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Optimal Foraging Exercise: Do Chicken Follow an IFD?

Treatment 1

No food present: are chicken distributed at random, more spread out than expected, or more clumped than expected?

Record the number of chicken in each half of the field, every 20 seconds, for five minutes:

OBS.	LEFT	RIGHT	D
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
		MEAN D:	

This means there are 7 chicken, 2 sides, and 15 trials. The null hypothesis (random distribution) is that each chicken has a 50% chance of being on the left or right side. To measure dispersal, calculate the metric D = **absolute value** of the number of chicken on the left side minus the number of chicken on the right side.

Question 1. Before reading ahead, what would be the D score if the 7 chickens were perfectly evenly distributed at all times? _____

For any trial, the possible outcomes are:

L	R	D Score
7	0	7
6	1	5
5	2	3
4	3	1
3	4	1
2	5	3
1	6	5
0	7	7

For your 15 trials (previous page), take an average D score. If the chickens are really clumped, this score will be high, and if they are really even, the score will be near zero. We ran 150,000 random trials on the computer, simulating the results for 15 trials if the chicken were really behaving randomly, and discovered the following:

Most average D values were between 3 and 5, centering around 3.9:

Percentile	D score
5%	3.000
50%	3.930
95%	5.000

An average D score < 3.0 represents a **significant** even distribution and a D score >5.0 represents **significant** clumping.

Question 2. Where do the chickens lie on this scale in the absence of food? Even if the value is not significant, does it tend towards clumping or even?

Treatment 2

Now we are testing for ideal free distributions in response to food, against the background of the chickens' behavior from experiment 1. The experimenter adds even amounts of food to each side of the field. Record the results from the trial below:

OBS.	LEFT	RIGHT	D
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			

12			
13			
14			
15			
		MEAN D:	

Question 3: Overall, was the average D-score significantly <u>different</u> in the "Even Food" treatment, compared to the "No Food" treatment? Please show your work (Hint: Use the t-test).

Insert a picture of your work here:

_____

Treatment 3

Here, we change the food distribution and see if the chickens are actually responding to food distributions, if those distributions are unequal (1:3). Follow the instructions in the lab protocol. You will be recording two 5-minute trials, switching the high-food side.

OBS.	LEFT (HI FOOD)	RIGHT	D
1			
2			
3			

4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
		MEAN D:	

OBS.	LEFT	RIGHT (HI FOOD)	D
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

		MEAN D:	

Question 3: Using data from treatment 1 (no food) and treatment 3, do the chickens seem to follow an ideal free distribution? In other words, was there significantly more clumping (higher D score) in the treatment 3 trials than treatment 1? Please show your work. (hint: use a T-Test and be sure to combine the two trials of treatment 3)

Insert a picture of your work here

Question 4: Based on your observations of chicken behavior in the video, does it appear that the chickens violated any of the 6 assumptions of IFD Theory? If so, which assumption(s) did they not conform to and how?

Question 5: If there were a high abundance of predators present, how would you expect chickens to distribute themselves if all food patches were equal (treatment 2)?

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