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The Effect of Education on Support for TNR as a Method of Feral Cat Management

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ABSTRACT

A feral cat is a cat that is untamed and not suitable for placement in a home. Through their naturally high rate of reproduction and lack of population management, feral cat populations have grown exponentially, leading to overpopulation. Feral cats effect their communities through their impact on wildlife, financial burden, and health risk to both humans and other animals. Due to the impact feral cats place on their communities, multiple management methods have been suggested. Trap-Neuter-Return (TNR) is a humane, effective method of management; however, controversy surrounds its use. Existing studies have determined that age, gender, and past experiences with cats can be predictors for which management method an individual prefers. To assess whether targeted education impacts support for TNR, sixty-five undergraduate students were administered a series of surveys prior to and following watching a video on either TNR (treatment) or cat breeds (control). The survey included questions about participants' past experiences with cats, views on cats and their management, and knowledge about cats. Participants were recruited by the researcher visiting multiple general education classes and passing around a sign-up sheet. Informed consent was given before participants continued to the rest of the survey. Data was analyzed using repeated measures ANOVA, followed by post-hoc comparisons for items with significance in the interaction terms. Significant interaction terms were observed for the survey items that directly asked about TNR. This suggests that the treatment video was effective in producing both cognitive and attitudinal changes in participants.

Keywords: education, feral cat, Trap-Neuter-Return

INTRODUCTION

Domestication of cats

Cats began their relationship with humans around ten to twelve thousand years ago in the Fertile Crescent, where agriculture was developed. As agricultural practices grew, mice and rats began to colonize near these farming towns. Cats, being opportunistic feeders, also colonized near these towns to capitalize on this localized food source (Alley Cat Allies, history; Deak et al., 2019). This created a mutualistic relationship between humans and cats, and soon cats were kept around intentionally to control populations of pests such as mice, rats, and other small mammals in homes and aboard ships. It was through this utilitarian use of cats that they were introduced to regions of all continents and many islands worldwide. Cats have readily adapted to these new environments and, in many cases, have established invasive populations (Deak et al., 2019, Robertson, 2008). Left unchecked, these cats were able to reproduce freely, increasing their populations exponentially.

Feral cats

A feral cat is defined as a cat that is untamed and evasive toward humans. Another definition describes a feral cat as a cat that cannot be handled and is not suitable for placement in a home as a pet. They are either born in the wild and lack socialization or are abandoned and lose trust in humans (Robertson, 2008). Cats have a high reproductive capacity as they reach sexual maturity around five to six months of age and can produce a litter of between one and six kittens approximately 1.6 times a year (Robertson, 2008). To further illustrate this, it is estimated that a single fertile cat and her offspring can collectively produce around 420,000 kittens in a seven-year period (Coleman et al., 2010). Their high reproductive rate easily explains how feral cat

populations have risen to extreme heights. Feral cat overpopulation has also been exacerbated due to owners allowing their cats to roam freely and breed with feral cats, and even further by abandonment (Coleman et al., 2010; Robertson, 2008).

The exact number of feral cats in the United States is unknown; however, it is estimated to be about one-third to one-half of the owned population. This would mean that there are anywhere between thirty million to forty-five million feral cats living in the United States right now (Robertson, 2008). Some more recent studies estimate the number to be even higher, being closer to seventy-four million (Spehar & Wolf, 2017). Regardless of the exact number of feral cats living in the United States, these cats are affecting the communities in which they live.

Feral cats and their communities

One aspect of their communities that feral cats can impact is the native wildlife in the area. Feral cats impact wildlife through competition for food, the spread of disease, and, primarily, predation (Robertson, 2008). As previously mentioned, cats are opportunistic feeders. They also require a high protein diet to sustain themselves, as they are not able to synthesize many essential vitamins and minerals. This is one of the reasons that, in 2001, cats were placed on the International Union of Conservation for Nature's (IUCN) list of the top 100 worst invasive species. At that time, they had a partial role in the extinction of 14% of native bird, mammal, and reptile species worldwide (Deak et al., 2019). The effect of feral cats on wildlife is one of the most controversial issues regarding these cats. This argument has been so polarizing that 'pro-cat' and 'pro-wildlife' groups have formed. Pro-cat advocates are concerned with the welfare of feral cats, whereas pro-wildlife advocates argue for the removal of cats from the environment as cats are an invasive species and threaten native species (Robertson, 2008).

