

8.1 Motor control: feedback, timing and evidence

Name: _____ Class: _____ Date: _____ Total: 10 marks

KEY WORDS augmented feedback • knowledge of results

Objective

Motor control: feedback, timing and evidence. Supported HL concept preparation; original classroom practice, not an official IB paper or assessed learner work.

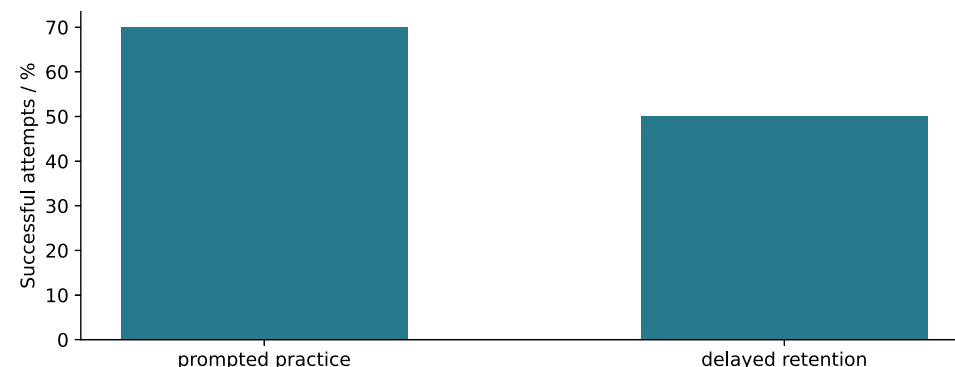
1 Key knowledge and worked examples

■ What would explain this observation?

- A learner adjusts a slow movement after seeing an error, but a very fast action may end before visual feedback can change it. Timing constrains the role of feedback.
- Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

■ Build the model

- Open-loop control emphasizes a pre-organized command during an action; closed-loop control uses feedback to compare the result with a goal and modify control. Many sporting actions combine feedforward preparation with feedback. Intrinsic feedback arises from the performer's sensory information, while **augmented feedback** is additional information supplied by another source.
- augmented feedback: Additional task information supplied beyond the performer's own sensory feedback; **knowledge of results** : Feedback about the outcome of an action.



■ Choose evidence that can test it

- Distinguish knowledge of results from knowledge of performance. A score reports the outcome; a description of arm position reports movement features. Feedback can guide practice, yet immediate success with continuous prompts may not persist when prompts are removed. Retention and transfer therefore provide stronger learning evidence than one practice score.
- Use a voluntary, low-risk seated target or tracing task. Define the outcome, keep practice opportunities equal, give an agreed feedback schedule and assess delayed performance without feedback. Counterbalance group order where feasible and use anonymous records. Do not claim the task completely models elite performance.

■ Work from known quantities

- State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution.
- Known: one trial provides 20 attempts and 14 successes, or 70%. A delayed no-feedback test provides 20 attempts and 10 successes, or 50%. The decline is 20 percentage points, not a 20% relative decline; relative decline is $(14-10)/14 \times 100$, approximately 28.6%. The observation supports investigating dependence on prompts, not a guaranteed explanation.

Example:

Success rate changes from 80% in practice to 55% in retention. Find the decrease in percentage points. Use the same sequence: known quantities → model → relation → substitution → unit and interpretation.

■ Check the conclusion and its limits

- Open-loop and closed-loop are models, not a claim that an athlete's nervous system uses only one mechanism. Feedback timing, task complexity and sensory availability affect what can be inferred.
- Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Warn:

A strong score with continuous prompts proves lasting motor learning. This claim is false: Open-loop and closed-loop are models, not a claim that an athlete's nervous system uses only one mechanism. Feedback timing, task complexity and sensory availability affect what can be inferred.

Key:

Motor control: feedback, timing and evidence: Distinguish knowledge of results from knowledge of performance. A score reports the outcome; a description of arm position reports movement features. Feedback can guide practice, yet immediate success with continuous prompts may not persist when prompts are removed. Retention and transfer therefore provide stronger learning evidence than one practice score.

2 Practice

2.1 Which comparison best examines persistence after practice? Choose one answer.

- **A** A delayed test without the practice prompts
- **B** Only the best prompted attempt
- **C** A different number of attempts for each group without adjustment

2.2 Success rate changes from 80% in practice to 55% in retention. Find the decrease in percentage points. Show the relation, substitution and units.

2.3 Decide whether this claim is true and justify: A strong score with continuous prompts proves lasting motor learning.

2.4 Additional task information supplied beyond the performer's own sensory feedback: write the technical term.

3 Exam-style questions

3.1 Fictional accuracy falls from 80% to 60% without prompts. Distinguish percentage-point and relative changes. Why is prompt dependence a hypothesis?

Solutions

2.1 A Distinguish knowledge of results from knowledge of performance. A score reports the outcome; a description of arm position reports movement features. Feedback can guide practice, yet immediate success with continuous prompts may not persist when prompts are removed. Retention and transfer therefore provide stronger learning evidence than one practice score.

2.2 $\text{Decrease} = 80 - 55 = 25$ percentage points; $\text{relative decrease} = 25/80 \times 100 = 31.25\%$.

2.3 False. Open-loop and closed-loop are models, not a claim that an athlete's nervous system uses only one mechanism. Feedback timing, task complexity and sensory availability affect what can be inferred.

2.4 augmented feedback. augmented feedback means Additional task information supplied beyond the performer's own sensory feedback.

3.1 The fall is 20 percentage points and 25% relative to baseline. Fatigue, task changes or variation could also explain it; controlled retention and transfer comparisons are needed.