Friend or Foe? The Impacts of Protection-Oriented and Threat-Oriented Signage on Human-Coyote Interactions

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SEEDS Sustainability Program

Executive Summary

Introduction

Kip and Carter are well-known coyote celebrities on UBC Vancouver's campus, with frequent sightings from staff and students alike. Their visibility and familiarity in the community exemplify the increasing activity of coyotes on campus in recent years, leading to a rise in human-coyote interactions. Our focus was to reduce negative human-coyote interactions for the protection and enhancement of urban biodiversity.

Research Question

Does using signage that emphasizes protection-oriented messaging (coyotes need protection from humans) or threat-oriented (coyotes are a threat to humans) messaging result in more appropriate human-coyote interactions?

Methods

We designed and tested an experimental study on the efficacy of signage with protection-oriented versus threat-oriented imagery and language to promote appropriate human-coyote interactions. We randomly assigned 290 participants to 3 conditions; (1) control signage that is already being used around Vancouver, (2) signage with protection-oriented messaging combined with an image of baby coyotes, and (3) signage with threat-oriented messaging combined with an image of adult coyotes. Participants rated the likelihood of their potential behavior in terms of reactions to the coyote, pet safety, and reporting the sighting after encountering a coyote.

Results

We found there was no significant difference between the 3 conditions.

Recommendations

We recommend further review of effective signage testing and additional efforts towards coyote safety education for everyone who lives, works, and plays on the UBC Vancouver campus.

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Introduction

In recent years, coyote activity on the UBC Vancouver campus has increased, leading to a rise in human-coyote interactions (Brind, 2022). One reliable method to reduce the negative impacts of human behavior on wildlife is to implement signage. Bond and Jones (2013), found that wildlife signage focused on animal welfare reduced the frequency of negative interactions. Griffin et al. (2023) found that images of baby animals combined with messages of animal welfare were most effective in reducing negative interactions. Such images trigger the 'baby schema effect,' where infant-like features, such as big eyes, motivate caretaking behavior and protection. In addition, Lu et al. (2016), discovered that fear influenced people's behavior towards coyotes, helping to prevent human-coyote conflict. However, none of the literature thus far mentions whether messaging focused on animals as potential threats to humans or prioritizing the protection of the animals themselves is more effective in reducing inappropriate interactions.

Research Question

Does using signage that emphasizes protection-oriented messaging (coyotes need protection from humans) or threat-oriented (coyotes are a threat to humans) messaging result in more appropriate human-coyote interactions?

Hypothesis

We hypothesize that messaging that prioritizes the protection of the coyotes will result in a higher amount of appropriate responses to human-coyote scenarios, compared to messaging that focuses on coyotes as potential threats to humans.

The independent variables in the study were the type of messages displayed to participants (control, protection-oriented messaging, and threat-oriented messaging). The dependent variable was the participants' intention to modify their behavior concerning human-coyote interactions after viewing an assigned signage, assessed through a Likert scale.

Methods

Participants

The study aimed to recruit a minimum of 246 participants (Effect size f = .2, a err prob = .05, Power (1-ß err prob) = .8, N_{group} = 3, Noncentrality parameter = 9.84, Critical F = 3.03, Actual power = .8). The final sample comprised 290 individuals from the City of Vancouver and the University of British Columbia. The mean age of participants was 22.91 years (SD = 8.53). 41 participants did not respond to the question regarding their gender identity. Among the participants who provided an answer to their gender identity, 62% identified as women, 32% identified as male, 4% identified as non-binary/third gender, and 2% preferred not to disclose their gender.

Conditions

The independent variable was the type of messaging presented to participants, operationalized as either protection-oriented or threat-oriented signage, with a control group receiving existing signage (see Appendix A1 - A3). The hypothesis proposed that protection-oriented signage of coyotes would prompt more appropriate responses compared to the threat-oriented ones. To operationalize this variable, modifications were made to the language, layout, and images on the signage. Participants were randomly assigned to one of three conditions: control, protection-oriented messaging, or threat-oriented messaging. In the control condition, participants (N = 93) viewed existing signage from Stanley Park by the City of Vancouver, providing information on appropriate human-coyote interaction, accompanied by an image of an adult coyote. The two experimental conditions involved modifications to language, layout, and images. In the protection-oriented condition, participants (N = 107) viewed signage depicting a coyote pup and emphasizing actions beneficial to coyotes. Conversely, in the threat-oriented condition, participants (N = 90) viewed signage with an image of an adult coyote and language highlighting potential dangers posed by coyotes. These manipulations aimed to operationalize the hypothesis that signage emphasizing coyote protection would prompt more appropriate responses than signage emphasizing coyote threats.

Measures

In this study, the dependent variable was the participants' intention to change their behavior regarding human-coyote interactions, which was measured using a Likert scale. After viewing either protection-oriented, threat-orie

nted, or control signage, participants' intentions were evaluated through a 16-item online Qualtrics survey (see Figure B3 to B5). The survey presented a hypothetical scenario where participants encountered a coyote on campus a nd included questions about their reactions, pet safety concerns, and willi ngness to report coyote sightings. Participants rated their likelihood of e ngaging in various behaviors on a Likert scale ranging from 0 to 7, where 0 indicated "extremely unlikely" and 7 indicated "extremely likely." While th e survey was not based on a validated scale, it was developed using informa tion from existing signage developed by the City of Vancouver, as well as r ecommendations given by UBC security about appropriate behavioral responses when encountering a coyote on campus (Ramsey, 2021).

Procedure

Recruitment occurred through online public servers, forums, social media pl atforms, Canvas inbox messages to our classmates, and in-person survey dist ribution on the UBC Vancouver campus. Participants accessed the survey eith er via a link or a QR code, beginning with a consent form. Following the co nsent form, participants were randomly assigned to view one of the three si gnage conditions. Regardless of condition, participants completed the same set of survey questions assessing their intended actions upon encountering a coyote on campus (see Appendix B for all survey questions). Demographic i nformation and the option to enter a draw for one of two $25 gift cards for AMS UBC Food Services outlets were collected after survey completion. One c hallenge during data collection was that our in-person recruitment predomin antly took place during the midterm exam period, when participants may have been short on time to thoroughly complete surveys due to academic obligatio ns. This timing potentially impacted the quality of responses and the exten t to which participants engaged with the survey content.

Results

To measure the effectiveness of our protection-oriented and threat-oriented messaging on influencing appropriate behavior in human-coyote interactions, we attempted to conduct ANOVA tests to examine the likelihood of certain be haviors across conditions for all Qualtrics statements. We are unable to pe rform an ANOVA test on the average of our Likert scales due to the Cronbach ' s alpha value being less than 0.7 (α = 0.641) and thus had to analyze ea ch question separately.

Estimate	Cronbach's α
Point estimate	0.641
95% CI lower bound	0.575
95% CI upper bound	0.698

Due to the violation of the normality assumption, homogeneity of variance assumption, and the existence of outliers, we used the Kruskal-Wallis test for the statements that failed to pass all of the ANOVA assumptions.

"Retreat and Maintain Eye Contact" had similar means between the threat condition (M=3.42, SD=1.878), protection condition (M=3.63, SD=2.157), and control (M=3.59, SD=2.06). The results of this statement passed all assumptions for ANOVA. There were no outliers according to the boxplot (see Appendix C6), the values for both skewness and kurtosis were within the appropriate range of -2 to +2 for all conditions which indicates a normal distribution, and the p-value for the Levene's Test for Equality of Variance was above 0.05 which passes the Homogeneity of Variance test (see Appendix C2). The ANOVA test showed a p-value of 0.764, which is above the significance threshold of 0.05.