Feral cats also place a large financial burden on the communities in which they live. Every year local governments spend money providing animal control services and catching, euthanizing, and disposing of homeless cats (Coleman et al., 2010). For example, in 2020 animal control expenses alone for Kankakee County, Illinois, were around $260,000 (Kankakee County Online). In bigger cities, or places with higher populations of feral cats, this cost can be much higher. Feral cats can also pose a threat to the livestock industry. Cats can transfer diseases to other animals, including toxoplasmosis. Toxoplasmosis can cause abortions in sheep or weaken newborn lambs, which can economically harm farming communities (Deak et al., 2019).

Because cats are the primary hosts of several diseases, they endanger not only the health of other animals but humans as well. Some diseases that cats carry have the potential to spread to humans, including rabies, toxoplasmosis, and Sarcocystis (Deak et al., 2019; Levy & Crawford, 2004). Parasitism is the most common transmissible problem of feral cats. Increased bite risk also correlates with increased feral cat populations. Most reported cat bites come from provoked feral cats (Levy & Crawford, 2004), meaning that an increased number of feral cats in an area increases the risk of those in the community getting bitten and the health complications that can arise from this. Although it is not extremely common for humans to get diseases or parasites directly from the feral cats themselves, an increase in their population increases this risk.

Management methods

Over the years, different management methods have been proposed to control the growing feral cat populations. One such solution is implementing Trap-Remove-Euthanize programs.

Trap-Remove-Euthanize

Trap-Remove-Euthanize, or Catch-and-Kill, is a lethal method of management where cats are trapped, removed from their original location, and euthanized, usually by a veterinarian or animal control (Robertson, 2008). Some people are under the impression that the life of a feral cat is full of risks and, therefore, not acceptable on welfare grounds, leading them to favor 'pre-emptive euthanasia' to prevent cats from suffering. Others favor this method because they believe that since cats are a non-native species, they should be removed from the environment to prevent predation on wildlife (Robertson, 2008). Although lethal methods of management may seem more effective initially, they almost always ignore a phenomenon called the 'vacuum effect.' The vacuum effect is based on the idea that individuals are drawn to resources. Feral cats live where resources such as food, shelter, and water are present. When a population is removed and killed, it creates a vacuum, attracting other feral cats living in surrounding areas. These new individuals, and any remaining members from the original population, fill the vacuum and resume reproducing. Before long, the area fills back to capacity and it is as if the cats were never removed to begin with (Alley Cat Allies, vacuum).

Trap-Neuter-Return (TNR)

The other prominent method of management is implementing Trap-Neuter-Return (TNR) programs where populations of feral cats are high. TNR is a non-lethal method of managing feral cat populations that involves humanely trapping, surgically sterilizing, and returning cats to their original location. These programs often vaccinate cats against rabies as well (Spehar & Wolf, 2020). TNR is the only current management method that factors in the vacuum effect. By returning cats to their original location, the vacuum remains full. This allows for populations to be stabilized and, eventually, decline (Alley Cat Allies, vacuum; Robertson, 2008). Although TNR is a relatively new method of management, only gaining popularity within the last twenty-five years, there is research showing that it is effective at controlling feral cat populations.

One such study examined a TNR program that took place in Newburyport, Massachusetts. This program is one of the most well-known and longest-running TNR programs in the United States. The program began in June of 1992 and went until December of 2009. The program included a TNR campaign in a targeted area called the Waterfront as well as facilitating the adoption of sociable cats that were trapped. By 1998, the last two known litters of kittens were born on the Waterfront. The program ended in 2009 when the last known cat on the Waterfront died (Spehar & Wolf, 2017). This program was able to completely eradicate feral cats in the targeted area.

Another example of an effective TNR program is taking place in Chicago, Illinois. This program was conducted by a citizen of Chicago in the neighborhood in which she lived. She worked with her neighbors to spay and neuter cats that lived near their homes. Twenty cat colonies were involved in the program over a ten-year period. The last known litter to be produced by cats in the program was in 2009, just two years after the program started. The program was able to completely eliminate eight of the twenty colonies. Of the colonies that were not eliminated, there was an average reduction of 54% from colony entry levels (Spehar & Wolf, 2018).

