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Why Do People Feed Free-roaming Cats?

The Role of Anticipated Regret in an Extended Theory of Planned Behavior in Malaysia

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ABSTRACT Free-roaming cats are common in residential and public areas in Malaysia and approach people for food. However, the psychological determinants of public feeding are unknown. This study investigated public perceptions of feeding free-roaming cats, based on an extended theory of planned behavior (TPB). It consisted of qualitative belief-elicitation interviews with 25 participants, followed by a quantitative survey of 167 participants, representative of the country's population. The majority (87.2%) of the sample had fed free-roaming cats. The mean intention score (4.88 out of 7) indicated the public was likely, and would make an effort, to feed free-roaming cats in the future. The public's benevolence toward animals largely explained the findings, based on generally positive attitudes and perceptions of moderate social credence and capability and confidence, underpinned by affective and cognitive beliefs. An important finding was the role of anticipated regret in predicting and explaining intentions, which contributed variance over and above that explained by the TPB constructs. The extended framework is explained by the influence of anticipated regret on the perceived evaluation of potential TPB outcomes, which in turn leads to the behavior becoming less volitional. Therefore, future TPB studies of people's interactions with animals, such as free-roaming cats, should take account of affective and emotional antecedents of behavior, such as anticipated regret, to improve explanatory power. The study also has implications for managing public feeding of free-roaming cats, such as drawing on and strengthening the Malaysian public's positive attitudes and emotional concern to redirect current feeding practices toward more constructive animal welfare initiatives. Such humane approaches align

with the public's sensitivity toward animal welfare and the historical development of cat population control from lethal methods to humane non-lethal methods to ensure adequate care.

Keywords: animal welfare, free-roaming cats, human–animal interaction

Free-roaming cats are typically seen in Malaysia in residential and public areas. The feeding of these cats by the public is common. Surveys in many countries indicate up to a half of households engage in feeding free-roaming cats (Centonze & Levy, 2002; Finkler & Terkel, 2012; Haspel & Calhoon, 1990; Lord, 2008; Slater et al., 2008; Toukhsati, Bennett, & Coleman, 2007; Toukhsati, Phillips, Podberscek, & Coleman, 2012). The reasons for this practice include emotional satisfaction; companionship; feelings of contentment, relaxation, and self-esteem, as well as pity, sympathy, and responsibility; pragmatic reasons such as control of pests, particularly rodents; and lack of confidence in animal management by local government authorities (Centonze & Levy, 2002; Finkler & Terkel, 2012; Haspel & Calhoon, 1990; Robertson, 2008; Stambach & Turner, 1999; Zasloff & Hart, 1998). Some people report a close relationship and strong bond with the free-roaming cats they feed (Centonze & Levy, 2002; Finkler & Terkel, 2012; Toukhsati et al., 2007; Zasloff & Hart, 1998), even when the cats live outdoors and are too unsocialized to be adopted or touched (Centonze & Levy, 2002; Haspel & Calhoon, 1990; Zasloff & Hart, 1998). These findings suggest that the feeding of free-roaming cats can have immense meaning and value in people's lives (Haspel & Calhoon, 1990). However, these benefits are counterbalanced with literature which emphasizes problems caused by the cats, such as aggression toward people, nuisance behaviors (e.g., defecation, urination, mating, conflicts with owned cats), predation of wildlife, hybridization with wildcats, overpopulation, and public health concerns such as infectious diseases and parasites (Brown, 2013; Centonze & Levy, 2002; Hakim, 2015; Haspel & Calhoon, 1990; Slater et al., 2008).

The influence of public feeding on the welfare of free-roaming cats is also debatable. On one hand, food provision improves health, quality of life, and longevity, particularly for abandoned or lost pets which are dependent on humans. People who feed free-roaming cats tend to be more willing to engage in more constructive actions to improve their welfare, such as trying to find a lost cat's owner, arranging shelter, monitoring health, arranging veterinary treatment, and participating in Trap-Neuter-Return (TNR) programs, an alternative to euthanasia or impoundment. The feeding of free-roaming cats is an important component of TNR programs, which involve a dedicated caretaker or manager providing food, luring them to traps based on classically conditioned feeding routines, and then continuing to regularly feed them after they have been spayed or neutered (Centonze & Levy, 2002; Haspel & Calhoon, 1990; Lord, 2008; Zasloff & Hart, 1998; Zito, Vankan, Bennett, Paterson, & Phillips, 2015). On the other hand, feeding can have negative welfare outcomes. Overpopulation is a particular problem in Malaysia, where the increasing numbers of unwanted cats entering animal shelters each year far exceed available space and number of adoptions (PAWS Animal Welfare Society, 2016). Excess animals, especially unsocialized free-roaming cats, are likely to be euthanized in animal shelters. Animal catchers reportedly use cruel methods, such as shooting and poisoning, and government-run animal shelters provide insufficient food and shelters (Brown, 2013; Hakim, 2015). Therefore, efforts to curb the factors responsible for overpopulation, such as the public feeding of free-roaming cats, might improve their welfare in the long term.

