Weekly report

Fangshu Ye

6/1/2020

Contents

1 Design

1.1 Design 1

Design one (workflow one).

Panel 1) Before arrival the animals are randomly allocated to receive the treatment
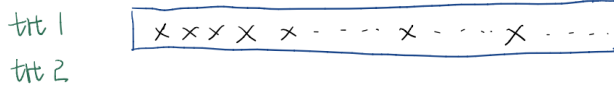Panel 2) The animals are systematically allocated to pens- sequentially
Panel 3) The animals arrive in groups (cohorts from the farm) and assess for eligibility
Panel 4) The animal's treatment assignment is determined
Panel 5) The assigned treatment is administered
Panel 6) Animals are placed in the pens
Final result the cohort is intact (cohort effect remains) and the treatment is mixed in pens (no pen effect?).

For $i = 1, 2$, $j = 1, \cdots, n_i$, let y_{ij} be the outcome for jth animal which received treatment i

$$y_{ij} = \mu_i + \epsilon_{ij}$$

where μ_i terms are fixed parameters .

1.2 Design 2

Design two (workflow two).

Panel 1) Before arrival the pens are randomly allocated to receive a treatment
Panel 2) before the animals arrive the animals are systematically allocated to pens- sequentially
Panel 3) The animals arrive in groups (cohorts from the farm) and assessed for eligibility
Panel 4) The animal's treatment assignment is determined based on the pen it is going into
Panel 5) The assigned treatment is administered
Panel 6) Animals are placed in the assigned pen
Final result the cohort is intact (cohort effect remains) and the treatment is not mixed in pens (pen effect remains).

For $i = 1, 2$, $j = 1, 2$, $k = 1, \cdots, n_{ij}$ and $l = 1, \cdots, n_{ijk}$, let y_{ijkl} be the outcome for lth animal in kth cohort of jth pen in treatment group i.

$$y_{ijkl} = \mu_i + p_{ij} + c_{ijk} + \epsilon_{ijkl}$$

where μ_i terms are fixed parameters and the other terms are random effects.

1.3 Design 3

Design three (workflow three).

Panel 1) Before arrival the pens are randomly allocated to receive a treatment
Panel 2) Before the animals arrive the animals are randomly allocated to pens
Panel 3) The animals arrive in groups (cohorts from the farm) and assessed for eligibility
Panel 4) The animal's treatment assignment is determined based on the pen it is going into
Panel 5) The assigned treatment is administered
Panel 6) Animals are placed in the assigned pen
Final result the cohort is not intact (cohort effect removed) and the treatment is not mixed in pens (pen effect remains).
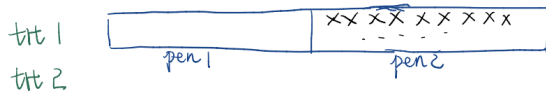
For $i = 1, 2$, $j = 1, 2$ and $k = 1, \cdots, n_{ij}$, let y_{ijk} be the outcome for kth animal which placed in jth pen of treatment group i.

$$y_{ijk} = \mu_i + p_{ij} + \epsilon_{ijk}$$

where μ_i terms are fixed parameters and the other terms are random effects.

1.4 Design 4

Design four (workflow four).

Panel 1) Before arrival the animals randomly allocated to receive a treatment
Panel 2) Before the animals arrive the pens are randomly allocated to treatments
Panel 3) The animals arrive in groups (cohorts from the farm) and assessed for eligibility
Panel 4) The animal's treatment assignment is determined based on induvial allocation
Panel 5) The assigned treatment is administered
Panel 6) Animals are placed in the pen that has been randomly allocated to receive that treatment but in pairs. I.e. fills pens 1 and 2, then fills 3 and 4.
Final result the arrival cohort is not intact (cohort effect removed) and the treatment is not mixed in pens (pen effect remains).