Controversy

Although research supports the efficacy of TNR programs, this management method is still somewhat controversial. As previously mentioned, controversy stems from the arguments between pro-cat advocates and pro-wildlife advocates. Pro-cat advocates tend to favor non-lethal management methods like TNR, whereas pro-wildlife advocates tend to favor lethal methods of management (Loyd & Hernandez, 2012). Other factors that are predictors of people's attitudes towards TNR are age, gender, and their experiences with feral cats. For example, one study found that 47% of females preferred TNR over lethal management methods, whereas only 20% of men surveyed preferred TNR (Loyd & Miller, 2010). Negative perceptions of TNR programs have also been correlated with a lack of knowledge on the topic or a perceived lack of need (McDonald & Clements, 2019). Due to this correlation, many studies have noted that it would be beneficial to study the relationship between education programs about feral cats/TNR and community support (Deak, et al., 2019; Loyd & Hernandez, 2012; Loyd & Miller, 2010). The present study attempts to answer the question of whether education on feral cats and TNR leads to increased support for TNR as a management method for feral cats. This was measured by administering a series of surveys prior to, and following, watching an educational video on either TNR (treatment) or cat breeds (control).

METHODS

Participants

The participants included sixty-five undergraduate students attending a mid-sized liberal arts university near Chicago, Illinois, recruited through general education courses. The average age of the students was 19, and all students were between the ages of 17 and 22. Of the participants, forty-six were female and nineteen were male. Freshmen accounted for 53.8% of participants, followed by sophomores at 23.1%, seniors at 12.3%, and juniors at 10.8%.

Among the participants, seventeen areas of study were represented. Eleven participants were studying in both the department of behavioral sciences and exercise science. Seven were in the department of biology, six were in the department of business, and five were in the department of education. The departments of nursing and music both had four participants. The departments of social work and criminal justice and chemistry and geosciences both had three participants. The departments of history and political science, art and digital media, and engineering all had two participants. The departments of art, mathematics, family and consumer sciences, communications, and general studies all had one participant.

Procedures

Upon receiving approval from the Institutional Review Board, participants were recruited from various general education classes. After giving a brief description of the study, a sign-up sheet was passed around requesting students' participation. Participants wrote their name and email address. Participants were then emailed two links; one to complete the first survey and another to sign up for a thirty-minute time slot to participate in the second phase of the study. The first survey included an informed consent question that gave a brief overview of the procedures, the objectives of the study, and explained the completely voluntary nature of their participation. The first survey also included a demographic section. The time between participants taking the first survey and coming to complete the second phase varied because the first survey was administered to all

participants at once. Some participants were offered extra credit in a course, and all participants were entered into a drawing for one of five $50 amazon gift cards upon completion of the study.

Once students arrived to participate in the second phase of the study they were allowed to choose one of six available rooms, separating them into two groups. Three of the available rooms were set up for the control group and three were set up for the treatment group. Once participants selected their room, they were instructed to watch the video on the computer in their respective room and complete a survey after watching the video. Those in the control group watched a video titled 'Cat Breeds' and those in the treatment group watched a video titled 'Trap-Neuter-Return.' One week following participants' completion of the second phase, they were emailed a link to complete a third, final survey. This survey included a few questions at the end for participants to enter their name for extra credit and to be entered in the gift card drawing.

Materials

Survey

All three surveys administered to participants included most of the same questions apart from the informed consent and demographics portions of the first survey and a question asking which video participants watched in the second survey. The survey used came from a study assessing public perception of domestic cats and preferences for feral cat management (Loyd & Hernandez, 2012). Some questions on the survey used by Loyd and Hernandez were not included in this study, as they pertained to the specific county in which their study was conducted. This left three sections to collect information on participants: past experiences with cats (seven questions), views about cats and their management (eight questions, some with multiple statements), and knowledge about cats (twelve statements and five concepts). This survey was administered using a pre- and post-survey format.

Videos

The control video used was titled 'Cat Breeds.' The video was thirteen minutes and thirty-eight seconds long. The video began with a brief overview of cat domestication and then went on to describe four cat breeds. The breeds discussed were Siamese, Maine Coon, Domestic shorthair, and Persian. For each breed, its origin, job/reason for breeding, temperament, and common health concerns were discussed. (Link to control video: https://youtu.be/KZG-at4znII)

The treatment video was titled 'Trap-Neuter-Return.' This video was seventeen minutes and ten seconds long. This video began with the same overview of cat domestication as the control video. This video then went on to describe feral cat overpopulation. The video then briefly described the difference between a feral and stray cat, followed by reasons that feral cat populations need to be managed. The rest of the video discussed TNR as a management method, including controversy surrounding the method and research supporting TNR. The video ended with some additional benefits of TNR. (Link to treatment video: https://youtu.be/QuIbKIBzP6M)

Analysis

Survey items that the treatment video addressed directly were chosen for analysis along with a few select items that were indirectly addressed. Repeated measures ANOVA tests were run to determine relationships between each time the survey was administered, separated by video group. A p-value of ≤ 0.05 was used to determine significance.