However, little information is known in Malaysia about the public's preferences based on their underlying beliefs, knowledge, and experiences. Indeed, research on free-roaming cats

in Malaysia is scarce, limited to the detection and identification of parasites (Norhidayu, Mohd Zain, Hayati, & Nurazila, 2012; Mohd Zain, Sahimin, Palb, & Lewis, 2013). A greater understanding of public perceptions of free-roaming cats is an important way forward to tackle some of the issues highlighted above, and to plan effective animal management strategies.

The theory of planned behavior (TPB; Ajzen, 1991; Figure 1) is a popular approach to examining people's attitudes and beliefs. In this model, behavior is co-determined by perceived behavioral control (PBC) and intention. Perceived behavioral control is a person's perception of the extent to which the performance of the behavior is easy or difficult. Intention is a person's decision to exert effort to perform the behavior, essentially a proximal measure of behavior as people typically behave in ways they intend. Intention, in turn, is determined by three constructs; attitudes, subjective norms, and perceived behavioral control. Attitudes are the individual's evaluation of engaging in the behavior, underpinned by an aggregate of beliefs about its likely consequences (behavioral beliefs). Subjective norms are the evaluation of social credence and approval from significant others to perform the behavior, based on beliefs about their normative expectations (normative beliefs). Perceived behavioral control is the evaluation of personal and situational factors that may facilitate or impede performance of the behavior, grounded in control beliefs (Figure 1). In combination, these constructs lead to the formation of intention and behavior. Numerous studies demonstrate strong support for the utility of the TPB for understanding a wide range of behaviors (Armitage & Conner, 2001). A few studies have applied the theory specifically to people's perceptions of free-roaming animals (Toukhsati et al., 2012; Zito et al., 2015), as well as ownership practices of owned companion animals (Gunaseelan, Coleman, & Toukhsati, 2013; Rohlf, Toukhsati, Coleman, & Bennett, 2010). Therefore, in the present study, it was considered a suitable theoretical framework to examine public perceptions of feeding free-roaming cats in Malaysia.

Although relatively successful in predicting intention and behavior, the TPB does not explain a substantial proportion of the variance and is open to further expansion with additional predictors (Ajzen, 1991; Armitage & Conner, 2001; Godin & Kok, 1996). As a cognitive-based model which assumes people perform their actions based on logical decisions, the TPB has been criticized for not accounting for affective and emotional antecedents of behavior (Ajzen, 1989; Conner & Armitage, 1998), despite overwhelming evidence of their importance in decision making. Indeed, the TPB performs less efficiently when behaviors have a strong affective component (Godin & Kok, 1996; Sandberg & Conner, 2008). The suggestion that the prediction and explanation of the TPB can be significantly enhanced by the addition of an affective and emotional component seems particularly relevant to the present study, as numerous studies have highlighted the role of emotions and feelings in the human-animal bond (Angantyr, Eklund, & Hansen, 2011; Finkler & Terkel, 2012; Haspel & Calhoon, 1990; Robertson, 2008; Vanutelli & Balconi, 2015; Zasloff & Hart, 1998).

One such affective and emotional aspect identified in previous research is anticipated regret (AR), a negative emotion experienced by a person weighing up the possible outcomes of enacting or not enacting a particular behavior and after performing it when they realize the situation could be better if they had acted differently (Sandberg & Conner, 2008). Empirical evidence shows anticipated regret adds to the capacity of the TPB to predict intention over and above the TPB variables and that it has a moderate relationship with a range of behaviors (Sandberg & Conner, 2008). However, there is no research examining its role in caring for free-roaming animals. Therefore, there were conceptual and empirical grounds for the inclusion of anticipated regret as an additional predictor in the TPB in the present study.

Figure 1. The theory of planned behavior. Intention and perceived behavioral control are proximal predictors of a behavior. Attitudes, subjective norms, and perceived behavioral control are predictors of intention. Attitudes are grounded on salient behavioral beliefs about a behavior, subjective norms on normative beliefs, and perceived behavioral control on control beliefs. The variables also influence one another, as shown in the double-ended arrows.

