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Courses » Learning about Learning: A Course on Neurobiology of Learning and Memory

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Unit 3 - Rescorla Wagner Model of Learning

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Course outline

How to access the portal

Memory and Associative Learning/Classical Conditioning

Rescorla Wagner Model of Learning

- Application of Rescorla Wagner Model - I
- Application of Rescorla Wagner Model - II
- Application of Rescorla Wagner Model - III
- Application of Rescorla Wagner Model - IV
- Limitations of Rescorla Wagner Model
- Quiz : Week 2:

Week 2: Assignment

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-02-13, 23:59 IST.

This is an assignment based on Module 2 content.
Please be aware that all questions are multiple choice questions (MCQs) with only one correct option. Each question carries 1 mark and there are no negative marks for incorrect answers.

1) Which phenomenon is the following application of the Rescorla–Wagner (1972) model describing: "Pre-training a tone–US association ensures that the US is fully predicted on subsequent tone and light–US trials, preventing the development of a light-US association" ***1 point***

- Overshadowing
- Latent Inhibition
- Conditioned Inhibition
- Blocking

No, the answer is incorrect.
Score: 0

Accepted Answers:
Blocking

2) For a CS-US conditioning experiment, Alpha = 0.3 and Vmax = 1, how many trials would it need to reach half the Vmax value? ***1 point***

- After 1 training
- After 2 trainings
- After 3 trainings
- After 4 trainings

No, the answer is incorrect.
Score: 0

Accepted Answers:
After 2 trainings

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Conditioning

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Molecular basis of Memory and Learning

- 0.25, 0.5

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.125, 0.875

4) What would be an appropriate value of Vmax to apply to the Rescorla–Wagner (1972) model when simulating extinction? ***1 point***

- 100
- $V—V_{ALL}$
- α (alpha)
- 0

No, the answer is incorrect.
Score: 0

Accepted Answers:
0

5) In a fear conditioning experiment where Vmax=1, and alpha of CS = 0.8, one CS-US paired training has been performed, and V1 (CR after 1 training) = 0.8. How many minimum numbers of extinction trainings (unpaired CS) do we give to reduce CR by half of that? ***0 points***

- 2 CS presentations after one CS-US training
- 1 CS presentations, i.e. a single extinction training is sufficient to reduce CR to pre-learning state
- It will never reduce below 0.4
- Sufficient Information has not provided to estimate this

No, the answer is incorrect.
Score: 0

Accepted Answers:
2 CS presentations after one CS-US training

6) How do Rescorla and Wagner (1972) explain the study in which it was found that the probability of the US in the absence of a CS, influenced responding to the CS? ***1 point***

- The animal compares the probabilities of the US in the presence of the CS with its absence
- A no-CS representation acquires associative strength and blocks learning to the CS
- They do not, it is a major challenge to the Rescorla–Waner (1972) model.
- The background is an additional stimulus, which can acquire associative strength

No, the answer is incorrect.
Score: 0

Accepted Answers:
The background is an additional stimulus, which can acquire associative strength

7) When one changes the frequency of the tone used as a conditional stimulus (CS), the parameter that changes in Rescorla Wagner model is ***1 point***

- Vmax
- Both Vmax and alpha
- Alpha
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Alpha

8) Rescorla Wagner model shows that the current associative strength of a compound stimulus (Vcompound), consisting of stimulus A and stimulus B, is **1 point**

- the difference of the contributions from all the CS (Vcompound = |Va – Vb|)
- the sum of the contributions from all the CS (Vcompound = Va + Vb)
- the product of the contributions from all the CS (Vcompound = Va * Vb)
- the sum of ratios of the contributions from all the CS (Vcompound = Va/Vb + Vb/Va)

No, the answer is incorrect.
Score: 0

Accepted Answers:
the sum of the contributions from all the CS (Vcompound = Va + Vb)

9) In an experimental paradigm 3 groups of mice are trained to associate a light (CS1) and a tone (CS2) with the shock (US) in three different conditions, (i) CS1-US, (ii) CS2-US, (iii) Compound stimulus, CS1CS2-US. **1 point**
Vmax = 1, Alpha for CS1 =0.7, Alpha for CS2 = 0.2

What would be the comparative amount of learning (i.e increase in fear response across the trials) of the three groups after one training session?