The items that were chosen for analysis were item 7 parts a, b, c, d, and f; item 11 parts a, b, d, and e; and item 8 (see Appendix for items). For items 7 and 11 each part was analyzed separately. For question 8, a 'total score' was calculated for each administration of the survey and a repeated measures ANOVA test was run to determine the relationship between the total scores, separated by video group. The total score was calculated by giving one point each time the participant chose TNR and zero points for each other answer. For item 8, a Cronbach's alpha internal consistency analysis was conducted for each administration. For administration one (T1) Cronbach's alpha was 0.724, for administration two (T2) Cronbach's alpha was 0.577, and for administration three (T3) Cronbach's alpha was 0.726. The reliability of T1 and T3 are acceptable for research purposes. The reliability of the T2 measure is less than desired, however, we are still fairly confident in any significant changes seen during T2 because they remained consistent through T3, which had an acceptable Cronbach's alpha value.

The remaining items in the survey served as distractions to participants to prevent them from guessing the hypothesis or purpose of the study, which could have affected how they answered. These items could also be used for future, more general analysis.

RESULTS

Given the research design being used, the key test in our repeated measures ANOVA is the interaction term, which determines the difference between groups' change over time. When an interaction term was significant, post-hoc tests were used to identify group change over time and at what points groups differed from one another. The patterns in post-hoc tests that would establish that the treatment had its intended effect were the following: at T1, groups are not different; for the TNR group, endorsement significantly increases between T1 and T2; maintenance of T2 scores at T3 suggests persistence of attitudinal change; at T2, TNR endorses significantly more than Cat Breeds; finally, at T3, TNR endorses significantly more than Cat Breeds, which suggests persistent change in attitudes. For parts a, b, c, and f of item 7 and part d of 11, the test of interaction term was not significant. In the rest of this section, only those tests of interaction that were significant will be discussed.

Post-Hoc Pairwise Comparisons for Significant Interaction terms

For item 7d, all necessary patterns to determine treatment efficacy were observed. During T1, no difference between the groups was observed (table 1, figure 1). For the TNR video, endorsement significantly increased between T1 and T2 (table 1, figure 1). The T2 score was also maintained at T3 for the TNR video (table 1, figure 1). When comparing between video groups, TNR endorses significantly more than cat breeds at T2 and maintains this endorsement at T3 (table 1, figure 1).

Table 1: Post Hoc Comparisons – Time*Video for Item 7d

Comparison	Mean Difference	Standard Error	Degree of Freedom	t	P_{tukey}
Cat Breeds T1 – TNR T1	-0.0172	0.227	63.0	-0.0759	1.000
TNR T1 – TNR T2	-0.8611	0.165	63.0	-5.2244	<0.001***
TNR T2 – TNR T3	2.78e-16	0.119	63.0	2.34e-15	1.000
Cat Breeds T2 – TNR T2	-0.6370	0.189	63.0	-3.3724	0.015*
Cat Breeds T3 – TNR T3	-0.5680	0.164	63.0	-3.4731	0.012*

Note. Item 7d assesses how much participants support TNR on a five-point Likert-scale. Table contains the pairwise comparisons used to determine treatment video efficacy. (*p < 0.05, **p < 0.01, ***p ≤ 0.001)