The overarching goal of the present study was to investigate public perceptions of feeding free-roaming cats in Malaysia, based on an extended TPB model with anticipated regret, to gain a better understanding of the determinants of the behavior to inform strategies to manage it. The first aim was to identify the prevalence of public feeding to understand the extent of the practice. As previous surveys in many countries indicate a sizeable proportion of the public engage in feeding, it was also expected to be common in Malaysia.

The second aim was to understand the reasons for feeding free-roaming cats by identifying its psychosocial determinants. Given the assumptions of the theory (Figure 1), and previous studies which confirm its success at predicting a wide range of behaviors (Armitage & Conner, 2001; Gunaseelan et al., 2013; Rohlf et al., 2010; Toukhsati et al., 2012; Zito et al., 2015), it was expected to predict the public's feeding behavior and intention in Malaysia. Further, as previous studies demonstrate an enhanced predictive capability when anticipated regret is included (Sandberg & Conner, 2008), it was also expected to improve the prediction of intention and behavior over and above the TPB's original constructs.

The third aim of the study was to further explore the specific beliefs held by the public, namely the affective and cognitive underpinnings of their perceptions. Based on the theory's assumptions (Figure 1), it was expected that beliefs guide people's decisions to engage or not engage in feeding free-roaming cats.

The final aim of the study was to examine gender and cat ownership. Based on previous research, cat ownership was expected to be important (Centonze & Levy, 2002; Fifield & Forsyth, 1999; Melson, 2003; Stammbach & Turner, 1999; Toukhsati et al., 2012). As men and women are more alike than different on many psychological traits and abilities (Hyde, 2014), it was expected their perceptions would not differ in the present study. Collectively, the findings will enable the recommendation of strategies to manage free-roaming cats and their welfare.

Methods

Elicitation Study

An elicitation study was conducted in questionnaire form to capture commonly held beliefs about feeding free-roaming cats to inform the construction of a survey to measure TPB constructs (Ajzen, 1991). A convenience sample of 25 participants (members of the public) completed

Table 1. Content analysis of the most widely held beliefs elicited from the sample.

Behavioral Beliefs (advantages and disadvantages of feeding stray cats)	Normative Beliefs (sources of social pressure; reference groups/individuals)	Control Beliefs (beliefs which encourage or discourage feeding stray cats)
Feeding stray cats increases the risk of contracting disease	Government authority (DBKL)	Seeing other people feed stray cats
Feeding stray cats exercises kindness and compassion	Business owners (e.g., hawkers in food stalls)	Knowing that feeding stray cats might produce more stray kittens
Feeding stray cats means they have sufficient food and will not starve	Animal activists	Hearing stray cats' persistent loud meows
Feeding stray cats means littering (making a place untidy)	Close friends	Having appropriate food for stray cats
Feeding stray cats supports natural pest control by cats	Colleagues/Classmates	Seeing stray cats around oneself
Feeding stray cats means they will lose their natural instincts to hunt/find food	Neighbors	Being afraid of cats
Feeding stray cats costs money	Family	Watching stray cats disturb people or their home
Feeding stray cats means feeling good about oneself	Partner (husband/wife or boyfriend/girlfriend)	Unfriendliness of some cats
—	—	When thinking that stray cats might be attracted to oneself

open-ended questions based on the TPB about the perceived advantages and disadvantages of feeding free-roaming cats (behavioral beliefs), approval and disapproval (normative beliefs), and perceived barriers and facilitating factors (control beliefs). The sample consisted of 14 females and 11 males, ages 18–65 years, including people who had or had not fed free-roaming cats.

The questions were: “What do you believe are the advantages of feeding stray cats?” “What do you believe are the disadvantages of feeding stray cats?” “Are there any other advantages or disadvantages that come to mind when you think about feeding stray cats?” “Are there any individuals or groups who would approve of you feeding stray cats?” “Are there any individuals or groups who would disapprove of you feeding stray cats?” “Are there any other individuals or groups that come to mind when you think about feeding stray cats?” “What factors or circumstances would encourage you to feed stray cats?” “What factors or circumstances would make it difficult or impossible for you to feed stray cats?” “Are there any other issues that come to mind that would encourage you or make it difficult for you to feed stray cats?”

Beliefs elicited from the sample were content analyzed to identify modal salient behavioral outcomes, normative referents, and control factors (Table 1), which were then used to construct items in the TPB survey. Examples of the operationalization of elicited beliefs into survey items are stated below.

