University of Jordan
School of Engineering
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EXPERIMENT# 7 REPORT

Aiming and Steadiness

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Objective:

- Measure the aspects of Aiming, eye-hand coordination.
- Measure the aspects of steadiness, arm-hand coordination.

Introduction:

Aiming is the ability to move one's hand to a precise stationary position. It differs from arm-hand steadiness in that aiming requires the person to move the hand to a particular position, rather than just holding it stationary. These abilities are highly related to precision working; it is most easily seen in dentistry where the dentist moves the drill to the precise, appropriate position on the affected tooth.

Arm-hand steadiness is the ability to hold one's hand and arm in a specific position for a relatively short period of time. This ability is highly related to the category of precision working. Specifically, it can be seen in the occupations of dentistry or watch repair. In these jobs, tools need to be held in a precise position for at least a short period of time. This factor does not involve eye-hand coordination, as is the case with the aiming factor.

Instruments:

Hole plate is a manipulative dexterity test. The subject's task is to hold a metal-tipped stylus in 9 progressively smaller hole sizes stationary without touching the sides.
Hole diameters: 1.156, 1.125, .5, .312, .25,.187,.109,.093,.078 inches.
Stylus diameter: .0625

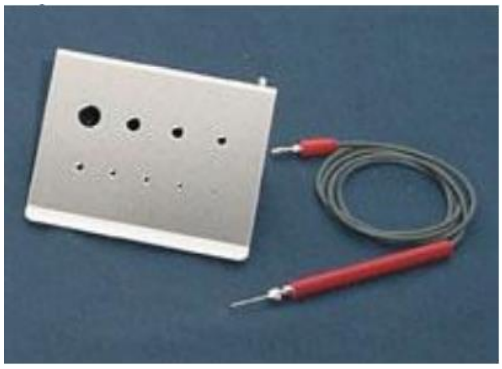

Figure1: Hole plate

Figure2: slot type grooved steadiness tester

Procedure:

A. For Aiming experiment

1. The person stands at a comfortable distance from the hole-plate holding the stylus in the dominant hand as holding a pencil.
2. Reset the counter and stopwatch to zero.
3. Flip the toggle switch to the start position.
4. Start the stopwatch at the same time.
5. The subject will insert rapidly the stylus in each of the specified 9 holes starting with the largest without touching the edges. - Each time the stylus touches an edge, it will be registered as an error or contact on the impulse counter. In addition, you can record the total amount of time for the task.
6. When the subject withdraws the stylus from the last hole, stop the stopwatch.
7. Record the time in seconds required in completing the task, and the number of contacts recorded on the impulse counter.

B. For Steadiness experiment

1. The person stands at a comfortable distance from the hole-plate holding the stylus in the dominant hand.
2. Reset the counter and stopwatch to zero.
3. The instructor should hold the stopwatch in one hand and ready his other hand to flip the toggle switch to the start position. The instructor should flip the toggle switch on and start the stopwatch at the same time.
4. The subject will hold the stylus in each of the specified 9 holes without touching the edges for 15 seconds. Each time the stylus touches an edge, it will be registered on the counter as an error or contact. Note: reset stopwatch to zero for each hole but do not reset the counter until the person finishes the 9 holes.
5. Record the number of contacts made as registered on the counter.

Collected data :

A1)

	Name	Trial	Time	Number of errors	Errors time
Males	Khaled	1	20	11	1.429
		2	11.8	12	1.271
		3	10.5	9	0.923
		Mean	14.100	10.667	1.208
		Std. dev.	5.151	1.528	0.259
	Abdalaziz	1	14.1	19	1.534
		2	8.5	16	1.949
		3	9.1	7	0.905
		Mean	10.567	14.000	1.463
		Std. dev.	3.075	6.245	0.526
	Bassam	1	11	18	2.472
		2	8.1	13	1.951
		3	6.7	18	2.073
		Mean	8.600	16.333	2.165
		Std. dev.	2.193	2.887	0.272
	Amro	1	8.3	14	1.954
		2	12.8	11	1.081
		3	9.9	8	0.628
		Mean	10.333	11.000	1.221
		Std. dev.	2.281	3.000	0.674
	Abdallah	1	8.3	14	1.954
		2	9	17	3.045
		3	8.1	6	1.323
		Mean	8.467	12.333	2.107
		Std. dev.	0.473	5.686	0.871
	Yahya	1	11	10	0.871
		2	8	10	1.521
		3	9.3	7	1.114
		Mean	9.433	9.000	1.169
		Std. dev.	1.504	1.732	0.328

Females	Jumana	1	19.28	24	2.5
		2	14.02	10	1.915
		3	12.07	16	1.827
		Mean	15.123	16.667	2.081
		Std. dev.	3.729	7.024	0.366
	Maryam	1	20.9	19	1.514
		2	18.25	9	1.238
		3	12.24	13	1.01
		Mean	17.130	13.667	1.254
		Std. dev.	4.437	5.033	0.252
	Rama	1	11.84	19	2.4
		2	10.79	11	1.029
		3	7.89	8	1.238
		Mean	10.173	12.667	1.556
		Std. dev.	2.046	5.686	0.739
	Layan	1	13.04	21	2.175
		2	14.04	10	0.87
		3	13.03	16	2.107
		Mean	13.370	15.667	1.717
		Std. dev.	0.580	5.508	0.735
	Sara	1	20.11	13	1.792
		2	11.09	14	2.162
		3	8.31	7	0.959
		Mean	13.170	11.333	1.638
		Std. dev.	6.169	3.786	0.616
	Dina	1	14.82	18	3.776
		2	12	6	1.097
		3	10.58	12	1.097
		Mean	12.467	12.000	1.990
		Std. dev.	2.158	6.000	1.547