The same case was made for the following statements: "Raise arms and shout", "Keep food scraps in a closed container", "Keep pet leashed and appear large", "Take a photo", and "Alert bystanders". These statements passed all ANOVA assumptions but had a p-value above 0.05 in the ANOVA test, indicating a lack of significant difference across means.

We conducted a Kruskal-Wallis test for the following statements (see Appendix C6 and C3): "Lying down in front of a coyote", and "Feed coyote leftovers" passed the Homogeneity of Variance assumption but were not normally distributed and had outliers; "Leave food in a secluded corner" was normally distributed and passed the Homogeneity of Variance assumption, but had several outliers; "Report to Campus Wildlife Sightings" was normally distributed but had outliers and did not pass the Homogeneity of Variance assumption; "Give coyote pet treats", "Let pet interact with the coyote", "Off-leash pet at a safe distance from coyote", "Encourage aggression in pet towards coyote", and "Alert UBC Security" did not pass any of the ANOVA assumptions. All Kruskal-Wallis p-values were above the significance threshold of 0.05 indicating a lack of significant difference across means (see Appendix C6 and C3).

There was only one occurrence of a significant result in the statement, "Shoo the Coyote Away Kindly", where there exists a difference in mean between the threat-oriented condition (M=2.822, SD=2.037), the control (M=1.710, SD=1.779), and protect-oriented condition (M=1.832, SD=1.799). This statement fitted a normal distribution assumption, but there are outliers (see App

endix C6) and the results did not pass the Homogeneity of Variance test as the p-value was 0.02 instead of above 0.05 (see Appendix C4). A Kruskal-Wallis test was conducted which presented a p-value of <0.001, indicating that there exists a difference of means between some combination of our conditions. Dunn's Post Hoc was used to find the difference (see Appendix C5). Comparing the control and protection-oriented conditions presented us with p = 0.583, which shows an insignificant difference. On the other hand, the p-values for the threat-oriented with control comparison and the threat-oriented with protect-oriented comparison were significant, as both comparisons had p < 0.001. Indicating that the threat-oriented condition signage had a significant difference from our other signage. According to Cohen (1988) regarding eta squared, the effect sizes of small, medium, and large have values of 0.01, 0.06, and 0.14 respectively. The eta squared value was 0.057, indicating a small effect size.

Discussion

Our findings suggest that neither the protection-oriented signage nor the threat-oriented signage resulted in more appropriate reaction responses during human-coyote encounters. Survey responses show that participants responded similarly across all conditions, for all scenarios except for Section 1, Question 3 (likelihood of the participant "shoo(ing) the coyote away kindly") (Figure B3). In Experimental Condition 2 (threat-oriented) signage, participants were significantly more likely to engage in the aforementioned behavior. However, this action is not recommended for coyote encounters; the threat-oriented condition backfired and encouraged an inappropriate response.

Implications

This study advances methods to improve awareness and education on human-coyote interactions. While our study did not elicit significant results between signage conditions, it provides further information on what modifications in signage and surveys in future educational campaigns can be taken into account.

The visual and textual differences between the signs in all conditions were not large enough to elicit a difference in the response. This suggests the need for greater contrast of signage content and design to influence behavior in human-wildlife conditions. One possible explanation for the lack of significant differences between the signage conditions could be the quantity of the survey questions. The length of the questionnaire may have led participants to forget the content of the posters by the time they completed the survey. An additional reason may be that participants did not read the signage carefully, meaning that their responses would have been the same regardless of the condition.

Additionally, it is important to consider that signage alone may not be sufficient to effectively educate people on what constitutes appropriate coyote-human interaction. Individuals may simply be unaware of what behaviors are considered appropriate in such situations. Previous studies have shown that marketing and media campaigns are effective in managing human-wildlife campaigns (Bond & Jones 2013; Griffen et al., 2023). A more comprehensive approach, incorporating various media channels like awareness movements, could enhance the impact of educational efforts in this domain.

Limitations

The limitations of our study mainly concern external and internal validity. The study was conducted entirely online through a Qualtrics survey and digital posters, which does not reflect the environment where educational coyote signage is normally found. The lack of ecological validity limits the generalizability of our results to real-world environments. Furthermore, the number of participants across all conditions who qualified for the behavioral questionnaire on pets did not meet the power analysis, which may render the findings inconclusive.

Future Research

Future studies could look into improving the signage to elicit a stronger effect on behavior, such as using typographically altered keywords (ie. bolded, underlined, and/or colored) to draw and sustain more visual attention to the sign. Enhancing behaviourally relevant and protection or threat-coded terms like "for their health, do not feed them" and "fed coyotes can be more aggressive to humans" may elicit stronger participant awareness (Lorch et al., 1995).

Residents, students, and employees could also be polled on their preference for poster design and asked for feedback on which style they found attractive and why; this would ensure that the signage used is sufficiently eye-catching and locally relevant. To improve the ecological validity of the study design, we recommend that physical signage be used in place of digital posters. Signs can be posted in areas of frequent coyote sightings and/or high-traffic areas around campus, such as residences or campus buildings near Pacific Spirit Park (Hendricks, 2022). A longitudinal study of knowledge of UBC residents on coyote-human interactions can be instated to measure the impacts of having signage in place. Future studies should create a greater contrast between the two experimental conditions' signage content and design to influence behavior in human-wildlife conditions.

Recommendations

Further education on safe human-coyote interactions should be first and foremost, as there are continuous encounters with coyotes on the UBC campus alone. Additionally, the UBC Vancouver campus boasts a high number of international students, staff, and visitors. It is important to start with and maintain educational efforts to reach both those familiar and new to urban coyotes and other wildlife found in the Vancouver area. We suggest that there be an inclusion of popular sighting spots, suggested key behaviors, and safety warnings to keep both parties safe, within UBC course syllabi. Whether it be included in every class introduction or simply within the first-year orientation material, we believe it is imperative to remind and educate students on safe practices with coyotes and the numerous other wildlife species on campus. To ensure that students and staff are aware of recommended practices, we suggest this information be incorporated as part of faculty-wide emails at the start of the term. Furthermore, incorporating wildlife safety information within classes in the form of case study contexts, assignment questions, and workshops, could provide an easy avenue for educators to increase awareness and engagement. These could serve as effective and engaging reminders of good practice for wildlife encounters, as well as general interest in UBC SEEDS and UBC Sustainability initiatives.

It is worth noting that, “providing knowledge alone,” in regards to safe coyote-human interactions, “typically does not change attitudes or behaviors” (Frick et al., 2004 as cited by Sponarski et al., 2016). In light of this, we suggest that education models such as those created by Sponarski et. al, previously tested in Canadian National Parks, be integrated on smaller scales within first-year orientation and employee orientation. The four-stage education model, consists of the action stage in which the learner is presented with a novel situation and asked to respond, followed by the second stage of debrief, in which learning is, “recognized, articulated and evaluated,” followed by the third stage of generalizing in which abstractions and generalizations are found, concluded with the application stage in which the “generalized conclusions” are applied to the novel situations (Sponarski et al., 2016). Our findings and recommendations align with and support the existing research and models for continuing efforts to improve and enhance urban biodiversity and improve human-wildlife interractions.