Survey Construction

The Feeding Stray Cats Survey (FSCS), incorporating elicited beliefs, was constructed and piloted. Its content, structure, and wording were designed in accordance with Fishbein and Ajzen (1975), Ajzen (1991), and Francis et al. (2004). The survey items investigated the public's feeding

of free-roaming cats in general, defined in terms of its target, action, context, and time (TACT), to ensure the theory's constructs measured the same level of generality (principle of compatibility; Fishbein & Ajzen, 1975). So, in the present study, the target was free-roaming cats, action was feeding or intention to feed, context was daily life situations, and time was sometime in the future. TPB constructs were measured in the survey directly by asking participants about their overall attitudes, subjective norms, and perceptions of behavioral control, and indirectly by asking about the corresponding beliefs. In Malaysia, the vast majority of free-roaming cats in need of food are unowned cats living outdoors all of the time, typically abandoned, escaped, or lost pets and their offspring, known colloquially as alley cats, community cats, stray cats, and street cats. Feral cats, born and raised outdoors without being accustomed to human contact, also live in close proximity to people and accept food but are less likely to approach people. Therefore, the colloquial phrase "stray cat" was used in the FSCS as it was likely to be most familiar to the participants (Zito et al., 2015). A copy of the FSCS can be obtained from the corresponding author.

Instrument

The instrument consisted of an Explanatory Statement, Consent Form, and the FSCS, which comprises the following sections:

Demographics: Ten questions about age, sex, ethnicity, religion, education level, marital status, employment status, household income, and current cat ownership.

Intention: Based on the mean of three items ("I will make an effort to feed stray cats in the future," "I will try to feed stray cats in the future," "I intend to feed stray cats in the future") which have 7-point "strongly disagree/strongly agree" response options. Higher scores indicate stronger intention to feed free-roaming cats. Cronbach's α was 0.81.

Attitudes: Based on the mean of four scales with 7-point bipolar response options ("Feeding stray cats in the future is: beneficial/harmful, enjoyable/unenjoyable, good/bad, pleasant/unpleasant"), with higher scores indicating a more favorable attitude toward feeding. Cronbach's α was 0.88.

Behavioral Beliefs: Eight items which incorporate behavioral beliefs (Table 1), assessed using 7-point "strongly disagree/strongly agree" response options, and eight corresponding items which assess the outcome evaluation of each belief on "extremely undesirable" (−3) to "extremely desirable" (+3) response options. For example, the elicited belief "feeding stray cats costs money" (Table 1) was converted to the statement "I will need to spend money if I feed stray cats in the future," and a corresponding item was created to evaluate the outcome ("Spending money to feed stray cats in the future is"; an incomplete sentence which the participants completed by using the set response options). An overall behavioral-beliefs (indirect attitudes) score was calculated by multiplying each behavioral belief item score by the corresponding outcome evaluation score, and summing all the resulting products (Fishbein & Ajzen, 1975; Francis et al., 2004).

Subjective Norms: Based on the mean of two items ("Most people important to me would approve of me feeding stray cats in the future," "It is expected of me that I feed stray cats in the future") which have 7-point "strongly disagree/strongly agree" response options. Higher scores indicate more social credence to feed cats. Cronbach's α was 0.61.

Normative Beliefs: Eight items incorporating normative beliefs (Table 1), with 7-point "strongly disagree/strongly agree" response options, and eight corresponding items assessing

motivation to comply with each belief on “not at all” (–3) to “very much” (+3) response options. For example, the belief that family was a source of social pressure was converted to a statement about its importance (“My family thinks I should [would approve of me] feeding stray cats in the future”), along with its corresponding item, “In the future, doing what my family thinks I should do is important to me,” to assess the strength of motivation to comply. An overall normative-beliefs (indirect subjective norms) score was calculated by multiplying each normative belief score by the corresponding motivation to comply score, and summing the resulting products of all items.

Perceived Behavioral Control: Based on the mean of four items measuring either self-efficacy (“I am confident that I could feed stray cats in the future if I wanted to,” “It would be easy to feed stray cats in the future if I wanted to”) or controllability (“The decision to feed stray cats in the future is beyond my control,” “In the future, whether I feed stray cats or not is entirely up to me”), which have 7-point “strongly disagree/strongly agree” response options. Higher scores indicate more self-efficacy or control of feeding. Cronbach’s α was 0.42.

Control Beliefs: Nine control beliefs (Table 1), measured using “extremely unlikely” (1) to “extremely likely” (7) response options, weighted with nine corresponding items which assess the power of these factors to influence feeding, measured on “much more difficult” (–3) to “much easier” (+3) response options. For example, the belief “having appropriate food for stray cats” (Table 1) was converted to a statement about whether it could facilitate the target behavior (“Having appropriate food for stray cats would encourage me to feed them in the future”), along with its corresponding item to assess its power, “Having appropriate food for stray cats would make it easier or more difficult to do” (an incomplete statement answered by the participants). For each item, the control belief score was multiplied by the corresponding statement which assessed its power, and the resulting products of all the items were summed to create an overall control-beliefs (indirect perceived behavioral control) score.