For $i = 1, 2$, $j = 1, 2$ and $k = 1, \cdots, n_{ij}$, let y_{ijk} be the outcome for kth animal which placed in jth pen of treatment group i.
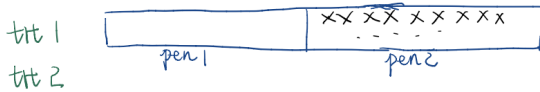
$$y_{ijk} = \mu_i + p_{ij} + \epsilon_{ijk}$$

where μ_i terms are fixed parameters and the other terms are random effects.
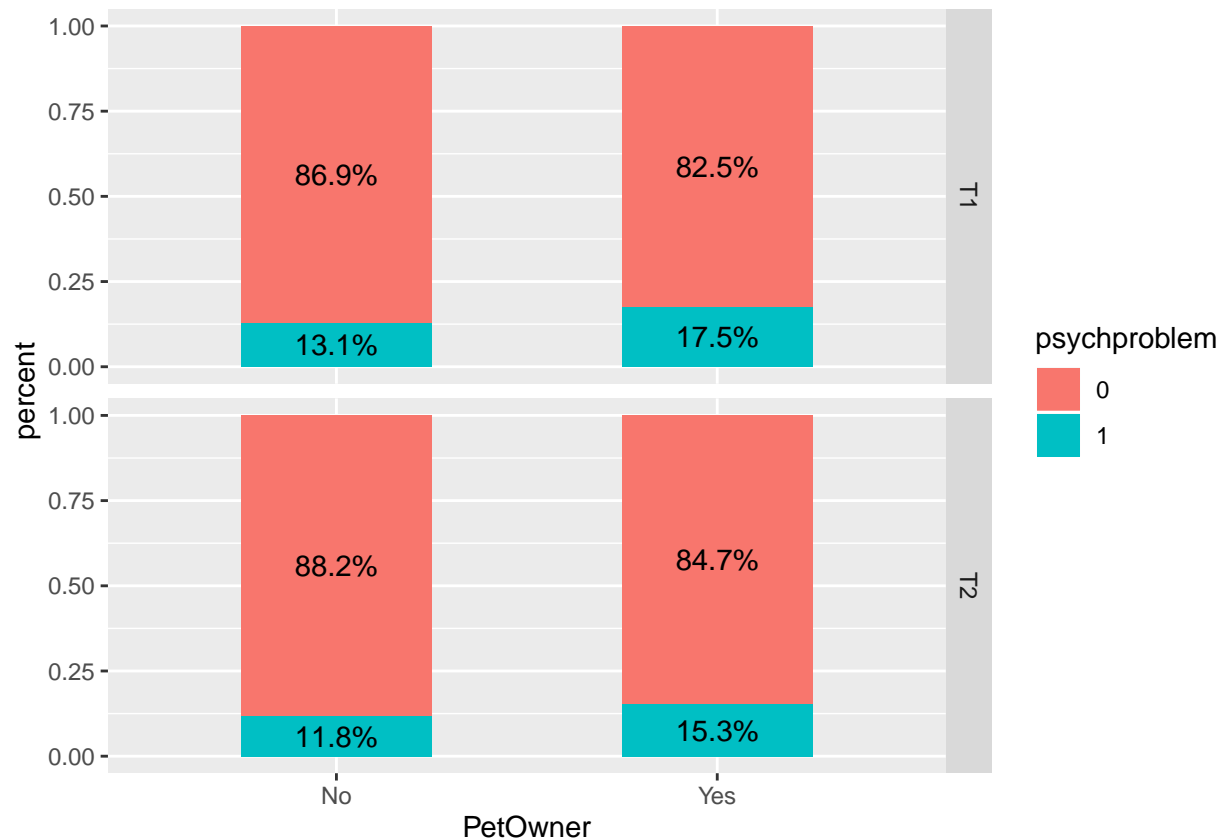
2 Pet Owner Effect

PetOwner(1:Yes; 0:No) : Do you currently have or share responsibility for a pet/companion animal?