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Appendix A

Figure A1

The Control Condition Poster

Figure A2

The Experimental Condition 1 (Protection-Oriented Messaging) Poster

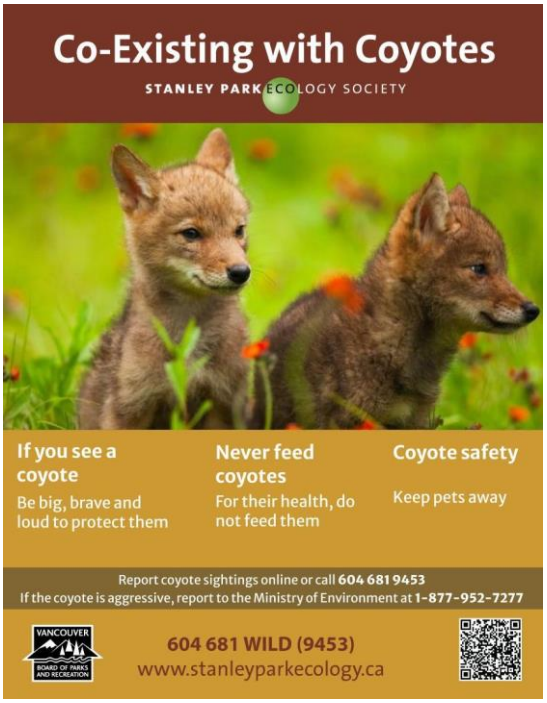
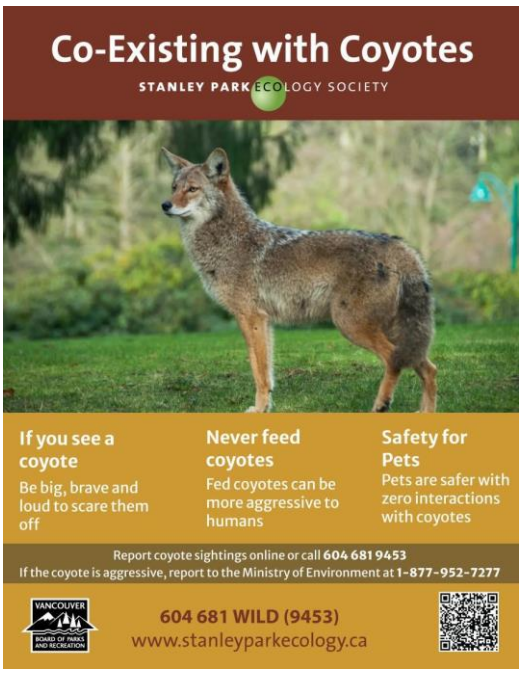


Figure A3

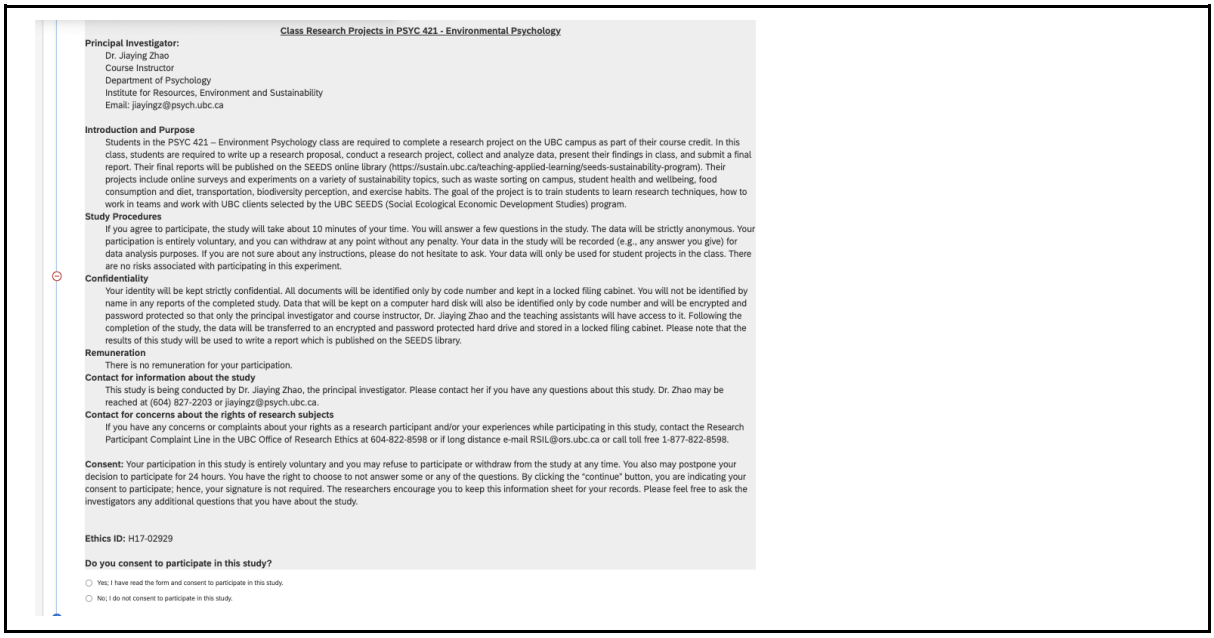
The Experimental Condition 2 (Threat-Oriented Messaging) Poster



Appendix B

Figure B1

The Consent Letter



Class Research Projects in PSYC 421 - Environmental Psychology

Principal Investigator:
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Course Instructor
Department of Psychology
Institute for Resources, Environment and Sustainability
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Introduction and Purpose
Students in the PSYC 421 – Environment Psychology class are required to complete a research project on the UBC campus as part of their course credit. In this class, students are required to write up a research proposal, conduct a research project, collect and analyze data, present their findings in class, and submit a final report. Their final reports will be published on the SEEDS online library (https://sustain.ubc.ca/teaching-applied-learning/seeds-sustainability-program). Their projects include online surveys and experiments on a variety of sustainability topics, such as waste sorting on campus, student health and wellbeing, food consumption and diet, transportation, biodiversity perception, and exercise habits. The goal of the project is to train students to learn research techniques, how to work in teams and work with UBC clients selected by the UBC SEEDS (Social Ecological Economic Development Studies) program.

Study Procedures
If you agree to participate, the study will take about 10 minutes of your time. You will answer a few questions in the study. The data will be strictly anonymous. Your participation is entirely voluntary, and you can withdraw at any point without any penalty. Your data in the study will be recorded (e.g., any answer you give) for data analysis purposes. If you are not sure about any instructions, please do not hesitate to ask. Your data will only be used for student projects in the class. There are no risks associated with participating in this experiment.

Confidentiality
Your identity will be kept strictly confidential. All documents will be identified only by code number and kept in a locked filing cabinet. You will not be identified by name in any reports of the completed study. Data that will be kept on a computer hard disk will also be identified only by code number and will be encrypted and password protected so that only the principal investigator and course instructor, Dr. Jiaying Zhao and the teaching assistants will have access to it. Following the completion of the study, the data will be transferred to an encrypted and password protected hard drive and stored in a locked filing cabinet. Please note that the results of this study will be used to write a report which is published on the SEEDS library.

Remuneration
There is no remuneration for your participation.

Contact for information about the study
This study is being conducted by Dr. Jiaying Zhao, the principal investigator. Please contact her if you have any questions about this study. Dr. Zhao may be reached at (604) 827-2203 or jiayingz@psych.ubc.ca.

Contact for concerns about the rights of research subjects
If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

Consent: Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time. You also may postpone your decision to participate for 24 hours. You have the right to choose to not answer some or any of the questions. By clicking the "continue" button, you are indicating your consent to participate; hence, your signature is not required. The researchers encourage you to keep this information sheet for your records. Please feel free to ask the investigators any additional questions that you have about the study.

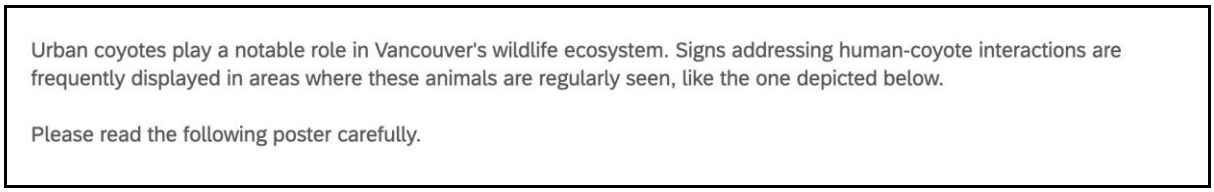
Ethics ID: H17-02929

Do you consent to participate in this study?