		Time	Number of errors	Errors time
Males	Mean	10.250	12.222	1.555
	Std. Dev	3.082	4.138	0.627
Females	Mean	13.572	13.667	1.706
	Std. Dev	3.802	5.099	0.746
All	Mean	11.911	12.944	1.631
	Std. Dev	3.804	4.635	0.684

A2)

	Name	Trial	Time	Distance
Males	Khaled	1	0.81	15.5
		2	0.58	19
		3	0.74	20
		Mean	0.710	18.167
		Std. dev.	0.118	2.363
	Abdalaziz	1	1.01	12
		2	1.69	17
		3	1.58	17.2
		Mean	1.427	15.400
		Std. dev.	0.365	2.946
	Bassam	1	0.77	16
		2	0.98	15.5
		3	0.97	13.5
		Mean	0.907	15.000
		Std. dev.	0.118	1.323
	Amro	1	4.47	22
		2	6.69	18.5
		3	8.45	21
		Mean	6.537	20.500
		Std. dev.	1.994	1.803
	Yousef	1	3.35	19
		2	2.78	19
		3	1.7	15
		Mean	2.610	17.667
		Std. dev.	0.838	2.309
	Yahya	1	0.83	16
		2	0.57	16
		3	0.62	15.5
		Mean	0.673	15.833
		Std. dev.	0.138	0.289

Females	Maryam	1	20	10.23
		2	19	6.17
		3	19.5	5.99
		Mean	19.500	7.463
		Std. dev.	0.500	2.398
	Jumana	1	21.6	9.57
		2	17.1	5.33
		3	22	4.66
		Mean	20.233	6.520
		Std. dev.	2.721	2.663
	Dina	1	20.9	7.62
		2	15.5	3.32
		3	17.5	5.53
		Mean	17.967	5.490
		Std. dev.	2.730	2.150
	Rama	1	12.3	5.13
		2	18.3	4.92
		3	18.5	5.1
		Mean	16.367	5.050
		Std. dev.	3.523	0.114
	Layan	1	23	6.3
		2	20	4.26
		3	20.5	4.45
		Mean	21.167	5.003
		Std. dev.	1.607	1.127
	Sara	1	17	3.93
		2	19.5	6.16
		3	20	6.43
		Mean	18.833	5.507
		Std. dev.	1.607	1.372

		Time	Distance
Males	Mean	2.144	17.094
	Std. Dev	2.263	2.602
Females	Mean	19.011	5.839
	Std. Dev	2.530	1.802
All	Mean	10.578	11.467
	Std. Dev	8.874	6.119

B) **(Females' data are take from another group, because there was not data in ours)*

	Name	Trial	Number of errors	Errors time
Males	Abdalaziz	1	48	6.230
		2	63	7.338
		3	54	6.136
		Mean	55.000	6.568
		Std. dev.	7.550	0.668
	Amro	1	26	2.576
		2	52	13.334
		3	41	9.528
		Mean	39.667	8.479
		Std. dev.	13.051	5.455
	Abdallah	1	45	24.679
		2	17	32.887
		3	21	30.145
		Mean	27.667	29.237
		Std. dev.	15.144	4.179

Females	Pascale	1	19	2.643
		2	9	1.377
		3	8	1.028
		Mean	12.000	1.683
		Std. dev.	6.083	0.850
	Marah	1	37	2.825
		2	25	1.759
		3	41	3.833
		Mean	34.333	2.806
		Std. dev.	8.327	1.037
	Leen	1	76	12.967
		2	28	2.388
		3	6	0.749
		Mean	36.667	5.368
		Std. dev.	35.796	6.632

		Time	Distance
Males	Mean	40.778	14.761
	Std. Dev	15.967	11.422
Females	Mean	27.667	3.285
	Std. Dev	22.551	3.692
All	Mean	34.222	9.023
	Std. Dev	19.854	10.144

Conclusions:

A. For Aiming experiment

- For the hole aiming, the fastest subject was Abdallah and the most accurate was Yahya, this indicates that aiming for males is better than it for females, because males are used to have more control while moving objects (dynamic).
- For the slot aiming, the best scores were for Khaled; with a little time and relatively long distance, again this indicates that aiming for males is better than it for females, because males are used to have more control while moving objects.
- If we decrease the hole diameter, the number of errors increases.
- This is an aiming process that contains continuous movement of the hand, so it does need visual acuity to perform the eye-hand coordination.

B. For Steadiness experiment

- All subjects used the same time interval to perform the experiment (15 seconds * 7 holes), but number of errors and errors time was less for females, because they are used to have more control in steadiness (static).
- As mentioned in the Procedure of the experiment; the difference is that aiming is performed by movement of the hand between holes, and measuring the time and number of errors, while steadiness is performed by fixing hand position for specific period of time.
- If the hole diameter is decreased, the number of errors increases.
- This process needs holding the hand in a specific position, there is no movement, i.e. there is no need for eye-hand coordination. So the need for visual acuity is minimum.