Data size:

```
 T1  T2
856 679
```

2.1 Psychproblem: Do you have a history of mental health problems?

Model	Estimate	Std. Error	pvalue
T1: psychproblem ~ PetOwner			
PetOwnerYes	0.348	0.196	0.076
T2: psychproblem ~ PetOwner			
PetOwnerYes	0.303	0.230	0.188
T1+T2: psychproblem ~ PetOwner + time + (1|workerId)			
PetOwnerYes	0.388	0.797	0.626
timeT2	-0.693	0.489	0.157
T1+T2: psychproblem ~ PetOwner + time + PetOwner*time + (1|workerId)			
PetOwnerYes	0.353	0.847	0.677
timeT2	-0.775	0.843	0.358
PetOwnerYes:timeT2	0.124	1.033	0.904

2.2 Genhealth : How would you describe your general health lately?
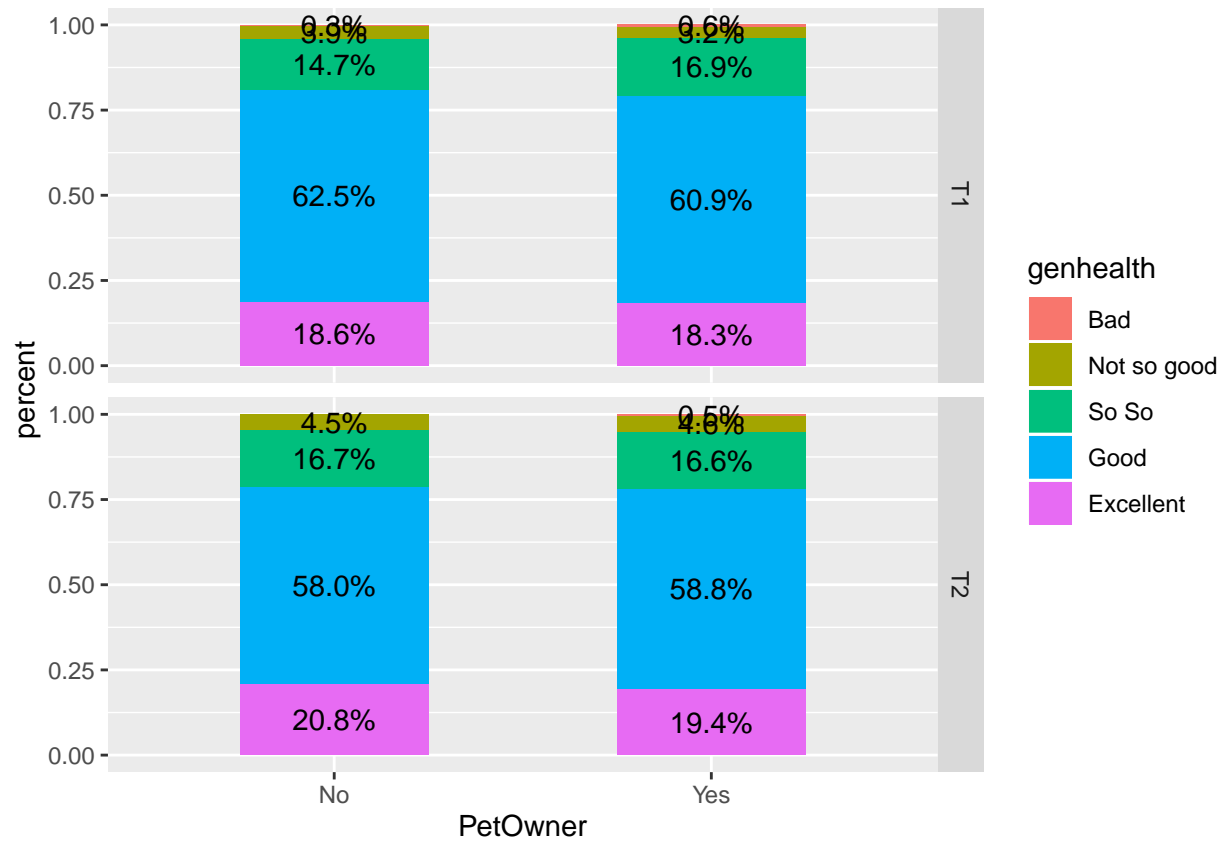
Table 1: Ordinal Logistic Regression: genhealth ~ PetOwner + time + (1|workerId)