○ Yes; I have read the form and consent to participate in this study.
○ No; I do not consent to participate in this study.

Figure B2

Instructions for all conditions, shown before the poster



Urban coyotes play a notable role in Vancouver's wildlife ecosystem. Signs addressing human-coyote interactions are frequently displayed in areas where these animals are regularly seen, like the one depicted below.

Please read the following poster carefully.

Figure B3

Survey Question – Reactions to Coyote

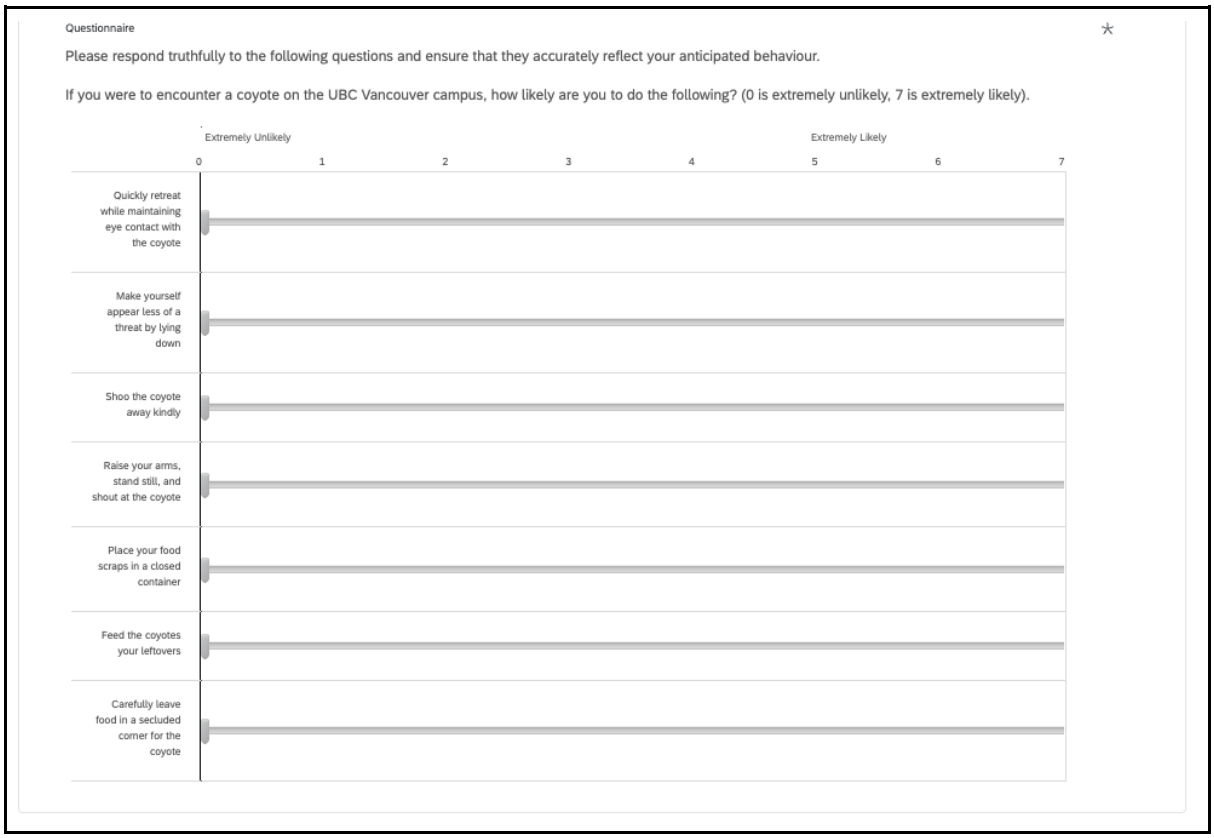


Figure B4

Survey Questions – Pet Safety

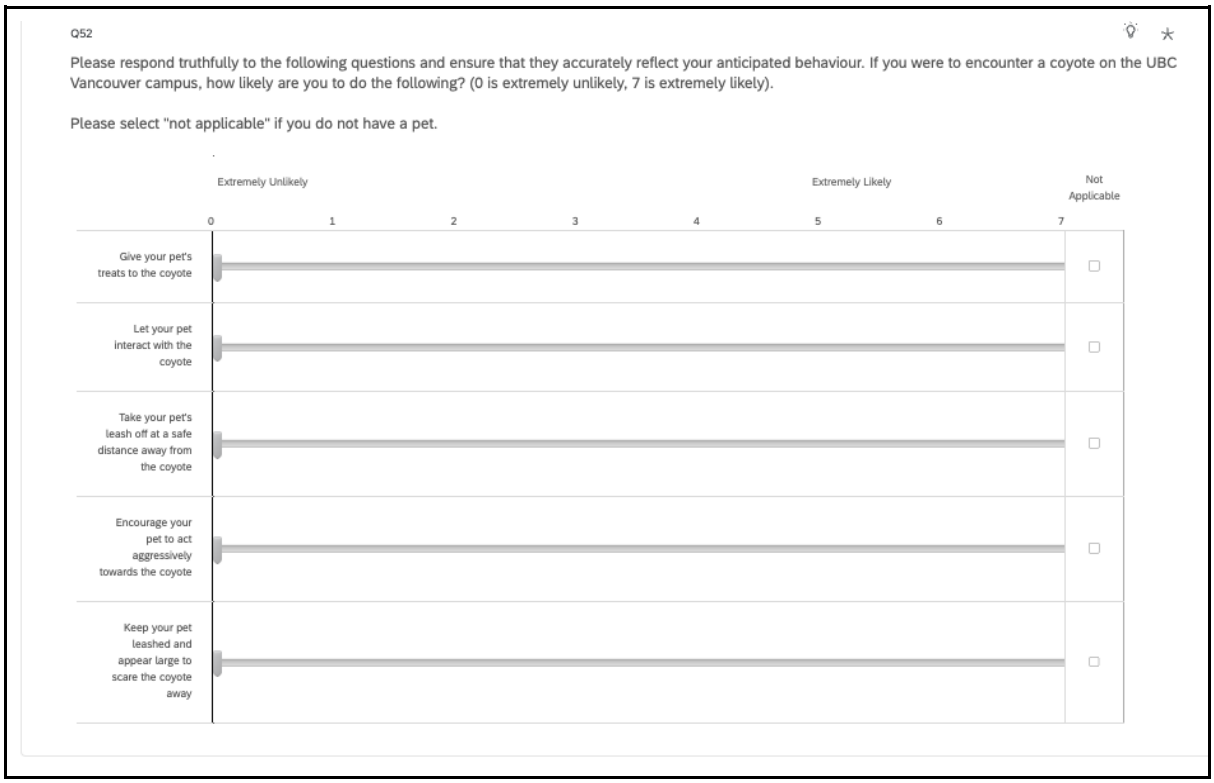


Figure B5

Survey Question – Report Coyote Sightings

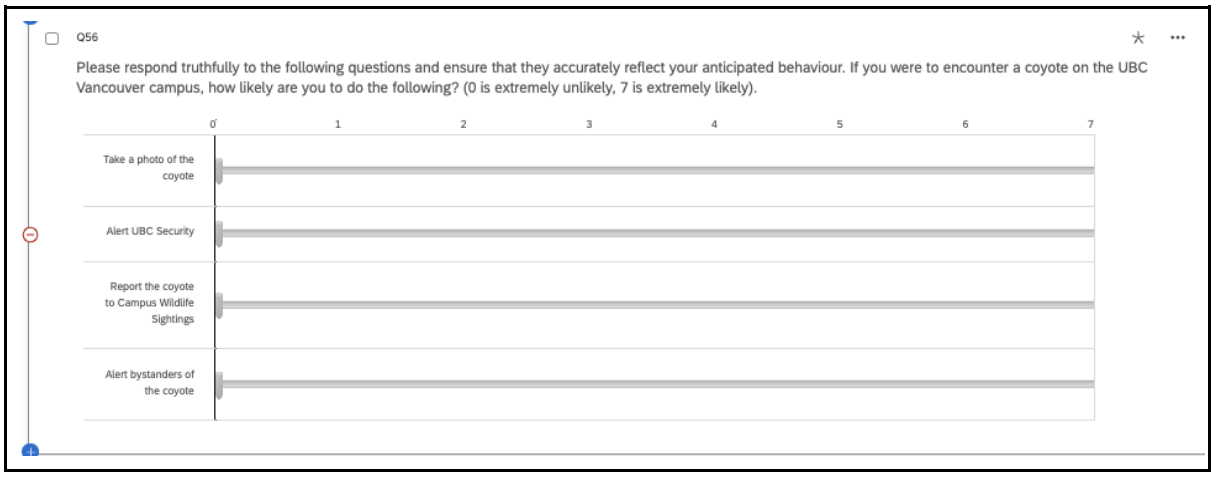


Figure B6

Demographics

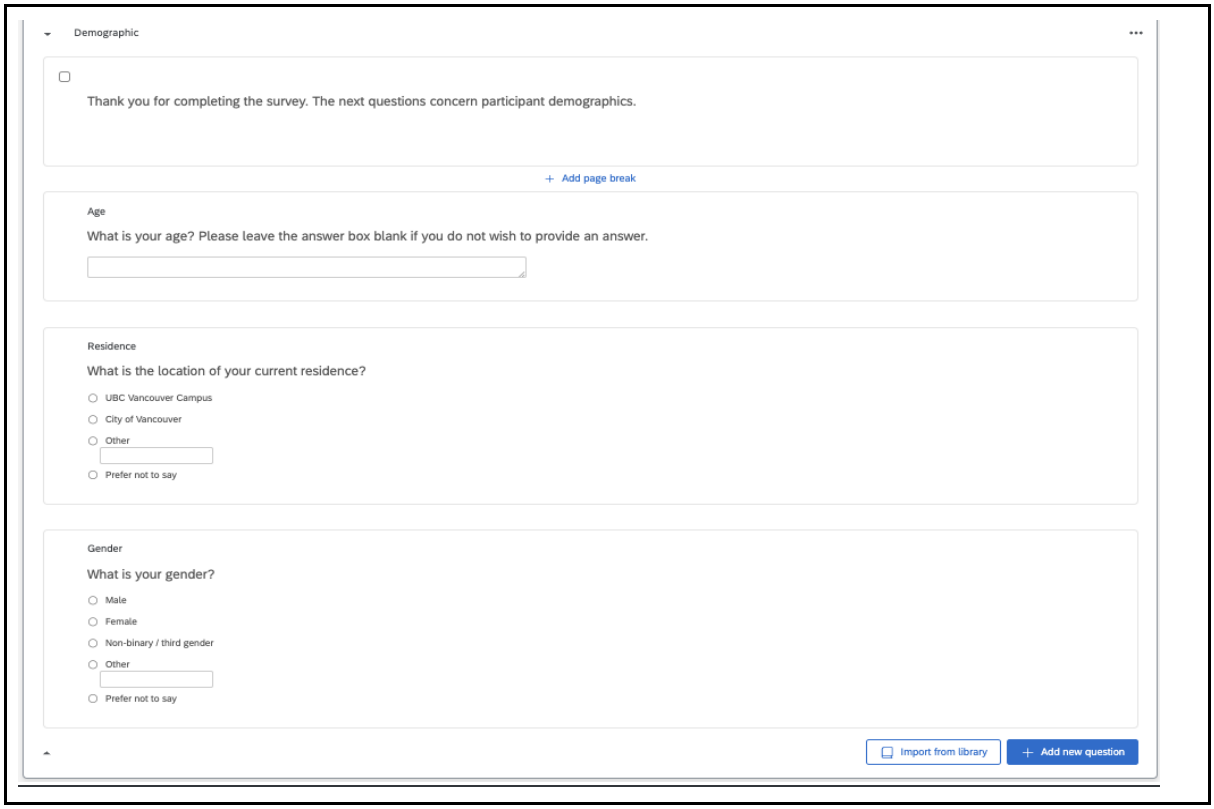
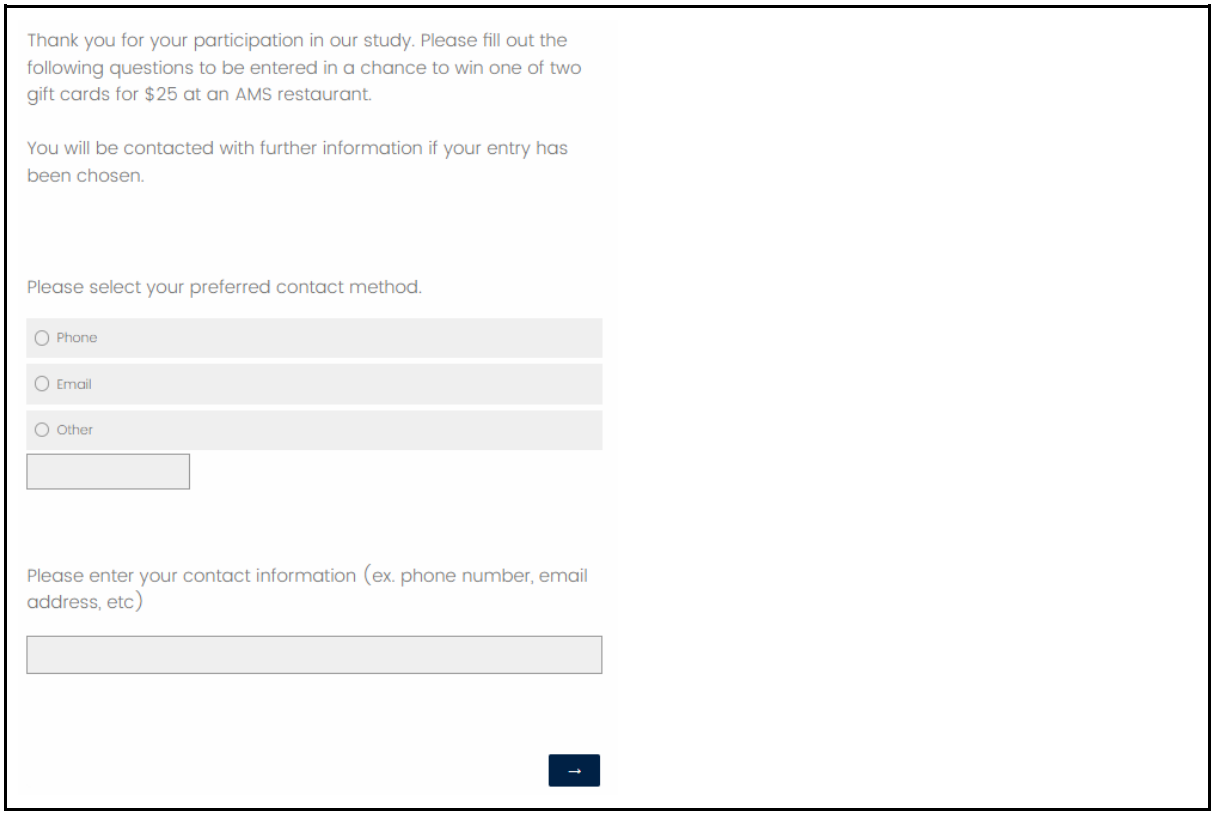