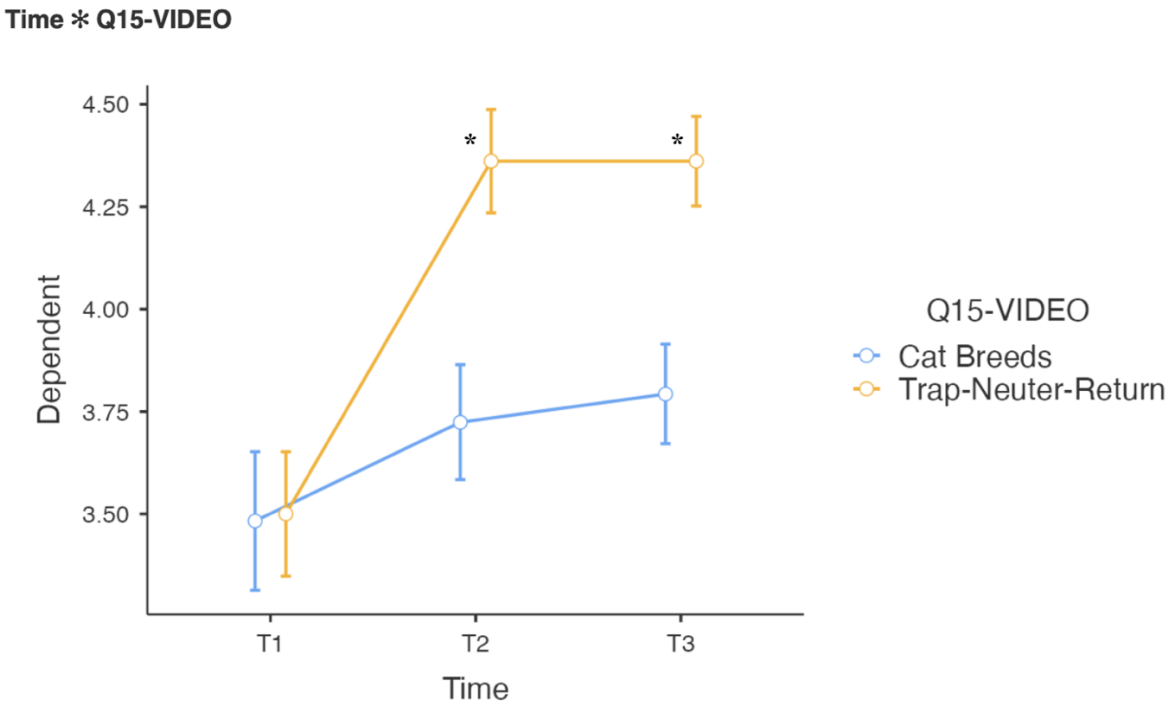

Figure 1: Graphical Representation of Significant Interaction Terms for Item 7d (*p < 0.05)

Table 2: Post Hoc Comparisons – Time*Video for Item 11e

Comparison	Mean Difference	Standard Error	Degree of Freedom	t	P_{tukey}
Cat Breeds T1 – TNR T1	0.126	0.1743	63.0	0.745	0.978
TNR T1 – TNR T2	-1.028	0.1086	63.0	-9.461	<0.001***
TNR T2 – TNR T3	0.139	0.0848	63.0	1.638	0.577
Cat Breeds T2 – TNR T2	-0.625	0.1458	63.0	-4.291	<0.001***
Cat Breeds T3 – TNR T3	-0.487	0.1499	63.0	-3.245	0.022*

Note. Item 11e assessed participants' perceived ability to explain TNR; on a three-point Likert-scale. Table contains the pairwise comparisons used to determine treatment video efficacy. (*p < 0.05, **p < 0.01, ***p ≤ 0.001)