	Estimate	Std. Error	z value	Pr(>|z|)
PetOwnerYes	-0.0540370	0.3173603	-0.1702701	0.8647977
timeT2	-0.1321207	0.2252042	-0.5866709	0.5574248

2.3 Kessler 1-10

Kessler3:How often did you feel so nervous that nothing could calm y

Kessler4: How often did you feel hopeless?
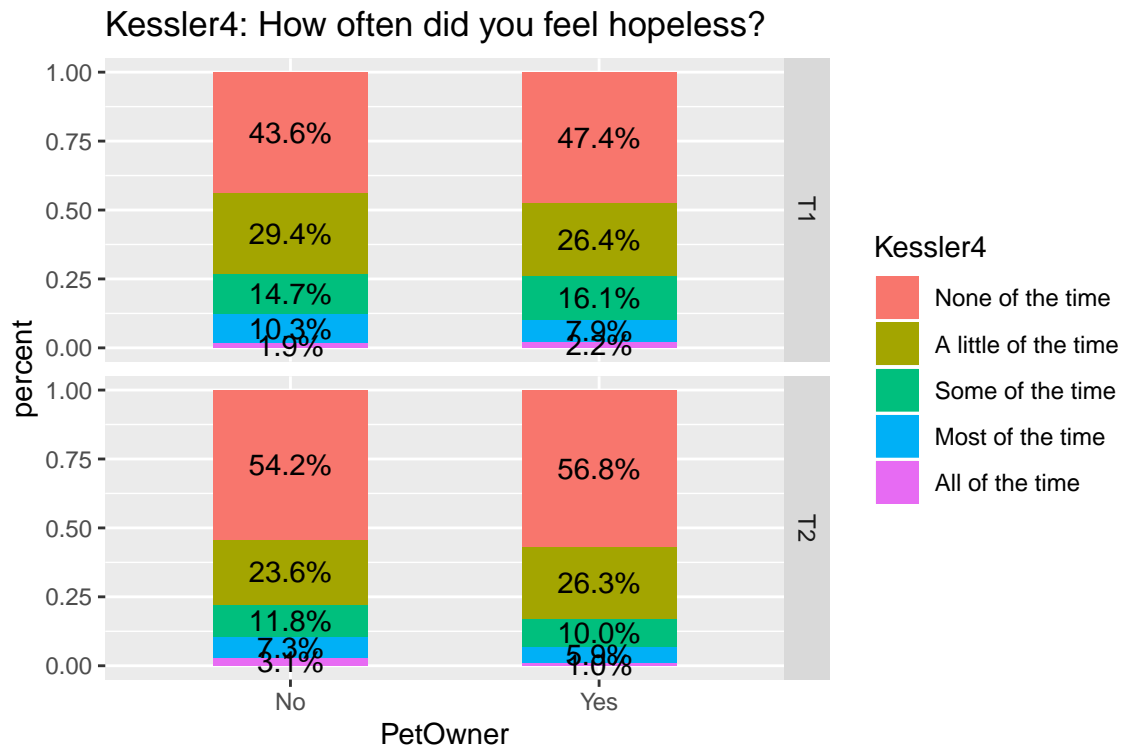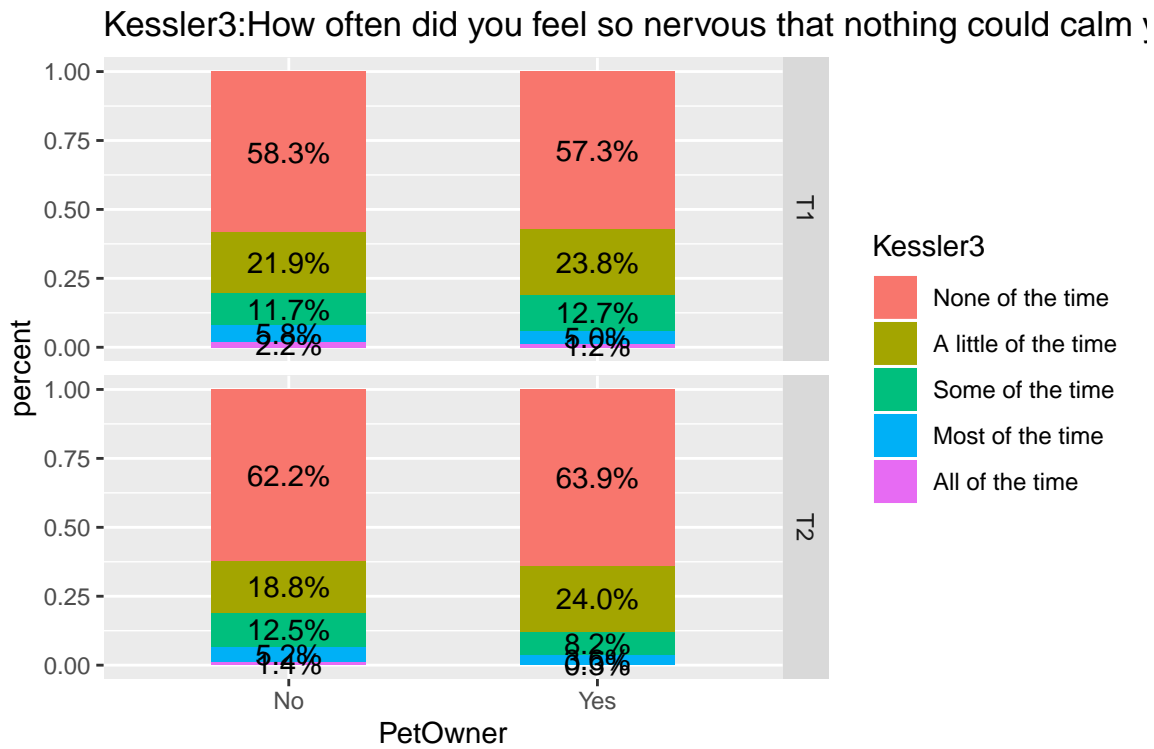
Table 2: Ordinal Logistic Regression: Kessler ~ PetOwner + time + (1|workerId)