Figure B7

Debrief

Figure B8

Gift Card Survey



Appendix C

Figure C1

Power Analysis Parameters

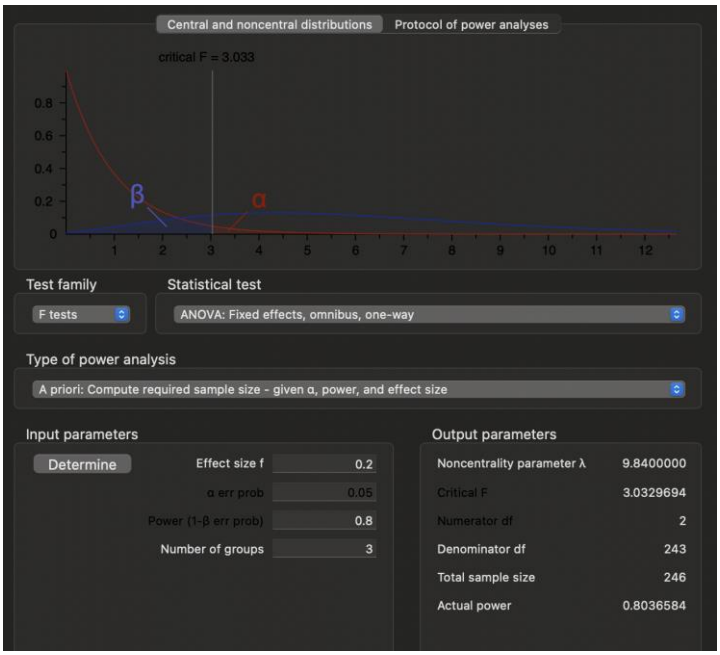


Figure C2

Anova Test

Qualtrics Statements	Control	Protection-oriented	Threat-oriented	P-value: Variance	P-value: ANOVA	Effect Size: Eta Squared
Retreat and Maintain Eye Contact	M = 3.591 SD = 2.060 N = 93 $\hat{\alpha}_3$ = 0.011 K = -0.973	M = 3.626 SD = 2.157 N = 107 $\hat{\alpha}_3$ = -0.251 K = -1.043	M = 3.422 SD = 1.878 N = 90 $\hat{\alpha}_3$ = -0.053 K = -0.883	p= 0.241	p= 0.764	η2= 0.002
Raise arms + Shout	M = 2.043 SD = 2.206 N = 93 $\hat{\alpha}_3$ = 1.074 K = 0.014	M = 1.981 SD = 2.123 N = 107 $\hat{\alpha}_3$ = 0.953 K = -0.236	M = 2.322 SD = 2.192 N = 90 $\hat{\alpha}_3$ = 0.638 K = -0.922	p= 0.461	p= 0.517	η2= 0.005
Keep Food Scraps in Closed Container	M = 3.677 SD = 2.786 N = 93 $\hat{\alpha}_3$ = -0.081 K = -1.615	M = 3.159 SD = 2.852 N = 107 $\hat{\alpha}_3$ = 0.190 K = -1.619	M = 3.556 SD = 2.482 N = 90 $\hat{\alpha}_3$ = 0.025 K = -1.459	p= 0.068	p = 0.367	η2 = 0.007
Keep Pet Leashed + Appear Larger	M = 3.154 SD = 2.498 N = 39 $\hat{\alpha}_3$ = 0.093	M = 3.922 SD = 2.834 N = 51 $\hat{\alpha}_3$ = -0.219 K = -1.633	M = 4.419 SD = 2.593 N = 43 $\hat{\alpha}_3$ = -0.624 K = -1.287	p= 0.368	p = 0.101	η2 = 0.035

Qualtrics Statements	Control	Protection-oriented	Threat-oriented	P-value: Variance	P-value: ANOVA	Effect Size: Eta Squared
	K = -1.425					
Take Photo	M = 4.355 SD = 1.987 N = 93 $\hat{\alpha}_3$ = -0.396 K = -0.508	M = 4.318 SD = 2.251 N = 107 $\hat{\alpha}_3$ = -0.456 K = -0.942	M = 4.644 SD = 2.189 N = 90 $\hat{\alpha}_3$ = -0.629 K = -0.654	p= 0.202	p = 0.523	$\eta 2$ = 0.005
Alert Bystanders	M = 3.548 SD = 2.348 N = 93 $\hat{\alpha}_3$ = 0.061 K = -1.269	M = 3.551 SD = 2.199 N = 107 $\hat{\alpha}_3$ = 0.041 K = -1.066	M = 3.211 SD = 2.117 N = 90 $\hat{\alpha}_3$ = 0.166 K = -1.058	p= 0.307	p = 0.487	$\eta 2$ = 0.005

Figure C3

Kruskal-Wallis Test

Qualtrics Statement	Control	Protection-oriented	Threat-oriented	P-value: Variance	P-value: Kruskal-Wallis	Effect Size: Eta Squared
Lying down	M = 0.806 SD = 1.534 N = 93 $\hat{\alpha}_3$ = 2.364 K = 5.191	M = 0.981 SD = 1.536 N = 107 $\hat{\alpha}_3$ = 2.358 K = 6.005	M = 0.678 SD = 1.150 N = 90 $\hat{\alpha}_3$ = 2.432 K = 6.136	p= 0.237	p = 0.179	η2= 0.005
Feed Coyote Leftovers	M = 0.688 SD = 0.804 N = 93 $\hat{\alpha}_3$ = 2.435 K = 5.929	M = 0.804 SD = 1.299 N = 107 $\hat{\alpha}_3$ = 2.031 K = 3.438	M = 0.800 SD = 1.408 N = 90 $\hat{\alpha}_3$ = 2.589 K = 7.594	p= 0.924	p = 0.583	η2= -0.003
Leave Food in Secluded Corner	M = 0.871 SD = 1.337 N = 93 $\hat{\alpha}_3$ = 1.942 K = 3.498	M = 0.991 SD = 1.563 N = 107 $\hat{\alpha}_3$ = 1.919 K = 2.852	M = 0.878 SD = 1.348 N = 90 $\hat{\alpha}_3$ = 1.692 K = 1.839	p= 0.759	p = 0.931	η2= -0.006
Give Pet Treats	M = 0.923 SD = 1.326 N = 39 $\hat{\alpha}_3$ = 1.363 K = 0.739	M = 0.941 SD = 1.618 N = 51 $\hat{\alpha}_3$ = 2.607 K = 7.013	M = 1.465 SD = 2.261 N = 43 $\hat{\alpha}_3$ = 1.539 K = 1.174	p= 0.004	p = 0.865	η2= -0.013
Let Pet interact with Coyote	M = 0.667 SD = 1.084 N = 39 $\hat{\alpha}_3$ = 1.765 K = 2.255	M = 0.600 SD = 1.050 N = 50 $\hat{\alpha}_3$ = 2.315 K = 5.136	M = 1.047 SD = 1.914 N = 43 $\hat{\alpha}_3$ = 2.301 K = 4.767	p= 0.025	p = 0.842	η2= -0.013

