

WARNING

This material has been reproduced and communicated to you by or on behalf of *Charles Darwin University* in accordance with section 113P of the *Copyright Act 1968 (Act)*.

The material in this communication may be subject to copyright under the Act.
Any further reproduction or communication of this material by you may be the subject of copyright protection under the Act.

Do not remove this notice



Family Name	
Given Names	
Student Number	
Teaching Period	Semester 1, 2017

FINAL EXAMINATION	DURATION
SPE210 – Motor Control and Development	Reading Time: 10 minutes
	Writing Time: 120 minutes

INSTRUCTIONS TO CANDIDATES

EXAM CONDITIONS

You may begin writing from the commencement of the examination session. The reading time indicated above is provided as a guide only.

This is a CLOSED BOOK examination

No calculators are permitted

No handwritten notes are permitted

No dictionaries are permitted

ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED
No additional printed material is permitted	1 x 8 Page Book 1 x Scrap Paper

**THIS EXAMINATION IS PRINTED
DOUBLE-SIDED.**

**THIS PAGE HAS BEEN INTENTIONALLY LEFT
BLANK.**

SECTION B

Short Answer Questions

Total Marks for this section: 40

Marks for each question are indicated. Suggested time allocation for Section B: 40 minutes

Question 41

Define what a *'skill'* is. And describe two ways of classifying a skill in motor learning/ performance with an example sport for each type.

Skill definition:

One type of skill with example sport:

Second type of skill with example sport:

(Marks: 3)

Question 42

Explain the benefits of *implicit learning* when learning a new skill and provide an example to support your explanation.

(Marks: 4)

Question 43

Name two of the three possible **memory systems** and describe how the named system deals with information:

(1) _____ memory system

Definition: _____

(2) _____ memory system

Definition: _____

(Marks: 4)

Question 44

Consider the **Speed Accuracy Trade Off** phenomenon. Describe what happens under the following conditions:

(1) Low Forceful movements

(2) Moderate Forceful movements

(3) Very Forceful movements

(Marks: 3)

Question 45

Each of the following statements has **TWO (2)** terms underlined. **CIRCLE THE CORRECT UNDERLINED** term to complete each sentence.

i) Neural cells have Sodium and Chloride ions on one side and potassium ions on the other. ATPases / pumps maintain the balance of ions. This balance is the Action/Resting Potential of the membrane.

ii) Contracting a muscle increases/decreases the tension on the muscle spindle.

iii) Basal ganglia receive inputs from multiple areas in the cerebral cortex and ultimately influence motor cortex output via the hypothalamus/ thalamus.

iv) Fast motor units innervate fast twitch/ slow twitch muscle fibres

v) All stretch reflexes are monosynaptic/polysynaptic and contralateral/ipsilateral.

(Marks: 5)

Question 46

Describe **Schema Theory**. What kind of practice enhances Schema Learning? Give a sport example.

(Marks: 3)

Question 47

Define **Blocked Practice** and **Random Practice** and describe how both of these can be used in a coaching situation. Give a specific sporting example of each type of practice when you would use it and the associated benefits.

(Marks: 6)

Question 48

What is a **GMP (Generalised Motor Program)**? Describe. Briefly outline what aspects of a GMP performers can change to produce an alteration in the same type of movement. What aspects remain consistent or invariant? Give a physical performance example.

(Marks: 4)

Question 49

Anticipation is an important part of elite sport. Name **two** types of anticipation and outline a cost and a benefit to each.

(1) _____ Anticipation

Cost: _____

Benefit: _____

(2) _____ Anticipation

Cost: _____

Benefit: _____

(Marks: 4)

Question 50

There are multiple theories of Learning. Name the three stages of **Bernstein's Theory of Learning**:

(1) _____

(2) _____

(3) _____

Name one way that Bernstein's Theory differs to Fitt's Theory of Learning?

(Marks: 4)

This is the end of section B. Total 40 marks

Please ensure that you have written your name and student number on your exam booklet.

SECTION C

Short Essay Questions

Total Marks for this section: 40

This section should be answered in the Answer Booklet provided.

You may use diagrams to help answer the questions.

Marks for each question are indicated. Suggested time allocation for Section C: 40 minutes

Question 51

Both skills and abilities affect the future performance of a task. In coaching, it is often important to identify characteristics that are beneficial to performing a task as well as challenges in predicting future performance.