Model	Estimate	Std. Error	pvalue
Kessler1: how often did you feel tired for no good reason?			
PetOwnerYes	0.130	0.266	0.625
timeT2	-0.805	0.119	0
Kessler2: how often did you feel nervous?			
PetOwnerYes	0.117	0.307	0.704
timeT2	-0.827	0.127	0
Kessler3: how often did you feel so nervous that nothing could calm you down?			
PetOwnerYes	-0.306	0.000	0
timeT2	-0.282	0.000	0
Kessler4: how often did you feel hopeless?			
PetOwnerYes	-0.300	0.001	0
timeT2	-0.663	0.001	0
Kessler5: how often did you feel restless or fidgety?			
PetOwnerYes	0.295	0.001	0
timeT2	-0.610	0.001	0
Kessler6: how often did you feel so restless that you could not sit still?			
PetOwnerYes	-0.162	0.331	0.626
timeT2	-0.623	0.140	0
Kessler7: how often did you feel depressed?			
PetOwnerYes	0.297	0.402	0.459
timeT2	-0.692	0.136	0
Kessler8: how often did you feel so depressed that nothing could cheer you up?			
PetOwnerYes	-0.112	0.445	0.801
timeT2	-0.902	0.187	0
Kessler9: how often did you feel that everything was an effort?			
PetOwnerYes	-0.086	0.000	0
timeT2	-0.394	0.000	0
Kessler10: how often did you feel worthless?			
PetOwnerYes	-0.136	0.429	0.751
timeT2	-0.452	0.176	0.01