Qualtrics Statement	Control	Protection-oriented	Threat-oriented	P-value: Variance	P-value: Kruskal-Wallis	Effect Size: Eta Squared
Off-leash Pet at a Safe Distance	M = 1.205 SD = 1.824 N = 39 $\hat{\alpha}_3$ = 1.656 K = 1.874	M = 0.600 SD = 0.969 N = 50 $\hat{\alpha}_3$ = 2.580 K = 8.565	M = 1.093 SD = 1.823 N = 43 $\hat{\alpha}_3$ = 2.080 K = 3.913	p= 0.007	p = 0.524	η2= -0.005
Encourage Aggressive Pet	M = 0.868 SD = 1.474 N = 38 $\hat{\alpha}_3$ = 2.165 K = 4.402	M = 0.700 SD = 1.129 N = 50 $\hat{\alpha}_3$ = 2.311 K = 5.552	M = 0.907 SD = 1.306 N = 43 $\hat{\alpha}_3$ = 1.727 K = 2.379	p= 0.515	p = 0.515	η2= -0.011
Alert UBC Security	M = 1.892 SD = 2.333 N = 93 $\hat{\alpha}_3$ = 1.051 K = -0.268	M = 1.664 SD = 1.990 N = 107 $\hat{\alpha}_3$ = 1.429 K = 1.216	M = 1.322 SD = 1.883 N = 90 $\hat{\alpha}_3$ = 1.780 K = 2.566	p= 0.008	p = 0.241	η2= 0.002
Report to Campus Wildlife Sightings	M = 1.850 SD = 2.184 N = 93 $\hat{\alpha}_3$ = 1.118 K = -0.076	M = 1.914 SD = 2.306 N = 107 $\hat{\alpha}_3$ = 1.120 K = 0.063	M = 1.289 SD = 1.800 N = 90 $\hat{\alpha}_3$ = 1.539 K = 1.746	p= 0.019	p = 0.092	η2= 0.009

Figure C4

Significant Result: Kruskal Wallis

Qualtrics Statement	Control	Protection-oriented	Threat-oriented	P-value: Variance	P-value: Kruskal-Wallis	Effect Size: Eta Squared
Shoo Kindly	M = 1.710 SD = 1.779 N = 93 $\hat{\alpha}_3$ = 0.901 K =-0.031	M = 1.832 SD = 1.799 N = 107 $\hat{\alpha}_3$ = 1.060 K = 0.311	M = 2.822 SD = 2.037 N = 90 $\hat{\alpha}_3$ = 0.304 K = -1.197	p = 0.02	p<0.001	η2= 0.057

