Advanced Statistics Homework 4: Picky cats

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Scenario

A cat food manufacturer is interested in investigating how the fish and beef content of cat food affects the amount of food cats eat. The manufacturer would also like to know whether some breeds have different fish and beef preferences compared to other breeds. In order to do this, the manufacturer gave four different types of cat food to a group of 40 cats. Of the cats, there were 10 each of the following breeds: Shorthair, Persian, Siamese, and Manx. Of the four types of food, one type contained neither fish or beef, one type contained only fish, one type contained only beef, and one type contained both fish and beef. Over the course of four sessions (on four consecutive days), each cat was provided with an unlimited quantity of each food (a different food every day), with the researchers recording the amount of food each cat ate (in grammes) before wandering off to destroy the furniture, go to sleep, or annoy a human. How do fish and beef influence the amount of food eaten? Do the different cat breeds differ in terms of their beef and fish preferences?

Assignment

Conduct and report the appropriate statistics as one would for an academic journal. Be sure to report the means, group sizes, and standard deviations in a table and to show all the significant effects in figures (Hint: you do not need to show non-significant effects). In addition, you should state whether there are any issues with the results (this may refer to assumption violations but other issues could also be mentioned) and how such problems might be overcome. Finally, in layperson (non-academic) language provide advice in terms of what you should be aware of when making cat food out of fish or beef.

Due date

This homework will be due on **Thursday, October 30th at 1 pm** and should be submitted via myBU.

Data

You can find the data in the table below. They are also available in the file `Assignment1_data.csv`.

Subject	Fish	Beef	Breed	Cat food eaten (in g)
1	yes	yes	Persian	63
1	yes	no	Persian	91
1	no	yes	Persian	71
1	no	no	Persian	39
2	yes	yes	Siamese	70
2	yes	no	Siamese	102
2	no	yes	Siamese	76
2	no	no	Siamese	56
3	yes	yes	Manx	83
3	yes	no	Manx	111

Subject	Fish	Beef	Breed	Cat food eaten (in g)
3	no	yes	Manx	82
3	no	no	Manx	77
4	yes	yes	Shorthair	80
4	yes	no	Shorthair	107
4	no	yes	Shorthair	81
4	no	no	Shorthair	57
5	yes	yes	Persian	79
5	yes	no	Persian	119
5	no	yes	Persian	78
5	no	no	Persian	59
6	yes	yes	Siamese	98
6	yes	no	Siamese	132
6	no	yes	Siamese	100
6	no	no	Siamese	83
7	yes	yes	Manx	161
7	yes	no	Manx	209
7	no	yes	Manx	191
7	no	no	Manx	149
8	yes	yes	Shorthair	57
8	yes	no	Shorthair	91
8	no	yes	Shorthair	57
8	no	no	Shorthair	43
9	yes	yes	Persian	76
9	yes	no	Persian	125
9	no	yes	Persian	94
9	no	no	Persian	79
10	yes	yes	Siamese	93
10	yes	no	Siamese	126
10	no	yes	Siamese	98
10	no	no	Siamese	73
11	yes	yes	Manx	104
11	yes	no	Manx	107
11	no	yes	Manx	102
11	no	no	Manx	56
12	yes	yes	Shorthair	69
12	yes	no	Shorthair	101

Subject	Fish	Beef	Breed	Cat food eaten (in g)
12	no	yes	Shorthair	90
12	no	no	Shorthair	72
13	yes	yes	Persian	43
13	yes	no	Persian	87
13	no	yes	Persian	43
13	no	no	Persian	13
14	yes	yes	Siamese	-6
14	yes	no	Siamese	27
14	no	yes	Siamese	17
14	no	no	Siamese	-3
15	yes	yes	Manx	135
15	yes	no	Manx	150
15	no	yes	Manx	117
15	no	no	Manx	99
16	yes	yes	Shorthair	66
16	yes	no	Shorthair	119
16	no	yes	Shorthair	87
16	no	no	Shorthair	81
17	yes	yes	Persian	46
17	yes	no	Persian	63
17	no	yes	Persian	57
17	no	no	Persian	37
18	yes	yes	Siamese	88
18	yes	no	Siamese	104
18	no	yes	Siamese	90
18	no	no	Siamese	67
19	yes	yes	Manx	139
19	yes	no	Manx	177
19	no	yes	Manx	156
19	no	no	Manx	135
20	yes	yes	Shorthair	54
20	yes	no	Shorthair	94
20	no	yes	Shorthair	73
20	no	no	Shorthair	59
21	yes	yes	Persian	97
21	yes	no	Persian	109

Subject	Fish	Beef	Breed	Cat food eaten (in g)
21	no	yes	Persian	106
21	no	no	Persian	81
22	yes	yes	Siamese	88
22	yes	no	Siamese	124
22	no	yes	Siamese	94
22	no	no	Siamese	77
23	yes	yes	Manx	129
23	yes	no	Manx	148
23	no	yes	Manx	143
23	no	no	Manx	114
24	yes	yes	Shorthair	27
24	yes	no	Shorthair	52
24	no	yes	Shorthair	44
24	no	no	Shorthair	5
25	yes	yes	Persian	86
25	yes	no	Persian	113
25	no	yes	Persian	93
25	no	no	Persian	55
26	yes	yes	Siamese	133
26	yes	no	Siamese	166
26	no	yes	Siamese	130
26	no	no	Siamese	139
27	yes	yes	Manx	71
27	yes	no	Manx	107
27	no	yes	Manx	92
27	no	no	Manx	80
28	yes	yes	Shorthair	57
28	yes	no	Shorthair	100
28	no	yes	Shorthair	79
28	no	no	Shorthair	49
29	yes	yes	Persian	111
29	yes	no	Persian	127
29	no	yes	Persian	127
29	no	no	Persian	87
30	yes	yes	Siamese	33
30	yes	no	Siamese	66

Subject	Fish	Beef	Breed	Cat food eaten (in g)
30	no	yes	Siamese	44
30	no	no	Siamese	39
31	yes	yes	Manx	44
31	yes	no	Manx	65
31	no	yes	Manx	48
31	no	no	Manx	34
32	yes	yes	Shorthair	90
32	yes	no	Shorthair	136
32	no	yes	Shorthair	117
32	no	no	Shorthair	79
33	yes	yes	Persian	80
33	yes	no	Persian	112
33	no	yes	Persian	100
33	no	no	Persian	80
34	yes	yes	Siamese	76
34	yes	no	Siamese	113
34	no	yes	Siamese	104
34	no	no	Siamese	86
35	yes	yes	Manx	113
35	yes	no	Manx	155
35	no	yes	Manx	114
35	no	no	Manx	83
36	yes	yes	Shorthair	55
36	yes	no	Shorthair	89
36	no	yes	Shorthair	61
36	no	no	Shorthair	51
37	yes	yes	Persian	73
37	yes	no	Persian	117
37	no	yes	Persian	88
37	no	no	Persian	69
38	yes	yes	Siamese	17
38	yes	no	Siamese	60
38	no	yes	Siamese	40
38	no	no	Siamese	24
39	yes	yes	Manx	104
39	yes	no	Manx	120

Subject	Fish	Beef	Breed	Cat food eaten (in g)
39	no	yes	Manx	116
39	no	no	Manx	56
40	yes	yes	Shorthair	71
40	yes	no	Shorthair	91
40	no	yes	Shorthair	94
40	no	no	Shorthair	68