MENTAL HEALTH OUTCOMES WITH PETS

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Abstract

I take a sample of patients who are consulting with physicians. (n=390) Using Natural Language Processing (NLP), I find those who are owners of pets. I test for impacts on the health outcomes of those patients compared to other patients. I control for different types of disorders and conditions as Ill as demographic and individual factors. I test for a difference in means and a difference across time, to test users for difference between pet owners and non-pet owners in mental health scores, and to test for improvement in mental health scores caused by pets. I find that there is a difference in scores from patients who have pets, but no difference in improvement has been shown between pet owners and non-pet owners with the data used in the analysis of this paper.

INTRODUCTION/LIT REVIEW:

Research has been performed on the effect of having an animal. Loneliness is decreased (Zasloff 1994) and physical health outcomes have been reported as higher (Headey 2008). Animals have been used often in therapy as Ill. Research has been done trying to find the effect of animals on those suffering from mental health issues. Individuals have been shown to be less lonely in old age and can attenuate negative externalities of loneliness through the company of animals. (Stanley et al 2014) Many studies have been performed to find the effect of animals in therapy related scenarios. Animals have been found to increase comfort among patients in adolescent health. (Kruger 2004) but it has been said: "[the author] intended for this material to inform and encourage future research into the various beneficial effects that he had documented. While this has occurred to some degree, more often Levinson's writings have been used to justify the implementation of animal-assisted interventions in the absence of valid efficacy studies." I look to add to the existing literature by using an experiment with a large sample size. In previous literature (Kruger 2004) it has been noted that many studies have been performed with a sample size that may not have been large enough. I have data from 274,964 transcripts that I can perform our analysis on. I look to test for the difference that pets will make on mental health outcomes. Our research is taken from a therapy company called talkspace. A brief description of the company is found in appendix A. (Located below citations)

DATA: The data for this project are taken from online therapy sessions between clients and certified therapists. All information regarding individual information has been removed from the transcripts to protect the privacy of the clients. There are 274,964 client therapist interactions between 426 clients and therapists. (n=390). Clients are living in the United States and Great Britain. My sample is predominantly women, being 78% percent female, but according to the World Health Organization they have stated: "Depression is not only the most common women's mental health problem but may be more persistent in women than men." Thus, I feel that my sample could be helpful to those suffering from mental health conditions.

I do not assume that this sample is nationally representative, as it is only a part of a larger sample, but the results of this study can be applied to those who are suffering from mental health challenges, due to the fact that this is a group representative of mental health patients with

different conditions. The variable primary condition is the first or major mental health concern with which the clients are joining the service. I have:

primary_condition	Freq.
ADD	416
Alcohol Abuse	886
Anxiety	68,769
Bipolar Disorder	4
Depression	115,219
Eating Disorder	93
GAD	25,038
OCD	175
Other	322
PTSD	2,233
Panic Disorder	145
Paranoid States	421
Personality Disorders	5,379
Psychosis	281
Relationship	629
Stress	51,243

primary_condition	Freq.
ADD	5
Alcohol Abuse	4
Anxiety	86
Bipolar Disorder	4
Depression	101
Eating Disorder	2
GAD	74
OCD	2
Other	4
PTSD	10
Panic Disorder	6
Paranoid States	2
Personality Disorders	2
Psychosis	4
Relationship	4
Stress	99

Stress, depression, and anxiety make up the majority of our sample. The table above is the number of messages we have from those people who are in the different categories. The second table is the number of users. We can see that the majority are in anxiety, depression, general anxiety and depression and stress. According to The British Psychological Society & The Royal College of Psychiatrists, the most common mental illnesses are depression and anxiety/stress. This is representative of those who are suffering from mental illness. Later studies using the talkspace data will be nationally representative, but I am constrained in our analysis for a short time. I compiled a list of household pets in the United States in a word bank. This word bank was then used to check for mentions of a pet in the transcripts of the therapy sessions. I interpret the using of words in the word-bank more than trivial amounts (more than 2 times in the transcript), as having a pet. Our sample contains 65% pet owners.

has_pet

0 148.0

1 277.0

Total 425.0

The outcome variable that I am interested in are psychological tests that are administered by the therapists. These tests are common psychological tests given in other therapy forms besides Talkspace. The tests results are ranked by severity, with a score of 0 as lacking mental health challenges, and the higher the score, the more severe the condition.