Anticipated Regret: Based on the mean of two items (“If I did not feed stray cats in the future, I would feel regret” and “If I did not feed stray cats in the future, I would feel upset”) which have 7-point “strongly disagree/strongly agree” response options. Higher scores indicate more regret about not feeding free-roaming cats. Cronbach’s α was 0.88.

Past Behaviors: Three items tap into feeding behavior: lifetime experience (Yes/No), experience in the past month (0–10 times, 11–20 times, 20+ times), and one’s frequency of feeding in the past year (daily, often, seldom, never).

Participants

Residents in Kuala Lumpur, capital and largest city in Malaysia, were approached in public areas and selected via quota sampling in terms of ethnicity and sex to ensure a sample representative of the country’s population ($n = 167$; age range = 18–64 years, $M = 27.40$, $SD = 8.59$) (Table 2). They satisfied the following inclusion criteria: 1) age 18 years and above, as the study focused on adult residents; 2) Malaysian national, and resident in the city, as opposed to visitors or tourists; and 3) able to follow self-report survey instructions in Bahasa Malaysia (Malay), the official language, or English (which most Malaysians understand). An English version of the questionnaire was prepared with forward and back translation procedures. The survey was completed on paper. Table 2 summarizes the demographic characteristics of the sample.

Table 2. Demographic characteristics of the sample ($n = 167$).

	Frequency	%		Frequency	%
<i>Sex</i>			<i>Employment Status</i>		
Male	85	50.91	Full-time	113	67.66
Female	82	49.09	Student	27	16.17
<i>Age group (years)</i>			Part-time	16	9.58
18–19	7	4.22	Unemployed	7	4.19
20–29	120	72.29	Homemaker	3	1.80
30–39	22	13.25	Job-seeker	1	0.60
40–49	12	7.23	<i>Monthly Household Income</i>		
50–59	1	0.60	Under RM10,000	113	68.07
60–64	4	2.41	RM10,000–RM19,999	12	7.23
<i>Ethnicity</i>			RM20,000–RM 29,999	4	2.41
Bumiputera	106	63.47	RM30,000–RM39,999	2	1.20
Chinese	42	25.15	RM50,000–RM74,999	5	3.01
Indian	12	7.19	RM100,000–RM150,000	1	0.60
Others	7	4.19	(Did not want to report)	29	17.47
<i>Religion</i>			<i>Current Cat Ownership</i>		
Buddhism	16	9.64	Yes	43	26.06
Christianity	30	18.07	No	122	73.94
Hinduism	11	6.63	<i>Past Stray Cat Feeding Experience in Lifetime</i>		
Islam	102	61.45	Yes	143	87.20
Atheism (no religion)	3	1.81	No	21	12.80
Chinese traditional beliefs	2	1.20	<i>Frequency of Stray Cat Feeding in the Last Year</i>		
Other	2	1.20	Daily	9	6.00
<i>Education</i>			Often	38	25.33
Tertiary	118	70.66	Seldom	88	58.67
Foundation / pre-university	12	7.19	Never	15	10.00
Secondary school	32	19.16	<i>Frequency of Stray Cat Feeding in the Last Month</i>		
Primary school	3	1.80	0–10 times	124	83.78
No education	2	1.20	11–20 times	13	8.78
<i>Marital Status</i>			More than 20 times	11	7.43
Single	116	70.73			
Married	45	27.44			
Widowed	3	1.83			

Data Analysis and Ethics

An a priori power calculation was conducted to ensure an appropriate minimum sample size. To achieve a moderate effect size ($\rho^2 = 0.13$) with $\alpha = 0.05$, desired power = 0.80, and four predictors for a multiple linear regression, a total sample size of 85 was needed. Similarly, a total sample size of 159 was required to achieve a logistic regression with $\alpha = 0.05$ and desired power = 0.80. For practical reasons, several more participants were recruited to replace any invalid survey responses.

