hits 1 1 2 3	C	Cones 0 1 0 0	Total Errors 10 5 7 6	Final Time (s) 86.5 53.47 70.09 51.17
Day 2 Trial non 1 non 2 non 3 non 4 non 5	Time 1m 2 0m 2 1m 2 0m 2	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s	Time 86 50. 70. 51. 64.	2 (s) .5 47 09 17 59	Rev	7.66666 versals 9 3 5 3 4	Hits 1 1 2 3 1	C	Cones 0 1 0 0 0 1	Total Errors 10 5 7 6 6	Final Time (s) 86.5 53.47 70.09 51.17 67.59
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6	Time 1m 0m 1m 0m 1m 0m 1m 0m 0m 0m 0m 0m 0m	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s	Time 86 50. 70. 51. 64. 40	(s) (5) (47) (09) (17) (59) (5)	Rev	7.66666 yersals 9 3 5 3 4 1	Hits 1 1 2 3 1 0	C	Cones 0 1 0 0 1 0 1 0	Total Errors 10 5 7 6 6 1	Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average	Time 1m 0m 1m 0m 1m 0m 1m	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s	Time 86 50. 70. 51. 64. 40 60.5	(s) .5 47 09 17 59 .5 533	4.166	7.66666 ersals 9 3 5 3 4 1 5 6666667	Hits 1 1 2 3 1 0 1.333333	C	Cones 0 1 0 0 1 0 0 3333333	Total Errors 10 5 7 6 6 1 5.833333333	Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average	Time 1m 0m 1m 0m 1m 0m 1m 0m 1m	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s	Time 86 50. 70. 51. 64. 40 60.5	(s) .5 47 09 17 59 .5 533	4.166	7.66666 9 3 5 3 4 1 5 6666667	Hits 1 1 2 3 1 0 1.333333	C 0.3	Cones 0 1 0 0 1 0 3333333	Total Errors 10 5 7 6 6 1 5.833333333	Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average	Time 1m : 0m ! 1m : 0m ! 1m 0m !	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s	Time 86 50. 70. 51. 64. 40 60.5	 (s) .5 47 09 17 59 .5 533 35 	4.166	7.66666 7ersals 9 3 5 3 4 1 56666667 3	Hits 1 1 2 3 1 0 1.333333 0	C	Cones 0 1 0 0 1 0 3333333 0	10 Total Errors 10 5 7 6 6 1 5.833333333	Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average	Time 1m 0m 1m 0m 1m 0m	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s	Time 86 50. 70. 51. 64. 40 60.5	77.0 (s) (s) (c) (c) (c) (c) (c) (c) (c) (c	4.166	7.66666 9 3 5 3 4 1 56666667 3 3 3	Hits 1 1 2 3 1 0 1.333333 0 0 0	0.3	Cones 0 1 0 0 1 0 3333333 0 1	10 Total Errors 10 5 7 6 6 6 1 5.83333333 3 3 3 4	77.56333333 Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3	Time 1m : 0m ! 1m : 0m ! 1m 0m / 0m / 0m /	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s	Time 86 50. 70. 51. 64. 40 60.5	<pre>//.((s) .5 47 09 17 59 .5 533 35 78 44</pre>	4.166	7.66666 Persals 9 3 5 3 4 1 5 6 6 6 6 7 8 8 9 9 3 5 3 4 1 5 6 6 6 6 6 6 6 6 6 6 6 6 6	Hits 1 1 2 3 1 0 1.333333 0 0 1 1	0.3	Cones 0 1 0 0 1 0 3333333 0 1 1 1	Total Errors 10 5 7 6 6 1 5.83333333 3 3 4 8	Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4	Time 1m : 0m : 1m : 0m : 0m : 0m : 0m : 1m	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s 46.68s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 65. 46.	77. ((s) (s) (s) (s) (s) (s) (s) (s	4.166	7.66666 Persals 9 3 5 3 4 1 56666667 3 3 6 2	Hits 1 1 2 3 1 0 1.333333 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1	0.3	Cones 0 1 0 1 0 1 0 3333333 0 1 1 0 0 1 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Errors 10 5 7 6 6 1 5.83333333 3 3 4 8 3	Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44 46.68
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4 lin 5	Time 1m : 0m ! 1m : 0m ! 0m ! 0m ! 1m 0m !	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s 46.68s 51 34s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 65. 46. 51	 77. (s) .5 47 09 17 59 .5 533 35 78 44 68 34 	4.166	7.66666 yersals 9 3 5 3 4 1 5 66666667 3 3 6 2 3 3	Hits 1 1 2 3 1 0 1.333333 0 0 1 1 2	0.3	Cones 0 1 0 1 0 1 0 3333333 0 1 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Errors 10 5 7 6 6 1 5.83333333 3 4 8 3 4 8 3 5	Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44 46.68 51.34
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6	Time 1m 0m 1m 0m 1m 0m 1m 0m	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s 46.68s 51.34s 41.81s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 51. 41	 77. (s) .5 47 09 17 59 .5 533 35 78 44 68 34 81 	4.166	7.66666 7ersals 9 3 5 3 4 1 5 66666667 3 3 6 2 3 1 1	Hits 1 1 2 3 1 0 1.333333 0 0 1 1 2 0 0 1 1 2 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0	0.3	Cones 0 1 0 0 1 0 3333333 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Errors 10 5 7 6 6 1 5.83333333 3 3 4 8 3 4 8 3 5 1	Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44 46.68 51.34 41.81
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 0m 1m 0m 1m 0m	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s 46.68s 51.34s 41.81s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 65. 46. 51. 41.	77. (s) (s) (s) (s) (s) (s) (s) (s)	4.166	7.66666 7ersals 9 3 5 3 4 1 5 6 6 2 3 6 2 3 1 3 4 3 6 2 3 1 3 4 3 5 3 4 3 5 3 4 3 5 5 3 5 5 5 5 5 5 5 5 5 5 5 5 5	Hits 1 1 2 3 1 0 1.333333 0 0 1 1 2 0 0 0 1 1 2 0 0 0 1 1 2 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	0.3	Cones 0 1 0 0 1 0 0 3333333 0 1 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Errors 10 5 7 6 6 1 5.83333333 3 3 4 8 3 4 8 3 5 1 4	77.56333333 Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44 46.68 51.34 41.81
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m : 0m ! 1m : 0m ! 1m 0m ! 0m ! 0m ! 0m !	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s 46.68s 51.34s 41.81s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 65. 46. 51. 41. 49.0	 77. (s) .5 47 09 17 59 .5 533 35 78 44 68 34 81 667 	4.166	7.66666 Persals 9 3 5 3 4 1 5 6 6 2 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 3 1 3 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3	Hits 1 1 2 3 1 0 1.333333 0 0 1 1 2 0 0.6666667	0.3 0.3	Cones 0 1 0 1 0 0 3333333 0 1 1 0 0 1 1 0 0 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3 3 3 3 3 3 3 3 3 3 3 3 3	Total Errors 10 5 7 6 6 1 5.83333333 3 3 4 8 3 4 8 3 5 1 1 4	Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44 46.68 51.34 41.81 50.06666667
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m : 0m ! 1m : 0m ! 1m 0m ! 0m ! 0m ! 0m !	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s 46.68s 51.34s 41.81s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 65. 46. 51. 41. 49.0	<pre>//.(//.(//.) //.(//.) //.(//.) /// /// /// // // // // // // // // //</pre>	4.160	7.66666 Persals 9 3 5 3 4 1 5 6 6 2 3 1 3 6 2 3 1 3 2 3 1 3 2 3 2 3 1 3 2 3 2 3 3 4 3 3 4 3 5 5 5 5 5 5 5 5 5 5 5 5 5	Hits 1 1 2 3 1 0 1.333333 0 0 1 1 2 0 0.6666667 2	0.3	Cones 0 1 0 1 0 1 0 3333333 0 1 1 0 0 3333333 0 1 1 0 0 3333333 2 2	10 Total Errors 10 5 7 6 6 1 5.83333333 3 4 8 3 5 1 4 8 3 5 1 4 8	77.56333333 Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44 46.68 51.34 41.81 50.066666667
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 0m 1m 0m 1m 0m 0m	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s 46.68s 51.34s 41.81s 46.22s 52 56s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 51. 41. 49.0 46. 52	 77. (s) .5 47 09 17 59 .5 533 35 78 44 68 34 81 667 22 56 	4.166	7.66666 yersals 9 3 5 3 4 1 5 66666667 3 3 6 2 3 1 3 1 3 2 2 2 2	Hits 1 1 2 3 1 0 1.333333 0 0 1.333333 0 0 1 1 2 0 0.6666667 2 0	0.3	20nes 0 1 0 1 0 1 0 3333333 0 1 1 0 0 1 1 0 0 3333333 2 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Errors 10 5 7 6 6 1 5.83333333 3 3 4 8 3 4 8 3 5 1 4 8 3 5 1 4 4 8 3 5 1 4 4 8 3 5 1 4 4 8 3 5 1 1 4 8 3 5 1 1 4 8 3 3 5 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 42.35 49.78 68.44 46.68 51.34 41.81 50.06666667 52.22 55.56
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average dig 1 dig 2 dig 2	Time 1m 0m 1m 0m 1m 0m 1m 0m 0m	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s 46.68s 51.34s 41.81s 46.22s 52.56s 55 19s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 51. 46. 51. 41. 49.0 46. 52.	<pre>//.(//.s //.s //.s //.s //.s //.s //.s</pre>	4.166	7.66666 7ersals 9 3 5 3 4 1 5 6 6 2 3 6 2 3 1 3 2 2 2 2 2 2 2	Hits 1 1 2 3 1 0 1.333333 0 0 1.333333 0 0 1 1 2 0 0.6666667 2 0 0 0 0 0 0 0 0 0 0 0 0 0	0.3	2 Cones 0 1 0 0 1 0 0 3333333 0 1 1 0 0 1 1 0 0 3333333 2 1 2 1 2 1 2 1 2 1 2 1 2	Total Errors 10 5 7 6 6 1 5.83333333 3 3 4 8 3 4 8 3 5 1 4 8 3 5 1 4 4 8 3 5 1 4 4 8 3 5 1 4 4 8 3 5 1 4 4 8 3 5 1 1 4 4 8 3 5 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44 46.68 51.34 41.81 50.06666667 52.22 55.56 61.19
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average dig 1 dig 2 dig 3 dig 4	Time 1m : 0m ! 1m : 0m ! 1m : 0m ! 0m ! 0m ! 0m ! 0m ! 0m ! 0m !	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s 46.68s 51.34s 41.81s 46.22s 52.56s 55.19s 49.03s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 51. 46. 51. 49.0 46. 52. 55. 49	<pre>// // // // // // // //.</pre>	4.166	7.66666 Persals 9 3 5 3 4 1 5 6 6 2 3 6 2 3 1 3 2 2 2 2 2 3 4 1 3 5 5 5 5 5 5 5 5 5 5 5 5 5	Hits 1 1 2 3 1 0 1.333333 0 0 1.333333 0 0 1 1 2 0 0.6666667 2 0 0 0 0 0 0 0 0 0 0 0 0 0	0.3	2 Cones 0 1 0 0 1 0 0 3333333 0 1 1 0 0 1 1 0 0 3333333 2 1 2 1 2 0 0 1 1 0 0 1 0 0 1 0 0 1 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	10 Total Errors 10 5 7 6 6 1 5.83333333 3 4 8 3 5 1 4 8 3 5 1 4 4 8 3 5 1 4 3 5 1 4 3 5 1 4 3 5 1 4 3 5 1 4 3 5 1 4 3 5 1 4 3 5 1 4 3 5 1 4 5 5 1 5 5 5 5 1 5 5 5 5 5 5 5 5 5 5 5 5 5	77.56333333 Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44 46.68 51.34 41.81 50.06666667 52.22 55.56 61.19 49.03
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average dig 1 dig 2 dig 3 dig 4 dig 5	Time 1m : 0m ! 1m : 0m ! 1m : 0m ! 0m ! 0m ! 0m ! 0m ! 0m ! 0m !	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 40.50s 42.35s 46.78s 5.44s 46.68s 51.34s 41.81s 46.22s 52.56s 55.19s 49.03s m 0s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 51. 41. 49.0 46. 52. 55. 49.	<pre>// 2 (s) 47 09 17 59 533 35 78 44 68 34 81 667 22 56 19 03 03 0</pre>	4.166	7.66666 Persals 9 3 5 3 4 1 5 6 6 2 3 1 3 6 2 3 1 3 2 2 2 3 6 2 3 6 2 3 1 3 6 2 3 6 2 3 6 2 3 6 2 3 6 6 7 7 8 8 8 9 9 1 9 1 9 1 9 1 1 1 1 1 1 1 1 1 1 1 1 1	Hits 1 1 2 3 1 0 1.333333 0 0 1.333333 0 0 1 1 2 0 0 0 0 1 2 0 0 0 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 1 0 1 1 0 1 1 1 2 0 0 0 1 1 1 2 0 0 0 1 1 2 0 0 0 0 1 1 2 0 0 0 0 0 1 1 2 0 0 0 0 0 1 1 2 0 0 0 0 0 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0	0.3	Cones 0 1 0 1 0 1 0 3333333 0 1 1 0 0 3333333 2 1 2 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0	10 Total Errors 10 5 7 6 6 1 5.83333333 3 4 8 3 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 7 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	77.56333333 Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44 46.68 51.34 41.81 50.066666667 55.56 61.19 49.03
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6	Time 1m : 0m ! 1m : 0m ! 1m 0m ! 0m ! 0m ! 0m ! 0m ! 0m ! 0m ! 0m !	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s 46.68s 51.34s 41.81s 46.22s 52.56s 55.19s 49.03s n 0s 42.68s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 51. 41. 49.0 46. 52. 55. 49. 60 42	<pre>// (s) (s) (s) (s) (s) (s) (s) (s) (s) (s)</pre>	4.166	7.66666 Persals 9 3 5 3 4 1 5 6 6 2 3 1 3 6 2 2 3 1 3 2 2 2 3 6 2 3 6 2 3 1 3 4 2 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5	Hits 1 1 2 3 1 0 1.333333 0 1.333333 0 1.333333 0 1.333333 0 1.333333 0 0 1.333333 0 0 0 0 1 1 2 0 0 0 0 1 1 2 0 0 0 0 1 1 2 0 0 0 1 1 2 0 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 1 1 2 0 0 0 1 1 2 0 0 0 1 1 2 0 0 0 1 1 2 0 0 0 1 1 2 0 0 0 0 1 1 2 0 0 0 0 1 1 2 0 0 0 0 1 1 1 2 0 0 0 0 0 1 1 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0	0.3	Cones 0 1 0 1 0 1 0 3333333 0 1 1 0 0 1 1 0 0 3333333 2 1 2 1 2 0 0 0 0 0 0 0 0 0 0 0 0 0	10 Total Errors 10 5 7 6 6 1 5.83333333 3 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 4 8 3 5 1 1 4 8 3 5 1 1 4 8 3 5 1 4 8 3 3 3 5 5 1 4 8 3 5 7 1 4 8 3 3 3 3 3 3 3 3 5 1 4 8 3 3 3 3 3 3 3 3 3 3 3 3 3	77.56333333 Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44 46.68 51.34 41.81 50.066666667 55.56 61.19 49.03 60 42.68
Day 2 Trial non 1 non 2 non 3 non 4 non 5 non 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6	Time 1m 0m 1m 0m 1m 0m 1m 0m 0m	e (min) 26.50s 50.47s 10.09s 51.17s 4.59s 40.50s 42.35s 46.78s 5.44s 46.68s 51.34s 41.81s 46.22s 52.56s 55.19s 49.03s n 0s 42.68s	Time 86 50. 70. 51. 64. 40 60.5 42. 46. 55. 41. 49.0 46. 52. 55. 49.0 60 42.	 77. (s) .5 47 09 17 59 .5 533 35 78 44 68 34 81 667 22 56 19 03 0 68 2467 	4.160	7.66666 yersals 9 3 5 3 4 1 5 6 6 2 3 1 3 6 2 2 2 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 3 6 2 3 6 2 3 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 2 3 6 6 6 6 6 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8	Hits 1 1 2 3 1 0 1.333333 0 1.333333 0 1.333333 0 1.333333 0 1.333333 0 0 1.333333 0 0 0 0 0 0 0 0 0 0 0 0 0	0.3	2 Cones 0 1 0 0 1 0 0 3333333 0 1 0 1 0 0 1 1 0 0 3333333 2 1 2 1 2 1 2 1 2 0 0 0 3333333 3 3 3 3 3 3 3 3 3 3	10 Total Errors 10 5 7 6 6 1 5.83333333 3 4 8 3 5 1 4 8 3 7 7 8 8 7 8 8 8 7 8 8 8 7 8 8 8 8 8 8 8 8 8 8 8 8 8	77.56333333 Final Time (s) 86.5 53.47 70.09 51.17 67.59 40.5 61.55333333 42.35 49.78 68.44 46.68 51.34 41.81 50.066666667 55.56 61.19 49.03 60 42.68



Subject 7											
Day 1											
Trial		Time (min)	Tim	ne (s)	Reversa	als	Hits	Cones	Total Errors	Final Time (s)
non 1		7m 4.	09s	424	4.09	49		25	4	78	436.09
non 2		4m 7.	66s	24	7.66	26		14	1	41	250.66
non 3		1m 59	.13s	11	9.13	13		9	0	22	119.13
non 4		1m 7.	84s	67	7.84	5		5	1	11	70.84
non 5		2m 25	.44s	14	5.44	20		18	2	40	151.44
non 6		0m 56	.88s	56	5.88	0		0	1	1	59.88
average				17	6.84	18.8333	33	11.8333	3 1.5	32.1666667	181.34
lin 1		2m 44	.09s	16	4.09	17		12	3	32	173.09
lin 2		1m 49	.31s	10	9.31	13		11	0	24	109.31
lin 3		0m 58	.25s	58	3.25	4		4	0	8	58.25
lin 4		0m 54	.16s	54	1.16	2		2	0	4	54.16
lin 5		0m 54	.60s	54	4.6	2		2	0	4	54.6
lin 6		1m 45	.85s	10	5.85	10		5	2	17	111.85
average				91.0)4333	8		6	0.833333	14.8333333	93.54333333
dig 1		1m 34	.28s	94	1.28	11		7	1	19	97.28
dig 2		0m 50	.60s	5	0.6	2		3	3	8	59.6
dig 3		1m 31	.03s	91	L.03	12		9	4	25	103.03
dig 4		1m 6.	48s	66	5.48	6		3	0	9	66.48
dig 5		1m 15	.00s	-	75	10		8	3	21	84
dig 6		1m 24	.19s	84	1.19	9		13	1	23	87.19
average				76	5.93	8.33333	33	7.16666	7 2	17.5	82.93
Day 2											
Trial	Time	e (min)	Time	e (s)	Rev	versals		Hits	Cones	Total Errors	Final Time (s)
lin 1	1m :	32.28s	92.	28		2		3	0	5	92.28
lin 2	1m :	17.02s	77.	02		2		2	0	4	77.02
lin 3	1m :	14.09s	74.	09		3		2	0	5	74.09
lin 4	0m !	58.44s	58.	44		0		0	0	0	58.44
lin 5	0m !	58.78s	58.	78		0		0	0	0	58.78
lin 6	1m -	41.75s	101	.75		0		0	0	0	101.75
average			77.	06	1.166	5666667	1.	166667	0	2.33333333	77.06
non 1	0m 4	45.84s	45.	84		0		0	1	1	48.84
non 2	0m	35.44	35.	44		0		0	0	0	35.44
non 3	0m !	54.40s	54	.4		7		5	1	13	57.4
non 4	0m 4	47.38s	47.	38		1		1	0	2	47.38
non 5	0m 3	39.78s	39.	78		1		1	3	5	48.78
non 6	0m 4	44.75s	44.	75		0		0	0	0	44.75
average			44.5	983		1.5	1.	166667	0.8333333	3.5	47.09833333
dig 1	0 m !	59.88s	59.	88		5		1	4	10	71.88
dig 2	0m !	57.63s	57.	63		3		3	1	7	60.63
dig 3	1m 3	37.75s	97.	75		7		8	1	16	100.75
dig 4	0m !	59.16s	59.	16		4		3	2	9	65.16
dig 5	0m !	54.44s	54.	44		2		2	0	4	54.44
dig 6	0m !	52.84s	52.	84		1		2	1	4	55.84
average			63.6	5167	3.666	5666667	3.	166667	1.5	8.33333333	68.11666667