- i > ii > iii
- i = ii = iii
- iii > i > ii
- iii > ii >i

No, the answer is incorrect.
Score: 0

Accepted Answers:
iii > i > ii

10) In an experimental paradigm 3 groups of mice are trained to associate a light (CS1) and a tone (CS2) with the shock (US) in three different conditions, (i) CS1-US, (ii) CS2-US, (iii) Compound stimulus, CS1CS2-US. **1 point**
Vmax = 1, Alpha for CS1 =0.7, Alpha for CS2 = 0.2

According to the R&W model, in the compound CS group (iii), if the alpha for CS2 were also to be 0.7, what would you observe after a training session?

- Vmax would consequently increase to accommodate higher CR
- CR would continue to surpass Vmax value and reach a new asymptote
- Over-expectation would reduce the CR for CS1 and CS2
- Blocking would lead to no learning

No, the answer is incorrect.
Score: 0

Accepted Answers:
Over-expectation would reduce the CR for CS1 and CS2

11) In an experimental paradigm 3 groups of mice are trained to associate a light (CS1) and a tone (CS2) with the shock (US) in three different conditions, (i) CS1-US, (ii) CS2-US, (iii) Compound stimulus, CS1CS2-US. **1 point**
Vmax = 1, Alpha for CS1 =0.7, Alpha for CS2 = 0.2

If Group iii were to be trained in 2-3 CS-US pairings before training with the compound stimulus (CS1CS2-US)

- Pre-training with CS1-US would be more prohibitive to the training of CS2 as a part of the compound stimulus
- Pre-training with CS2-US would be more prohibitive to the training of CS1 as a part of the compound stimulus
- Pre-training with another CS, (a puff of odor), CS3 with an alpha = 1 would be able to bloc the learning in the compound training
- Compound stimulus training would be unaffected by either CS1 or CS2 pre-training

No, the answer is incorrect.
Score: 0

Accepted Answers:
Pre-training with CS1-US would be more prohibitive to the training of CS2 as a part of the compou stimulus

12) Alpha can have values higher than 1. ***1 po***

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

13) Which of the following rules concerning the explanation of the Rescorla-Wagner Model is incorrect? ***1 point***

- if the strength of the US is greater than the strength of expectation, all CSs paired with a US get excitatory conditioning (V increases).
- if the strength of the US is less than the strength of expectation, all CSs paired with a US get inhibitory conditioning (V decreases).
- the rate of conditioning of more salient (noticeable) CSs will be lower (slow learning) than less salient CSs.
- if the strength of the US equals the strength of expectation, no conditioning takes place.

No, the answer is incorrect.
Score: 0

Accepted Answers:
the rate of conditioning of more salient (noticeable) CSs will be lower (slow learning) than less salient CS

14) Which of the following does the Rescorla-Wagner Model explain best? ***1 point***

- Occasion Setting
- Blocking
- Latent Inhibition
- Configural learning

No, the answer is incorrect.
Score: 0

Accepted Answers:
Blocking

15) In the case of a configural learning experiment, animals are trained in paired presentations of a light and a shock followed by a tone and a shock presentation. Subsequently, the tone and the light individually, as well as a compound of the tone and light were presented in the absence of shock. ***1 point***

How are the results best characterized?