As items were mixed in the survey, and some positive and negative endpoints of response options were reversed to minimize acquiescence and response sets, they were re-coded prior to data analysis to ensure that higher means represented more positive attitudes, supportive subjective norms, and greater perceived behavioral control (Francis et al., 2004). Data were screened for outliers and response set bias: two cases were deleted due to substantial missing data, and eight missing data within five cases were replaced with the mean

of each variable. Reliability was assessed with Cronbach's α . Descriptive statistics summarize the variables. We used t -tests compare constructs according to cat ownership. The chi-square test was used to detect associations between TPB variables and demographic variables. Multivariate regression with maximum likelihood estimation was used to examine whether TPB constructs and anticipated regret predicted intention. Multinomial logistic regression modelling was used to analyze feeding behavior in the past year and its proximal constructs (i.e., intention and perceived behavioral control).

The study was reviewed and approved by the Monash University Human Research Ethics Committee (Project Number: CF16/1296-2016000685). Participants gave informed consent and were offered a goodwill gesture of 5 Malaysian Ringgit (US\$1.2) to purchase refreshments while completing the survey.

Results

Prevalence of Feeding Free-roaming Cats

The vast majority of the sample (90%) had fed free-roaming cats in the past year. Specifically, 6% provided food daily, a quarter (25.33%) often, 58.67% seldom, and 10% never. Chi-square tests showed no significant association between sex and feeding frequency in the past year ($\chi^2 = 3.30$, $df = 3$, $p = 0.348$), but cat owners provided food more frequently than non-cat owners ($\chi^2 = 22.76$, $df = 3$, $p < 0.001$). The majority of the sample (83.78%) had fed free-roaming cats in the past month on 0–10 occasions, 8.78% had done so on 11–20 occasions, and 7.43% had done so on more than 20 occasions. There was no association between sex and feeding frequency in the past month ($\chi^2 = 2.05$, $df = 2$, $p = 0.359$), but there was a trend toward a significant difference between cat owners and non-cat owners ($\chi^2 = 4.83$, $df = 2$, $p = 0.089$).

TPB Constructs and Anticipated Regret

Table 3 shows the means, standard deviations, and statistical comparisons of TPB constructs and anticipated regret for the overall sample, and for cat owners and non-cat owners. The mean intention score was moderately positive, which showed that the participants in general thought they were likely, and would make an effort, to feed free-roaming cats in the future. While there was no sex difference, cat-owners reported a significantly higher intention than non-cat owners. The mean attitudes and behavioral beliefs scores show that the participants were largely in favor of feeding free-roaming cats, in terms of both their overall evaluation of performing the behavior (direct attitude score) and specific beliefs about its consequences (behavioral beliefs score), and cat owners reported more positive scores than non-cat owners. When asked to evaluate subjective norms and normative beliefs of feeding free-roaming cats, the participants indicated moderate agreement that important others in their lives would agree with and approve of their behavior; cat owners reported more social credence than non-cat owners, but there was no sex difference. The low to moderate mean perceived behavioral control and control beliefs scores show the participants felt in control of feeding free-roaming cats in terms of their capability, confidence, and extent to which the decision was up to them; there was no sex difference but cat owners thought it was easier and more within their control. Regarding anticipated regret, the participants reported moderate regret and sadness for not feeding free-roaming cats, which was significantly greater among cat owners. In summary, there was support for feeding free-roaming cats which did not differ according to sex but was significantly stronger among cat owners, except for a few scores on the borderline of significance (Table 3).

Table 3. Mean scores of theory of planned behavior (TPB) constructs and anticipated regret (AR), and a comparison of participants with different cat ownership.

Variable	<i>M</i>	<i>SD</i>	Cat Owner (<i>n</i> = 43) <i>M</i> (<i>SD</i>)	Non-cat Owner (<i>n</i> = 120) <i>M</i> (<i>SD</i>)	<i>t</i>	Cohen's <i>d</i>
Intention ^a	4.88	1.62	5.72 (1.12)	4.55 (1.66)	5.14**	0.83 ^f
<i>Direct</i>						
Attitudes ^a	5.13	1.51	5.44 (1.43)	4.99 (1.52)	1.70	0.30 ^d
Subjective norms ^a	4.65	1.59	5.45 (1.20)	4.32 (1.59)	4.27**	0.80 ^f
Perceived Behavioral Control ^a	5.39	1.05	5.78 (0.91)	5.26 (1.07)	2.89**	0.52 ^e
Anticipated regret ^a	4.16	1.74	5.00 (1.54)	3.82 (1.71)	3.98**	0.73 ^e
<i>Indirect</i>						
Behavioral beliefs ^b	26.88	33.73	38.67 (32.19)	21.56 (59.57)	2.98**	0.53 ^e
Normative beliefs ^b	33.21	59.47	53.05 (56.63)	26.12 (59.57)	2.58*	0.46 ^d
Control beliefs ^c	36.85	54.81	59.77 (45.65)	27.65 (55.42)	3.41**	0.63 ^e

* $p < 0.05$, ** $p < 0.01$. ^aPossible range of this variable is 1 to 7. ^bPossible range of this variable is -168 to 168. ^cPossible range of this variable is -189 to 189. ^dSmall effect size. ^eMedium effect size. ^fLarge effect size.