Subject 8										
Day 1										
Trial		Time (min)	Tim	ne (s)	Reversa	ls Hits	Cones	Total Errors	Final Time (s)
dig 1		2m 40	.84s	16	0.84	18	16	3	37	169.84
dig 2		0m 58	.56s	58	8.56	5	1	2	8	64.56
dig 3		1m 7.	28s	67	7.28	8	4	2	14	73.28
dig 4		1m 0.	.63s	60	0.63	8	4	1	13	63.63
dig 5		1m 24	.97s	84	1.97	17	9	2	28	90.97
dig 6		0m 54	.56s	54	1.56	5	5	2	12	60.56
average				81	1.14	10.1666	6.5	2	18.6666667	87.14
non 1		0m 39	.43s	39	9.43	0	0	1	1	42.43
non 2		0m 39	.18s	39	9.18	2	2	0	4	39.18
non 3		0m 33	.97s	33	3.97	2	2	1	5	36.97
non 4		0m 28	.78s	28	3.78	0	1	1	2	31.78
non 5		0m 27	.94s	27	7.94	0	0	1	1	30.94
non 6		0m 30	.84s	30).84	0	1	2	3	36.84
average				33.3	35667	0.66666	57 1	1	2.66666667	36.35666667
lin 1		0m 29	.25s	29	9.25	0	0	0	0	29.25
lin 2		0m 26	.62s	26	5.62	0	1	0	1	26.62
lin 3		0m 34	.31s	34	1.31	3	3	1	7	37.31
lin 4		0m 49	.12s	49	9.12	5	4	1	10	52.12
lin 5		1m 9.	.59s	69	9.59	11	9	0	20	69.59
lin 6		0m 26	.72s	26	5.72	0	0	3	3	35.72
average				201	\mathbf{r}	216666		2 0 022222	ϵ 0	11 76000000
	_			39.2	26833	3.10000	2.85555	0.855555	0.83333333	41.70655555
Day 2				59.2	20833	3.10000	2.83333	0.033333	0.03333333	41.706555555
Day 2 Trial	Time	e (min)	Time	≥ (s)	Rev	versals	Hits	Cones	Total Errors	Final Time (s)
Day 2 Trial lin 1	Time 0m 2	e (min) 25.19s	Time 25.	e (s) 19	Rev	ersals	Hits 1	Cones 0	Total Errors	Final Time (s)
Day 2 Trial lin 1 lin 2	Time Om 2 Om 2	e (min) 25.19s 23.65s	Time 25. 23.	e (s) 19 65	Rev	0 0	Hits 1 0	Cones 0 0	Total Errors	Final Time (s) 25.19 23.65
Day 2 Trial lin 1 lin 2 lin 3	Time 0m 2 0m 2 0m 2	e (min) 25.19s 23.65s 23.50s	Time 25. 23. 23	e (s) 19 65 .5	Rev	versals 0 0 0	Hits 1 0 0	Cones 0 0 0	Total Errors	Final Time (s) 25.19 23.65 23.5
Day 2 Trial lin 1 lin 2 lin 3 lin 4	Time 0m 2 0m 2 0m 2	e (min) 25.19s 23.65s 23.50s 24.63s	Time 25. 23. 23 24.	e (s) 19 65 .5 63	Rev	0 0 0 1	Hits 1 0 0 1	Cones 0 0 0 1	Total Errors 1 0 0 3	Final Time (s) 25.19 23.65 23.5 27.63
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5	Time 0m : 0m : 0m : 0m :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s	Time 25. 23. 23 24. 28.	s (s) 19 65 .5 63 12	Rev	2.10000 2000 2000 2000 2000 2000 2000 20	Hits 1 0 0 1 1	Cones 0 0 0 1 0	Total Errors 1 0 0 3 2	Final Time (s) 25.19 23.65 23.5 27.63 28.12
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6	Time 0m : 0m : 0m : 0m : 0m : 1m :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s	Time 25. 23. 23 24. 28. 75.	(s) (s) 19 65 5 63 12 94	Rev	versals 0 0 0 1 1 1	Hits 1 0 0 1 1 1 13	Cones 0 0 0 1 0 1	Total Errors 1 0 0 3 2 28	Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time Om : Om : Om : Om : Om : Im :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s	Time 25. 23. 24. 28. 75. 33.5	(s) 19 65 .5 63 12 94 505	20833 Rev 2.666	7ersals 0 0 0 1 1 14 56666667	Hits 1 0 0 1 1 13 2.6666667	Cones 0 0 0 1 0 1 0.33333333	Total Errors 1 0 3 2 28 5.666666667	Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 0m 0m 0m 0m 0m 1m	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s	Time 25. 23. 23 24. 28. 75. 33.5	e (s) 19 65 55 63 12 94 505	20833 Rev 2.666	3.10000 versals 0 0 1 14 56666667	Hits 1 0 0 1 1 13 2.666667	Cones 0 0 0 1 0 0 1 0.3333333	1 0 0 3 2 28 5.666666667	Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time Om : Om : Om : Om : 1m :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s	Time 25. 23. 23. 24. 28. 75. 33.5 23.	2 (s) 19 65 .5 63 12 94 505	20833 Rev 2.666	2.10000 2000 2000 2000 2000 2000 2000 20	Hits 1 0 1 1 1 13 2.666667 1	Cones 0 0 1 0 1 0.33333333 3	0.83333333 Total Errors 1 0 3 2 28 5.6666666667	Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 32.06
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time Om Om Om Om Om Im Om	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s	Time 25. 23. 24. 28. 75. 33.5 23. 46.	2 (s) 19 65 .5 63 12 94 505 06 53	20833 Rev 2.666	2.10000 2000 2000 2000 2000 2000 2000 20	Hits 1 0 0 1 1 13 2.6666667 1 6	Cones 0 0 1 0 1 0.3333333 3 1	5 13	Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 32.06 49.53
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3	Time Om :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25.	2 (s) 19 65 .5 63 12 94 505 06 53 15	20833 Rev 2.666	2.10000 2.10000 2.10000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.000000 1.000000 1.000000 1.00000000 1.00000000 1.0000000000	Hits 1 0 0 1 1 13 2.6666667 1 6 2	Cones 0 0 1 0 0 1 0 0 3 3 1 1 1	5 5 1 0 0 3 2 28 5.666666667 5 13 4	41.76833333 Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 32.06 49.53 28.15
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4	Time Om :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s 25.50s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25. 25.	≥ (s) 19 65 .5 63 12 94 505 06 53 15 .5	20833 Rev 2.666	2.10000 2.10000 2.10000 1.1000 1.1000 1.1000 1.1000 1.1000 1.1000 1.100000 1.100000 1.100000 1.100000 1.100000 1.100000 1.100000 1.100000 1.1000000 1.1000000 1.10000000 1.100000000 1.10000000000	Hits 1 0 0 1 1 13 2.6666667 1 6 2 1	Cones 0 0 1 0 1 0.3333333 3 1 1 0 0	5 1 0 0 3 2 28 5.666666667 5 13 4 2	Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 32.06 49.53 28.15 25.5
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5	Time Om Om Om Om Om Im Om	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s 25.50s 27.53s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25. 25. 25. 27.	2 (s) 2 (s) 19 65 63 12 94 505 06 53 15 .5 53	20833 Rev 2.666	3.10000 versals 0 0 1 14 56666667 1 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Hits 1 0 0 1 1 13 2.6666667 1 6 2 1 1 1 1 1 1 1 1 1 1 1 1 1	Cones 0 0 1 0 1 0.3333333 3 1 1 0 1 0 1	5 5 13 4 2 3 3 4 2 3	Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 32.06 49.53 28.15 25.5 30.53
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6	Time 0m	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s 25.50s 27.53s 26.50s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25. 25. 27. 26	2 (s) 19 65 .5 63 12 94 505 06 53 15 .5 53 .5 .5	20833 Rev 2.666	3.10000 versals 0 0 1 14 56666667 1 6 1 1 1 0 0	Hits 1 0 0 1 1 13 2.6666667 1 6 2 1 1 0	Cones 0 0 0 1 0 1 0 1 0 3 1 1 0 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	5 13 4 2 3 2	Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 32.06 49.53 28.15 25.5 30.53 26.5
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average	Time Om : Om :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s 25.50s 27.53s 26.50s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25. 25. 27. 26 29.0	<pre>set(s) 19 655 63 12 94 505 06 53 155 535 535</pre>	2.666	2.10000 2.10000 2.10000 1.10000 1.1000 1.	Hits 1 0 0 1 1 1 2.666667 1 6 2 1 1 0 1.833333	Cones 0 0 0 1 0 1 0 3 3 1 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	5 5 13 4 2 3 0 4 2 3 0 4 5 5 3 0 4 5 5 3 3 0 4 5 5 3 3 0 4 5 5 3 3 0 4 5 5 3 3 0 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	41.70833333 Final Time (s) 25.19 23.65 23.763 27.63 28.12 78.94 34.505 32.06 49.53 28.15 25.5 30.53 26.5 32.045
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average	Time Om : Om : Om : Om : Om : Om : Om : Om :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s 25.50s 27.53s 26.50s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25. 25. 25. 27. 26. 29.0	2 (s) 19 65 .5 63 12 94 505 06 53 15 .5 53 .5 045	2.666	3.10000 rersals 0 0 1 14 56666667 1 1 1 1 1 0 56666667	Hits 1 0 0 1 1 13 2.6666667 1 6 2 1 1 0 1.833333	Cones 0 0 0 1 0 1 0 1 0 3 3 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	5 13 4 2 3 0 4 2 3 0 4 2 3 0 4 2 3 0 4.5 0	Final Time (s) 25.19 23.65 23.5 23.5 27.63 28.12 78.94 34.505 332.06 49.53 28.15 25.5 30.53 26.5 32.045
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average	Time Om : Om : Om : Om : Om : Om : Om : Om :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s 25.50s 27.53s 26.50s 58.13s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25. 25. 27. 26 29.0	a (s) a (s) 19 65 63 12 94 505 06 53 15 53 .5 53 .5 53 .5 .5 .045 .5 .13 .13	2.666 1.666	3.10000 rersals 0 0 1 14 56666667 1 1 1 1 6 1 1 56666667 20	Hits 1 0 0 1 1 13 2.6666667 1 6 2 1 1 0 1.833333 16	Cones 0 0 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	0.833333333 Total Errors 1 0 3 2 28 5.666666667 5 13 4 2 3 0 4.5	41.76833333 Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 32.06 49.53 28.15 25.5 30.53 26.5 32.045 136.13
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average	Time Om : Om :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s 25.50s 27.53s 26.50s 26.50s 58.13s 33.75s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25. 25. 27. 26 29.0 118 33.	a (s) a (s) 19 65 .5 63 12 94 505 06 53 .5 53 .5 .5 .5 .5 .5 .5 .5 .45 .75	2.666 1.666	3.10000 versals 0 0 1 14 56666667 1 1 0 56666667 20 2 2	Hits 1 0 0 1 1 13 2.6666667 1 6 2 1 1 0 1.833333 16 2	Cones 0 0 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	0.835333333 Total Errors 1 0 3 2 28 5.666666667 5 13 4 2 3 0 4 2 3 0 4.5	41.76833333 Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 32.06 49.53 28.15 25.5 30.53 26.5 32.045 136.13 36.75
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3	Time Om : Om :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s 25.50s 27.53s 26.50s 26.50s 58.13s 33.75s 47.65s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25. 25. 27. 26 29.0 1118 33. 47.	39.2 (s) 19 65 .5 63 12 94 505 06 53 15 .5 53 .5 .5 .5 .5 .5 .5 .13 .75 .65	2.666	20 2 2 2 5 3.10000 2 20 2 3.10000 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Hits 1 0 0 1 1 1 2.666667 1 1 6 2 1 1 0 1.833333 16 2 5	Cones 0 0 0 1 2 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	0.835333333 Total Errors 1 0 3 2 28 5.666666667 5 13 4 2 3 0 4.5	41.76833333 Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 32.06 49.53 28.15 25.5 30.53 26.5 32.045 136.13 36.75 53.65
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4	Time Om : Om :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s 25.50s 27.53s 26.50s 27.53s 26.50s 58.13s 33.75s 47.65s 36.43s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25. 25 27. 26 29.0 118 33. 47. 36.	2 (s) 19 65 .5 63 12 94 505 06 53 15 .5 53 .5 045 .13 .75 .65 .43	2.666	20 2 5 5 5 2 2 2 2 2 2 2 2 2 2 2 5 5 2 2 2 2 2 2 2 5 5	Hits 1 0 0 1 1 1 2.6666667 1 1 6 2 1 1 0 1.833333 16 2 5 6	Cones 0 0 0 1 0 2 2 2 2 2 2 2 2 2 2 2 2 2	5 5 1 0 0 3 2 28 5.666666667 5 13 4 2 3 0 4.5 4 2 3 0 4.5 12 13 4	41.76833333 Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 32.06 49.53 28.15 25.5 30.53 26.5 32.045 136.13 36.75 53.65 42.43
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5	Time Om : Om : Om : Om : Om : Om : Om : Om :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s 25.50s 27.53s 26.50s 58.13s 33.75s 47.65s 36.43s 30.41s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25. 25. 27. 26 29.0 118 33. 47. 36. 30.	2 (s) 19 65 .5 63 12 94 505 06 53 15 .5 045 .5 045 .5 .5 .5 .5 .5 .5 .5 .5 .5	2.660	20 20 20 20 20 20 5 0 20 20 5 0	Hits 1 0 0 1 1 1 1 2.6666667 1 1 6 2 1 1 0 1.833333 16 2 5 6 1 1	Cones 0 0 0 1 0 2 2 2 2 2 2 2 2	0.833333333 Total Errors 1 0 3 2 28 5.666666667 5 13 4 2 3 0 4 2 3 0 4.5 42 5 12 13 3	41.76833333 Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 34.505 32.06 49.53 28.15 25.5 30.53 26.5 32.045 136.13 36.75 53.65 42.43 36.41
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6	Time Om : Om : Om : Om : Om : Om : Om : Om :	e (min) 25.19s 23.65s 23.50s 24.63s 28.12s 15.94s 23.06s 46.53s 25.15s 25.50s 27.53s 26.50s 58.13s 33.75s 47.65s 36.43s 30.41s 32.40s	Time 25. 23. 24. 28. 75. 33.5 23. 46. 25. 25. 27. 26 29.0 118 33. 47. 36. 30. 30. 32	2 (s) 2 (s) 19 65 63 12 94 505 06 53 15 53 .5 53 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	2.666	3.10000 rersals 0 0 1 14 56666667 1 1 1 1 6 1 1 6 1 6 1 6 1 20 2 5 5 0 3	Hits 1 0 0 1 1 13 2.6666667 1 1 6 2 1 1 0 1.833333 16 2 5 6 1 4	Cones 0 0 0 1 0 1 0 1 0 0 1 0 1 0 1 0 1 0 1	0.835333333 Total Errors 1 0 3 2 28 5.666666667 5 13 4 2 3 0 4 2 3 0 4.5 42 5 12 13 3 3 3 3 3 8	41.76833333 Final Time (s) 25.19 23.65 23.5 27.63 28.12 78.94 34.505 32.06 49.53 28.15 25.5 30.53 26.5 32.045 136.13 36.75 53.65 42.43 36.41 35.4



Subject 9												
Day 1												
Trial		Time (min)	Tin	ne (s)	Revers	als	Hits		Cones	Total Errors	Final Time (s)
dig 1		1m 21	78s	8	1.78	1		0		0	1	81.78
dig 2		1m 13	8.69s	7	3.69	4		0		0	4	73.69
dig 3		1m 13	8.53s	7	3.53	6		1		0	7	73.53
dig 4		1m 11	.06s	7	1.06	4		2		0	6	71.06
dig 5		1m 12	.56s	7	2.56	2		0		0	2	72.56
dig 6		0m 55	5.07s	5	5.07	2		0		0	2	55.07
average				71.	28167	3.1666	67	0.5		0	3.66666667	71.28166667
lin 1		1m 47	′.41s	10	7.41	9		4		1	14	110.41
lin 2		3m 18	3.28s	19	8.28	20		7		2	29	204.28
lin 3		0m 51	.69s	5	1.69	2		2		1	5	54.69
lin 4		0m 25	5.04s	2	5.04	0		0		0	0	25.04
lin 5		0m 41	16s	4	1.16	4		3		0	7	41.16
lin 6		0m 45	.94s	4	5.94	2		1		0	3	45.94
average				78.	25333	6.1666	67	2.83333	33	0.666667	9.66666667	80.25333333
non 1		0m 27	'.69s	2	7.69	0		0		0	0	27.69
non 2		0m 25	5.96s	2	5.96	1		1		0	2	25.96
non 3		0m 24	.91s	24	4.91	1		1		0	2	24.91
non 4		0m 22	2.81s	2	2.81	1		1		1	3	25.81
non 5		0m 26	5.72s	2	6.72	1		1		0	2	26.72
non 6		0m 23	8.03s	2	3.03	0		0		0	0	23.03
average				25.	18667	0.6666	67	0.66666	67	0.166667	1.5	25.68666667
Day 2												
Trial	Time	(min)	Time	(s)	Rev	ersals		Hits		Cones	Total Errors	Final Time (s)
dig 1	0m 5	57.50s	57.	5		5		2		4	11	69.5
dig 2	0m 5	58.03s	58.0	03		2		2		0	4	58.03
dig 3	0m 3	35.87s	35.8	87		2		1		1	4	38.87
dig 4	0m 3	30.19s	30.3	19		1		1		0	2	30.19
dig 5	0m 3	36.25s	36.2	25		3		2		1	6	39.25
dig 6	0m 4	2.62s	42.0	52		3		2		0	5	42.62
average			43.4	41	2.666	666667	1.6	666667		1	5.33333333	46.41
non 1	0m 3	8.53s	38.	53		1		0		1	2	41.53
non 2	0m 2	27.87s	27.	87		2		2		0	4	27.87
non 3	0m 3	30.10s	30.	1		2		1		1	4	33.1
non 4	0m 3	84.53s	34.	53		2		2		0	4	34.53
non 5	0m 2	29.12s	29.	12		0		0		0	0	29.12
non 6	0m 3	32.40s	32.	4		1		1		0	2	32.4
average			32.0	917	1.333	333333		1	0.	3333333	2.66666667	33.09166667
lin 1	0m 3	31.16s	31	16		1		1		0	2	31.16
lin 2	0m 2	27.035	27 (03		0		0		1	1	30.03
lin 3	0m 3	31.885	31	38		0		0		0	0	31.88
lin 4	0m 2	28.005	25	3		0		0		0	0	28
lin 5	0m 2	9.225	29	22		- 1		1		0	2	29.22
lin 6	0m 2	23.445	23	14		0		0		0	0	23.44
average			28.4	55	0.333	333333	0.3	333333	0.	1666667	0.83333333	28.955



Subject 10										
Day 1										
Trial		Time (min)	Tim	ne (s)	Reversa	s Hits	Cones	Total Errors	Final Time (s)
non 1		2m 5.	87s	12	5.87	8	6	2	16	131.87
non 2		1m 3.	35s	63	3.35	4	1	0	5	63.35
non 3		1m 9.	87s	69	9.87	6	7	0	13	69.87
non 4		0m 58	.41s	58	3.41	6	3	0	9	58.41
non 5		0m 43	.13s	43	3.13	1	1	0	2	43.13
non 6		0m 28	.94s	28	3.94	0	1	0	1	28.94
average				64.9	2833	4.16666	7 3.16666	7 0.333333	7.66666667	65.92833333
lin 1		0m 45	.06s	45	5.06	0	0	0	0	45.06
lin 2		0m 53	.93s	53	8.93	2	3	0	5	53.93
lin 3		0m 57	.47s	57	7.47	1	1	0	2	57.47
lin 4		1m 0.	97s	60).97	2	2	0	4	60.97
lin 5		1m 5.	75s	65	5.75	2	2	0	4	65.75
lin 6		0m 46	.59s	46	5.59	0	0	0	0	46.59
average				54.9	96167	1.16666	7 1.33333	3 0	2.5	54.96166667
dig 1		1m 40	.13s	10	0.13	17	9	1	27	103.13
dig 2		0m 41	.00s	4	41	1	2	1	4	44
dig 3		0m 48	.63s	48	8.63	6	6	1	13	51.63
dig 4		1m 4.	28s	64	1.28	8	4	2	14	70.28
dig 5		0m 51	.43s	51	L.43	7	4	3	14	60.43
dig 6		0m 40	.22s	40).22	0	0	0	0	40.22
average				57.	.615	6.5	4.16666	7 1.333333	12	61.615
Day 2										
Trial	Time	e (min)	Time	e (s)	Rev	versals	Hits	Cones	Total Errors	Final Time (s)
lin 1	0m 4	43.13s	43.	13		0	0	0	0	43.13
lin 2	0m 2	28.72s	28.	72		0	0	0	0	28.72
lin 3	0m 3	30.47s	30.	47		0	1	0	1	30.47
lin 4	0m 3	31.50s	31	.5		0	0	0	0	31.5
lin 5	0m 2	28.85s	28.	85		0	1	0	1	28.85
lin 6	0m 3	34.50s	34	.5		1	1	1	3	37.5
average			32.8	617	0.166	5666667	0.5	0.1666667	0.83333333	33.36166667
dig 1	0m 3	37.53s	37.	53		0	1	0	1	37.53
dig 2	0m 4	40.37s	40.	37		2	2	1	5	43.37
dig 3	0m 4	48.19s	48.	19		3	3	0	6	48.19
dig 4	0m 3	36.15s	36.	15		2	2	1	5	39.15
dig 5	0m !	56.41s	56.	41		11	7	1	19	59.41
dig 6	0m !	57.09s	57.	09		10	6	2	18	63.09
average			45.9	567	4.666	5666667	3.5	0.8333333	9	48.45666667
non 1	0m 2	22.50s	22	.5		0	1	1	2	25.5
non 2	0m 2	26.68s	26.	68		1	1	1	3	29.68
non 3	0m 3	31.31s	31.	31		2	3	0	6	31.31
			· · · · · ·			5	_			
non 4	0m 3	35.44s	35.	44		3	2	1	6	38.44
non 4 non 5	0m 3 0m 2	35.44s 25.97s	35. 25.	44 97		3 1	2 1	1 0	6 2	38.44 25.97
non 4 non 5 non 6	0m 3 0m 2 0m 2	35.44s 25.97s 28.19s	35. 25. 28.	44 97 19		3 1 1	2 1 1	1 0 0	6 2 2	38.44 25.97 28.19

Total Averages	Time (s)	Errors
Digital	51.7858333	10.5
Linear	43.9116667	1.666667
Nonlinear	46.6383333	5.583333