- Intermediate levels of responding to the compound, and the tone and the light
- Stronger responding to the compound than to the light and tone separately
- Stronger responding to the light and tone than to the compound
- Weak levels of responding to the compound, and the tone and the light

No, the answer is incorrect.
Score: 0

Accepted Answers:
Stronger responding to the light and tone than to the compound

16) A farmer feeds his hens seeds on his farm. However, after learning neuroscience, he has an idea to train his favourite hen to associate the ringing of a bell with dinner time, where he gives it seeds. Now every time the farmer feeds his hen, he first changes from his plain white work apron int his huge striped house apron. Then, he goes into the dining room where he rings the bell and feeds hen the bird seeds by placing it on the floor. If he does not change into striped apron, even when he rings the bell, he doesn't scatter any seed on the floor. ***1 po***

Over a period of time he notices that the hen starts pecking the floor in anticipation of food only when the farmer rings the bell while wearing the huge striped apron. In such a case, the apron is is an example of:

- an occasion setter
- a compound stimulus
- a secondary reinforcer
- conditioned inhibitor

No, the answer is incorrect.
Score: 0

Accepted Answers:
an occasion setter

17) Which of the following descriptions best characterizes latent inhibition? ***1 point***

- A reduction in the effects of pairing a CS with a US, as a result of prior exposure to the US
- A reduction in the effects of pairing a CS with a US, as a result of prior exposure to the CS and the US
- A reduction in responding to a stimulus as a consequence of a context change
- A reduction in the effects of pairing a CS with a US, as a result of prior exposure to the CS

No, the answer is incorrect.
Score: 0

Accepted Answers:
A reduction in the effects of pairing a CS with a US, as a result of prior exposure to the CS

18) According to the stimulus-substitution model, with training which of the following happens? ***1 point***

- The CS comes to activate the UR directly.
- The CR comes to activate the UR directly.
- The CS activates the UR via excitation of US centers.
- The CR activates the US via excitation of the UR centers.

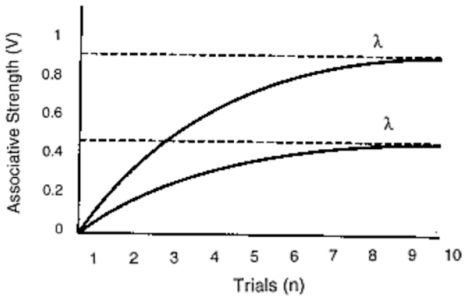
No, the answer is incorrect.
Score: 0

Accepted Answers:
The CS comes to activate the UR directly.

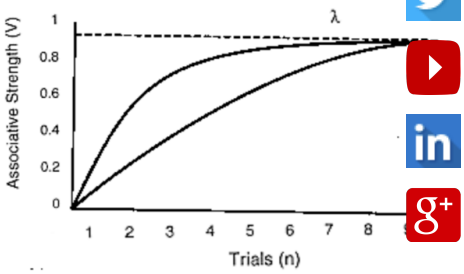
19) In Apartment A with a pest problem, the residents decided to use poisoned ***1 point***

food as rat-bait. A large dose would successfully kill the rats but a small amount of this food would make the rats violently ill. This food always had the same strong smell and flavor, and soon the rats began to avoid the bait all together, regardless of which location it was placed in. In Apartment B, the rat-bait used was always of a different flavor everyday but it was kept in the same place under the kitchen sink. The rats came to avoid this bait too eventually. While in both apartments rats learn to avoid the rat bait, in which case did they learn to do so faster? How would the graph comparing their rate of learning look like?

Graph 1



Graph 2



In Apartment A , the rats take longer time to learn to avoid the bait, the learning curves for these two cases is shown in graph 1

In Apartment A , the rats take longer time to learn to avoid the bait, the learning curves for these two cases is shown in graph 2

In Apartment B , the rats take longer time to learn to avoid the bait, the learning curves for these two cases is shown in graph 1

In Apartment B , the rats take longer time to learn to avoid the bait, the learning curves for these two cases is shown in graph 2

No, the answer is incorrect.
Score: 0

Accepted Answers:
In Apartment B , the rats take longer time to learn to avoid the bait, the learning curves for these two cas is shown in graph 2

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