Beliefs about Feeding Free-roaming Cats

Table 4 shows means and standard deviations of behavioral, normative, and control beliefs according to sex and cat ownership. Most of the beliefs were highest among females, but only one (kindness and compassion) was significantly different ($t = 2.30$, $df = 152.52$, $p = 0.023$). Cat owners reported higher scores for all behavioral beliefs, and half were significant (Table 4). Specifically, kindness and compassion for animals ($t = 2.34$, $df = 161$, $p = 0.021$), and concern that free-roaming cats have sufficient food ($t = 2.57$, $df = 161$, $p = 0.011$), were significantly higher among cat owners, whereas the cost of feeding ($t = 2.33$, $df = 161$, $p = 0.021$) and risk of contracting disease ($t = 2.26$, $df = 89.70$, $p = 0.027$), were significantly higher among non-cat owners. Regarding normative beliefs, cat owners reported significantly greater approval of the behavior by their close friends ($t = 2.61$, $df = 161$, $p = 0.010$), colleagues ($t = 3.32$, $df = 161$, $p = 0.001$), family ($t = 3.31$, $df = 96.24$, $p = 0.001$), and neighbors ($t = 2.46$, $df = 161$, $p = 0.15$) than non-cat owners. Regarding control beliefs, having appropriate food ($t = 3.29$, $df = 161$, $p = 0.001$), seeing free-roaming cats ($t = 3.58$, $df = 161$, $p < 0.001$), seeing other people feed cats ($t = 2.83$, $df = 161$, $p = 0.005$), hearing persistent meows for food ($t = 2.57$, $df = 161$, $p = 0.011$), and seeing cats attracted to oneself ($t = 3.09$, $df = 161$, $p = 0.181$) all encouraged cat owners significantly more than non-cat owners to provide food. Being afraid of free-roaming cats ($t = 2.78$, $df = 161$, $p = 0.011$) and knowing they disturb people ($t = 2.25$, $df = 161$, $p = 0.026$) hindered feeding significantly more for non-cat owners than cat owners.

Prediction of Feeding Behavior and Intention

Multivariate regression was used to examine whether TPB constructs and anticipated regret predict intention (Table 5). Specifically, two multivariate regression analyses were modelled with maximum likelihood estimation based on the TPB and extended TPB. Stronger intention to feed free-roaming cats was associated with more positive attitudes, more social approval from important others, greater control over feeding, and less regret about feeding, as the two models explain a significant proportion of variance in intention (77.2% and 78.2%). However, in the first model, only attitudes and subjective norms were associated with stronger intention, as

Table 4. Mean behavioral, normative, and control belief scores.