2.4 Grad 1-7

Gad4:How often have you had trouble relaxing?
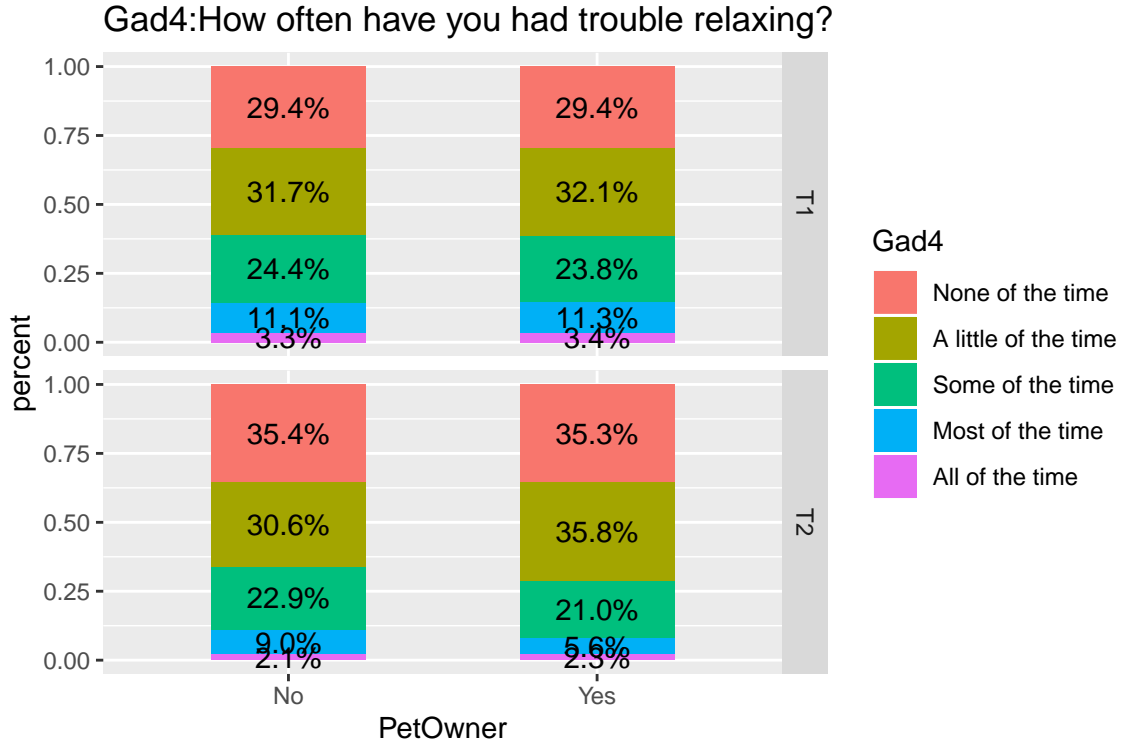
Table 3: Ordinal Logistic Regression: Grad ~ PetOwner + time + (1|workerId)

Model	Estimate	Std. Error	pvalue
Gad1: how often have you been bothered by feeling nervous, anxious or on edge?			
PetOwnerYes	0.394	0.316	0.212
timeT2	-0.471	0.124	0
Gad2: how often have you been bothered by not being able to stop or control worrying?			
PetOwnerYes	-0.041	0.345	0.906
timeT2	-0.602	0.135	0
Gad3: how often have you been bothered by worrying too much about different things?			
PetOwnerYes	0.130	0.271	0.63
timeT2	-0.599	0.122	0
Gad4: how often have you had trouble relaxing?			
PetOwnerYes	-0.096	0.000	0
timeT2	-0.566	0.000	0
Gad5: how often have you been so restless that it's hard to sit still?			
PetOwnerYes	0.093	0.250	0.711
timeT2	-0.317	0.000	0
Gad6: how often have you become easily annoyed or irritable?			
PetOwnerYes	0.282	0.280	0.313
timeT2	-0.102	0.119	0.392
Gad7: how often have you been bothered by feeling afraid as if something awful might happen?			
PetOwnerYes	-0.114	0.268	0.671
timeT2	-0.578	0.125	0