Subject 11										
Day 1										
Trial		Time (min)	Tim	1e (s)	Reversa	ls Hits	Cones	Total Errors	Final Time (s)
non 1		2m 3.	03s	12	3.03	3	1	0	4	123.03
non 2		1m 51	.04s	11	1.04	5	3	0	8	111.04
non 3		1m 35	.44s	95	5.44	1	0	0	1	95.44
non 4		1m 21	.41s	81	1.41	0	0	1	1	84.41
non 5		2m 8.	53s	12	8.53	7	4	0	11	128.53
non 6		1m 0.	57s	60).57	0	0	0	0	60.57
average				100	.0033	2.66666	7 1.33333	3 0.166667	4.16666667	100.5033333
dig 1		2m 0.	13s	12	0.13	26	12	3	41	129.13
dig 2		1m 19	.78s	79	9.78	13	9	4	26	91.78
dig 3		0m 58	.59s	58	3.59	7	6	3	16	67.59
dig 4		0m 46	.15s	46	5.15	6	7	2	15	52.15
dig 5		1m 12	.72s	72	2.72	12	10	2	24	78.72
dig 6		0m 59	.34s	59	9.34	5	4	1	10	62.34
average				72	.785	11.5	8	2.5	22	80.285
lin 1		1m 36	.16s	96	5.16	6	3	0	9	96.16
lin 2		0m 56	.00s	!	56	1	1	0	2	56
lin 3		0m 59	.34s	59	9.34	0	0	0	0	59.34
lin 4		1m 25	.47s	85	5.47	6	4	1	11	88.47
lin 5		0m 42	.00s	. 4	42	1	1	0	2	42
lin 6		1m 17	.75s	77	7.75	4	3	0	7	77.75
avorago										
average				69.4	15333	3	2	0.166667	5.16666667	69.95333333
Day 2				69.4	45333	3	2	0.166667	5.16666667	69.95333333
Day 2 Trial	Time	e (min)	Time	69.4 e (s)	15333 Rev	3 versals	2 Hits	0.166667 Cones	5.16666667 Total Errors	69.95333333 Final Time (s)
Day 2 Trial dig 1	Time 1m	e (min) 4.78s	Time	69.4 e (s) <mark>78</mark>	15333 Rev	3 versals 8	2 Hits 4	0.166667 Cones 4	5.16666667 Total Errors 16	69.95333333 Final Time (s) 76.78
Day 2 Trial dig 1 dig 2	Time 1m 0m 4	e (min) 4.78s 42.81s	Time 64. 42.3	69.4 e (s) 78 81	15333 Rev	3 versals 8 4	2 Hits 4 3	0.166667 Cones 4 2	5.16666667 Total Errors 16 9	69.95333333 Final Time (s) 76.78 48.81
Day 2 Trial dig 1 dig 2 dig 3	Time 1m 0m 4 0m 4	e (min) 4.78s 42.81s 42.93s	Time 64. 42.3 42.9	69.4 e (s) 78 81 93	15333 Rev	3 versals 8 4 6	Hits 4 3 5	0.166667 Cones 4 2 1	5.16666667 Total Errors 16 9 12	69.95333333 Final Time (s) 76.78 48.81 45.93
Day 2 Trial dig 1 dig 2 dig 3 dig 4	Time 1m 0m 4 0m 4	e (min) 4.78s 42.81s 42.93s 45.68s	Time 64. 42.3 42.9 45.0	69.4 (s) 78 81 93 68	45333 Rev	3 versals 8 4 6 6	Hits 4 3 5 6	0.166667 Cones 4 2 1 1	5.16666667 Total Errors 16 9 12 13	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5	Time 1m 0m 4 0m 4 0m 4	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s	Time 64. 42. 42. 45. 85.	69.4 e (s) 78 81 93 68 59	15333 Rev	3 versals 8 4 6 6 16	2 Hits 4 3 5 6 11	0.166667 Cones 4 2 1 1 2	5.16666667 Total Errors 16 9 12 13 29	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6	Time 1m 0m 4 0m 4 0m 4 0m 5	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s	Time 64. 42. 45. 85. 34.	69.4 (s) 78 81 93 68 59 72	15333 Rev	3 versals 8 4 6 6 16 3	2 Hits 4 3 5 6 11 3	0.166667 Cones 4 2 1 1 2 3	5.16666667 Total Errors 16 9 12 13 29 9	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m 4 0m 4 1m 2 0m 3	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s	Time 64. 42. 45. 85. 34. 52.7	69.4 2 (s) 78 81 93 68 59 72 517	15333 Rev 7.166	3 versals 8 4 6 6 16 3 56666667	2 Hits 4 3 5 6 11 3 5.333333	0.166667 Cones 4 2 1 1 2 3 2.1666667	5.16666667 Total Errors 16 9 12 13 29 9 14.6666667	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m 4 0m 4 0m 4 0m 4 0m 5 0m 5	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s	Time 64. 42. 45. 85. 34. 52.7	69.4 2 (s) 78 81 93 68 59 72 517	15333 Rev 7.166	3 versals 8 4 6 16 3 56666667	2 Hits 4 3 5 6 11 3 5.333333	0.166667 Cones 4 2 1 1 2 3 2.16666667	5.16666667 Total Errors 16 9 12 13 29 9 14.6666667	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m 4 0m 4 1m 2 0m 2	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s	Time 64. 42. 45. 85. 34. 52.7	69.4 2 (s) 78 81 93 68 59 72 517 4	45333 Rev 7.166	3 rersals 8 4 6 6 16 3 56666667 1 1	2 Hits 4 3 5 6 11 3 5.333333	0.166667 Cones 4 2 1 1 2 3 2.1666667 1	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m 4 0m 5 0m 5 0m 4 0m 4 0m 4 0m 4	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s	Time 64. 42. 45. 34. 52.7 44 48.	69.4 78 81 93 68 59 72 517 4 47	15333 Rev 7.166	3 versals 8 4 6 6 16 3 56666667 1 7	2 Hits 4 3 5 6 11 3 5.333333 5.333333	0.166667 Cones 4 2 1 1 2 3 2.16666667 1 2	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 54.47
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m 4 0m 4 0m 4 0m 5 0m 4 0m 5 0m 4 0m 5 0m 6 0m 7 0m 7 0m 6 0m 7	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s	Time 64. 42. 45. 85. 34. 52.7 44 48. 35.	69.4 78 78 93 68 59 72 517 4 47 87	15333 Rev 7.160	3 versals 8 4 6 6 16 3 5 5 5 6 6 6 6 6 6 6 7 7 3	2 Hits 4 3 5 6 11 3 5.333333 5.333333	0.166667 Cones 4 2 1 1 2 3 2.16666667 1 2 0	5.16666667 Total Errors 16 9 12 13 29 9 14.6666667 3 13 6	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 54.47 35.87
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4	Time 1m 0m 4 0m 4 0m 5 0m 4 0m 5 0m 4 0m 5 0m 6 0m 7	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s 27.94s	Time 64. 42. 45. 85. 34. 52.7 44 48. 35. 27.	69.4 (s) 778 881 993 668 559 72 5517 4 4 47 87 94	15333 Rev 7.166	3 versals 8 4 6 6 16 3 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	2 Hits 4 3 5 6 11 3 5.333333 5.333333 1 4 3 3 0	0.166667 Cones 4 2 1 1 2 3 2.16666667 1 2 0 1 2 0 1	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13 6 1	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 54.47 35.87 30.94
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4 lin 5	Time 1m 0m 0m 1m 0m	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s 27.94s 34.04s	Time 64. 42. 45. 85. 34. 52.7 44 48. 35. 27. 34.	69.4 78 81 93 68 59 72 517 4 4 47 87 94 04	45333 Rev 7.166	3 versals 8 4 6 6 16 3 56666667 1 7 3 0 3 3	2 Hits 4 3 5 6 11 3 5.333333 5.333333 4 1 4 3 0 3 0 3 3	0.166667 Cones 4 2 1 1 2 3 2.1666667 1 2 0 1 1 2 0 1 1 1 2 0 1 1 1 2 0 1 1 2 0 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 2 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13 6 1 3 13 6 1 7	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 59.25166667 47 54.47 35.87 30.94 37.04
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6	Time 1m 0m 0m 1m 0m	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s 27.94s 34.04s 23.90s	Time 64. 42. 45. 85. 34. 52.7 44 48. 35. 27. 34. 23	69.4 78 81 93 68 59 72 517 4 47 87 94 04 .9	45333 Rev 7.166	3 rersals 8 4 6 6 16 3 56666667 1 7 3 0 3 0 3 0 3 0	2 Hits 4 3 5 6 11 3 5.333333 5.333333 1 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	0.166667 Cones 4 2 1 1 2 3 2.16666667 1 2 0 1 1 2 0 1 1 0 0	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13 6 1 7 0	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 59.25166667 47 54.47 35.87 30.94 37.04 23.9
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 0m 4 0m 4 0m 5 0m 4 0m 5 0m 5 0m 5 0m 5 0m 5 0m 6 0m 7	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s 27.94s 34.04s 23.90s	Time 64. 42. 45. 85. 34. 52.7 44 48. 35. 27. 34. 23 35.7	69.4 (s) (s) (s) (s) (s) (s) (s) (s)	2.333 Rev 7.166	3 versals 8 4 6 6 16 3 5 5 6 6 6 6 6 6 6 7 3 0 3 0 3 0 3 3 3 3 3 3 3 3 3 3 3 3 3	2 Hits 4 3 5 6 11 3 5.333333 5.333333 1 4 4 3 0 3 0 3 0 3 0 1.833333	0.166667 Cones 4 2 1 1 2 3 2.16666667 1 2 0 1 1 0 0.8333333	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13 6 1 7 0 5	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 54.47 35.87 30.94 37.04 23.9 38.20333333
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average	Time 1m 0m 4 0m 4 0m 2 1m 2 0m 2 0m 2 0m 2 0m 2 0m 2 0m 2	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s 27.94s 34.04s 23.90s	Time 64. 42. 45. 85. 34. 52.7 44 48. 35. 34. 27. 34. 23 35.7	69.4 2 (s) 78 81 93 68 59 72 517 4 47 87 94 04 .9 033	2.333 Rev	3 versals 8 4 6 6 16 3 56666667 1 7 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 3 0 1 1 1 1 1 1 1 1 1 1 1 1 1	2 Hits 4 3 5 6 11 3 5.333333 5.333333 7 1 4 3 0 3 0 3 0 1.833333	0.166667 Cones 4 2 1 1 2 3 2.16666667 1 2 0 1 1 0 0 0.8333333	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13 6 1 7 0 5	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 59.25166667 47 54.47 35.87 30.94 37.04 23.9 38.2033333
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 0m 0m 1m 0m 1m 0m	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s 27.94s 34.04s 23.90s	Time 64. 42. 45. 85. 34. 52.7 44 48. 35. 27. 34. 23 35.7 25	69.4 2 (s) 78 81 93 68 59 72 517 4 4 47 87 94 04 .9 033 .6	2.333 Rev	3 versals 8 4 6 6 16 3 56666667 1 7 3 0 3 3 0 3 3 0 3 3 3 3 3 3 3 1	2 Hits 4 3 5 6 11 3 5.333333 5.333333 7 1 4 3 0 3 0 1.833333	0.166667 Cones 4 2 1 1 2 3 2.1666667 1 2 0 1 1 0 0.8333333 0	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13 6 1 7 0 5 2	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 54.47 35.87 30.94 37.04 23.9 38.20333333
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 0m 4 0m 4 1m 3 0m 4 0m 4 0m 5 0m 5 0m 5 0m 6 0m 7 0m 7	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s 27.94s 34.04s 23.90s 25.60s 29.31s	Time 64. 42. 45. 34. 52.7 44 48. 35. 27. 34. 23 35.7 34. 23 35.7 29.	69.4 2 (s) 78 81 93 68 59 72 517 4 47 87 94 04 .9 033 .6 31	2.333 Rev	3 versals 8 4 6 6 16 3 56666667 1 7 3 0 3 0 3 3 0 3 3 0 3 3 3 3 3 3 3 3 3 3 3 3 3	2 Hits 4 3 5 6 11 3 5.33333 5.33333 7 1 4 3 0 1.833333 1 8 3 0 1.833333	0.166667 Cones 4 2 1 1 2 3 2.16666667 1 2 0 1 1 0 0.8333333 0 1 1 0 0 0.8333333	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13 6 1 7 0 5 2 9	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 59.25166667 47 54.47 35.87 30.94 37.04 23.9 38.20333333 25.6 32.31
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 0m 4 0m 5 0m 6 0m 7 0m 7	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s 27.94s 34.04s 23.90s 25.60s 29.31s 23.09s	Time 64. 42. 45. 34. 52.7 44 48. 35. 27. 34. 23 35.7 23. 25 29. 23.	69.4 2 (s) 78 81 93 68 59 72 517 4 47 87 94 04 .9 033 .6 31 09	2.333 Rev	3 rersals 8 4 6 6 16 3 56666667 1 7 3 0 3 0 3 3 0 3 3 0 3 3 3 1 4 0 0 3 3 0 3 3 0 3 3 3 3 3 3 3 3 3 3 3 3 3	2 Hits 4 3 5 6 11 3 5.333333 5.333333 7 1 8 3 0 1 8 3 0 1 8 3 0 1 8 3 0 1 8 3 3 0 1 8 3 3 0 1 8 3 3 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8	0.166667 Cones 4 2 1 1 2 3 2.16666667 1 1 0 0 1 1 0 0.8333333 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13 6 1 7 0 5 2 9 1	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 54.47 35.87 30.94 37.04 23.9 38.20333333 25.6 32.31 26.09
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 0m 0m 0m 1m 0m 1m 0m 0m 0m 0m 0m 0m 0m 0m 0m 0m 0m 0m <	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s 27.94s 34.04s 23.90s 25.60s 29.31s 23.09s 42.06s	Time 64. 42. 45. 85. 34. 52.7 44 48. 35. 27. 34. 23 35.7 25 29. 23. 42.	69.4 (s) 78 81 93 68 59 72 517 4 47 87 94 04 .9 033 .6 31 09 06	2.333 Rev	3 versals 8 4 6 6 16 3 6 6 6 6 6 16 3 0 1 7 3 0 3 0 3 3 0 3 3 3 3 3 3 3 3 3 3 3 3 3	2 Hits 4 3 5 6 11 3 5.333333 5.333333 7 1.8333333 1.8333333 1.8333333 1.833333 1.8333333 1.833333 1.833333 1.833333 1.8333333 1.83333 1.83333 1.83333 1.833333 1.833333 1.833333 1.833333 1.83333 1.833333 1.833333 1.83333 1.83333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.83333 1.83333 1.83333 1.833333 1.833333 1.83333 1.83333 1.83333 1.83333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.83333 1.83333333 1.833333 1.833333 1.83333333 1.833333 1.833333 1.8	0.166667 Cones 4 2 1 1 2 3 2.16666667 1 2 0 1 1 0 0.8333333 0 1 1 0 0.8333333 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13 6 1 7 0 5 - 2 9 1 1 1 2	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 54.47 35.87 30.94 37.04 23.9 38.2033333 26.09 48.06
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 0m 0m 0m 1m 0m 0m	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s 27.94s 34.04s 23.90s 25.60s 29.31s 23.09s 42.06s 28.50s	Time 64. 42. 45. 85. 34. 52.7 44 48. 35. 27. 34. 23 35.7 25 29. 23. 42. 23. 42. 23	69.4 a (s) 78 81 93 68 59 72 517 4 4 47 87 94 04 .9 033 .6 31 09 06 .5 .5	45333 Rev 7.166	3 versals 8 4 6 6 16 3 56666667 1 7 3 0 3 0 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 3 3 3 3 3 3 3 3 3 3 3	2 Hits 4 3 5 6 11 3 5.333333 5.333333 7 1 4 3 0 1.833333 1 1.833333 1 1.833333	0.166667 Cones 4 2 1 1 2 3 2.1666667 1 2 0 1 1 0 0.8333333 0 0 1 1 0 0.8333333 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 0 1 1 0 0 0 1 1 0 0 0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13 6 1 7 0 5 - 2 9 1 11 0	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 59.25166667 47 54.47 35.87 30.94 37.04 23.9 38.20333333 25.6 32.31 26.09 48.06 28.5
Day 2 Trial dig 1 dig 2 dig 3 dig 4 dig 5 dig 6 average Iin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6	Time 1m 0m 0m 1m 0m 1m 0m 0m 0m 0m 0m 0m 0m 0m 0m 0m 0m	e (min) 4.78s 42.81s 42.93s 45.68s 25.59s 34.72s 44.00s 48.47s 35.87s 27.94s 34.04s 23.90s 25.60s 29.31s 23.09s 42.06s 28.50s 43.34s	Time 64. 42. 45. 45. 34. 52.7 44 48. 35. 27. 34. 23 35.7 29. 23. 42. 23. 42. 23. 42. 23. 34. 35.7	69.4 2 (s) 78 81 93 68 59 72 517 4 4 47 87 94 04 .9 04 .9 033 .6 31 09 06 .5 34	45333 Rev 7.166	3 versals 8 4 6 6 16 3 56666667 1 7 3 0 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 3 3 3 3 3 3 3 3 3 3 3	2 Hits 4 3 5 6 11 3 5.33333 5.33333 5.33333 7 1 4 3 0 1.83333 1 0 1.833333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.83333 1 0 1.833333 1 0 1.833333 1 0 1.833333 1 0 1.833333 1 0 1.833333 1 0 1.833333 1 0 1.8333333 1 0 1.833333 1 1.833333 1 1.833333 1 1.8333333 1 1.8333333 1 1.8333333 1 1.8333333 1 1.8333333 1 1.8333333 1 1.8333333 1 1.833333 1 1.8333333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.833333 1.83333 1.833333 1.833333 1.833333 1.8333333 1.833333 1.8333333 1.8333333 1.833333 1.8333333 1.8333333 1.8333333 1.8333333 1.8333333 1.8333333 1.8333333 1.83333333 1.83333333 1.8333333 1.83333333 1.833333333 1.83333333 1.83333333 1.83333333 1.833333333 1.83333333 1.83333333 1.83333333 1.83333333 1.83333333 1.833333333 1.833333333 1.83333333 1.83333333 1.8333333 1.83333333 1.83333333 1.83333333 1.8333333 1.83333333 1.83333333 1.833333333 1.833333333 1.833333333 1.833333333 1.833333333 1.8333333333 1.83333333 1.8333333333 1.83333333 1.83333333 1.833333333 1.833333333 1.83333333 1.8333333333 1.833333333 1.83333333 1.8333333 1.83333333 1.83333333 1.8333333 1.83333333 1.8333333 1.83333333 1.83333333333	0.166667 Cones 4 2 1 1 2 3 2.1666667 1 2 0 1 1 0 0.8333333 0 0 1 1 0 0.8333333 0 1 1 2 0 1 1 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 1 1 0 0 0 1 1 0 0 0 0 0 0 1 1 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0	5.16666667 Total Errors 16 9 12 13 29 9 14.66666667 3 13 6 1 7 0 5 2 9 1 1 1 0 5 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	69.95333333 Final Time (s) 76.78 48.81 45.93 48.68 91.59 43.72 59.25166667 47 59.25166667 47 54.47 35.87 30.94 37.04 23.9 38.20333333 25.6 32.31 26.09 48.06 28.5 46.34



Subject 12												
Day 1												
Trial		Time (min)	Tim	ne (s)	Revers	als	Hits		Cones	Total Errors	Final Time (s)
non 1		1m 0	.88s	60).88	7		8		1	16	63.88
non 2		0m 31	87s	31	l.87	1		1		3	5	40.87
non 3		0m 44	l.25s	44	1.25	3		2		3	8	53.25
non 4		1m 7	.19s	67	7.19	9		8		2	19	73.19
non 5		1m 6	.75s	66	5.75	9		7		2	18	72.75
non 6		0m 56	5.35s	56	5.35	8		9		0	17	56.35
average				54.5	54833	6.1666	67	5.83333	33	1.833333	13.8333333	60.04833333
lin 1		1m 21	25s	81	L.25	13		7		3	23	90.25
lin 2		0m 41	15s	41	L.15	3		3		2	8	47.15
lin 3		0m 29	9.03s	29	9.03	1		1		1	3	32.03
lin 4		1m 26	5.53s	86	5.53	15		11		2	28	92.53
lin 5		0m 45	5.40s	4	5.4	5		4		1	10	48.4
lin 6		0m 58	3.00s	!	58	9		8		1	18	61
average				56.8	39333	7.6666	67	5.66666	57	1.666667	15	61.89333333
dig 1		0m 50).75s	50).75	12		11		3	26	59.75
dig 2		0m 37	7.69s	37	7.69	9		9		2	20	43.69
dig 3		0m 25	5.74s	25	5.74	4		4		3	11	34.74
dig 4		0m 32	2.22s	32	2.22	7		7		2	16	38.22
dig 5		0m 34	1.00s	1	34	7		7		2	16	40
dig 6		0m 22	2.84s	22	2.84	2		1		2	5	28.84
average				33.8	37333	6.8333	33	6.5		2.333333	15.6666667	40.87333333
Day 2												
Trial	Time	(min)	Time	(s)	Rev	ersals		Hits		Cones	Total Errors	Final Time (s)
dig 1	0m 3	30.87s	30.8	37		6		5		4	15	42.87
dig 2	0m 3	39.00s	39)		8		7		1	16	42
dig 3	0m 2	29.06s	29.0	06		3		5		2	10	35.06
dig 4	0m 4	40.44s	40.4	14		8		7		2	17	46.44
dig 5	0m 3	36.29s	36.2	29		7		6		1	14	39.29
dig 6	0m 2	24.16s	24.1	16		3		3		4	10	36.16
average			33.30	033	5.833	333333		5.5	2.	3333333	13.6666667	40.30333333
lin 1	0m 3	30.16s	30.1	16		3		3		2	8	36.16
lin 2	0m 3	30.34s	30.3	34		3		3		0	6	30.34
lin 3	0m 2	21.94s	21.9	94		0		0		0	0	21.94
lin 4	0m 2	27.65s	27.6	55		3		5		0	8	27.65
lin 5	0m 2	26.12s	26.1	12		3		4		0	7	26.12
lin 6	0m 2	24.84s	24.8	34		2		2		1	5	27.84
average			26.84	417	2.333	333333	2.8	333333		0.5	5.66666667	28.34166667
non 1	0m 2	26.69s	26.6	59		4		4		7	15	47.69
non 2	0m 2	22.00s	22	-		2		3		2	7	28
non 3	0m 3	36.75s	36.7	/5		6		6		0	12	36.75
non 4	0m 2	28.66s	28.6	56		4		3		1	8	31.66
non 5	()					<u> </u>		<u> </u>				
non 5	Um .	16.855	16.8	35		0		0		3	3	25.85
non 6	0m 2	16.85s 27.56s	16.8 27.5	35 56		0 3		0 3		3 3	3 9	25.85 36.56

Total Averages	Time (s)	Errors
Digital	33.5883333	14.66667
Linear	41.8675	10.33333
Nonlinear	40.4833333	11.41667