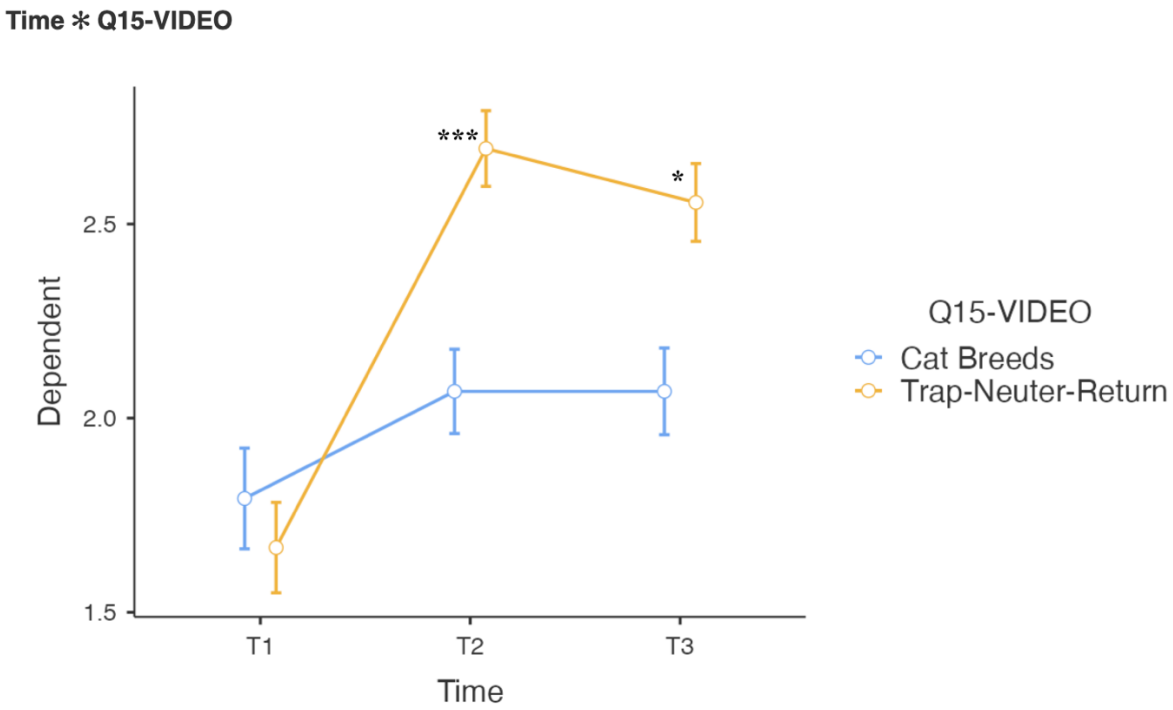

Figure 2: Graphical Representation of Significant Interaction Terms for Item 11e (*p < 0.05, ***p ≤ 0.001)

All necessary patterns to establish treatment efficacy were also observed for item 11e. T1 showed no significant difference between groups (table 2, figure 2). The TNR group experienced a significant increase in endorsement at T2, and maintained its score at T3 (table 2, figure 2). Also, at T2, TNR endorsed significantly more than Cat Breeds. At T3, TNR endorsed more than Cat Breeds, which suggests persistent change in attitudes (table 2, figure 2).

Table 3: Post Hoc Comparisons – Time*Video for Item 8

Comparison	Mean Difference	Standard Error	Degree of Freedom	t	P_{tukey}
Cat Breeds T1 – TNR T1	-0.4157	0.411	63.0	-1.012	0.912
TNR T1 – TNR T2	-1.1944	0.270	63.0	-4.377	<0.001***
TNR T2 – TNR T3	0.1111	0.145	63.0	0.766	0.972
Cat Breeds T2 – TNR T2	-1.0929	0.270	63.0	-4.047	0.002**
Cat Breeds T3 – TNR T3	-1.1542	0.331	63.0	-3.484	0.011*

Note. Item 8 assesses participants' likelihood of choosing TNR as a management method in five different scenarios; total score was calculated with a maximum score of five. Table contains the pairwise comparisons used to determine treatment video efficacy. (*p < 0.05, **p < 0.01, ***p ≤ 0.001)