METHODS:

Model 1:

$Healthscore = \beta_0 + \beta_1(has\_pet) + \beta_2(demographics) + \beta_3(acuity) + \beta_4(primary\_health\_concern) + \beta_5(education) + \beta_5(first\_time\_in\_therapy) + \beta_6(female) + u$

Our outcome is the health score of the self-reported scores of those who are participating in therapy. These tests are administered to the clients when they participate in therapy. The scores begin at 0 and then the more severe the condition, the higher the score. I test for statistical significance in the difference of self-reported scores controlling for those who have pet mentions. β_1 Is the difference in means between those who have pets and those without pets. I have a sample population of those who do not mention pets in their transcripts. This is a comparison of means model. If the variable is negative then I know that pets have a positive impact on health scores, as the lower the health score, the less severe the condition, and better the mental health. The value here is the difference in reported scores of those who have pets and those who do not. β_0 Is the score of those who do not have a pet. I have controlled for the acuity of the condition. This will eliminate the concern that those with pets have systematically less severe conditions. I control for education, and gender, to check for demographic differences. Primary health condition is controlled for making sure that I have not put those with pets as having less severe or different problems. u is our error term.

Using this model, I look to systematically check if those with pets have higher self-reported scores. I test this with the null hypothesis that $\beta_1 > 0$.

Model 2:

$$Healthscore_{last} - Healthscore_{first} = \beta_0 + \beta_1 \left(has_{pet}\right) + \beta_2 \left(demographics\right) + \beta_3(education) + \beta_4(acuity) + \beta_5(gender) + \beta_6(first\_time\_in\_therapy) + u$$

This is a time series analysis model where I compare the scores from individuals across time, testing to see if those who have a non-trivial amount of pet mentions in their transcripts have better improvement over time.

Where the outcome is the health outcomes of the patients' first visit compared to the last visit. I have scores from multiple self-reported mental health tests. These tests are scored by severity. The higher the score the more severe the results. I take the last score the client has taken, and subtract the first score. This will give us an improvement score. This is the outcome variable of interest, as it will show us if those with pets have better improvement than those without pets. I look to see if the improvement/or lack thereof is systematically correlated with those that have pets to see if pets are aiding in the healing process. B_1 is a binary if they client is talking about their pet. This will be the variable to tell us if pets are aiding the healing process.

$B_{2\text{-}6}$ are variables for all the demographic characteristics I control for. I have education, gender, age state, the primary condition of the client. I look to see if the improvement/or lack thereof is systematically correlated with those that have pets to see if pets are aiding in the healing process. I use this model to test for improvement. This will show us those patients who have made the most improvement from their first to their last score. I want to see if pets have a significant impact on improvement. The first model will show us if pet owners have higher scores, but the second model will show us if pets help us heal. The question addressed in previous research (Kruger 2004) whether or not pets help us heal. This will also remove the self-selection bias across sample groups, as I test individuals.