Subject 13												
Day 1												
Trial		Time (min)	Tin	ne (s)	Revers	als	Hits		Cones	Total Errors	Final Time (s)
lin 1		1m 15	5.25s	7	5.25	7		2		0	9	75.25
lin 2		1m 22	2.56s	8	2.56	12		6		1	19	85.56
lin 3		0m 53	3.37s	5	3.37	5		1		1	7	56.37
lin 4		0m 57	7.59s	5	7.59	9		1		1	11	60.59
lin 5		0m 52	2.04s	5	2.04	6		0		1	7	55.04
lin 6		0m 54	l.71s	5	4.71	7		2		2	11	60.71
average				62.	58667	7.6666	67	2		1	10.6666667	65.58666667
non 1		0m 48	3.75s	4	8.75	8		4		2	14	54.75
non 2		0m 37	7.85s	3	7.85	0		0		1	1	40.85
non 3		0m 36	5.60s	Э	6.6	0		0		0	0	36.6
non 4		0m 38	3.16s	3	8.16	1		1		1	3	41.16
non 5		0m 4	9.62	4	9.62	7		4		0	11	49.62
non 6		0m 40).62s	4	0.62	5		3		0	8	40.62
average				41.	93333	3.5		2		0.666667	6.16666667	43.93333333
dig 1		1m 25	5.88s	8	5.88	20		9		3	32	94.88
dig 2		0m 50).91s	5	0.91	6		5		4	15	62.91
dig 3		0m 54	l.78s	5	4.78	10		6		3	19	63.78
dig 4		0m 49).34s	4	9.34	5		3		2	10	55.34
dig 5		0m 30).59s	3	0.59	2		1		0	3	30.59
dig 6		0m 24	l.59s	2	4.59	1		0		0	1	24.59
average				49.	34833	7.3333	33	4		2	13.3333333	55.34833333
Day 2												
Trial	Time	(min)	Time	(s)	Rev	ersals		Hits		Cones	Total Errors	Final Time (s)
dig 1	0m 4	45.50s	45.	5		7		2		1	10	48.5
dig 2	0m 4	46.44s	46.4	44		5		5		1	11	49.44
dig 3	0m 3	39.06s	39.0	06		4		1		1	6	42.06
dig 4	0m 2	28.43s	28.4	43		1		1		1	3	31.43
dig 5	0m 2	27.62s	27.6	52		2		2		3	7	36.62
dig 6	0m 4	44.65s	44.6	65		6		0		0	6	44.65
average			38.6	167	4.166	666667	1.8	833333	1.	1666667	7.16666667	42.11666667
non 1	0m 3	33.81s	33.8	31		4		1		2	7	39.81
non 2	0m 2	25.66s	25.6	56		2		1		2	5	31.66
non 3	0m 3	30.47s	30.4	47		4		2		1	7	33.47
non 4	0m 2	26.28s	26.2	28		0		0		1	1	29.28
non 5	0m 3	34.37s	34.3	37		4		3		1	8	37.37
non 6	0m 2	26.90s	26.	9		3		0		0	3	26.9
average			29.58	817	2.833	333333	1.1	166667	1.	1666667	5.16666667	33.08166667
lin 1	0m 3	35.38s	35.3	38		4		2		0	6	35.38
lin 2	0m 3	31.79s	31.7	79		1		0		2	3	37.79
lin 3	0m 3	39.44s	39.4	44		3		2		2	7	45.44
lin 4	0m 4	40.91s	40.9	91		5		2		0	7	40.91
lin 5	0m 3	33.66s	33.6	o6		3		2		0	5	33.66
lin 6	0m 2	28.46s	28.4	46		0		0		0	0	28.46
average			34.9	94	2.666	666667	1.3	333333	0.	6666667	4.66666667	36.94



Subject 14											
Day 1											
Trial		Time (min)	Tim	ie (s)	Reversa	als	Hits	Cones	Total Errors	Final Time (s)
non 1		4m 32	.94s	27	2.94	48		31	3	82	281.94
non 2		2m 22	.50s	14	2.5	18		17	2	37	148.5
non 3		1m 53	.57s	113	3.57	10		4	2	16	119.57
non 4		1m 45	.84s	10	5.84	10		5	2	17	111.84
non 5		1m 22	.94s	82	2.94	10		7	3	20	91.94
non 6		2m 10	.18s	13	0.18	16		11	1	28	133.18
average				141.	.3283	18.6666	57	12.5	2.166667	33.3333333	147.8283333
dig 1		2m 16	.34s	13	6.34	19		12	6	37	154.34
dig 2		1m 49	.28s	109	9.28	12		5	1	18	112.28
dig 3		1m 15	.68s	75	5.68	5		3	1	9	78.68
dig 4		1m 3.	41s	63	3.41	4		5	1	10	66.41
dig 5		1m 15	.87s	75	5.87	9		5	2	16	81.87
dig 6		1m 7.	87s	67	7.87	3		4	3	10	76.87
average				88.	.075	8.66666	57	5.66666	7 2.333333	16.6666667	95.075
											_
lin 1		0m 44	.15s	44	1.15	1		0	0	1	44.15
lin 2		0m 45	.66s	45	5.66	2		1	1	4	48.66
lin 3		0m 32	.66s	32	2.66	0		0	0	0	32.66
lin 4		0m 43	.34s	44	1.34	3		1	1	5	47.34
lin 5		0m 37	.09s	37	7.09	0		0	1	1	40.09
lin 6		0m 54	.22s	54	1.22	6		3	2	11	60.22
average		001		43	3.02	2		0.83333	3 0.833333	3.66666667	45.52
Day 2											
Trial	Time	e (min)	Time	e (s)	Rev	versals		Hits	Cones	Total Errors	Final Time (s)
non 1	0m 3	37.12s	37.	12		1		1	1	3	40.12
non 2	0m !	59.19s	59.	19		7		3	2	12	65.19
non 3	0m 3	38.50s	38	.5		2		0	0	2	38.5
non 4	0m 4	43.78s	43.	78		2		1	1	4	46.78
non 5	0m 3	35.94s	35.	94		2		2	2	6	41.94
non 6	0m !	54.04s	54.	04		3		1	1	5	57.04
average			44.7	617	2.833	3333333	1.	333333	1.1666667	5.33333333	48.26166667
lin 1	1m	0.06s	60.	06		6		3	0	9	60.06
lin 2	1m 3	34.50s	94	.5		14		7	2	23	100.5
lin 3	2m :	19.59s	139	.59		19		11	4	34	151.59
lin 4	1m :	18.72s	78.	72		7		3	2	12	84.72
lin 5	1m :	25.06s	85.	06		11		2	1	14	88.06
lin 6	1m :	15.97s	75.	97		11		3	1	15	78.97
average			88.9	833	11.33	3333333	4.	833333	1.6666667	17.8333333	93.98333333
dig 1	1m :	34.93s	94.	93		21		15	4	40	106.93
dig 2	0m 3	34.81s	34.	81		3		2	3	8	43.81
dig 3	1m	1.31s	61.	31		8		4	2	14	67.31
dig 4	0m 3	38.06s	38.	06		2		5	2	9	44.06
dig 5	0m !	59.90s	59	.9		8		1	2	11	65.9
dig 6	0m !	53.60s	53	.6		5		2	1	8	56.6
				047	7 0 2 2	111111	4	011111	n n n n n n n n n n	10	64 10166667



Subject 15										
Day 1										
Trial		Time (min)	Tim	ne (s)	Reversa	ls Hits	Cones	Total Errors	Final Time (s)
lin 1		5m 33	.65s	33	3.65	42	14	4	60	345.65
lin 2		6m 0.	87s	36	0.87	42	15	3	60	369.87
lin 3		1m 19	.69s	79	9.69	2	1	1	4	82.69
lin 4		2m 32	.56s	15	2.56	13	3	2	18	158.56
lin 5		1m 57	.72s	11	7.72	7	1	1	9	120.72
lin 6		1m 18	.13s	78	3.13	2	2	2	6	84.13
average				187	.1033	18	6	2.166667	26.1666667	193.6033333
dig 1		1m 50	.03s	11	0.03	8	6	2	16	116.03
dig 2		1m 50	.91s	11	0.91	5	2	1	8	113.91
dig 3		1m 36	.82s	96	5.82	15	4	2	21	102.82
dig 4		1m 19	.72s	79	9.72	5	3	1	9	82.72
dig 5		1m 42	.63s	10	2.63	14	6	3	23	111.63
dig 6		2m 15	.19s	13	5.19	15	8	2	25	141.19
average				105	.8833	10.3333	3 4.83333	3 1.833333	17	111.3833333
non 1		2m 6.	03s	12	6.03	15	9	2	26	132.03
non 2		1m 12	.87s	72	2.87	5	3	3	11	81.87
non 3		0m 57	.28s	57	7.28	1	0	2	3	63.28
non 4		1m 29	.00s	į	89	5	2	2	9	95
non 5		1m 32	.78s	92	2.78	1	0	1	2	95.78
non 6		1m 5.	85s	65	5.85	2	1	0	3	65.85
average										
				83.9	96833	4.83333	3 2.5	1.666667	9	88.96833333
Day 2				83.9	96833	4.83333	3 2.5	1.666667	9	88.96833333
Day 2 Trial	Time	e (min)	Time	83.9 e (s)	96833 Rev	4.83333	3 2.5	1.666667	9 Total Errors	88.96833333
Day 2 Trial	Time 1m	e (min) 4.69s	Time	83.9 e (s) 69	96833 Rev	4.83333 ersals	3 2.5 Hits 3	1.666667 Cones	9 Total Errors 10	88.96833333 Final Time (s) 70.69
Day 2 Trial lin 1 lin 2	Time 1m	e (min) 4.69s 17.56s	Time 64.	83.9 e (s) 69 56	96833 Rev	4.83333 versals 5 5	3 2.5 Hits 3 4	1.666667 Cones 2 0	9 Total Errors 10 9	Final Time (s) 70.69 77.56
Day 2 Trial lin 1 lin 2 lin 3	Time 1m 1m	e (min) 4.69s 17.56s 51.12s	Time 64. 77.	83.9 e (s) 69 56 12	96833 Rev	4.83333 versals 5 5 2	3 2.5 Hits 3 4	1.666667 Cones 2 0	9 Total Errors 10 9 3	Final Time (s) 70.69 77.56 51.12
Day 2 Trial lin 1 lin 2 lin 3 lin 4	Time 1m 1m 0m 1 1m	e (min) 4.69s 17.56s 51.12s 28.59s	Time 64. 77. 51.	83.9 e (s) 69 56 12 59	96833 Rev	4.83333 versals 5 5 2 10	3 2.5 Hits 3 4 1 4	1.666667 Cones 2 0 0	9 Total Errors 10 9 3 14	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5	Time 1m 1m 0m 1m	e (min) 4.69s 17.56s 51.12s 28.59s 43 19s	Time 64. 77. 51. 88.	83.9 e (s) 69 56 12 59 19	96833 Rev	4.83333 versals 5 5 2 10 1	3 2.5 Hits 3 4 1 4 1 4	1.666667 Cones 2 0 0 0 1	9 Total Errors 10 9 3 14 3	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6	Time 1m 1m 0m 1m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s	Time 64. 77. 51. 88. 43.	83.9 e (s) 69 56 12 59 19 84	96833 Rev	4.83333 rersals 5 5 2 10 1 1	3 2.5 Hits 3 4 1 4 1 1 1	1.666667 Cones 2 0 0 0 1 0	9 Total Errors 10 9 3 14 3 2	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 1m 0m 1m 0m 0m 0m 0m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s	Time 64. 77. 51. 88. 43. 43. 45.	83.9 e (s) 69 56 12 59 19 84 317	96833 Rev	4.83333 versals 5 5 2 10 1 1 4	3 2.5 Hits 3 4 1 4 1 1 2 333333	1.666667 Cones 2 0 0 0 1 0 0 0 5	9 Total Errors 10 9 3 14 3 2 6 83333333	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63 33166667
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 1m 0m 1m 0m 0m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s	Time 64. 77. 51. 88. 43. 45. 61.8	83.9 (s) 69 56 12 59 19 84 317	96833 Rev	4.83333 rersals 5 5 2 10 1 1 4	3 2.5 Hits 3 4 1 4 1 1 2.333333	1.666667 Cones 2 0 0 0 1 0 0.5	9 Total Errors 10 9 3 14 3 2 6.83333333	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 1m 0m 1m 0m 0m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s	Time 64. 77. 51. 88. 43. 45. 61.8	83.9 (s) 69 56 12 59 19 84 317	96833 Rev	4.83333 rersals 5 5 2 10 1 1 4 2	3 2.5 Hits 3 4 1 4 1 2.333333 3	1.666667 Cones 2 0 0 0 1 0 0.5 1	9 Total Errors 10 9 3 14 3 2 6.83333333	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average	Time 1m 1m 0m 1m 0m 0m 0m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s 52.97s 46.50s	Time 64. 77. 51. 88. 43. 43. 45. 61.8	83.9 (s) 69 56 12 59 19 84 317 97 5	96833 Rev	4.83333 rersals 5 2 10 1 1 4 2 0	3 2.5 Hits 3 4 1 4 1 2.333333 3 0	1.666667 Cones 2 0 0 0 1 0 0.5 1 2 1 2 1 2	9 Total Errors 10 9 3 14 3 2 6.83333333 6 8 3 3 3 3 3 3 3 3 3 3 3 3 3 3	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 55.97 52 5
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 pon 3	Time 1m 1m : 0m : 0m : 0m : 0m :	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s 52.97s 46.50s 55.53s	Time 64. 77. 51. 88. 43. 45. 61.8 52. 46 55.	83.9 69 56 12 59 19 84 317 97 .5	Rev	4.83333 versals 5 5 2 10 1 1 4 2 0 2 0 2	3 2.5 Hits 3 4 1 4 1 2.3333333 3 0 1	1.666667 Cones 2 0 0 0 1 0 0.5 1 1 2 1 1 2 1	9 Total Errors 10 9 3 14 3 2 6.83333333 6 2 4	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 55.97 52.5 58.53
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4	Time 1m 1m 0m 1m 0m 0m 0m 0m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s	Time 64. 77. 51. 88. 43. 45. 61.8 52. 46 55. 54	83.5 69 56 12 59 19 84 317 97 .5 53 72	Rev	4.83333 versals 5 5 2 10 1 1 4 2 0 2 3	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 1	1.666667 2 0 0 0 1 0 0.5 - 1 2 1 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0	9 Total Errors 10 9 3 14 3 2 6.83333333 6 2 4 4 4 4	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 63.33166667 55.97 52.5 58.53 58.53
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 pop 5	Time 1m 1m 0m 1m 0m 0m 0m 0m 0m 0m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s 51.44s	Time 64. 77. 51. 88. 43. 45. 61.8 52. 46 55. 54. 51.	83.5 e (s) 69 56 12 59 19 84 317 97 .5 53 72 44	Rev	4.83333 rersals 5 5 2 10 1 1 4 2 0 2 3 2 2	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 1 2	1.666667 2 0 0 0 1 0 0.5 1 2 1 0 1 0 1 0 1 1 0 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	9 Total Errors 10 9 3 14 3 2 6.83333333 6 2 4 4 4 5	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 63.33166667 55.97 52.5 58.53 54.72 54.44
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 pon 6	Time 1m 1m 0m 1m 0m 0m 0m 0m 0m 0m 0m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s 51.44s 59.68s	Time 64. 77. 51. 88. 43. 45. 61.8 52. 46 55. 54. 51.	83.5 (s) (69) (56) (12) (59) (12) (57) (12) (57) (12) (57) (12) (57) (12) (57) (12) (57) (12) (57) (12) (57) (12) (Rev	4.83333 rersals 5 5 2 10 1 1 4 2 0 2 3 2 3	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 1 2 0	1.666667 Cones 2 0 0 0 1 0 0 1 0 0 1 2 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	9 Total Errors 10 9 3 14 3 2 6.83333333 6 2 4 4 4 5 3	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 55.97 52.5 58.53 58.53 54.72 54.44 59.68
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average	Time 1m 1m 0m 1m 0m 0m 0m 0m 0m 0m 0m 0m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s 51.44s 59.68s	Time 64. 77. 51. 88. 43. 43. 45. 61.8 52. 46 55. 54. 51. 51. 52.4	83.5 (s) (69) (56) (12) (59) (12) (59) (12) (59) (12) (59) (12) (12) (12) (12) (12) (12) (12) (12	96833 Rev	4.83333 rersals 5 5 2 10 1 1 4 2 0 2 3 2 3 2 3 2 3 2	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 1 2 0 1 166667	1.666667 Cones 2 0 0 0 1 0 0.5 1 2 1 0 1 0 1 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	9 Total Errors 10 9 3 14 3 2 6.83333333 6 2 4 4 5 3 4	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 55.97 52.5 58.53 54.72 54.44 59.68 55.9733333
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average	Time 1m 1m 0m 1m 0m 0m 0m 0m 0m 0m 0m 0m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s 51.44s 59.68s	Time 64. 77. 51. 88. 43. 45. 61.8 52. 46 55. 54. 54. 51. 59. 53.4	83.5 (6) (6) (5) (1) (5) (1) (5) (1) (2) (3) (3) (3) (3) (3) (3) (3) (3	96833 Rev	4.83333 rersals 5 2 10 1 1 4 2 0 2 3 2 3 2 3 2 3 2	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 1 2 0 1.166667	1.666667 Cones 2 0 0 0 1 0 0.5 1 2 1 0 1 0 0 1 0 0 0.5 1 0 0 0 0 0 0 0 0 0 0 0 0 0	9 Total Errors 10 9 3 14 3 2 6.83333333 6.83333333 4	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 55.97 52.5 58.53 54.72 54.72 54.44 59.68 55.97333333
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average	Time 1m 1m 0m 1m 0m 0m 0m 0m 0m 0m 0m 0m 0m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s 51.44s 59.68s	Time 64. 77. 51. 88. 43. 45. 61.8 52. 46 55. 54. 51. 59. 53.4	83.5 (6) (6) (5) (1) (5) (5) (5) (5) (7) (4) (6) (7) (3) (5) (5) (7) (4) (6) (7) (7) (7) (7) (7) (7) (7) (7	96833 Rev	4.83333 rersals 5 5 2 10 1 1 1 4 2 0 2 3 2 3 2 3 2 4	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 1 2 0 1.166667	1.666667 2 0 0 0 1 0 0.5 1 2 1 0 0 1 0 0 0.8333333 2	9 Total Errors 10 9 3 14 3 2 6.83333333 6 2 4 4 5 3 4 4 5 3 4	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 55.97 52.5 58.53 54.72 54.44 59.68 55.97333333
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average	Time 1m 1m: 0m 1 1m: 0m 1 0m 1 0m 1 0m 1 0m 1 0m 1 0m 1 0m 1	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s 51.44s 59.68s 8.50s 8.50s	Time 64. 77. 51. 88. 43. 45. 61.8 52. 46 55. 54. 59. 59. 53.4	83.5 (s) (s) (s) (s) (s) (s) (s) (s)	96833 Rev	4.83333 rersals 5 5 2 10 1 1 4 2 0 2 3 2 3 2 3 2 4 2 4 2	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 1 2 0 1.166667 5 1	1.666667 2 0 0 0 1 0 0 1 0 0 1 2 1 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	9 Total Errors 10 9 3 14 3 2 6.83333333 6 2 4 4 5 3 4 5 3 4 11 2	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 55.97 52.5 58.53 54.72 54.44 59.68 55.97333333 74.5 54.75
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 2	Time 1m 1m 0m 1m 0m 0m 0m 0m 0m 0m 10m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s 51.44s 59.68s 8.50s 8.50s 54.75s	Time 64. 77. 51. 88. 43. 45. 61.8 52. 46 55. 54. 59. 53.4 68 54. 53.4	83.5 (s) (s) (s) (s) (s) (s) (s) (s)	96833 Rev	4.83333 rersals 5 5 2 10 1 1 4 2 0 2 3 2 3 2 3 2 4 2 3 2 3 2 4 2 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 3 2 3 3 2 3 3 3 3 3 3 3 3 3 3 3 3 3	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 1 2 0 1.166667 5 1 1 1	1.666667 Cones 2 0 0 0 1 0 0 1 0 1 2 1 0 0 0 0.8333333 2 0 1 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	9 Total Errors 10 9 3 14 3 2 6.83333333 6 2 4 4 4 5 3 4 4 5 3 4 11 3 4	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 55.97 52.5 58.53 54.72 54.44 59.68 55.97333333 74.5 54.75 54.75
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4	Time 1m 1m 0m 1m 0m 0m 0m 0m 0m 0m 10m 0m 1m 0m	 (min) 4.69s 17.56s 51.12s 28.59s 43.19s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s 51.44s 59.68s 8.50s 54.75s 54.35s 54.35s 54.35s 	Time 64. 77. 51. 88. 43. 43. 45. 61.8 55. 54. 55. 51. 59. 53.4	83.5 (s) (69) (56) (12) (59) (12) (59) (13) (33) (5) (13) (13) (13) (13) (13) (13) (13) (13	96833 Rev	4.83333 versals 5 5 2 10 1 1 1 4 2 0 2 3 2 3 2 3 2 4 2 3 2 4 2 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 3 2 3 3 2 3 3 3 3 3 3 3 3 3 3 3 3 3	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 1 2 0 1.166667 5 1 1 2 0 1.166667	1.666667 Cones 2 0 0 1 0 0 1 0 0 1 2 1 0 0 0 8333333 2 0 1 2 0 1 2 0 1 2 1 0 1 0 1 2 1 0 1 0 1 2 1 0 1 0 1 0 1 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	9 Total Errors 10 9 3 14 3 2 6.83333333 4 6 2 4 4 5 3 4 5 3 4 11 3 4 8 8 9	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 63.33166667 55.97 52.5 58.53 54.72 54.44 59.68 55.97333333 74.5 54.75 57.35 60.60
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5	Time 1m 1m 0m 1m 0m 0m 0m 0m 0m 0m 0m 1m 0m 0m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s 51.44s 59.68s 8.50s 54.75s 54.75s 54.75s 54.75s 54.75s	Time 64. 77. 51. 88. 43. 45. 61.8 52. 46 55. 54. 59. 53.4 53.4 68 54. 53.4	83.5 (a) (b) (c) (c) (c) (c) (c) (c) (c) (c	96833 Rev	4.83333 versals 5 5 2 10 1 1 1 4 2 0 2 3 2 3 2 4 2 2 2 2 2 2 2 2 2 2 2 2 2	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 2.333333 3 0 1 1 2 0 1.166667 5 1 1 1 3 2 0 1.166667	1.666667 Cones 2 0 0 0 1 0 0.5 	9 Total Errors 10 9 3 14 3 2 6.83333333 4 5 3 4 5 3 4 5 3 4 5 3 4 5 3 4 5 3 4 5 3 4 5 3 4 5 3 4 5 5 3 4 5 5 3 4 5 5 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 55.97 52.5 58.53 54.72 54.72 54.74 59.68 55.97333333 74.5 54.75 57.35 60.69 52.16
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6	Time 1m 1m 0m 1m 0m 0m 0m 0m 0m 0m 0m 0m 0m 0m 0m 1m 0m 0m	 (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s 51.44s 59.68s 8.50s 54.75s 54.75s 54.35s 	Time 64. 77. 51. 88. 43. 45. 61.8 52. 46 55. 54. 59. 53.4 53.4 53.4 54. 53.4	83.5 (s) (s) (s) (s) (s) (s) (s) (s)	96833 Rev	4.83333 rersals 5 5 2 10 1 1 1 4 2 0 2 3 2 3 2 4 2 2 2 2 1 1 1 4 2 2 3 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 2 0 1.166667 5 1 1 3 2 1 1 3 2 1 1 3 2 1 1 3 2 1 1 3 2 1 1 3 2 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	1.666667 2 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	9 Total Errors 10 9 3 14 3 2 6.83333333 4 5 5 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 55.97 52.5 58.53 54.72 54.44 59.68 55.97333333 74.5 55.97333333 74.5 55.9735 60.69 52.16 53.25
Day 2 Trial lin 1 lin 2 lin 3 lin 4 lin 5 lin 6 average non 1 non 2 non 3 non 4 non 5 non 6 average dig 1 dig 2 dig 3 dig 4 dig 5 dig 6	Time 1m 1m 0m 1m 0m 0m 0m 0m 0m 0m 0m 1m 0m 0m 0m 10m 0m 10m	e (min) 4.69s 17.56s 51.12s 28.59s 43.19s 45.84s 52.97s 46.50s 55.53s 54.72s 51.44s 59.68s 8.50s 54.75s 54.75s 54.35s 54.35s 54.35s 51.69s 49.16s 50.35s	Time 64. 77. 51. 88. 43. 45. 61.8 52. 46 55. 54. 51. 59. 53.4 53.4 54. 53.4	83.5 (s) (s) (s) (s) (s) (s) (s) (s)	96833 Rev	4.83333 rersals 5 5 2 10 1 1 4 2 0 2 3 2 3 2 3 2 4 2 2 2 1 2 2 1 2 2 1 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 3 2 3 3 2 3 3 2 3 3 2 3 3 2 3 3 2 3 3 3 3 3 3 3 3 3 3 3 3 3	3 2.5 Hits 3 4 1 4 1 2.333333 3 0 1 1 2 0 1.166667 5 1 1 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 2 1 3 3 3 3 3 3 3 3 3 3 3 3 3	1.666667 2 0 0 0 1 0 0 1 0 0 1 2 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	9 Total Errors 10 9 3 14 3 2 6.83333333 4 5 3 4 5 3 4 5 3 4 5 3 4 5 3 4 5 3 4 5 3 4 5 3 4 5 5 3 4 5 5 3 4 5 5 3 4 5 5 3 4 5 5 3 6 5 5 5 5 5 5 5 5 5 5 5 5 5	88.96833333 Final Time (s) 70.69 77.56 51.12 88.59 46.19 45.84 63.33166667 55.97 52.5 58.53 54.72 54.44 59.68 55.97333333 74.5 54.75 54.75 54.75 55.37 60.69 52.16 53.35 60.69 53.35