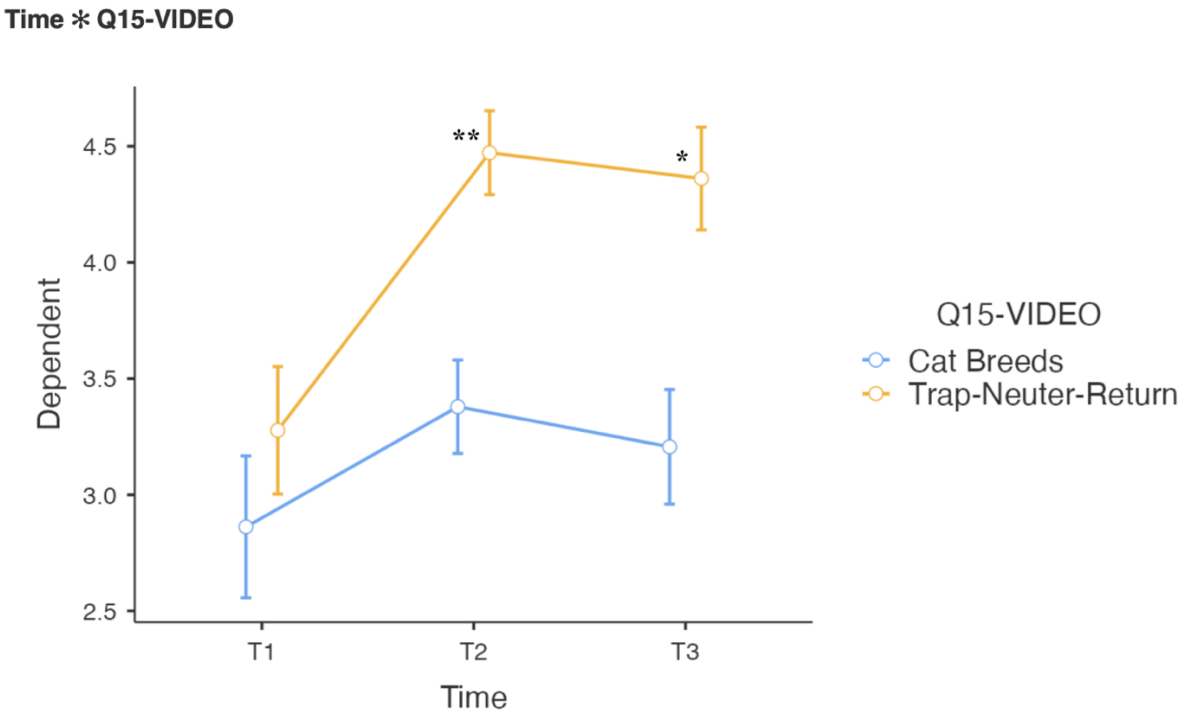

Figure 3: Graphical Representation of the Significant Interaction Terms for Item 8 (*p < 0.05, **p < 0.01)

For item 8, all patterns to determine treatment efficacy were observed. At T1, there was no significant difference between groups (table 3, figure 3). The TNR group experienced a significant increase in endorsement from T1 to T2 (figure 3, table 3). Maintenance of the T2 score was also observed at T3, which suggests persistence of attitudinal change (table 3, figure 3). Between video groups, TNR showed significantly more endorsement than Cat Breeds at T2 (table 3, figure 3). At T3, TNR endorsed significantly more than Cat Breeds, which suggests persistent change in attitudes (table 3, figure 3).

Post-Hoc Pairwise Comparisons for TNR Group Over Time

In this section, results are discussed suggesting that the TNR group changed on items that the Cat Breeds group didn't, but the difference between these groups over time either did not reach significance or were uninterpretable.

Table 4: Post Hoc Comparisons – Time*TNR group for Item 11a

Comparison	Mean Difference	Standard Error	Degree of Freedom	t	P_{tukey}
Cat Breeds T1 – TNR T1	0.1398	0.168	63.0	0.831	0.961
TNR T1 – TNR T2	-0.4722	0.118	63.0	-3.992	0.002**
TNR T2 – TNR T3	-2.08e-16	0.115	63.0	-181e-15	1.000
Cat Breeds T2 – TNR T2	-0.1255	0.152	63.0	-0.823	0.962
Cat Breeds T3 – TNR T3	-0.1944	0.153	63.0	-1.272	0.799

Note. Item 11a assesses participants' perceived ability to explain how non-native species impact an ecosystem; on a three-point Likert-scale. Table contains the pairwise comparisons used to determine treatment video efficacy. (**p < 0.01)

For item 11a, only a few of the patterns necessary to determine treatment efficacy were observed. At T1, there was no significant difference observed between groups (table 4). For the TNR video group, a significant increase in endorsement was observed between T1 and T2 (table 4). This increase was also maintained at T3 (table 4). The difference between groups over time, however, did not reach significance (table 4).

Table 5: Post Hoc Comparison – Time*TNR group for Item 11b

Comparison	Mean Difference	Standard Error	Degree of Freedom	t	P_{tukey}
Cat Breeds T1 – TNR T1	0.1006	0.147	63.0	0.682	0.983
TNR T1 – TNR T2	-0.6667	0.124	63.0	-5.380	<0.001***
TNR T2 – TNR T3	-0.0883	0.100	63.0	-0.830	0.961
Cat Breeds T2 – TNR T2	-0.1868	0.139	63.0	-1.348	0.757
Cat Breeds T3 – TNR T3	-0.4425	0.157	63.0	-2.827	0.066

Note. Item 11b assessed participants' perceived ability to explain the interactions between cats and wildlife; on a three-point Likert-scale. Pairwise comparisons of importance are outlined in red. (*$p < 0.05$, **$p < 0.01$, ***$p \leq 0.001$)

Some of the patterns necessary to determine treatment efficacy were observed for item 11b. At T1, no significant difference was observed between groups (table 5). A significant increase in endorsement was observed at T2 for the TNR group and was maintained at T3 (table 5). Some pairwise comparisons on the post-hoc test showed significant difference between the groups over time; however, this significance is uninterpretable.

