Worksheet For Exercises From Chapter 16

Record Your Data From The Simulations In The Tables Below

	Positive Patterning	Negative Patterning
Previously Reinforced	**File: PRpos.net**	**File: PRneg.net**
	660	849
	657	836
	662	820
	660	826
	659	827
	Average: 659.6	***Average: 831.6***
Not Previously Reinforced	**File: NPRpos.net**	**File: NPRneg.net**
	824	660
	828	658
	834	652
	830	658
	812	658
	Average: 825.6	***Average: 657.2***

Table 16-2. Record of data obtained from Study 1

	Positive Patterning	Negative Patterning
Previously Reinforced	**File: PRpos.net**	**File: PRneg.net**
	61	58
	63	52
	58	51
	60	54
	60	51
	Average: 60.4	***Average: 53.2***
Not Previously Reinforced	**File: NPRpos.net**	**File: NPRneg.net**
	23	54
	19	54
	33	62
	66	58
	21	59
	Average: 32.4	***Average: 57.4***

Table 16-3. Record of data obtained from Study 2

Exercise 16.1

1. **Examine your results in Table 16-2. Is it possible for perceptrons to provide potential models of patterning? Why are you in a position to make this claim?**

Perceptrons can provide potential models of patterning. This can be said because a traditional perceptron was capable of learning in all of the conditions that were used in the Delamater et al. paper.

2. **Are your results consistent with those of the model that was created by Delamater, Sosa and Koch (1999)? Make sure that you describe how your results are consistent or inconsistent, in qualitative terms – a yes or no answer will not suffice! (You will have to consult Section 16.1.2 to answer this question.)**

The results in the first table suggest that when stimuli are previously reinforced, positive patterning is learned faster than is negative patterning. In contrast, when stimuli are not previously reinforced positive patterning is learned slower than is negative patterning. This pattern of results is exactly the pattern that was reported by Delamater et al.

3. **Are your results consistent with those of the animal data that was collected by Delamater, Sosa and Koch (1999)? Make sure that you describe how your results are consistent or inconsistent, in qualitative terms – a yes or no answer will not suffice! (You will have to consult 16.1.2 to answer this question)**

Because these results are essentially the same as Delamater et al. reported for their model, it can be said that the simulation results are not consistent with the animal data. This is because they reported for animals that previous reinforcement aided negative patterning (the opposite is true for the simulation data), and that it had very little effect on positive patterning.

EXERCISE 16.2

1. **Examine your results in Table 16-3. Is it possible for perceptrons to provide potential models of patterning? Why are you in a position to make this claim?**

Again, the networks converged in all of the conditions used by Delamater et al. Therefore, perceptrons can contribute to the patterning literature.

2. **Are your results consistent with those of the model that was created by Delamater, Sosa and Koch (1999)? Make sure that you describe how your results are consistent or inconsistent, in qualitative terms – a yes or no answer will not suffice! (You will have to consult Section 16.1.2 to answer this question.)**

In the results reported above, previous reinforcement appears to produce a slight facilitation of learning in negative patterning, relative to positive patterning. These results also show that the fastest learning occurs for positive patterning that is not previously reinforced, while negative patterning that is not reinforced has about the same learning speed as the top two conditions in the table. These results are different from the first table, and are therefore different from Delamater et al.'s. These differences must be due to the change in the activation function.

3. **Are your results consistent with those of the animal data that was collected by Delamater, Sosa and Koch (1999)? Make sure that you describe how your results are consistent or inconsistent, in qualitative terms – a yes or no answer will not suffice! (You will have to consult 16.1.2 to answer this question)**

Some aspects of these results seem more like the animal data – in particular, the possibility that previous reinforcement is better for negative patterning than for positive patterning. This effect is small in the simulation data, but is in the right direction. Of interest is whether the fast learning for the nonreinforced positive patterning is consistent with the animal data. Our chapter does not report the results necessary to evaluate this aspect of the simulation data.

4. **On the basis of the answers to the six preceding questions in this chapter, what are the implications of these results for using perceptrons to study patterning in experiments on animal learning?**

The results reported above show that perceptrons can be used to learn patterning, when patterning is operationalized in the fashion used by animal learning researchers (e.g., in terms of the training sets used by Delamater et al.). They also show that the qualitative nature of the results can be affected by the type of activation function that is used in the perceptron. This suggests that one might be able to explore the properties of different types of perceptrons, and find one that generates behaviour more similar to animals than was generated by Delamater et al.'s multilayer network.