Subject 16											
Day 1											
Trial		Time (min)	Tim	ne (s)	Reversa	als	Hits	Cones	Total Errors	Final Time (s)
dig 1		1m 37	.78s	97	7.78	10		6	2	18	103.78
dig 2		1m 50	1m 50.54s		<mark>0.54</mark> 19			12	4	35	122.54
dig 3		0m 59.19s		59	9.19	2		1	1	4	62.19
dig 4		1m 3.	1m 3.37s		3.37	8		2	0	10	63.37
dig 5		1m 3.	10s	6	3.1	10		8	1	19	66.1
dig 6		0m 58	.44s	58	3.44	1		0	0	1	58.44
average				75.4	10333	8.33333	33	4.83333	3 1.333333	14.5	79.40333333
lin 1		1m 5.	.00s		65	8		2	2	12	71
lin 2		1m 2.	81s	62	2.81	2		0	0	2	62.81
lin 3		0m 47	.75s	47	7.75	3		2	0	5	47.75
lin 4		0m 35	.03s	35	5.03	0		0	1	1	38.03
lin 5		0m 40	.91s	40).91	3		2	0	5	40.91
lin 6		0m 40	.19s	40).19	3		2	0	5	40.19
average				48	.615	3.16666	67	1.33333	3 0.5	5	50.115
non 1		0m 43	.97s	43	3.97	5		3	4	12	55.97
non 2		0m 36	.07s	36	5.07	5		6	1	12	39.07
non 3		1m 2.	n 2.63s 6		2.63	10		10	4	24	74.63
non 4		0m 25	.44s 25.4 4		5.44	2		1	3	6	34.44
non 5		0m 30	n 30.87s 🛛 🔒).87	3		2	5	10	45.87
non 6		0m 45.03s		45	5.03	3		2	1	6	48.03
average			40.		56833	4.66666	57	4	3	11.6666667	49.66833333
Day 2											
Trial	Time	e (min)	n) Time (s) Re		Rev	versals		Hits	Cones	Total Errors	Final Time (s)
lin 1	1m	0.66s	60.	66		5		2	1	8	63.66
lin 2	1m	6.47s	66.	47		4		2	0	6	66.47
lin 3	1m	4.19s	64.	19		2		0	0	2	64.19
lin 4	1m :	16.00s	7	6		4		3	2	9	82
lin 5	1m	3.22s	63.	3.22		5		0	1	6	66.22
lin 6	0m :	53.90s 53.9		.9		3		0	0	3	53.9
average			64.0733 3		3.833	3.833333333		166667	0.6666667	5.66666667	66.07333333
dig 1	0m :	56.59s	56.	59		11		10	4	25	68.59
dig 2	0m 4	40.90s	40	.9		5		2	4	11	52.9
dig 3	0m	54.35s	54	35		9		9	3	21	63.35
dig 4	0m	54.91s	54	91		5		3	3	11	63.91
dig 5	0m 4	40.375	40	0.37		6		7	4	17	52.37
dig 6	1m	8.155	68.	15		6		7	6	19	86.15
average		0.1200	52 1	545		3 7	6 3		4	17 3333333	64 545
average				545		1	0.5		-	17.3333333	04.545
non 1	0m ⁻	27 91s	27	91		2		2	1	5	30 91
non 2	0m	21 250	21	35		0		- 1		1	21 35
non 2	0m	29 00-	21.	9		3		- 2	1	7	21.33
non 4	0m	-9.003 10 10c	40	19		7		5	2	15	ے۔ ۸۹ ۱۵
non 5	0m	16 28c	40. AG	28		, 5		3	2	10	52.22
non 6		-0.203	40.	20		1		5	2	10	25.20
	()m	70 2/Ic	70			4			,		33 3/1
average	0m :	29.34s	29. 32.3	34		4	2 9	3	15	7 83333333	35.34



Appendix B Individual Subject NASA TLX Data

Subject 1										
Day 1				Day 2				Ave	erages	
course digital				course nonlin	ear				course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating		scale title	adjusted rating
mental demand	4	7	28	mental demand	3	4	12	me	ntal demand	16
physical demand	1	7	7	physical demand	1	7	7	phy	ysical demand	5.5
temporal demand	4	4	16	temporal demand	3	4	12	ten	nporal demand	58
performance	3	10	30	performance	4	1	4	per	formance	23
effort	3	7	21	effort	4	7	28	eff	ort	18
frustration	0	4	0	frustration	0	1	0	<mark>fru:</mark>	stration	0
		sum	102			sum	63		sum	120.5
	weig	hted rating	6.8		weig	hted rating	4.2	`	weighted rating	8.033333333
course linea	ar			course linea	ar in the second se			course linear		
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating		scale title	adjusted rating
mental demand	2	14	28	mental demand	1	10	10	me	ntal demand	19
physical demand	3	10	30	physical demand	5	19	95	phy	sical demand	62.5
temporal demand	1	3	3	temporal demand	1	10	10	ten	nporal demand	6.5
performance	4	1	4	performance	3	2	6	per	formance	5
effort	5	5	25	effort	4	19	76	eff	ort	50.5
frustration	0	2	0	frustration	1	4	4	fru	stration	2
		sum	90			sum	201		sum	145.5
	weig	hted rating	6		weig	hted rating	13.4	\	weighted rating	9.7
scale title	woight	raw rating	adjusted rating		woight	raw rating	adjusted rating		scale title	adjusted rating
mental demand	vergine ع	10	30	mental demand	2	2		me	ntal demand	21
nbysical demand	1	10	1	nhysical demand	1	4	-т Л	nh	vsical demand	5 5
temporal demand	2	4	ч 8	temporal demand	5		100	ten	nnoral demand	10
nerformance	5	-	10	nerformance	Л	20	16		formance	7
effort	4	4	16	effort	4	5	15	off	ort	22
frustration		2	0	frustration	0	2	0	fru	stration	0
Hastration	U	2 51m	68	indstration	Ū	- sum	139		cum	65.5
	woig	btod rating	1 522222222		weig	btod rating	0 266666667		veighted rating	4 366666667
	weig	nieuraung	4.0000000000		weig	nieuraung	9.20000007		weighteurating	4.300000007





Subject 2									
Day 1				Day 2				Averages	
course line	ar			course nonlin	ear			course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	1	1	1	mental demand	2	1	2	mental demand	0.5
physical demand	3	6	18	physical demand	3	1	3	physical demand	13
temporal demand	2	3	6	temporal demand	1	1	1	temporal demand	6
performance	5	4	20	performance	5	3	15	performance	50
effort	4	4	16	effort	4	1	4	effort	44
frustration	0	1	0	frustration	0	1	0	frustration	16.5
		sum	61			sum	25	sum	130
	weig	hted rating	4.066666667		weig	hted rating	1.666666667	weighted rating	8.666666667
course digital				course digital				course l	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	0	4	0	mental demand	1	1	1	mental demand	2
physical demand	2	10	20	physical demand	3	2	6	physical demand	51.5
temporal demand	1	8	8	temporal demand	2	2	4	temporal demand	3.5
performance	5	16	80	performance	5	4	20	performance	13
effort	4	18	72	effort	4	4	16	effort	32
frustration	3	11	33	frustration	0	1	0	frustration	0
		sum	213			sum	47	sum	102
	weig	hted rating	14.2		weig	hted rating	3.13333333	weighted rating	6.8
course poplin	oar			course lines	ar .			course no	nlinear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	1	1	1	mental demand	3	1	3	mental demand	1.5
physical demand	2	1	2	physical demand	5	17	85	physical demand	2.5
temporal demand	3	1	3	temporal demand	1	1	1	temporal demand	2
performance	5	3	15	performance	3	2	6	performance	15
effort	4	2	8	effort	3	16	48	effort	6
frustration	0	2	0	frustration	0	1	0	frustration	0
		sum	29			sum	143	sum	27
	weig	hted rating	1.933333333		weig	hted rating	9.533333333	weighted rating	1.8





Subject 3									
Day 1				Day 2				Averages	
course digital				course linea	ar			course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	1	12	12	mental demand	0	3	0	mental demand	24
physical demand	5	15	75	physical demand	5	8	40	physical demand	47.5
temporal demand	0	11	0	temporal demand	3	4	12	temporal demand	3.5
performance	3	4	12	performance	3	8	24	performance	23
effort	4	15	60	effort	3	4	12	effort	56
frustration	2	3	6	frustration	1	2	2	frustration	19.5
		sum	165			sum	90	sum	173.5
	weig	hted rating	11		weig	ghted rating	6	weighted rating	11.56666667
course line	ar			course nonlin	near			course l	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	1	3	3	mental demand	2	6	12	mental demand	1.5
physical demand	5	16	80	physical demand	5	5	25	physical demand	60
temporal demand	2	2	4	temporal demand	2	5	10	temporal demand	8
performance	3	8	24	performance	1	5	5	performance	24
effort	4	7	28	effort	2	9	18	effort	20
frustration	0	2	0	frustration	3	4	12	frustration	1
		sum	139			sum	82	sum	114.5
	weig	hted rating	9.266666667		weig	ghted rating	5.466666667	weighted rating	7.633333333
									nlincor
course nomin	weight	raw rating	adjusted rating		woight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	1	יזעי זענווז ק כ	3	mental demand	2	12	36	mental demand	7 5
nhysical demand	5	13	65	nhysical demand	2	10	20	nhysical demand	45
temporal demand	2	2	4	temporal demand	1	7	7	temporal demand	7
nerformance	2	2 0	4 27		2	, 17	24	nerformance	16
effort	4	12	/8	effort	1	12	52	effort	22
frustration	4	12	40	frustration	4	15	22	frustration	55
Tustiduon	0	1	147	indstration	5	11	187	nusuation	114 5
	woie	sum stod rating	0.8		woid	sum abtod rating	12 1222222	woighted reting	7 62222222
	weig	meuraung	9.0		wei	snieuraung	12.13333333	weighted rating	1.000000000000





Subject 4									
Day 1				Day 2				Averages	
course digital				course line	ar			course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	5	18	90	mental demand	4	3	12	mental demand	61
physical demand	4	18	72	physical demand	4	8	32	physical demand	56
temporal demand	2	13	26	temporal demand	1	1	1	temporal demand	14
performance	1	10	10	performance	2	3	6	performance	11
effort	3	20	60	effort	4	2	8	effort	50
frustration	0	10	0	frustration	0	1	0	frustration	0
		sum	258			sum	59	sum	192
	weig	hted rating	17.2		wei	ghted rating	3.93333333	weighted rating	12.8
course nonlin	lear			course nonlir	iear			course l	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	5	20	mental demand	4	3	12	mental demand	21
physical demand	3	7	21	physical demand	3	3	9	physical demand	50
temporal demand	2	2	4	temporal demand	2	1	2	temporal demand	9.5
performance	2	3	6	performance	3	3	9	performance	7.5
effort	4	5	20	effort	3	3	9	effort	20
frustration	0	3	0	frustration	0	2	0	frustration	0
		sum	71			sum	41	sum	108
	weig	hted rating	4.733333333		weig	ghted rating	2.733333333	weighted rating	7.2
course line	ar			course digital				course no	niinear
scale title	weight	raw rating	adjusted rating		weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	5	0	30		4	8 10	32	mental demand	10
physical demand	4	1/	68	physical demand	4	10	40	physical demand	15
temporal demand	3	6	18	temporal demand	1	2	2	temporal demand	3
performance	1	9	9	performance	2	6	12	performance	7.5
effort	2	16	32	effort	4	10	40	effort	14.5
frustration	0	5	0	frustration	0	1	0	frustration	0
		sum	157			sum	126	sum	56
	weig	hted rating	10.46666667		wei	shted rating	8.4	weighted rating	3.733333333





Subject 5									
Day 1				Day 2				Averages	
course line	ar			course nonlin	ear			course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	5	12	60	mental demand	5	9	45	mental demand	60
physical demand	2	7	14	physical demand	2	4	8	physical demand	11.5
temporal demand	1	5	5	temporal demand	1	3	3	temporal demand	2.5
performance	3	16	48	performance	3	8	24	performance	10
effort	4	10	40	effort	4	12	48	effort	42
frustration	0	5	0	frustration	0	2	0	frustration	27
		sum	167			sum	128	sum	153
	weig	hted rating	11.13333333		weig	ghted rating	8.533333333	weighted rating	10.2
course digital				course digital				course l	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	5	11	55	mental demand	5	13	65	mental demand	42
physical demand	2	8	16	physical demand	1	7	7	physical demand	34.5
temporal demand	0	5	0	temporal demand	1	5	5	temporal demand	4.5
performance	2	7	14	performance	1	6	6	performance	35
effort	3	12	36	effort	4	12	48	effort	42.5
frustration	3	11	33	frustration	3	7	21	frustration	0
		sum	154			sum	152	sum	158.5
	weig	<mark>hted rating</mark>	10.26666667		weig	<mark>ghted rating</mark>	10.13333333	weighted rating	10.56666667
course noniir	woight	row roting	adjusted rating		ar woight	row roting	adjusted rating	course no	niinear
mental demand	weight 5			mental demand	weight A	faw raung	24	mental demand	
nbysical demand	2	5	4J	nbysical demand	5	11	55	nbysical demand	45
tomporal domand	2	1	10	tomporal domand	1	11		tomporal domand	25
norformanco	1	4	4	norformance	2	4	4	norformance	5.5
offort	4	11	44	performance	2	11	22	offort	54 40 E
frustration	5		55	fruction	5	2	45	frustration	40.5
Tustration	0	5	126	nustration	U	C III	150	nusuation	122
	woig	sum btod rating	066666667		woid	sum thed rating	10	weighted rating	152
	weig	meuraung	9.00000000		weit	incurating.	10	weighted falling	0.0




Subject 6									
Day 1				Day 2				Averages	
course digital				course nonli	near			course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	18	72	mental demand	2	14	28	mental demand	70
physical demand	1	10	10	physical demand	3	16	48	physical demand	37
temporal demand	1	13	13	temporal demand	1	6	6	temporal demand	20.5
performance	2	8	16	performance	3	1	3	performance	12.5
effort	4	20	80	effort	4	6	24	effort	55
frustration	3	15	45	frustration	2	2	4	frustration	22.5
		sum	236			sum	113	sum	217.5
	weig	hted rating	15.73333333		weig	hted rating	7.533333333	weighted rating	14.5
course nonlin	ear			course line	ar			course l	near
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	5	19	95	mental demand	4	14	56	mental demand	64
physical demand	0	15	0	physical demand	3	15	45	physical demand	40.5
temporal demand	2	16	32	temporal demand	2	4	8	temporal demand	12.5
performance	3	6	18	performance	3	1	3	performance	8.5
effort	2	18	36	effort	3	14	42	effort	34
frustration	3	20	60	frustration	0	3	0	frustration	15
		sum	241		_	sum	154	sum	174.5
	weig	hted rating	16.06666667		weig	hted rating	10.26666667	weighted rating	11.63333333
an una linea									
scale title	woight	raw rating	adjusted rating		woight	raw rating	adjusted rating		adjusted rating
mental demand	weight A	10	72	mental demand	A	17		mental demand	61 5
neutral demand	+	10	26	nhysical domand	4	16	64	nhysical domand	24
tomporal domand	2 1	17	17	tomporal domand	4	10	20	tomporal domand	10
norformanco	1 2	- 1/	17		2	24	28		10 5
effort	2	12	26	effort	2	15	30	effort	30
frustration	2	10	20	fructration	2	0		frustration	30
Tustidiun	5	10	105	in usu auton	U	9	100		177
	weig	hted rating	13		weig	hted rating	13 26666667	weighted rating	11.8





Subject 7									
Day 1				Day 2				Averages	
course nonlin	near			course linea	ar			course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	5	16	80	mental demand	4	9	36	mental demand	68
physical demand	0	6	0	physical demand	1	6	6	physical demand	22
temporal demand	2	7	14	temporal demand	2	5	10	temporal demand	0
performance	1	10	10	performance	3	6	18	performance	30
effort	4	18	72	effort	5	10	50	effort	66
frustration	3	10	30	frustration	0	3	0	frustration	42
		sum	206			sum	120	sum	228
	weig	hted rating	13.73333333		wei	shted rating	8	weighted rating	15.2
course line	ar			course nonlin	ear			course l	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	5	15	75	mental demand	5	7	35	mental demand	55.5
physical demand	0	8	0	physical demand	1	4	4	physical demand	3
temporal demand	1	9	9	temporal demand	2	4	8	temporal demand	9.5
performance	3	10	30	performance	3	10	30	performance	24
effort	4	14	56	effort	4	10	40	effort	53
frustration	2	8	16	frustration	0	4	0	frustration	8
		sum	186			sum	117	sum	153
	weig	shted rating	12.4		wei	shted rating	7.8	weighted rating	10.2
course digital				course digital				course no	nlinear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	20	80	mental demand	4	14	56	mental demand	57.5
physical demand	2	20	40	physical demand	1	4	4	physical demand	2
temporal demand	0	10	0	temporal demand	0	5	0	temporal demand	11
performance	2	15	30	performance	2	15	30	performance	20
effort	4	20	80	effort	4	13	52	effort	56
frustration	3	16	48	frustration	4	9	36	frustration	15
		sum	278			sum	178	sum	161.5
	weig	ted rating	18.53333333		wei	ted rating	11.86666667	weighted rating	10.76666667





Subject 8									
Day 1				Day 2				Averages	
course digital				course line	ar			course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	14	56	mental demand	4	9	36	mental demand	35
physical demand	1	10	10	physical demand	0	5	0	physical demand	5
temporal demand	2	13	26	temporal demand	1	5	5	temporal demand	18
performance	5	18	90	performance	5	11	55	performance	70.5
effort	0	17	0	effort	3	8	24	<mark>effort</mark>	28
frustration	3	5	15	frustration	2	5	10	frustration	39.5
		sum	197			sum	130	sum	196
	weig	shted rating	13.13333333		weig	ghted rating	8.666666667	weighted rating	13.06666667
course nonlir	near			course nonlin	near			course l	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	11	44	mental demand	4	8	32	mental demand	48
physical demand	1	5	5	physical demand	1	6	6	physical demand	8
temporal demand	3	11	33	temporal demand	1	4	4	temporal demand	6.5
performance	5	12	60	performance	5	15	75	performance	52.5
effort	2	17	34	effort	3	11	33	effort	31.5
frustration	0	4	0	frustration	1	4	4	frustration	5
		sum	176			sum	154	sum	151.5
	weig	shted rating	11.73333333		weig	ghted rating	10.26666667	weighted rating	10.1
course line	ar			course digital				course no	nlinear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	15	60	mental demand	2	/	14	mental demand	38
physical demand	2	8	16	physical demand	0	5	0	physical demand	5.5
temporal demand	1	8	8	temporal demand	2	5	10	temporal demand	18.5
performance	5	10	50	performance	3	17	51	performance	67.5
effort	3	13	39	effort	4	14	56	effort	33.5
frustration	0	2	0	frustration	4	16	64	frustration	2
		sum	173			sum	195	sum	165
	weig	ted rating	11.53333333		weia	shted rating	13	weighted rating	11





