Fagen et al. (2014): Elephant learning

Lesson 1.3.2 | Concepts and methods

1. Learning concepts

Operant conditioning: consequences change the likelihood of behaviour. **Positive reinforcement** adds a rewarding consequence to increase a response. **Negative reinforcement** removes an aversive event to increase a response; it is not punishment. **Punishment** reduces behaviour.

Primary reinforcer: has unlearned reinforcing value, such as food. **Secondary reinforcer:** gains value through association. **Shaping:** reinforce closer approximations. **Chaining:** link learned actions into a sequence.

2. Aim and sample

Test whether secondary positive reinforcement could train working elephants to cooperate voluntarily with a trunk wash for tuberculosis testing. This was structured observation of learning, not an experiment comparing training methods.

Five selected female elephants in one Nepalese stable: four juveniles aged 5-7, and one adult estimated in her 50s. Staff selected docile, nonpregnant animals without a current calf. They had traditional training histories, but not this reward method.

3. Training procedure

A whistle was paired with chopped banana (a primary reinforcer), becoming a bridge/secondary reinforcer. Trainers captured existing actions, used lures and shaped approximations. Spoken cues were added; small sequences were linked into the full chain.

Tasks: **trunk here** (tip on a palm), **trunk up**, **bucket** (tip inside), **blow** (exhale) and **steady** (hold position). A syringe and fluid were introduced gradually towards 60 mL. Rewards and gradual exposure helped reduce aversion. Progress was tailored to each elephant; mahouts remained nearby without signalling.

4. Measures

Records included session time, number of offers/cues and behavioural performance tests, about every five sessions from session 10. Passing required at least 80% success. Completed full-sequence training ended for that elephant.

> An offer is an opportunity, not necessarily success. The trainer judged response quality; not-yet-taught tasks received 0%, and some components of passed chains received a default 90%.

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Lesson 1.3.2 | Evidence and interpretation

1. Completion results

Elephant	Sessions to pass	Mean session minutes
1	30	12.42
2	25	10.29
3	35	13.27
4	35	11.11
5: adult	Did not complete	Not a completion value

Four of five elephants, all juveniles, completed within 35 sessions. Sessions averaged about 12 minutes overall; mean total training time across all five animals was 378 minutes. This is feasibility evidence for this group, not a comparison showing superiority over traditional methods.

2. Recorded learning progress

Mean recorded task success increased from **39.0% after 10 sessions to 89.3% after 35 sessions**. Successful animals had already stopped training, so only Elephants 3 and 4 remained in the session-35 mean. Scores also included defaults. This is not an identical pre/post test of all five.

Task	Mean offers before first pass
Trunk here	295.40
Trunk up	166.20
Bucket	61.40
Blow into bucket	54.25

3. Qualitative observations

For one elephant, replacing saline with water reduced drinking-related problems. The adult did not finish within the available time; calf distraction, a foot abscess and possible physical/vision issues complicate age explanations.

Some elephants completed the practical wash while failing a "steady" test requiring an unnecessary trunk-down position. Assessment criteria can understate functional competence.

Conclusion: reward-based training could establish a useful veterinary sequence in these juveniles. One adult's noncompletion does not show that adult elephants cannot learn.

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Lesson 1.3.2 | Evaluation and connections

1. Strengths

Practical relevance: the response served a real veterinary sampling purpose in a working stable.
Detailed repeated records: times, offers and performance tests documented learning rather than only final success.
Adaptation: shaping and gradual exposure allowed training to follow the individual learner's progress.

2. Limitations

No comparison group: superiority or welfare improvement relative to another method was not established.
Measurement: trainer judgements, default scores, some estimated times and changing membership of averages complicate interpretation.
Generalisability: five selected females in one stable, with only one adult, cannot represent all elephants or ages.

3. Animal welfare

The study used positive reinforcement during sessions without adding punishment. Elephants could turn or move away, but existing chains restricted their freedom. Training occurred in familiar stalls without changing normal husbandry; familiar conditions were not necessarily ideal.

Normal management restricted water mainly to grazing periods; water was also offered during training. The study did not impose extra deprivation to make rewards effective. Existing care, discomfort and the adult's health still require evaluation.

Evaluate replacement, species, justified numbers, housing, rewards/deprivation and pain/distress. Potential veterinary benefit is not the same as a directly measured improvement in welfare.

4. Applications and debates

Application: reward-based cooperation with husbandry and veterinary procedures.
Nurture: shaping/chaining illustrates learned behaviour, interacting with health, age and prior experience.
Individual/situational: differences between learners and training conditions were not separately isolated.
Animals: research can benefit the animals themselves, while still needing welfare safeguards.

> Remember: reinforcement increases behaviour; punishment decreases it. Positive/negative describe adding/removing consequences, not good/bad treatment.

Hint: State who remains in an average and how the score was assigned before describing a change as learning.