RESULTS:

MODEL 1 results:

VARIABLES	(1) score	(2) score	(3) score	(4) score
has_pet	-2.834***	-4.350***	-4.402***	-3.701***
	[0.0249]	[0.0302]	[0.0315]	[0.0345]
female		-2.164***	-1.836***	-1.795***
		[0.0276]	[0.0294]	[0.0307]
acuity		-0.780***	-1.166***	-1.098***

		[0.0177]	[0.0224]	[0.0228]
first_time_in_therapy		0.781***	0.680***	0.242***
		[0.0279]	[0.0304]	[0.0318]
control for primary condition	no	yes	yes	yes
marital status	no	no	yes	yes
control for educ	no	no	no	yes
Constant	15.51***	16.51***	16.75***	13.62***
	[0.0174]	[0.0393]	[0.149]	[0.161]
Observations	274,964	256,600	256,600	256,600
R-squared	0.045	0.125	0.135	0.151

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

These results are to model 1. I found that those with pets have a difference of three points from those without pets. This is psychologically significant as Ill. Our test scores range from 0-24. Three point seven points can be a difference that matters in these tests. This shows us that those with pets get lower scores. I had different robustness checks to insure, and after controlling for gender, acuity, the primary condition, education and marital status I find that the coefficient has remained the same. This shows that there is a difference among those with pets. I feel I have adequately checked for omitted variables bias. There exist things I have not controlled for, but I have controlled for those things that could affect our scores. There may be some self-selection bias in these results because those who have pets have bought them themselves and they Ire not randomly assigned. I look to address that with our second model. The second model will test for improvement among patients.

Table 2:

VARIABLES	(1) improvement_score	(2) improvement_score	(3) improvement_score	(4) improvement_score
has_pet	5.445	4.186	5.438	6.348
	[3.820]	[3.901]	[3.991]	[4.054]
female		3.646	3.295	2.100
		[3.642]	[3.684]	[3.755]
acuity		-3.436	-3.546	-2.946
		[3.265]	[3.257]	[3.304]

control for primary condition	no	yes	yes	yes
control for marital status	no	no	yes	yes
control for education	no	no	no	yes
Constant	-3.048	5.046	-5.523	-7.080
	[3.366]	[6.563]	[9.538]	[9.972]
Observations	188	171	171	171
R-squared	0.011	0.064	0.105	0.132

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

For our second model I have found the results in table 2. I find that there is no significant difference in improvement by our clients. The sample size was reduced to 188 by those who do not have multiple observations being omitted as they do not have an improvement score.

CONCLUSION: I can preliminarily conclude that those people who are mentioning pets in their therapy sessions have systematically lower self-reported scores than those who do not. I assume that these are the pet owners. I can support the existing literature for therapy animals, and encourage those who have been diagnosed with mental conditions to seek companionship from animals to maintain mental well-being. I however, have no proof as to whether animals help healing. The results say that decrease it, but they are not statistically significant from zero. More research will be needed to check with a larger sample size, as our pool was greatly reduced.

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Appendix A:

TALKSPACE:

"Talkspace is a desktop computer and mobile smartphone application that allows for 24/7 communication with licensed psychotherapists via secure interactive text chat for a set fee ($100 per month at the time this study was conducted). Potential patients typically learn about it through social media marketing channels (e.g., Facebook), and popular press articles. Therapists use this medium to conduct psychotherapy according to their preferred theoretical orientation. They are expected to respond to patient texts a minimum of twice a day within an 8 hr/day, 5 day/week timeframe. Within these boundaries, therapists are also required to respond to every text that clinically requires a response. When patients first sign up, they are told of these requirements for therapist responses; in addition, each patient is given the usual hours when their particular therapist most typically responds. Outside of these minimum requirements, text messaging is unlimited for both sides but therapists are given freedom to negotiate logistical boundaries with their patients, such as the timing, intensity, and rapidity of responses to texts. For example, psychotherapists may encourage patients to continue messaging throughout the night with the understanding that they will respond in the morning when work hours recommence. Although

interactive text chat is the primary means to deliver therapy, therapists, and patients are also able to leave one another asynchronous audio and video messages. In addition, therapist and patients can set up times when both are in front of their screens to have a “live chat” session. Thus, although interactive text chat is expected to be primarily asynchronous, there is also an understanding that responses can become semi synchronous at times and “live” at other times. For the most part, though, interactive text chat eliminates audio–visual cues and the time boundaries of discrete, 45–50 min sessions.” (NITZBURG 2019)