Subject 9 Image: state 1 <th></th>										
Day1 Iva Iva <thiva< th=""> Iva <thi< td=""><td>Subject 9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></thi<></thiva<>	Subject 9									
verse digitalverse digitalverse	Day 1				Day 2				Averages	
scale titleweight raw rating adjusted ratingscale titleweight raw rating adjusted ratingscale titleadjusted ratingmental demand1188mental demand19mental demand36.5temporal demand2360temporal demand4936.6temporal demand32.1performance56300performance4936.6temporal demand32.1performance721effort21020.0effort20.5fustration0100fustration177fustration3.5fustration12.900010.00000.00.0scale titleweightraw rating adjusted rating8.600000000000.0 </th <th>course digital</th> <th></th> <th></th> <th></th> <th>course digital</th> <th></th> <th></th> <th></th> <th>course digital</th> <th></th>	course digital				course digital				course digital	
mental demand41664mental demand339mental demand36.5physical demand236physical demand4999physical demand8.5performance56300performance41768Performance49effort3721effort21020effort2.05fustration0101777fustration3.5fustrating8.601777109.2666667fustrating8.60019.333333309.2666667course linear1777109.2666667renatal demand188mental demand351510physical demand188mental demand34121010physical demand313099101010101010physical demand311889103010 <t< td=""><td>scale title</td><td>weight</td><td>raw rating</td><td>adjusted rating</td><td>scale title</td><td>weight</td><td>raw rating</td><td>adjusted rating</td><td>scale title</td><td>adjusted rating</td></t<>	scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
physical demand18899 <td>mental demand</td> <td>4</td> <td>16</td> <td>64</td> <td>mental demand</td> <td>3</td> <td>3</td> <td>9</td> <td>mental demand</td> <td>36.5</td>	mental demand	4	16	64	mental demand	3	3	9	mental demand	36.5
temporal demand236temporal demand4936temporal demand21performance56309976899777 <td>physical demand</td> <td>1</td> <td>8</td> <td>8</td> <td>physical demand</td> <td>1</td> <td>9</td> <td>9</td> <td>physical demand</td> <td>8.5</td>	physical demand	1	8	8	physical demand	1	9	9	physical demand	8.5
performance5630performance417689erformance49effort3721effort21020effort20.5frustration010frustration177frustration3.5weighted rating8.600eweighted rating9.933333330weighted rating9.566666course linerveighted rating8.600veighted rating9.9333333300course linerscale titleweightraw ratingadjusted rating9.9333333300course liner00mental demand188mental demand3515mental demand11.5physical demand4104010performance4728performance20performance310300performance4728performance20effort22040effort188effort30fustration040fustration020frustration30fustration14333333333333333333333333333333333	temporal demand	2	3	6	temporal demand	4	9	36	temporal demand	21
effort3721effort21020effort20.5frustration010frustration1777frustration3.5frustration109999999999weighted rating8.6000999 </td <td>performance</td> <td>5</td> <td>6</td> <td>30</td> <td>performance</td> <td>4</td> <td>17</td> <td>68</td> <td>performance</td> <td>49</td>	performance	5	6	30	performance	4	17	68	performance	49
frustration 0 1 0 frustration 1 7 7 frustration 3.5 sum 129 sum 129 sum 149 sum 149 sum 139 course linear scale title weighted rating 9.3333333 0 weighted rating 9.2666667 course linear weighted rating adjusted rating scale title weighted rating 9.3333333 course linear 3 5 15 mental demand 1.1 5 scale title weight raw rating adjusted rating scale title weight de rating 3 5 15 mental demand 1.5 mental demand 6.5 15 mental demand 7 2.8 2.9 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 10.3 </td <td>effort</td> <td>3</td> <td>7</td> <td>21</td> <td>effort</td> <td>2</td> <td>10</td> <td>20</td> <td>effort</td> <td>20.5</td>	effort	3	7	21	effort	2	10	20	effort	20.5
sum129sum129sum149sum149sum149sum139 $\mathbf{veighted rating}$	frustration	0	1	0	frustration	1	7	7	frustration	3.5
weighted rating 8.6 weighted rating 9.3333333 weighted rating 9.2666666 course linear course nonlinear course nonlinear course nonlinear course nonlinear of course nonlinear			sum	129			sum	149	sum	139
course liner ice		weig	hted rating	8.6		weig	shted rating	9.93333333	weighted rating	9.266666667
course lineveight raw raing adjusted ratingdipfeat at the scale titleveight veight raw raing adjusted ratingdipfeat at the raw rating adjusted ratingdip<dipdipdipdipdipdipdipdipdipdipdipdipdipdipdipdipdipdipdip <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>										
scale titleweightraw ratingadjusted ratingscale titleweightraw ratingadjusted ratingscale titleadjusted ratingmental demand188mental demand3515mental demand11.5physical demand520100physical demand3410mental demand6615temporal demand341040099106016	course line	ar			course nonlin	lear			course l	inear
mental demand188mental demand3515mental demand11.5physical demand520100physical demand410406566temporal demand4104041040666666performance310309rformance47289rformance21effort22040effort188effort3030frustration0406rustration0206rustration02or sum21866sum10.33310.3333310.33333310.33333310.33333310.33333310.3333333310.333333310.3333333310.3333333310.3333333310.3333333310.3333333310.33333333310.33333333310.333333333<	scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
physical demand520100physical demand41040104055temporal demand41040440412456476<	mental demand	1	8	8	mental demand	3	5	15	mental demand	11.5
temporal demand41040temporal demand3412temporal demand26performance31030performance4728performance21effort22040effort188effort30frustration0400frustration0200frustration00400frustration0200frustration02function11888effort303030function0400frustration0200frustration0function11888effort0200frustration0function11888effort1388effort3030function111333141213301010310103101031010310	physical demand	5	20	100	physical demand	4	10	40	physical demand	65
performance31030performance4728performance21effort22040effort188effort30frustration040frustration020frustration0frustration040frustration020frustration02frustration040frustration020frustration02frustration014.5333333300010866666667099course nonliner14.5333333300010010010.23333frustration01330010010010.23333frustration0133mental demand3515mental demand9physical demand133mental demand310300physical demand412performance41248performance4312performance1818effort2918effort210200effort13frustration010frustration010frustration010frustration01210frustration010frustration010	temporal demand	4	10	40	temporal demand	3	4	12	temporal demand	26
effort22040effort188effort30frustration040frustration020frustration0frustration040frustration020frustration0sumSum218188103frustration0weighted rating14.533333314.5333333101036.866666667weighted rating10.23333course nonlinearv18881039103910.33333course nonlinearv1888103910.23333310310010010.233333course nonlinear133101003010010010.23333performance133100300100100100100100physical demand133100300100	performance	3	10	30	performance	4	7	28	performance	21
frustration040frustration020frustration0sumsum218sum103sumsum153.5weighted rating14.53333333weighted rating6.866666667weighted rating10.23333course nonliver10.23333scale titleweightraw ratingadjusted rating	effort	2	20	40	effort	1	8	8	effort	30
Image: Sum 218Sum 218Sum 103Sum 104Sum 104Sum 103Sum 103Sum 104Sum 104Sum 104Sum 104Sum 103Sum 104Sum 10	frustration	0	4	0	frustration	0	2	0	frustration	0
weighted rating14.53333333inclusionweighted rating6.8666666667weighted rating10.2333333333333333333333333333333333333			sum	218			sum	103	sum	153.5
course nonlinear medight raw rating adjusted rating mental demand 3 3 mental demand 3 5 15 mental demand 9 physical demand 1 3 3 mental demand 3 5 15 mental demand 9 physical demand 4 12 48 physical demand 3 10 300 physical demand 44 44 temporal demand 4 11 444 temporal demand 3 12 performance 4 2 8 performance 4 3 12 performance 18 performance 1 0 13 10 20 effort 13 14 13 14 13 14 13 14 1		weig	hted rating	14.53333333		weig	shted rating	6.866666667	weighted rating	10.23333333
scale titleweightraw ratingadjusted ratingscale titleweightraw ratingadjusted ratingadjusted ratingmental demand133mental demand3515mental demand9physical demand41248physical demand31030physical demand44temporal demand41144temporal demand3412temporal demand28performance428performance4312performance18effort2918effort21020effort13frustration010frustration010100weighted rating8.0666666667666666667weighted rating5.933333333weighted rating7.4666666666666666666666666666666666666										
mental demand133mental demand3515mental demand9physical demand41248physical demand31030physical demand44temporal demand41144temporal demand3412temporal demand28performance428performance4312performance18effort2918effort21020effort13frustration010frustration010frustration0weighted rating8.06666666678.0666666667weighted rating5.933333333weighted rating7.4666666	scale title	weight	raw rating	adjusted rating	scale title	ar weight	raw rating	adjusted rating	scale title	adjusted rating
physical demand41248physical demand31030physical demand44temporal demand41144temporal demand3412temporal demand28performance428performance4312performance18effort2918effort21020effort13frustration010frustration010frustration0weighted rating8.0666666667	mental demand	1	3	3	mental demand	3	5	15	mental demand	9
temporal demand41144temporal demand3412temporal demand28performance428performance4312performance18effort2918effort21020effort13frustration010frustration010frustration0weighted rating8.0666666667weighted rating5.933333333weighted rating7.4666666	physical demand	4	12	48	physical demand	3	10	30	physical demand	44
performance428performance4312performance18effort2918effort21020effort13frustration010frustration010frustration0weighted rating8806666666667weighted rating5933333333weighted rating77	temporal demand	4	11	44	temporal demand	3	4	12	temporal demand	28
effort2918effort21020effort13frustration010frustration010frustration0sum 121weighted rating 5 933333333weighted rating 8 0666666667	performance	4	2	8	performance	4	3	12	performance	18
frustration 0 1 0 frustration 0 1 0 frustration 0 1 0 weighted rating 8.0666666667 weighted rating 5.933333333 weighted rating 7.4666666	effort	2	9	18	effort	2	10	20	effort	13
sum 121 sum 89 sum 112 weighted rating 8.0666666667 weighted rating 5.933333333 weighted rating 7.4666666	frustration	0	1	0	frustration	0	1	0	frustration	0
weighted rating 8 066666667 weighted rating 5 933333333 weighted rating 7 4666666			sum	121		, i i i i i i i i i i i i i i i i i i i	sum	89	sum	112
		weig	ted rating	8.066666667		weig	ted rating	5.933333333	weighted rating	7.466666667





Subject 10									
Day 1				Day 2				Averages	
course nonlin	near			course line	ar			course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	5	10	50	mental demand	3	8	24	mental demand	43
physical demand	0	4	0	physical demand	2	8	16	physical demand	7
temporal demand	2	8	16	temporal demand	1	10	10	temporal demand	14.5
performance	3	8	24	performance	4	4	16	performance	47.5
effort	4	12	48	effort	5	10	50	<mark>effort</mark>	54.5
frustration	1	3	3	frustration	0	2	0	frustration	0
		sum	141			sum	116	sum	166.5
	weig	hted rating	9.4		weig	ted rating	7.733333333	weighted rating	11.1
course line	-							course l	incor
course me	ar woight	row roting	adjusted rating		woight	row roting	adjusted rating	course i	adjusted rating
scale title	weight			Scale title	weight	10		scale title	
nental demand	2 E	4 1E	0 75		2 1	10	30	mental demand	10
tomporal domand	2 1	0	75		1 2	4	10	tomporal domand	45.5
temporal demand	1 2	Ö O	8 24		2	9	18	temporal demand	9
performance	3	8 12	24	efformance	5	10	50	performance	20
errort	4	12	48	errort	4	- 11	44	errort	49
Trustration	U	4	0	Trustration	0	5	140	rrustration	О 120 Г
		sum	163			sum	146	sum	139.5
	weig	ted rating	10.86666667		weig	shted rating	9.73333333	weighted rating	9.3
course digital				course nonlin	ear			course no	nlinear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	14	56	mental demand	3	4	12	mental demand	31
physical demand	2	5	10	physical demand	2	4	8	physical demand	4
temporal demand	1	11	11	temporal demand	1	10	10	temporal demand	13
performance	3	15	45	performance	4	5	20	performance	22
effort	5	13	65	effort	5	5	25	effort	36.5
frustration	0	8	0	frustration	0	2	0	frustration	1.5
		sum	187			sum	75	sum	108
	weig	hted rating	12.46666667		weig	ted rating	5	weighted rating	7.2





Subject 11									
Day 1				Day 2				Averages	
course nonlir	near			course digital				course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	17	68	mental demand	2	11	22	mental demand	27
physical demand	4	17	68	physical demand	2	10	20	physical demand	16
temporal demand	3	17	51	temporal demand	5	12	60	temporal demand	58
performance	1	10	10	performance	2	12	24	performance	12
effort	3	15	45	effort	4	13	52	<mark>effort</mark>	56
frustration	0	6	0	frustration	0	3	0	frustration	18
		sum	242			sum	178	sum	187
	weig	shted rating	16.13333333		weig	hted rating	11.86666667	weighted rating	12.46666667
course digital				course linea	ar			course l	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	2	16	32	mental demand	1	7	7	mental demand	17
physical demand	1	12	12	physical demand	2	7	14	physical demand	25
temporal demand	4	14	56	temporal demand	5	10	50	temporal demand	43
performance	0	13	0	performance	3	9	27	performance	18.5
effort	4	15	60	effort	4	10	40	effort	47.5
frustration	4	9	36	frustration	0	2	0	frustration	0
		sum	196			sum	138	sum	151
	weig	<mark>shted rating</mark>	13.06666667		weig	hted rating	9.2	weighted rating	10.06666667
course line	ar	rowroting	adjusted rating	course nonlin	ear	row roting	adjusted rating	course no	nlinear
montal domand	veight 2		27	montal domand	veign		10	montal domand	20
nbysical demand	2	12	27	nbysical demand	2	7	10	nbysical demand	35 /1
tomporal domand	с С	12	20	tomporal domand	2 E	10	14	tomporal domand	41 F0 F
temporal demand	3	12	30 10		2 2	10	50		50.5
offort		10	10	performance	2	11	14	offert	
freetration	5	- 11	55	erfort	4	11	44	errort	44.5
Trustration	U	5	0	trustration	0	2	0	Trustration	0
		sum	164			sum	132	sum	187
	weig	pted rating	10.93333333		weig	nted rating	8.8	weighted rating	12.46666667





Subject 12									
Day 1				Day 2				Averages	
course nonlin	near			course digital				course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	20	80	mental demand	3	16	48	mental demand	54
physical demand	4	20	80	physical demand	4	20	80	physical demand	80
temporal demand	0	7	0	temporal demand	1	3	3	temporal demand	8
performance	1	10	10	performance	2	13	26	performance	24
effort	3	20	60	effort	5	20	100	effort	100
frustration	3	15	45	frustration	0	4	0	frustration	0
		sum	275			sum	257	sum	266
	weig	shted rating	18.33333333		weig	ghted rating	17.13333333	weighted rating	17.73333333
course line	ar			course linea	ar			course l	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	20	80	mental demand	3	14	42	mental demand	61
physical demand	4	20	80	physical demand	4	20	80	physical demand	80
temporal demand	0	5	0	temporal demand	1	3	3	temporal demand	1.5
performance	1	11	11	performance	2	4	8	performance	9.5
effort	4	20	80	effort	5	20	100	effort	90
frustration	2	9	18	frustration	0	11	0	frustration	9
		sum	269			sum	233	sum	251
	weig	ted rating	17.93333333		weig	ghted rating	15.53333333	weighted rating	16.73333333
course digital				course nonlin	ear			course no	nlinear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	3	20	60	mental demand	3	10	30	mental demand	55
physical demand	4	20	80	physical demand	4	18	72	physical demand	76
temporal demand	1	13	13	temporal demand	0	2	0	temporal demand	0
performance	2	11	22	performance	2	8	16	performance	13
effort	5	20	100	effort	5	19	95	effort	77.5
frustration	0	14	0	frustration	1	2	2	frustration	23.5
		sum	275			sum	215	sum	245
	weig	ted rating	18.33333333		wei	ted rating	14.33333333	weighted rating	16.33333333





Subject 13									
Day 1				Day 2				Averages	
course line	ar			course digital				course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	3	15	45	mental demand	4	7	28	mental demand	50
physical demand	1	9	9	physical demand	3	4	12	physical demand	11.5
temporal demand	0	15	0	temporal demand	0	8	0	temporal demand	0
performance	4	7	28	performance	2	6	12	performance	22.5
effort	5	14	70	effort	5	7	35	effort	53.5
frustration	2	15	30	frustration	1	5	5	frustration	28
		sum	182			sum	92	sum	165.5
	weig	hted rating	12.13333333		weig	ghted rating	6.133333333	weighted rating	11.03333333
course nonlin	near			course nonlin	ear			course l	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	5	14	70	mental demand	4	6	24	mental demand	34.5
physical demand	0	8	0	physical demand	3	6	18	physical demand	13.5
temporal demand	1	11	11	temporal demand	0	4	0	temporal demand	0
performance	3	7	21	performance	2	7	14	performance	23
effort	4	16	64	effort	5	10	50	effort	60
frustration	2	13	26	frustration	1	6	6	frustration	17.5
		sum	192			sum	112	sum	148.5
	weig	hted rating	12.8		weig	ghted rating	7.466666667	weighted rating	9.9
course digital				course lines				course no	nlinoar
	woight	row roting	adjusted rating		woight	row roting	adjusted rating		adjusted rating
mental demand	A	12		mental demand	A	faw raung	24	mental demand	AUJUSTEU Tatilig
nbysical demand	4	10	11	nhwsical demand	2	6	18	nbysical demand	47
tomporal domand	1	11	0	tomporal domand	0	2	0	tomporal domand	5
norformance	2	15	22		2	2	19		5.5 17 E
offort	3	10		offort	5	10	50	offort	57
fructration	4	18	72	frustration	2	10	50	frustration	57
Trustration	3	1/	220	rustration	T	5	5 11E	rrustration	152
		sum	239			sum	715	sum	10 1000000
	weig	inced rating	15.93333333		weig	inted rating	1.000000000	weighted rating	10.13333333





Subject 14									
Day 1				Day 2				Averages	
course nonlir	near			course nonlin	ear			course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	2	18	36	mental demand	5	13	65	mental demand	45
physical demand	0	13	0	physical demand	1	10	10	physical demand	6.5
temporal demand	3	18	54	temporal demand	4	11	44	temporal demand	64
performance	4	15	60	performance	1	10	10	performance	32
effort	1	16	16	effort	3	10	30	effort	22
frustration	5	20	100	frustration	1	5	5	frustration	80.5
		sum	266			sum	164	sum	250
	weig	hted rating	17.73333333		weig	shted rating	10.93333333	weighted rating	16.66666667
course digital				course line	ar			course l	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	2	18	36	mental demand	3	13	39	mental demand	30.5
physical demand	0	17	0	physical demand	4	15	60	physical demand	66
temporal demand	3	11	33	temporal demand	2	7	14	temporal demand	9.5
performance	4	16	64	performance	0	14	0	performance	12.5
effort	1	14	14	effort	1	12	12	effort	15
frustration	5	17	85	frustration	5	18	90	frustration	45
		sum	232			sum	215	sum	178.5
	weig	ted rating	15.46666667		weig	shted rating	14.33333333	weighted rating	11.9
course line	ar			course digital				course no	nlinear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	2	11	22	mental demand	3	18	54	mental demand	50.5
physical demand	4	18	72	physical demand	1	13	13	physical demand	5
temporal demand	1	5	5	temporal demand	5	19	95	temporal demand	49
performance	5	5	25	<mark>performance</mark>	0	15	0	performance	35
effort	3	6	18	effort	2	15	30	effort	23
frustration	0	5	0	frustration	4	19	76	frustration	52.5
		sum	142			sum	268	sum	215
	weig	hted rating	9.466666667		weig	ted rating	17.86666667	weighted rating	14.33333333





Subject 15									
Day 1				Day 2				Averages	
course line	ar			course linea	ar			course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	3	10	30	mental demand	4	10	40	mental demand	40
physical demand	1	10	10	physical demand	2	7	14	physical demand	1.5
temporal demand	0	9	0	temporal demand	1	6	6	temporal demand	5
performance	4	13	52	performance	2	11	22	performance	45
effort	2	11	22	effort	3	11	33	<mark>effort</mark>	27
frustration	5	14	70	frustration	3	10	30	frustration	28.5
		sum	184			sum	145	sum	147
	weig	hted rating	12.26666667		weig	ted rating	9.666666667	weighted rating	9.8
course digital					lear			course i	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	10	40	mental demand	5	9	45	mental demand	35
physical demand	0	10	0	physical demand	2	6	12	physical demand	12
temporal demand	1	10	10	temporal demand	0	3	0	temporal demand	3
performance	5	12	60	performance	2	11	22	performance	37
effort	2	12	24	effort	4	11	44	effort	27.5
frustration	3	12	36	frustration	2	9	18	frustration	50
		sum	170			sum	141	sum	164.5
	weig	hted rating	11.33333333		weig	shted rating	9.4	weighted rating	10.96666667
course nonlir	near			course digital				course no	nlinear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	9	36	mental demand	5	8	40	mental demand	40.5
physical demand	1	8	8	physical demand	1	3	3	physical demand	10
temporal demand	0	7	0	temporal demand	0	3	0	temporal demand	0
performance	4	11	44	performance	3	10	30	performance	33
effort	2	11	22	effort	3	10	30	effort	33
frustration	4	12	48	frustration	3	7	21	frustration	33
		sum	158			sum	124	sum	149.5
	weig	hted rating	10.53333333		weig	ted rating	8.266666667	weighted rating	9.966666667





Subject 16									
Day 1				Day 2				Averages	
course digital				course linea	ar			course digital	
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	4	18	72	mental demand	3	10	30	mental demand	43.5
physical demand	0	12	0	physical demand	5	18	90	physical demand	30
temporal demand	3	16	48	temporal demand	0	11	0	temporal demand	24
performance	1	11	11	performance	2	3	6	performance	45.5
effort	2	20	40	effort	4	20	80	<mark>effort</mark>	50
frustration	5	18	90	frustration	1	16	16	frustration	85
		sum	261			sum	222	sum	278
	weig	<mark>hted rating</mark>	17.4		wei	ghted rating	14.8	weighted rating	18.53333333
course line	ar			course digital				course l	inear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	1	18	18	mental demand	1	15	15	mental demand	24
physical demand	5	18	90	physical demand	3	20	60	physical demand	90
temporal demand	0	15	0	temporal demand	0	15	0	temporal demand	0
performance	2	5	10	performance	4	20	80	performance	8
effort	3	19	57	effort	3	20	60	effort	68.5
frustration	4	18	72	frustration	4	20	80	frustration	44
		sum	247			sum	295	sum	234.5
	weig	shted rating	16.46666667		weig	ghted rating	19.66666667	weighted rating	15.63333333
course nonlir	near			course nonlin	ear			course no	nlinear
scale title	weight	raw rating	adjusted rating	scale title	weight	raw rating	adjusted rating	scale title	adjusted rating
mental demand	3	19	57	mental demand	1	18	18	mental demand	37.5
physical demand	5	20	100	physical demand	2	20	40	physical demand	70
temporal demand	0	19	0	temporal demand	0	16	0	temporal demand	0
performance	3	15	45	performance	5	11	55	performance	50
effort	1	20	20	effort	3	18	54	effort	37
frustration	3	20	60	frustration	4	18	72	frustration	66
		sum	282			sum	239	sum	260.5
	weig	ted rating	18.8		wei	ted rating	15.93333333	weighted rating	17.36666667