DISCUSSION

This study assessed the effect of targeted education on participants' knowledge and attitudes towards TNR as a method of feral cat management. A positive correlation was observed between the treatment video and preference for TNR. This result correlates with a study done on education on invasive species, which also found that increased knowledge was accompanied by attitudinal change toward management (Waliczeck et al., 2018). The present result also correlates with a study that determined an association between awareness of a management program and increased participation in the program (McDonald & Clements, 2019). This study also noted the absence of change in the control group, which is consistent with past studies that have noted that general knowledge of domestic cats did not appear to influence or be a predictor for support for management (Loyd & Hernandez, 2012).

Another interesting thing to note is the correlation between items in which all necessary patterns to determine treatment efficacy were observed and the ones in which only some were observed. The items that showed significance in all of the important pairwise comparisons, 7d, 11e, and 8, all asked about support, understanding, or preference for TNR as a management method, which is the majority of what the treatment video covered. The items that showed significance in some of the important pairwise interactions, 11a and 11b, asked about understanding of how invasive species, specifically cats, affect wildlife, which was only briefly discussed in the treatment video. This observation suggests that the treatment video was effective in educating on this topic, however, not drastically enough to be significant when comparing between the groups. Finally,

the items that showed no significance (7a, 7b, 7c, 7f, and 11d) asked about topics that were indirectly related to the treatment video. These observations suggest that the treatment video was most effective in producing cognitive and attitudinal changes in areas that it most directly addressed.

This study may be hindered by several limitations, one of which being small sample sizes. Having approximately thirty participants in each group allowed some confidence in analysis; however, more participants would increase that confidence. There were also a few items that were close to being significant during analysis, which may have been significant with more participants. Another limitation to this study was that a survey from a different study was used. Although the survey used assessed the correlations desired in this study, it was a more general survey than was necessary for this study. A survey written with this study's hypothesis in mind may have allowed for more specific results. There are also a few confounding factors to be aware of, one being that video assignment was not completely random. For the second step of the study, rooms on the left were set up with the TNR video, while rooms on the right were set up with the cat breeds video. Since participants were allowed to choose which room they watched the video in during this phase, it is possible that those who preferred to go into a room on the left somehow differed from those who chose a room on the right. Logically, it seems unlikely that this affected my results, however in a future study it would be better to randomly assign participants to rooms. Another confounding factor to consider is that the experimental (TNR) video was a few minutes longer than the control video. This difference in video length could suggest that the differences seen might be a result of the extra exposure to information about cats. Logically, the difference seen would be due to the content of each video, however, the length is still something to consider. In a future study, it would be beneficial to make each video the same length to avoid this possibility.

Future research in this area would benefit from pairing an educational program with a TNR program. The results of the present study determined significance in cognitive and attitudinal change in hypothetical scenarios. By studying the effects of an educational program being run alongside a TNR program, behavioral changes could also be assessed. Further, since topics addressed most directly in the treatment video produced the most significant changes, additional research could be done to determine the amount of education needed to obtain the desired changes. For example, different methods of education could be compared to determine the most effective way to distribute information during an educational program. Management programs often rely on public funding, so community support is imperative. Community support is also needed to help TNR programs run more smoothly and end up being more successful in the long run (Deak et al., 2019). This need for community support emphasizes the importance of studying education and its relation to participation and support for feral cat management.

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Appendix

Items of the Survey used for Analysis

7. **How much do you support the following actions regarding the management of feral cats?**

	Unacceptable in all cases	**Unacceptable in most cases**	**Unsure**	**Acceptable in most cases**	**Acceptable in all cases**
a. Capture and euthanize feral cats					
b. Capture and place feral cats in a sanctuary created for them					
c. Educate the public about feral cats and wildlife					
d. Trap, sterilize (neuter), and re-release feral cats					
f. Leave cats alone					

8. **Please pick the choice that corresponds to the management option you choose to each question.**

	Trap-Neuter-Return (capture, sterilize, and re-release cats)	**Capture and euthanize**	**I am unsure**	**Other**
a. Which do you believe would be the most effective at cat population reduction?				
b. Which do you believe is more humane to cats?				
c. Which management option do you believe is more humane to wildlife?				
d. Which option would you prefer tax-payer money be spent on?				
e. Which option would you donate money to? (NOTE: we are not soliciting donations; we only care about your potential to donate money)				

11. How well would you be able to explain the following concepts to a friend?

	Could not explain	Could somewhat explain	Could explain well
a. How non-native species impact an ecosystem			
b. Interactions between cats and wildlife			
d. Causes of the songbird decline in the US			
e. Trap-Neuter-Return			