- 1) Distinguish between a skill and an ability by defining the terms.
- 2) Consider one sport from the following options: basketball, cross-country skiing, or tennis.
 - a. Describe some of the fundamental movements and activities required
 - b. List five abilities and skills—five total, not five each—that would make someone suited for performing the sport or activity. Indicate which are abilities and which are skills.
 - c. Explain how the abilities you listed influence the skills needed for performing the sport or activity well.
 - d. Describe one challenge that might be encountered in predicting who will perform the sport or activity well in the future.

(Marks: 10)

Question 52

Feedback is an important part of practice and learning. Define inherent and augmented feedback. With regard to effectiveness for learning discuss (provide sport specific examples for each):

- 1) feedback frequency
- 2) feedback timing (during or after movement)
- 3) feedback precision
- 4) feedback schedules

(Marks: 8)

Question 53

Discuss how both motor learning and transfer of skill can be measured. Provide sport specific examples which discuss how a coach could distinguish between temporary and relatively permanent effects.

(Marks: 8)

Question 54

An experiment will be described and results from it presented. Answer the questions that follow.

Experiment Design & Procedure: 20 participants took part in a study which recorded the *reaction time* (ms) it took for the participants to respond to a set of controlled stimuli with their dominate hand. A flashing light was the stimuli. The stimuli was presented with 3 configurations: 1) two light targets, 2) four light targets, 3) eight light targets. Both the age and the gender were recorded for each participant.

Data:

Table 1: The individual results from each participant with the overall summary data (average, standard deviation, minimum, and maximum) presented at the bottom.

Participant	Gender	Age (years)	2 Targets (ms)	4 Targets (ms)	8 Targets (ms)
participant 1	M	22	270	450	685
participant 2	F	45	360	750	1060
participant 3	M	29	250	480	705
participant 4	F	43	350	650	970
participant 5	F	32	260	510	720
participant 6	F	52	400	740	1110
participant 7	M	21	220	423	659
participant 8	M	33	230	490	705
participant 9	F	62	420	810	1140
participant 10	M	19	230	400	625
participant 11	M	34	250	520	750
participant 12	F	37	300	600	850
participant 13	M	53	390	820	1105
participant 14	F	34	330	630	854
participant 15	F	27	240	460	715
participant 16	M	36	350	720	970
participant 17	M	44	380	730	1025
participant 18	F	41	370	750	1025
participant 19	F	39	290	700	925
participant 20	F	31	240	490	695
	Average	36.7	307	606	865
	Standard Deviation	10.8	65	136	170
	Min	19.0	220	400	625
	Max	62.0	420	820	1140

Table 2: The average and standard deviation for the participants broken down by gender.

	N	Average Age	Ave 2 targets	Ave 4 targets	Ave 8 targets
Females	11	40.3	324	645	915
Males	9	32.3	286	559	803
	N	Std Dev Age	Std Dev 2 targets	Std Dev 4 targets	Std Dev 8 targets
Females	11	9.6	59.6	113	154
Males	9	10.6	64.3	146	169

Table 3: The average and standard deviation for the participants broken down by age groups.

	N	Average Age	Ave 2 targets	Ave 4 targets	Ave 8 targets
under 35	10	28.2	252	485	711
35 and over	10	45.2	361	727	1018
	N	Std Dev Age	Std Dev 2 targets	Std Dev 4 targets	Std Dev 8 targets
under 35	10	5.4	29.6	59.9	57.6
35 and over	10	7.8	39.1	62.9	86.2

Table 4: The results from a two-tailed, unpaired T-test with $\alpha=0.05$ for comparing 1) the reaction time between genders, 2) the reaction time for the two age categories (under 35 vs 35 and over). Comparisons were made for all three stimuli levels.

P Values from the results of a 2 tailed, unpaired T-test comparing: gender (male vs. female) and age (under 35 vs. 35 and over)			
Reaction Time			
	2 Targets	4 Targets	8 Targets
Male vs Females	0.21	0.18	0.16
Under vs Over 35	3.0E-06	1.3E-07	5.4E-08