2.5 Lonely 1-3

Lonely1: How often did you feel you lack companionship?
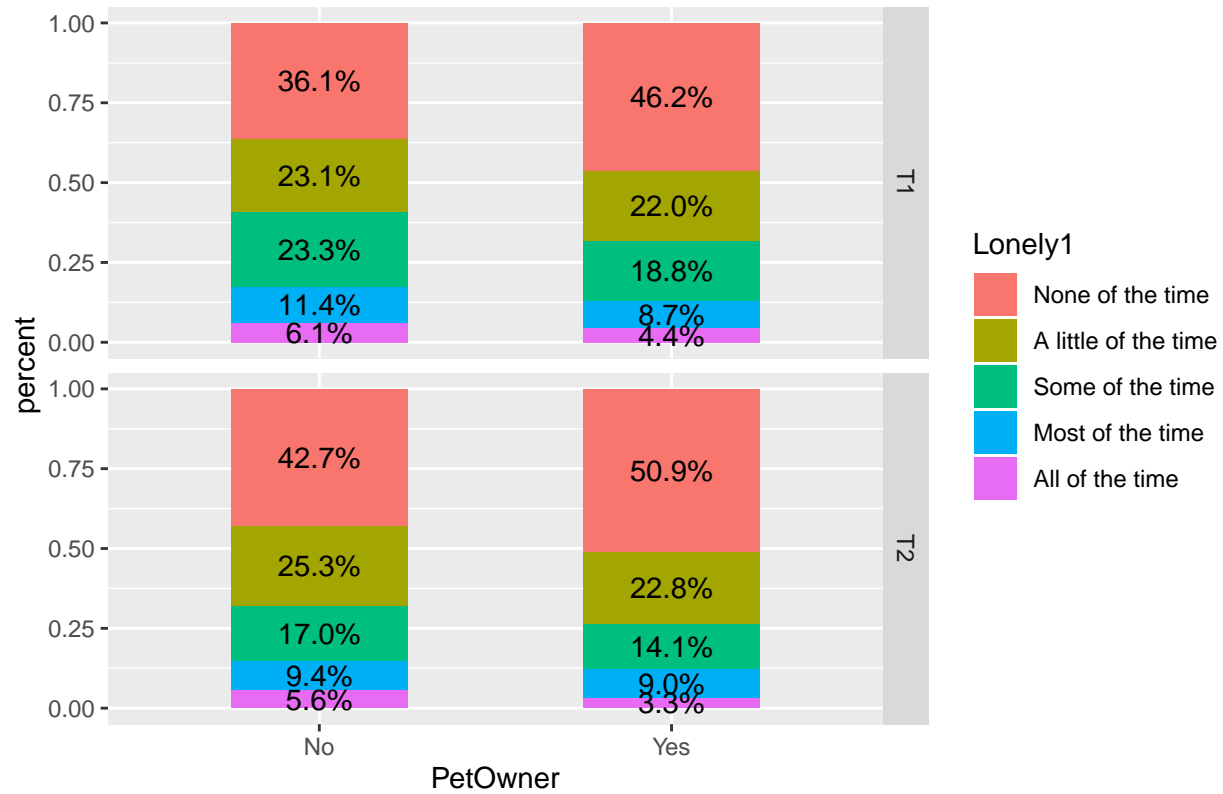
Table 4: Ordinal Logistic Regression: Lonely ~ PetOwner + time + (1|workerId)

Model	Estimate	Std. Error	pvalue
Lonely1: how often did you feel you lack companionship?			
PetOwnerYes	-1.057	0.376	0.005
timeT2	-0.366	0.132	0.005
Lonely2: how often did you feel left out?			
PetOwnerYes	-0.931	0.349	0.008
timeT2	-0.113	0.133	0.397
Lonely3: how often did you feel isolated from others?			
PetOwnerYes	-0.128	0.257	0.619
timeT2	-0.621	0.117	0