Appendix C: Generalized Estimating Equations Analysis

Time

Tests of Model Effects										
	Type III									
Source	Wald Chi- Square	df	Sig.							
(Intercept)	2287.693	1	0.000							
day	37.637	1	.000							
condition	3.855	2	.146							
day* 36.574 2 .00										
Dependent Variable: time										

Model: (Intercept), day, condition, day*

Parameter Estimates							
			Confidence Interval		Hypothesis Test		
Parameter	в	Std. Error	Lower	Upper	Wald Chi- Square	df	Sig.
(Intercept)	3.217	.0956	3.029	3.404	1131.340	1	0.000
[day=1]	1.272	.0956	1.084	1.459	176.799	1	0.000
[day=2]	0 ^a						
[condition=1]	.612	.1193	.378	.846	26.319	1	.000
[condition=2]	.701	.2093	.291	1.111	11.211	1	.001
[condition=3]	0 ^a						
[day=1] * [condition=1]	771	.2286	-1.219	322	11.357	1	.001
[day=1] * [condition=2]	-1.197	.2271	-1.642	752	27.781	1	.000
[day=1] * [condition=3]	0 ^a						
[day=2] * [condition=1]	0 ^a						
[day=2] * [condition=2]	0 ^a						
[day=2] * [condition=3]	0 ^a						
(Scale)	1						
Dependent Variable: time Model: (Intercept), day, condition, day * condition a. Set to zero because this parameter is redundant.							
Estir	nate	d Margi	inal Me	ans 1: o	day		
-------------------	----------------------	----------------------------	--------------------	--------------------	-------------	----------------------------	--------------------------
		Estimat	tes				
			95% Wald (Inte	Confidence rval			
day	Mean	Std. Error	Lower	Upper			
1	71.55	5.834	60.98	83.95			
2	38.65	4.254	31.15	47.95			
			Pairwise	e Comparis	ons		
		Mean				95% Wald (Interval for	Confidence Difference
(I) day		Difference (I-J)	Std. Error	df	Sig.	Lower	Upper
1	2	32.90 ^a	5.302	1	.000	22.51	43.30
2	1	-32.90 ^a	5.302	1	.000	-43.30	-22.51
Pairwis depend	e compa ent varia	arisons of es able time	stimated ma	rginal mear	ns based or	n the original	scale of
a. The r	nean dif	ference is s	ignificant at	the .05 level			
Over	all Test	Results					
Chi- Squar	df	Sig.					
38.506	1	.000					
The Wa	ld chi-so	quare tests					

the effect of day. This test is based on the linearly

Estima	ted N	largina	l Means	s 2: cor	ndition		
		Estimates	5				
			Inte	rval			
condition	Mean	Std. Error	Lower	Upper			
1	59.11	8.165	45.09	77.49			
2	52.20	7.543	39.33	69.29			
3	47.12	2.254	42.91	51.75			
			Pairwise (Comparison			
			T all wise C	Joinpanson	5		
		Mean				95% Wald (Interval for	Confidence Difference
		Difference	Std Error	df	Sig	Lower	Upper
(1) condition	2	(I-J)	SIG. EITOI	ui	Sig.	Lower	0000
		6.91	10.053	1	.492	-12.80	26.61
	3	11.98	7.571	1	.113	-2.85	26.82
2	1	-6.91	10.053	1	.492	-26.61	12.80
	3	5.08	6.678	1	.447	-8.01	18.17
3	'1	-11.98	7.571	1	.113	-26.82	2.85
	2	-5.08	6.678	1	.447	-18.17	8.01
Pairwise co dependent	ompariso variable t	ns of estima time	ated margina	al means ba	ased on the	original sca	le of
Overa	ll Test Re	esults					
Wald Chi- Square	df	Sig.					
3.063	2	.216					
The Wald c effect of cor based on th	hi-square ndition. The linear	e tests the his test is					

Esti	mated Ma	rginal I	Means :	3: day*	conditi	on
		Estim	nates			
				Inte	rval	
day		Mean	Std. Error	Lower	Upper	
1	1	75.94	15.983	50.27	114.72	
	2	54.19	6.457	42.91	68.45	
	3	89.00	0.000	89.00	89.00	
2	1	46.01	6.415	35.00	60.47	
	2	50.28	10.758	33.06	76.48	
	3	24.95	2.386	20.69	30.10	

		Pairwise C	comparison	S			
		Mean Difference				Interval for	Difference
(I) day*condition		(I-J)	Std. Error	df	Sig.	Lower	Upper
[day=1]*[condition=1]	[day=1]*[condition=2]	21.75	17.076	1	.203	-11.72	55.22
	[day=1]*[condition=3]	-13.06	15.983	1	.414	-44.38	18.27
	[day=2]*[condition=1]	29.94	15.895	1	.060	-1.22	61.09
	[day=2]*[condition=2]	25.66	18.918	1	.175	-11.42	62.74
	[day=2]*[condition=3]	50.99 ^a	15.784	1	.001	20.05	81.93
[day=1]*[condition=2]	[day=1]*[condition=1]	-21.75	17.076	1	.203	-55.22	11.72
	[day=1]*[condition=3]	-34.81 ^a	6.457	1	.000	-47.46	-22.15
	[day=2]*[condition=1]	8.19	6.718	1	.223	-4.98	21.35
	[day=2]*[condition=2]	3.91	9.658	1	.685	-15.02	22.84
	[day=2]*[condition=3]	29.24 ^a	4.924	1	.000	19.59	38.89
[day=1]*[condition=3]	[day=1]*[condition=1]	13.06	15.983	1	.414	-18.27	44.38
	[day=1]*[condition=2]	34.81 ^a	6.457	1	.000	22.15	47.46
	[day=2]*[condition=1]	42.99 ^a	6.415	1	.000	30.42	55.57
	[day=2]*[condition=2]	38.72 ^a	10.758	1	.000	17.63	59.81
	[day=2]*[condition=3]	64.05 ^a	2.386	1	0.000	59.37	68.73

[day=2]*[condition=1]	[day=1]*[condition=1]	-29.94	15.895	1	.060	-61.09	1.22
	[day=1]*[condition=2]	-8.19	6.718	1	.223	-21.35	4.98
	[day=1]*[condition=3]	-42.99 ^a	6.415	1	.000	-55.57	-30.42
	[day=2]*[condition=2]	-4.27	11.647	1	.714	-27.10	18.55
	[day=2]*[condition=3]	21.06 ^a	5.510	1	.000	10.26	31.85
[day=2]*[condition=2]	[day=1]*[condition=1]	-25.66	18.918	1	.175	-62.74	11.42
	[day=1]*[condition=2]	-3.91	9.658	1	.685	-22.84	15.02
	[day=1]*[condition=3]	-38.72 ^ª	10.758	1	.000	-59.81	-17.63
	[day=2]*[condition=1]	4.27	11.647	1	.714	-18.55	27.10
	[day=2]*[condition=3]	25.33 ^a	10.367	1	.015	5.01	45.65
[day=2]*[condition=3]	[day=1]*[condition=1]	-50.99 ^a	15.784	1	.001	-81.93	-20.05
	[day=1]*[condition=2]	-29.24 ^a	4.924	1	.000	-38.89	-19.59
	[day=1]*[condition=3]	-64.05 ^ª	2.386	1	0.000	-68.73	-59.37
	[day=2]*[condition=1]	-21.06 ^a	5.510	1	.000	-31.85	-10.26
	[day=2]*[condition=2]	-25.33ª	10.367	1	.015	-45.65	-5.01
Pairwise comparison a. The mean difference	s of estimated marginal	l means bas 5 level.	ed on the o	original scale	e of depende	ent variable	time

est Results	
df	Sig.
5	0.000
	est Results df 5

The Wald chi-square tests the effect of day*condition. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

Error

	Tests of Mo	odel Effects	
		Type III	
	Wald Chi-		
Source	Square	df	Sig.
(Intercept)	575.291	1	0.000
day	51.751	1	.000
condition	50.267	2	.000
day * condition	.485	2	.785

Dependent Variable: total errors

Model: (Intercept), day, condition, day*

		Para	imeter Esti	mates			
			Confidenc	e Interval	Hypot	hesis Te	st
Parameter	В	Std. Error	Lower	Upper	Wald Chi- Square	df	Sig.
(Intercept)	1.591	.1280	1.340	1.841	154.517	1	0.000
[day=1]	.441	.1575	.132	.750	7.848	1	.005
[day=2]	0 ^a						
[condition=1]	.703	.1257	.457	.950	31.291	1	.000
[condition=2]	203	.1660	528	.122	1.495	1	.221
[condition=3]	0 ^a						
[day=1] * [condition=1]	.120	.1724	218	.458	.485	1	.486
[day=1] * [condition=2]	.172	.3278	470	.814	.275	1	.600
[day=1] * [condition=3]	0 ^a						
[day=2] * [condition=1]	0 ^a						
[day=2] * [condition=2]	0 ^a						
[day=2] * [condition=3]	0 ^a						
(Scale)	1						
Dependent Var Model: (Interce	riable: total e pt), day, con	errors dition, da <u>y</u>	y * conditior	า			
a. Set to zero b	ecause this	paramete	er is redund	lant.			

Estima	ited Ma	rginal N	Means [.]	1: day			
		Estimates					
			Inte	rval			
day	Mean	Std. Error	Lower	Upper			
1	9.93	.896	8.32	11.85			
2	5.80	.548	4.82	6.98			
			Pairwise Co	omparisons			
						95% Wald Interval for	Confidence Difference
		Mean					
(I) day		Difference	Std Error	df	Sig	Lower	Upper
(I) day 1	2	(I-J)	Old. Elloi	u	Olg.	Lowor	Oppor
		4.13 ^a	.665	1	.000	2.83	5.44
2	1	-4.13 ^a	.665	1	.000	-5.44	-2.83
Pairwise co dependent	omparisons variable tota	of estimated al errors	d marginal r	neans base	d on the ori	ginal scale o	of
a. The mea	In difference	is significar	nt at the .05	level.			
Over	rall Test Res	sults					
Wald Chi-							
Square	df	Sig.					
38.681	1	.000					
The Wald c effect of day	hi-square te y. This test is independer	ests the s based on at pairwise					

		Estimates			
			Inter	val	
condition	Mean	Std. Error	Lower	Upper	
1	13.12	.863	11.54	14.93	
2	5.44	.609	4.37	6.78	
3	6.12	.826	4.69	7.97	

						95% Wald (Interval for	Confidence Difference
(I) cond	lition	Mean Difference (I-J)	Std. Error	df	Sig.	Lower	Upper
1	2	7.68 ^a	1.007	1	.000	5.71	9.65
	3	7.01 ^a	1.040	1	.000	4.97	9.04
2	1	-7.68 ^a	1.007	1	.000	-9.65	-5.71
	3	68	.524	1	.197	-1.70	.35
3	1	-7.01 ^a	1.040	1	.000	-9.04	-4.97
	2	.68	.524	1	.197	35	1.70

Pairwise comparisons of estimated marginal means based on the original scale of dependent variable total errors

a. The mean difference is significant at the .05 level.

Over	rall Test Res	sults
Wald Chi- Square	df	Sig.
58.278	2	.000
The Wald c effect of cor based on th	hi-square te ndition. This he linearly ir	ests the test is idependent

Estimated Marginal Means 3: day* condition										
		Estin	nates							
				Interval						
day		Mean	Std. Error	Lower	Upper					
1	1	17.37	1.343	14.93	20.22					
	2	7.39	1.063	5.58	9.80					
	3	7.63	1.374	5.36	10.86					
2	1	9.91	.952	8.21	11.97					
	2	4.00	.637	2.93	5.47					
	3	4.91	.628	3.82	6.30					

Pairwise Comparisons									
		Mean				95% Wald (Interval for	Confidence Difference		
(I) day*condition		Difference (I-J)	Std. Error	df	Sig.	Lower	Upper		
[day=1]*[condition=1]	[day=1]*[condition=2]	9.98 ^a	1.754	1	.000	6.54	13.42		
	[day=1]*[condition=3]	9.75 ^a	1.818	1	.000	6.18	13.31		
	[day=2]*[condition=1]	7.46 ^a	1.533	1	.000	4.46	10.47		
	[day=2]*[condition=2]	13.37 ^a	1.359	1	0.000	10.71	16.03		
	[day=2]*[condition=3]	12.47 ^a	1.419	1	0.000	9.69	15.25		
[day=1]*[condition=2]	[day=1]*[condition=1]	-9.98 ^a	1.754	1	.000	-13.42	-6.54		
	[day=1]*[condition=3]	23	1.526	1	.879	-3.22	2.76		
	[day=2]*[condition=1]	-2.52	1.526	1	.099	-5.51	.47		
	[day=2]*[condition=2]	3.39 ^a	1.189	1	.004	1.06	5.72		
	[day=2]*[condition=3]	2.49 ^a	.809	1	.002	.90	4.07		
[day=1]*[condition=3]	[day=1]*[condition=1]	-9.75 ^ª	1.818	1	.000	-13.31	-6.18		
	[day=1]*[condition=2]	.23	1.526	1	.879	-2.76	3.22		
	[day=2]*[condition=1]	-2.29	1.618	1	.158	-5.46	.88		
	[day=2]*[condition=2]	3.62 ^a	.987	1	.000	1.69	5.56		
	[day=2]*[condition=3]	2.72 ^a	1.176	1	.021	.42	5.02		
[day=2]*[condition=1]	[day=1]*[condition=1]	-7.46 ^a	1.533	1	.000	-10.47	-4.46		
	[day=1]*[condition=2]	2.52	1.526	1	.099	47	5.51		
	[day=1]*[condition=3]	2.29	1.618	1	.158	88	5.46		
	[day=2]*[condition=2]	5.91 ^a	1.044	1	.000	3.86	7.95		
	[day=2]*[condition=3]	5.01 ^a	.908	1	.000	3.23	6.79		

[day=2]*[condition=2]	[day=1]*[condition=1]	-13.37 ^a	1.359	1	0.000	-16.03	-10.71
	[day=1]*[condition=2]	-3.39 ^a	1.189	1	.004	-5.72	-1.06
	[day=1]*[condition=3]	-3.62 ^a	.987	1	.000	-5.56	-1.69
	[day=2]*[condition=1]	-5.91 ^a	1.044	1	.000	-7.95	-3.86
	[day=2]*[condition=3]	90	.723	1	.212	-2.32	.52
[day=2]*[condition=3]	[day=1]*[condition=1]	-12.47 ^a	1.419	1	0.000	-15.25	-9.69
	[day=1]*[condition=2]	-2.49 ^a	.809	1	.002	-4.07	90
	[day=1]*[condition=3]	-2.72 ^a	1.176	1	.021	-5.02	42
	[day=2]*[condition=1]	-5.01 ^a	.908	1	.000	-6.79	-3.23
	[day=2]*[condition=2]	.90	.723	1	.212	52	2.32

Pairwise comparisons of estimated marginal means based on the original scale of dependent variable total errors

a. The mean difference is significant at the .05 level.

Overall Test Results						
Wald Chi-Square	df	Sig.				
305.714	5	0.000				

The Wald chi-square tests the effect of day*condition. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

Overall Workload

Tests of Model Effects								
		Туре III						
	Wald Chi-							
Source	Square	df	Sig.					
(Intercept)	1195.995	1	0.000					
day	.000	1	.987					
condition	208.695	2	0.000					
day * condition	1.405	1	.236					

Dependent Variable: NASA

Model: (Intercept), day, condition, day*

Parameter Estimates										
			Interval		Hy	pothesis Te	st			
Parameter	В	Std. Error	Lower	Upper	Wald Chi- Square	df	Sig.			
(Intercept)	1.609	########	1.609	1.609	########	1	0.000			
[day=1]	.172	.2859	389	.732	.361	1	.548			
[day=2]	0 ^a									
[condition=1]	.956	0.0000	.956	.956		1	0.000			
[condition=2]	.470	.1179	.239	.701	15.905	1	.000			
[condition=3]	0 ^a									
[day=1] * [condition=1]	339	.2859	899	.222	1.405	1	.236			
[day=1] * [condition=2]	0 ^a									
[day=2] * [condition=1]	0 ^a									
[day=2] * [condition=2]	0 ^a									
[day=2] * [condition=3]	0 ^a									
(Scale)	1									

Dependent Variable: NASA

Model: (Intercept), day, condition, day * condition

a. Set to zero because this parameter is redundant.

Estima	ted Ma	rginal I	Means '	1: day			
		Estimates					
			Inte	rval			
day	Mean	Std. Error	Lower	Upper			
1	10.22	1.332	7.92	13.20			
2	8.04	.316	7.45	8.69			
			Pairwise Co	omparisons	i		
Mean					95% Wald (Interval for	Confidence Difference	
(I) day		(I-J)	Std. Error	df	Sig.	Lower	Upper
1	2	2.18	1.369	1	.111	50	4.86
2	1	-2.18	1.369	1	.111	-4.86	.50
Pairwise co dependent	omparisons variable NA	of estimate SA	d marginal r	neans base	ed on the ori	ginal scale o	of
Over	rall Test Res	sults					
Wald Chi-							
Square	df	Sig.					
2.540	1	.111					
The Wald c effect of day the linearly	hi-square te y. This test is independer	ests the s based on nt pairwise					

Estima	Estimated Marginal Means 2: conditi							
		Estimates						
			Inte	rval				
condition	Mean	Std. Error	Lower	Upper				
1	11.96	.000	11.96	11.96				
2	8.72	1.246	6.59	11.54				
3	5.00	.000	5.00	5.00				

Pairwise Comparisons

(I) condition		Mean				95% Wald Interval for	Confidence Difference
		Difference (I-J)	Std. Error	df	Sig.	Lower	Upper
1	2	3.24 ^a	1.246	1	.009	.80	5.68
	3	6.96 ^a	.000	1	0.000	6.96	6.96
2	1	-3.24 ^a	1.246	1	.009	-5.68	80
	3	3.72 ^a	1.246	1	.003	1.28	6.16
3	1	-6.96 ^a	.000	1	0.000	-6.96	-6.96
	2	-3.72 ^a	1.246	1	.003	-6.16	-1.28

Pairwise comparisons of estimated marginal means based on the original scale of dependent variable NASA

a. The mean difference is significant at the .05 level.

Overall Test Results					
Wald Chi- Square	df	Sig.			
6.760	1	.009			
The Wald chi-square tests the effect of condition. This test is based on the linearly independent					

Estimated Marginal Means 3: day* condition										
Estimates										
				Inte	rval					
day		Mean	Std. Error	Lower	Upper					
1	1	11.00	.000	11.00	11.00					
	2	9.50	2.475	5.70	15.83					
2	1	13.00	.000	13.00	13.00					
	2	8.00	.943	6.35	10.08					
	3	5.00	.000	5.00	5.00					

		Pairwise Co	mparisons				
		Mean				95% Wald (Interval for	Confidence Difference
(I) day*condition		(I-J)	Std. Error	df	Sig.	Lower	Upper
[day=1]*[condition=1]	[day=1]*[condition=2]	1.50	2.475	1	.544	-3.35	6.35
	[day=2]*[condition=1]	-2.00 ^a	.000	1	0.000	-2.00	-2.00
	[day=2]*[condition=2]	3.00 ^a	.943	1	.001	1.15	4.85
	[day=2]*[condition=3]	6.00 ^a	.000	1	0.000	6.00	6.00
[day=1]*[condition=2]	[day=1]*[condition=1]	-1.50	2.475	1	.544	-6.35	3.35
	[day=2]*[condition=1]	-3.50	2.475	1	.157	-8.35	1.35
	[day=2]*[condition=2]	1.50	2.648	1	.571	-3.69	6.69
	[day=2]*[condition=3]	4.50	2.475	1	.069	35	9.35
[day=2]*[condition=1]	[day=1]*[condition=1]	2.00 ^a	.000	1	0.000	2.00	2.00
	[day=1]*[condition=2]	3.50	2.475	1	.157	-1.35	8.35
	[day=2]*[condition=2]	5.00 ^a	.943	1	.000	3.15	6.85
	[day=2]*[condition=3]	8.00 ^a	.000	1	0.000	8.00	8.00
[day=2]*[condition=2]	[day=1]*[condition=1]	-3.00 ^a	.943	1	.001	-4.85	-1.15
	[day=1]*[condition=2]	-1.50	2.648	1	.571	-6.69	3.69
	[day=2]*[condition=1]	-5.00 ^a	.943	1	.000	-6.85	-3.15
	[day=2]*[condition=3]	3.00 ^a	.943	1	.001	1.15	4.85
[day=2]*[condition=3]	[day=1]*[condition=1]	-6.00 ^a	.000	1	0.000	-6.00	-6.00
	[day=1]*[condition=2]	-4.50	2.475	1	.069	-9.35	.35
	[day=2]*[condition=1]	-8.00 ^a	.000	1	0.000	-8.00	-8.00
	[day=2]*[condition=2]	-3.00 ^a	.943	1	.001	-4.85	-1.15
Pairwise comparisons	of estimated marginal r	neans base	d on the orig	inal scale o	f dependen	t variable NA	ASA
a. The mean difference	e is significant at the .05	level.					

Overall Test Results			
Wald Chi- Square	df	Sig.	
10.492	2	.005	
The Wald chi-square tests the effect of			
day*condition. This test is based on the			
linearly independent pairwise			
comparisons among the estimated			

marginal means

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Appendix D

Consent Form and Script

RESEARCH SUBJECT INFORMATION AND CONSENT FORM

TITLE: Evaluation of a Novel Myoelectric Training Device

PROTOCOL NO: HM20004508

INVESTIGATOR: Peter Pidcoe, PhD, DPT, PT

If any information contained in this consent form is not clear, please ask the study staff to explain any information that you do not fully understand. You may take home an unsigned copy of this consent form to think about or discuss with family or friends before making your decision.