Reaction Time vs Number of Stimuli

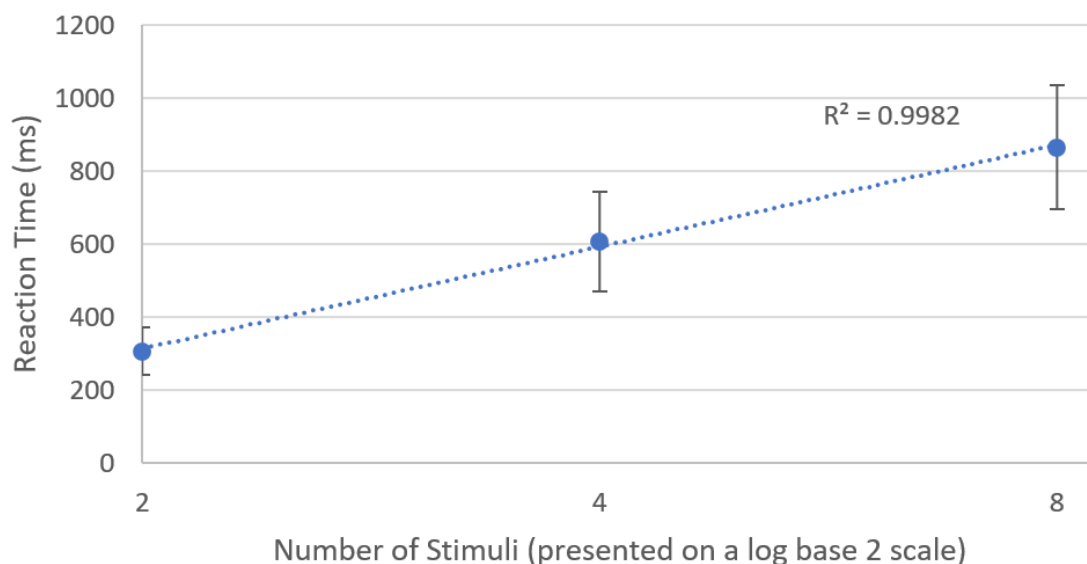


Figure 1: Average reaction time (ms) of all participants over the number of light stimuli. The x-axis is presented in a log base 2 scale and the R^2 value is shown for a best fit line. Error bars represent the standard deviation.

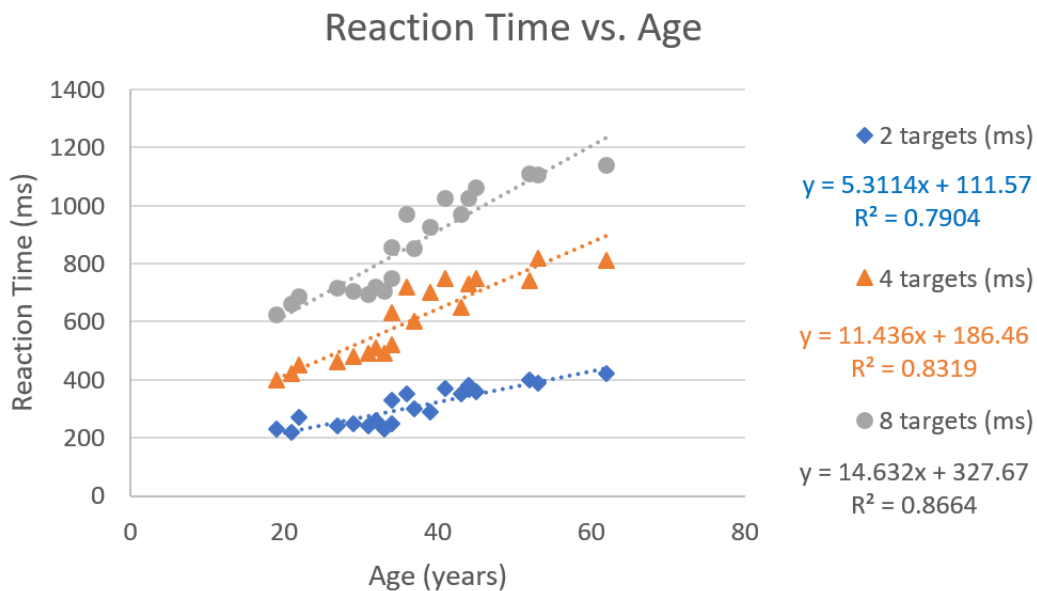


Figure 2: Reaction time (ms) over the age of the participants (N=20 for each target level). The linear regression equations as well as the R² values are shown for the best fit lines.

Questions:

- 1) Name and briefly describe the information processing law that this experiment is testing?
- 2) In this experiment, can it be concluded that gender influenced the reaction time? Provide specific information from the data to support your answer.
- 3) In this experiment, can it be concluded that age influenced the reaction time? Provide specific information from the data to support your answer.
- 4) Using the data presented, what conclusion can be made about the relationship between reaction time and the number of stimuli? Does this finding correspond with the law described in part 1 of this question?
- 5) Describe a sporting scenario where a coach can apply the principle behind this law in order to attempt to improve their athlete's performance of a specific task.

(Marks: 14)

This is the end of section C. Total 40 marks

Please ensure that you have written your name and student number on your exam paper and answer booklet.