2.6 Risk 1-3

Risk2:How serious do you think COVID−19 would be if you contracted it?
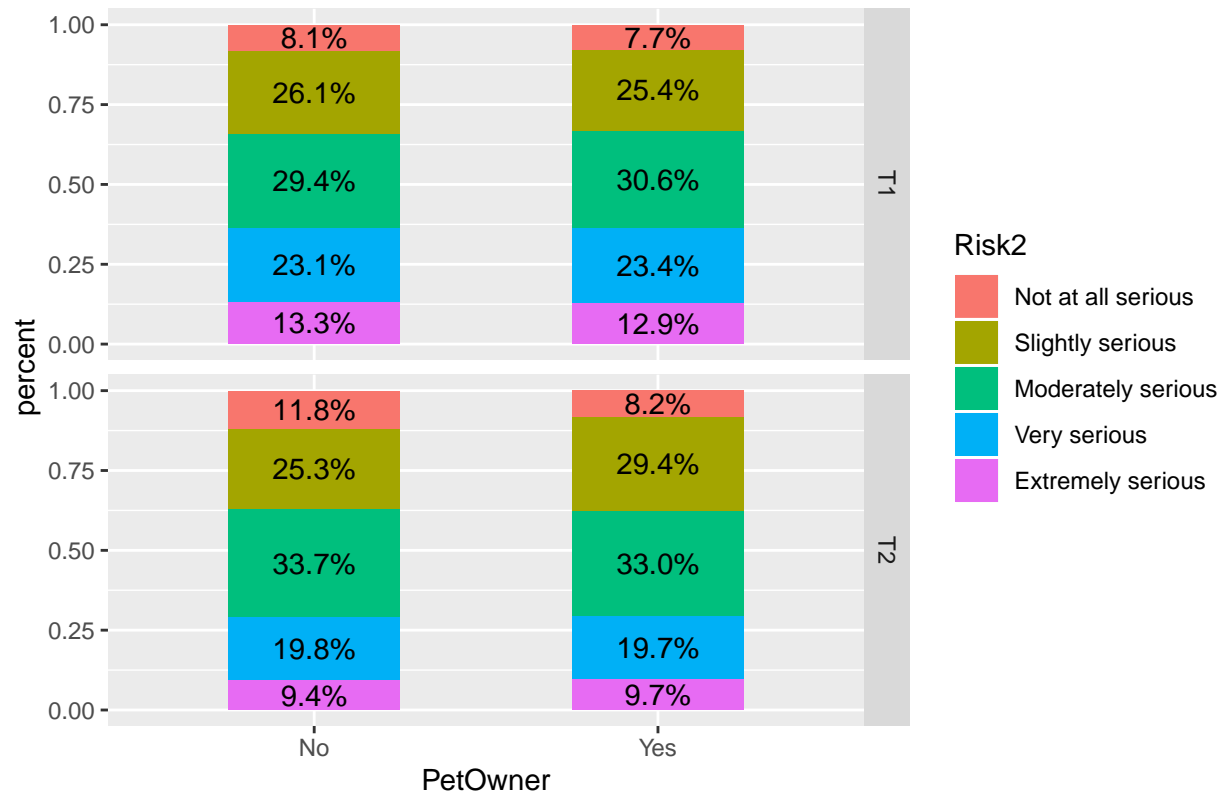
Table 5: Ordinal Logistic Regression: Risk ∼ PetOwner + time + (1|workerId)

Model	Estimate	Std. Error	pvalue
Risk1:In your opinion, how likely is it that you will contract COVID-19?			
PetOwnerYes	0.514	0.293	0.079
timeT2	-0.143	0.110	0.193
Risk2:How serious do you think COVID-19 would be if you contracted it?			
PetOwnerYes	0.118	0.297	0.691
timeT2	-0.470	0.117	0
Risk3:How concerned are you about the COVID-19?			
PetOwnerYes	0.033	0.342	0.923
timeT2	-0.828	0.125	0