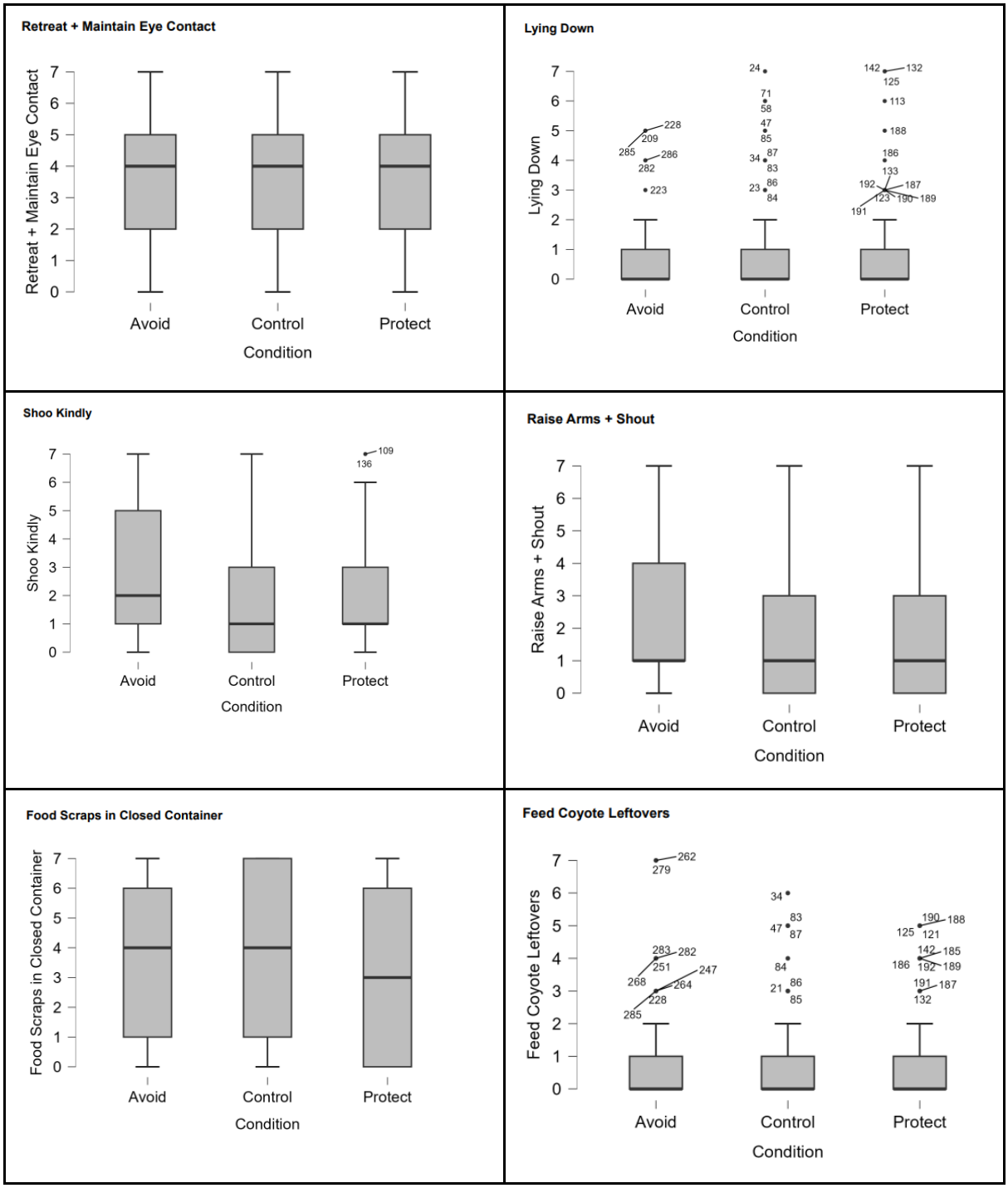
Figure C5

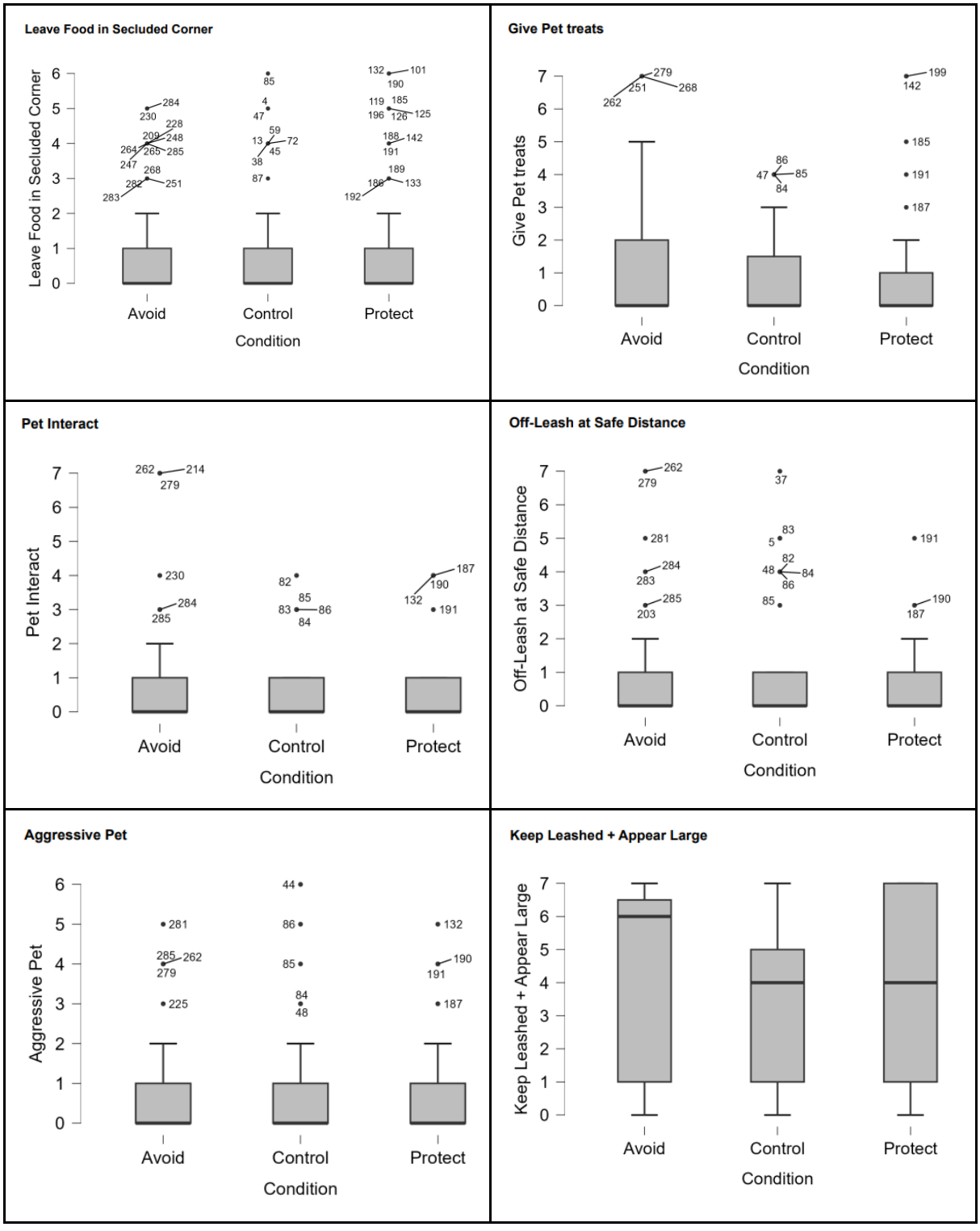
Dunn's Post Hoc Test

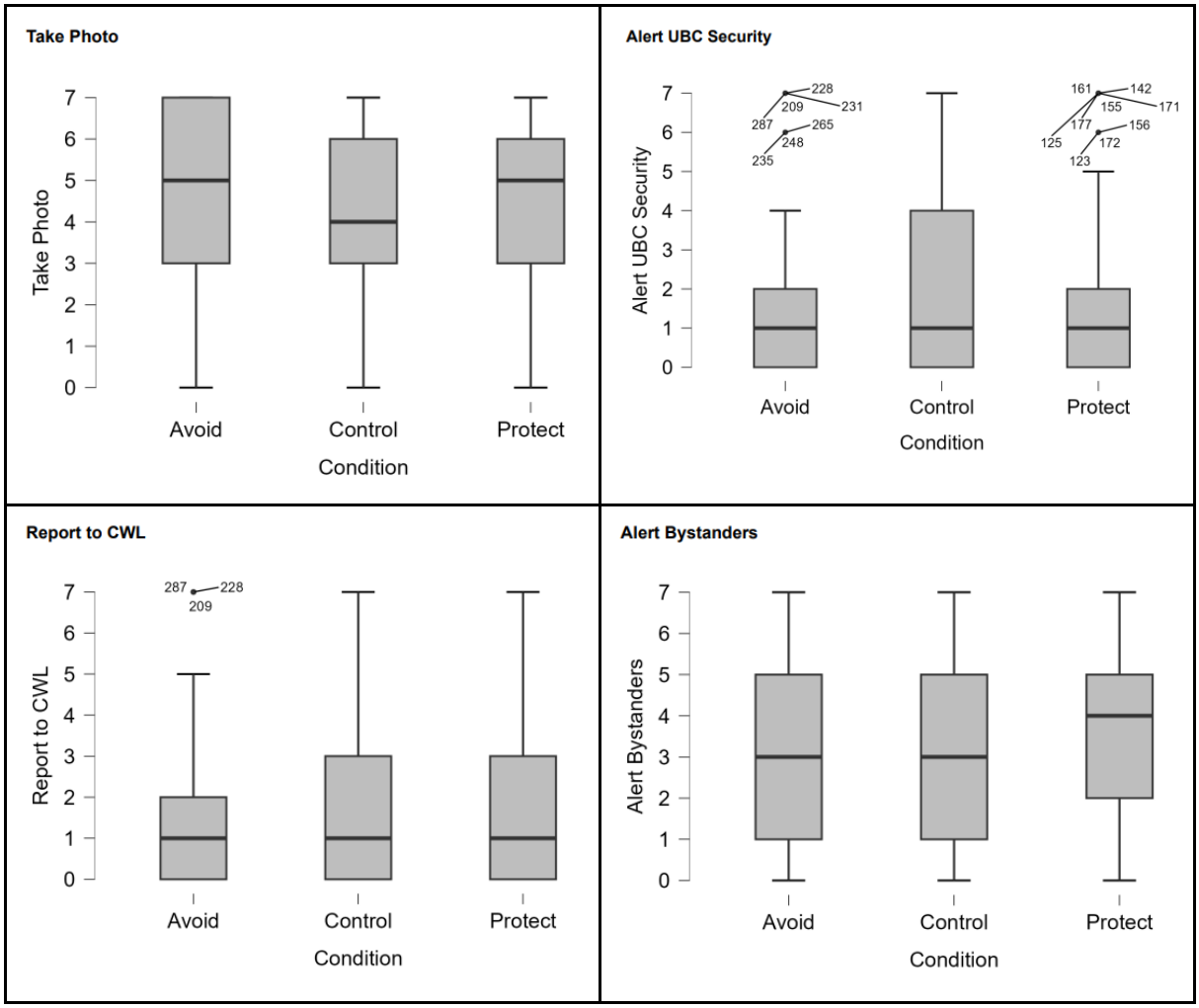
Comparison	z	W_i	W_j	p	p_{bonf}	p_{holm}
Threat-oriented - Control	3.940	176.183	128.269	<.001	<.001	<.001
Threat-oriented - Protect-oriented	3.529	176.183	134.668	<.001	0.001	<.001
Control - Protect-oriented	-0.549	128.269	134.668	0.583	1.000	0.583

Figure C6

Box Plots of Survey Questions


Retreat + Maintain Eye Contact
Retreat + Maintain Eye Contact
Avoid
Control
Protect
Condition
Lying Down
Lying Down
Avoid
Control
Protect
Condition
Shoo Kindly
Shoo Kindly
Avoid
Control
Protect
Condition
Raise Arms + Shout
Raise Arms + Shout
Avoid
Control
Protect
Condition
Food Scraps in Closed Container
Food Scraps in Closed Container
Avoid
Control
Protect
Condition
Feed Coyote Leftovers
Feed Coyote Leftovers
Avoid
Control
Protect
Condition


Leave Food in Secluded Corner
Leave Food in Secluded Corner
Avoid
Control
Protect
Condition
Give Pet treats
Give Pet treats
Avoid
Control
Protect
Condition
Pet Interact
Pet Interact
Avoid
Control
Protect
Condition
Off-Leash at Safe Distance
Off-Leash at Safe Distance
Avoid
Control
Protect
Condition
Aggressive Pet
Aggressive Pet
Avoid
Control
Protect
Condition
Keep Leashed + Appear Large
Keep Leashed + Appear Large
Avoid
Control
Protect
Condition


Take Photo
Take Photo
0
1
2
3
4
5
6
7
Avoid
Control
Protect
Condition
Alert UBC Security
Alert UBC Security
228
209
231
287
265
248
235
161
142
155
171
177
156
125
172
123
Avoid
Control
Protect
Condition
Report to CWL
Report to CWL
287
228
209
Avoid
Control
Protect
Condition
Alert Bystanders
Alert Bystanders
Avoid
Control
Protect
Condition