In this consent form, "you" always refers to the research participant.

PURPOSE OF THE STUDY:

The purpose of this research study is to find an equation that matches the natural behavior of muscles in the forearm during rest and activity.

PROCEDURES

If you decide to be in this research study, you will be asked to sign this consent form after you have had all your questions answered.

At your first study visit (Visit 1), you will begin the study for data collection. This visit is considered training, so you can become familiar with the system. You will be asked to wear braces on your forearms during the study to make sure the data being collected is from the correct muscles. Then you will push the ends of your fingers against the braces to control a toy car and move it through an obstacle course. The total time for you to finish the course as well as the number of mistakes you make will be recorded. Mistakes include backing up, hitting a wall, or hitting a cone.

For your second visit (Visit 2), which should be scheduled within 48 hours of Visit 1, you will go through the procedure again for comparison purposes.

Your participation in this study will last up to 120 minutes for each visit. Approximately 10 individuals will participate in this study.

RISKS AND DISCOMFORTS

You may feel tired or uncomfortable during the study due to the braces, but the risk is small and you can take a break at any time. There is also a small chance of skin irritation from the electrode gel.

BENEFITS

The information gathered during the study may lead to a better understanding of the behavior of muscle activation, which has the potential to make advanced hand replacements feel more natural.

COSTS

There are no charges for the study visits. You will not be paid to participate.

ALTERNATIVE TREATMENT

Your alternative is not to participate in this study.

CONFIDENTIALITY

Data is being collected only for research purposes. Your data will be identified by ID numbers, not names, and stored separately from other records in a locked research area. All personal identifying information will be kept in password protected files and these files will be deleted five (5) years after the completion of the study. Other physical records will be kept in a locked file cabinet for five (5) years after the study ends and will be destroyed at that time. Access to all data will be limited to study personnel.

You should know that research data about you may be reviewed or copied by Virginia Commonwealth University.

Although results of this research may be presented at meetings or in publications, identifiable personal information pertaining to participants will not be disclosed.

VOLUNTARY PARTICIPATION AND WITHDRAWAL

Your participation in this study is voluntary. You may decide to not participate in this study. Your decision not to take part will involve no penalty or loss of benefits to which you are otherwise entitled. If you do participate, you may freely withdraw from the study at any time. Your decision to withdraw will involve no penalty or loss of benefits to which you are otherwise entitled.

Your participation in this study may be stopped at any time by the researcher without your consent. The reasons might include:

- the researcher thinks it necessary for your health or safety;
- you have not followed study instructions; or
- administrative reasons require your withdrawal.

QUESTIONS

If you have any questions, complaints, or concerns about your participation in this research, contact:

Peter Pidcoe, 804-628-3655, pepidcoe@vcu.edu West Hospital, Basement, Room 100 1200 E Broad St, West Hospital P.O. Box 980224 Richmond, VA 23298-0224 or Joshua Arenas, 757-567-3827, arenasja2@vcu.edu

The researcher/study staff named above is the best person(s) to call for questions about your participation in this study.

If you have general questions about your rights as a participant in this or any other research, you may contact:

Office of Research Virginia Commonwealth University 800 East Leigh Street, Suite 3000 P.O. Box 980568 Richmond, VA 23298 Telephone: (804) 827-2157

Contact this number for general questions, concerns, or complaints about research. You may also call this number if you cannot reach the research team or if you wish to talk to someone else. General information about participation in research studies can also be found at <u>http://www.research.vcu.edu/irb/volunteers.htm</u>.

Do not sign this consent form unless you have had a chance to ask questions and have received satisfactory answers to all of your questions.

CONSENT

I have been provided with an opportunity to read this consent form carefully. All of the questions that I wish to raise concerning this study have been answered.

By signing this consent form, I have not waived any of the legal rights or benefits, to which I otherwise would be entitled. My signature indicates that I freely consent to participate in this research study. I will receive a copy of the consent form once I have agreed to participate.

Participant Name, printed	
Participant Signature	Date
Name of Person Conducting Informed Consent Discussion / Witness (Printed)	
Signature of Person Conducting Informed Consent Discussion / Witness	Date
Principal Investigator Signature (if different from above)	Date

Script

1. Introduction

In this experiment I am going to use an EMG, which senses the electrical activity of your muscles, to allow you to drive a remote control car. I will place pairs of electrodes over muscles in your lower arm and then brace your arms so that the muscles will be in a constant position while we conduct the trial. Then, I will ask you to contract those muscles in order to control the toy car and drive it through a course I have prepared. If you are ready now, I will begin placing the electrodes on your arm.

2. Calibration

With the electrodes now in place, we are going to calibrate the system. I am going to ask you to rest and then contract each of the braced muscles as hard as you can in order to get a baseline reading for the system. It is best that you flex using your fingertips and extend using your fingernails in order to get the most accurate reading for the maximum activation of the muscle.

3. Control Training

Your dominant arm will be used to control the steering of the car, while your other arm will be used to control the forward and backward motion of the car. You may now try moving your arms to move the wheels left and right, as well as move the car forward and back.

I am now going to place the car inside the box. In order to learn to drive the car using this specific algorithm, I am going to ask you to drive the car through a full 360° of rotation from one full turn in one direction. Please let me know if you feel that any adjustments should be made to the sensitivity of the controls. When you have completed this, I will have you take the NASA TLX survey to rate how difficult you felt this task was. After that we will move on to the driving course.

Before you begin, I will read the rating scale definitions of the survey so you can keep them in mind as you complete the task.

4. Functional Training/Testing

When I tell you to begin, I want you to navigate through the course and cross the blue tape at the end. You should pass through each of the gates marked by the white tape and avoid hitting the cones and the walls. If you hit a cone, three seconds will be added to your total time.

5. NASA TLX

Now that you have completed the course using this algorithm, I am going to have you take the NASA TLX survey to rate how difficult you felt this task was.

Appendix E

NASA TLX Survey

Figure 8.6

NASA Task Load Index

Hart and Staveland's NASA Task Load Index (TLX) method assesses work load on five 7-point scales. Increments of high, medium and low estimates for each point result in 21 gradations on the scales.

Name	Task				Date	
Mental Demand		How	v menta	illy de	manding	g was the task?
	1 1	Т		11	1 1	
Very Low			11			Very High
Physical Demand	How p	hysica	ily dem	andin	g was tr	ie task?
Very Low						Very High
Temporal Demand	How h	urried	or rush	ed wa	s the pa	ice of the task?
		- I				
Very Low						Very High
Performance	How s you we	uccess ere ask	sful wer ad to c	re you to?	in acco	mplishing what
					11	
Perfect					•	Fallure
Effort	How h your le	ard did wel of	i you h perforn	ave to nance	work to ?	accomplish
Very Low						Very High
Frustration	How Ir and ar	isecure	e, disco I werey	ourage ou?	sd, Irritat	ed, stressed,
Very Low		-	ł	•	- •	Very High

	RATING SCA	LE DEFINITIONS
Title	Endpoints	Descriptions
MENTAL DEMAND	Low/High	How much mental and perceptual activity was required (e.g., thinking, deciding, calculating, remembering, looking, searching, etc.)? Was the task easy or demanding, simple or complex, exacting or forgiving?
PHYSICAL DEMAND	Low/High	How much physical activity was required (e.g. pushing, pulling, turn- ing, controlling, activating, etc.)? Was the task easy or demanding, slow or brisk, slack or strenuous, restful or laborious?
TEMPORAL DEMAND	Low/High	How much time pressure did you feel due to the rate or pace at which the tasks or task elements occurred? Was the pace slow and leisurely or rapid and frantic?
PERFORMANCE	good/poor	How successful do you think you were in accomplishing the goals of the task set by the experimenter (or yourself)? How satisfied were you with your per- formance in accomplishing these goals?
EFFORT	Low/High	How hard did you have to work (men- tally and physically) to accomplish your level of performance?
FRUSTRATION	Low/High	How insecure. discouraged. irritated. stressed and annoyed versus secure. gratified. content. relaxed and compla- cent did you feel during the task?

Effort		Temporal Demand
or	•	or
Performance	•	Frustration
i criorinalice		TUSTIBUI
	• • • • • • •	
Terrorit	•	
Temporal Demand		Physical Demand
or	•	
	:	01
Effort		Frustration
	•	
	•	
Performance		Physical Demand
		r nysicar o cinana
or		or
Frustration		Temporal Demand
	•	
Physical Demand		Temporal Demand
or		or
Performance	•	Martal D.
renormance	15	Mental Demand

Frustration		Performance
or		or
	•	
Effort	•	Mental Demand
	•	
	÷	
Performance		Mental Demand
renormance		Mental Demand
or		or
		01
Temporal Demand		Effort
		LIGIC
	•	
Mental Demand		Effort
	•	
or	•	or
DI 1 1 D		
Physical Demand		Physical Demand
Frustration		
or		
Mental Demand		
	16	

Subject	ID:	
ouples.		

Date:		
	the second se	

Scale Title	Tally	Weigh
MENTAL DEMAND		
PHYSICAL DEMAND		
TEMPORAL DEMAND		
PERFORMANCE		
EFFORT		
FRUSTRATION		

Total count = _____

(NOTE - The total count is included as a check. If the total count is not equal to 15, then something has been miscounted. Also, no weight can have a value greater than 5.) Subject ID:

Task ID:

WEIGHTED RATING WORKSHEET			
Scale Title	Weight	Raw Rating	Adjusted Rating (Weight X Raw)
MENTAL DEMAND			
PHYSICAL DEMAND			
TEMPORAL DEMAND			
PERFORMANCE			
EFFORT			
FRUSTRATION			

Sum of "Adjusted Rating" Column = _____

WEIGHTED RATING = [i.e., (Sum of Adjusted Ratings)/15]

Appendix F: Schematics

EMG Amplifying Board



EMG Filters



Switch Circuit



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Dial Switch





Remote Control Car Arduino Circuit



Appendix G: Arduino Code

Code used to process EMG data and transmit to car.

#include <EasyTransfer.h>
EasyTransfer ET;

struct SEND_DA	TA_STRUCTURE{
int angle;	
int carspeed;	
int cardirec;	
<u>}:</u>	

};

SEND_DATA_STRUCTURE txdata;

/*-----

variables for LEDs and push button -----*/ const int ledFlex = 13; const int ledRest = 12; const int ledExtend = 11; const int ledLeft = 10; const int ledRight = 9; const int ArmPin = 8; const int CalibratePin = 7; const int EmergencyPin = 6; const int LinearPin = 5; const int DigitalPin = 4; const int NonlinearPin = 3; int buttonState = 0; int emergencyState = 0; int armState = 0; int linearState = 0; int digitalState = 0; int nonlinearState = 0; int ledActive;
/*-----*/ pins for EMG channels -----*/ const int Channel1 = A2;

const int Channel2 = A3; const int Channel3 = A4; const int Channel4 = A5;

/*_____

variables for the original and mapped values of the sensor pins

-----*/

int C1sensorval; int C2sensorval; int C3sensorval; int C4sensorval; int C1mapval; int C2mapval; int C3mapval;

int C4mapval;

/*_____

variables for calibration method and calculation of channel averages

-----*/

const int calib_array_size = 200; float sumRest; float sumActive; float C1Rest; float C1Active; float C2Rest; float C2Active; float C3Rest; float C3Active; float C4Rest; float C4Active; int C1LinMax; int C2LinMax; int C4LinMax; const float gain = 1.00;

/*_____ variables to determine position for servo and stepper motors -----*/ int steerdiff; int speeddiff; int leftmap; int rightmap; int forwardmap; int backmap; const int thresh = 10; const float leftslope = 0.4333; const float rightslope = -0.4333; const float forwardslope = 0.7111; const float backslope = 0.7111; int straight = 81; float degreeconv; int degree; float spdconv; int spd; int direc; float degree1; int degree2; int debug = 0; void setup() { Serial.begin(9600); analogReference(INTERNAL); setupCalibration(); /* code below reads data from each sensor pin for 2 seconds to prevent erroneous data due to analog Reference being changed*/ int C1test = analogRead(Channel1); int C2test = analogRead(Channel2); int C3test = analogRead(Channel3); int C4test = analogRead(Channel4); delay(2000);

```
ET.begin(details(txdata), &Serial);
}
```

```
void loop() {
 emergencyState = digitalRead(EmergencyPin);
 if (emergencyState == HIGH) {
  digitalWrite(ledExtend, HIGH);
  spd = 0;
  degree = straight;
  txdata.angle = degree;
  txdata.carspeed = spd;
  ET.sendData();
}
 if (emergencyState == LOW) {
  digitalWrite(ledExtend, LOW);
  buttonState = digitalRead(CalibratePin);
  if (buttonState == HIGH) {
   armState = digitalRead(ArmPin);
   C1Rest = 0;
   C1Active = 0;
   C2Rest = 0;
   C2Active = 0;
   C3Rest = 0;
   C3Active = 0;
   C4Rest = 0;
   C4Active = 0;
```

```
digitalWrite(ledRight, HIGH);
ledActive = ledExtend;
calibration(Channel1);
C1Rest = sumRest / calib_array_size;
C1Active = sumActive / calib_array_size;
C1LinMax = round(C1Active * gain);
delay(1000);
```

```
ledActive = ledFlex;
calibration(Channel2);
C2Rest = sumRest / calib_array_size;
C2Active = sumActive / calib_array_size;
C2LinMax = round(C2Active * gain);
delay(1000);
digitalWrite(ledRight, LOW);
```

```
digitalWrite(ledLeft, HIGH);
ledActive = ledFlex;
calibration(Channel3);
C3Rest = sumRest / calib_array_size;
C3Active = sumActive / calib_array_size;
C3LinMax = round(C3Active * gain);
delay(1000);
```

```
ledActive = ledExtend;
calibration(Channel4);
C4Rest = sumRest / calib_array_size;
C4Active = sumActive / calib_array_size;
C4LinMax = round(C4Active * gain);
delay(1000);
digitalWrite(ledLeft, LOW);
}
```

```
if (buttonState == LOW) {
    linearState = digitalRead(LinearPin);
    digitalState = digitalRead(DigitalPin);
    nonlinearState = digitalRead(NonlinearPin);
```

```
if (armState == LOW) {
    leftmap = C4mapval;
    rightmap = C3mapval;
    forwardmap = C2mapval;
    backmap = C1mapval;
    steerdiff = C4mapval - C3mapval;
    speeddiff = C2mapval - C1mapval;
```

```
else {
 leftmap = C2mapval;
 rightmap = C1mapval;
 forwardmap = C3mapval;
 backmap = C4mapval;
 steerdiff = C2mapval - C1mapval;
 speeddiff = C3mapval - C4mapval;
}
```

}

```
C1sensorval = analogRead(Channel1);
C1mapval = constrain(map(C1sensorval, C1Rest, C1LinMax, 0, 100), 0, 100);
C2sensorval = analogRead(Channel2);
C2mapval = constrain(map(C2sensorval, C2Rest, C2LinMax, 0, 100), 0, 100);
C3sensorval = analogRead(Channel3);
C3mapval = constrain(map(C3sensorval, C3Rest, C3LinMax, 0, 100), 0, 100);
C4sensorval = analogRead(Channel4);
C4mapval = constrain(map(C4sensorval, C4Rest, C4LinMax, 0, 100), 0, 100);
```

```
if (linearState == HIGH) {
 digitalWrite(ledFlex, HIGH);
 digitalWrite(ledRest, LOW);
 if (steerdiff > thresh) {
  degreeconv = ((leftslope * leftmap) + 76.6667);
  degree = constrain(degreeconv, straight, 120);
 }
 else if (steerdiff < -thresh) {</pre>
  degreeconv = ((rightslope * rightmap) + 85.3333);
  degree = constrain(degreeconv, 42, straight);
 }
 else {
  degree = straight;
 }
 if (speeddiff > thresh) {
  spdconv = ((forwardslope * forwardmap) - 7.1111);
  spd = constrain(spdconv, 0, 64);
  direc = 1;
```

```
}
 else if (speeddiff < -thresh) {</pre>
  spdconv = ((backslope * backmap) - 7.1111);
  spd = constrain(spdconv, 0, 64);
  direc = 0;
 }
 else {
  spd = 0;
  direc = 0;
 }
}
if (digitalState == HIGH) {
 digitalWrite(ledRest, HIGH);
 digitalWrite(ledFlex, LOW);
 if (steerdiff > thresh) {
  degree = 120;
 }
 else if (steerdiff < -thresh) {</pre>
  degree = 42;
 }
 else {
  degree = straight;
 }
 if (speeddiff > thresh) {
  spd = 64;
  direc = 1;
 }
 else if (speeddiff < -thresh) {
  spd = 64;
  direc = 0;
 }
 else {
  spd = 0;
  direc = 0;
 }
}
```

```
if (nonlinearState == HIGH) {
    digitalWrite(ledFlex, HIGH);
    digitalWrite(ledRest, HIGH);
    if (steerdiff > thresh) {
     0.02950*46))) - 1);
     degree2 = round((degree1 * 29.50) + 81);
     degree = constrain(degree2, straight, 120);
    }
    else if (steerdiff < - thresh) {</pre>
     degree1 = ((pow(2.71828, ((-46*(rightmap-10))*0.001))) - 1) / ((pow(2.71828, (-
0.02950*46))) - 1);
     degree2 = round((degree1 * -29.50) + 81);
     degree = constrain(degree2, 42, straight);
    }
    else {
     degree = straight;
    }
    if (speeddiff > thresh) {
     spdconv = ((pow(2.71828, ((-46*(forwardmap-10))*0.001))) - 1) / ((pow(2.71828, (-
0.06102*46))) - 1);
     spd = round(spdconv * 61.02);
     spd = constrain(spd, 0, 64);
     direc = 1;
    }
    else if (speeddiff < -thresh) {
     spdconv = ((pow(2.71828, ((-46*(backmap-10))*0.001))) - 1) / ((pow(2.71828, (-
0.06102*46))) - 1);
     spd = round(spdconv * 61.02);
     spd = constrain(spd, 0, 64);
     direc = 0;
    }
    else {
     spd = 0;
     direc = 0;
    }
   }
```

```
if (linearState == LOW && digitalState == LOW && nonlinearState == LOW) {
    digitalWrite(ledFlex, LOW);
   digitalWrite(ledRest, LOW);
    spd = 0;
   degree = straight;
   direc = 0;
   }
   constrain(degree, 42, 120);
   constrain(spd, 0, 64);
   txdata.angle = degree;
   txdata.carspeed = spd;
  txdata.cardirec = direc;
  ET.sendData();
 }
}
}
/*_____
method used to find the sum of resting and flexion/extension values for
the specified EMG channel (sensorPin); the average is then calculated in
the loop code
-----*/
void calibration(int sensorPin) {
int calibrationArray[calib array size];
int i = 0;
int sensorval;
sumRest = 0;
sumActive = 0;
 blinkLED(ledRest);
 while (i < calib array size) {
 sensorval = analogRead(sensorPin);
 calibrationArray[i] = sensorval;
 sumRest = sumRest + calibrationArray[i];
 delay(15);
 i = i + 1;
 }
```

```
if (i == calib array size) {
  digitalWrite(ledRest, LOW);
 }
i = 0;
 delay(1000);
 blinkLED(ledActive);
 while(i < calib array size) {</pre>
  sensorval = analogRead(sensorPin);
  calibrationArray[i] = sensorval;
  sumActive = sumActive + calibrationArray[i];
  delay(15);
 i = i + 1;
 }
if (i == calib array size) {
  digitalWrite(ledActive, LOW);
}
}
/*-----
initializes the pins for LEDs and the button of the calibration system
-----*/
void setupCalibration() {
 pinMode(ledLeft, OUTPUT);
 pinMode(ledRight, OUTPUT);
 pinMode(ledRest, OUTPUT);
 pinMode(ledFlex, OUTPUT);
 pinMode(ledExtend, OUTPUT);
 pinMode(ArmPin, INPUT);
 pinMode(CalibratePin, INPUT);
 pinMode(EmergencyPin, INPUT);
 pinMode(LinearPin, INPUT);
 pinMode(DigitalPin, INPUT);
 pinMode(NonlinearPin, INPUT);
```

```
digitalWrite(ledLeft, LOW);
digitalWrite(ledRight, LOW);
digitalWrite(ledRest, LOW);
digitalWrite(ledFlex, LOW);
digitalWrite(ledExtend, LOW);
}
```

/*----method used to blink the LEDs, signaling to the user which channel
is being calibrated
------*/
void blinkLED(int led) {
 digitalWrite(led, HIGH);
 delay(500);
 digitalWrite(led, LOW);
 delay(500);
 digitalWrite(led, HIGH);
 delay(500);
 digitalWrite(led, LOW);
 delay(500);
 digitalWrite(led, HIGH);
 delay(500);
 digitalWrite(led, LOW);
 delay(500);
 digitalWrite(led, HIGH);
 delay(500);
 delay(500);
 delay(500);
 digitalWrite(led, HIGH);
 delay

}

Code downloaded to car to receive transmission and control car.

```
#include <Servo.h>
Servo Steer;
#include <EasyTransfer.h>
EasyTransfer ET;
const int speedpin = 11;
const int dirpin = 13;
int servo;
int spd;
int dir;
```

```
struct RECEIVE_DATA_STRUCTURE {
    int angle;
    int carspeed;
    int cardirec;
```

```
};
```

```
RECEIVE_DATA_STRUCTURE txdata;
void setup() {
Serial.begin(9600);
 setupMotor();
 ET.begin(details(txdata), &Serial);
 Steer.attach(9);
}
void loop() {
 if(ET.receiveData()){
  servo = constrain(txdata.angle, 42, 120);
  spd = constrain(txdata.carspeed, 0, 127);
  dir = constrain(txdata.cardirec, 0, 1);
  Steer.write(servo);
  Drive(dir, spd);
 }
}
void Drive(int dir, int spd) {
 digitalWrite(dirpin, dir);
 analogWrite(speedpin, spd);
```

}

void setupMotor() {
 pinMode(speedpin, OUTPUT);
 pinMode(dirpin, OUTPUT);
 digitalWrite(speedpin, LOW);
 digitalWrite(dirpin, LOW);
}