	Female		Male			Cat Owner		Non-cat Owner		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>
<i>Behavioral Beliefs</i>										
Having sufficient food	9.17	8.81	7.25	9.83	1.32	11.12	7.98	6.93	9.53	2.57*
Kindness and compassion	14.23	6.62	11.42	8.99	2.30*	15.12	6.39	11.8	8.38	2.34*
Pest control	8.56	9.46	8.18	8.56	0.27	8.77	9.13	8.01	8.89	0.48
Risk of contracting disease	-4.16	6.37	-4.62	7.30	0.43	-2.51	5.83	-4.99	7.11	2.26*
Loss of hunting instincts	-3.41	7.25	-1.94	6.92	-1.33	-1.63	6.38	-3.08	7.38	1.14
Costs money	5.09	8.70	5.30	8.05	-0.16	7.47	7.85	4.12	8.19	2.33*
Feeding is littering	-4.69	6.60	-4.73	5.67	0.04	-3.84	6.38	-5.05	6.07	1.11
Feeling good about oneself	4.99	8.96	3.24	9.16	1.24	4.19	11.29	3.78	7.98	0.22
<i>Normative Beliefs</i>										
Approval by close friends	5.79	7.69	4.26	8.48	1.21	7.77	7.78	4.04	8.10	2.61*
Approval by colleagues	5.06	8.08	3.71	7.99	1.08	7.84	7.85	3.21	7.83	3.32**
Approval by neighbors	2.95	8.56	3.36	8.38	-0.31	5.84	7.81	2.18	8.56	2.46*
Approval by family	4.97	12.18	4.68	10.59	0.17	8.91	8.99	3.14	11.73	3.31**
Approval by partner	6.69	11.28	5.32	9.99	0.83	8.05	10.75	5.06	10.50	1.59
Approval by the Government	0.58	8.92	1.49	9.41	-0.64	2.81	9.29	0.63	8.99	1.36
Approval by business owners	0.60	8.71	0.27	8.79	0.24	2.63	9.01	-0.14	8.46	1.81
Approval by animal lovers/activists	8.96	7.31	7.79	9.13	0.91	9.21	8.90	8.00	8.12	0.82
<i>Control Beliefs</i>										
Seeing cats around	7.96	8.10	6.35	7.77	1.30	10.51	7.70	5.70	7.53	3.58***
Having appropriate food	8.68	8.34	7.69	8.34	0.76	11.47	7.23	6.78	8.28	3.29*
Seeing other people feeding cats	7.98	8.68	6.14	8.48	1.37	9.95	8.54	5.77	8.26	2.83**
Being afraid of cats	-2.96	7.40	-2.85	7.63	-0.10	-0.26	6.93	-3.90	7.54	2.78**
Hearing cat's persistent meows	5.46	9.60	5.44	8.97	0.01	8.28	9.73	4.18	8.72	2.57*
Knowing that cats disturb people	3.69	8.01	2.76	8.60	0.72	5.72	9.02	2.44	7.91	2.25*
Unfriendliness of some cats	-1.94	8.65	-0.63	9.60	-0.92	-0.77	8.39	-1.56	9.46	0.48
Cats that are attracted to participant	5.85	8.54	6.87	8.43	-0.77	9.74	7.85	5.18	8.47	3.09**
Cats might produce more kittens	4.06	7.88	3.23	9.19	0.63	5.12	8.32	3.07	8.67	1.34

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Possible range of each belief is from -21 to +21.

Table 5. Theory of planned behavior (TPB) constructs that predict feeding behavior and intention to feed.

Variable	Model 1: TPB				Model 2: TPB and Anticipated Regret			
	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Attitudes	0.25	0.05	5.09	< 0.001	0.21	0.05	4.21	< 0.001
Subjective norms	0.70	0.05	13.79	< 0.001	0.66	0.05	12.87	< 0.001
Perceived Behavioral Control	0.11	0.07	1.66	0.098	0.14	0.07	2.12	0.034
Anticipated regret					0.11	0.04	2.75	0.006
R^2	0.77			< 0.001	0.78			< 0.001

b = unstandardized regression coefficient.

Figure 2. Extended theory of planned behavior constructs which predict feeding frequency. Solid arrows represent significant relationships, whereas dashed arrows represent nonsignificant relationships. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

perceived behavioral control was not a significant predictor ($p = 0.102$). Perceived behavioral control was a significant predictor in the second model (extended TPB), which accounts for a 1% increase in explained variance.

Multinomial logistic regression with maximum likelihood estimation was performed to examine whether PBC and intention predict feeding frequency. Feeding in the past year was analyzed as the outcome variable, with one's feeding intention and PBC as the predictors. The association between feeding frequency and perceived behavioral control was not significant, and was therefore removed. In the final model (intention predicting feeding frequency; Figure 2), participants who reported higher intention scores were more likely than participants with lower intention scores to feed free-roaming cats daily ($b = 1.84$, $p < 0.001$; OR = 6.28), often ($b = 1.32$, $p < 0.001$; OR = 3.72), and seldom ($b = 1.28$, $p < 0.001$; OR = 3.61), versus those who never fed free-roaming cats, indicating a significantly positive relationship between intention and behavior.

Discussion

The study shows that the vast majority of the participants fed free-roaming cats, and almost a third fed cats often or daily, which implies it is a common practice in Malaysia. Furthermore, the high mean intention scores suggest the high prevalence will continue. The constructs of the extended-TPB predicted feeding behavior and intention, and explained a significant proportion of the variance, which likely explains the high prevalence.

Perhaps the most important finding was the role of anticipated regret in predicting and explaining intention to feed free-roaming cats. It contributed substantial variance over and above the variance explained by the TPB constructs; in other words, anticipated regret was salient in the decision to feed the cats. The results also suggest that anticipating feeling regretful and upset about not feeding affects decision-making by changing the perceived evaluation of potential outcomes, which leads to the behavior becoming less volitional. This is because perceived behavioral control is only a significant predictor when anticipated regret is included in the model. This indicates that anticipated regret changes the participants' perception of control, as it should be less important when people have more volitional control

over behavior (Madden, Ellen, & Ajzen, 1992). It should be noted that anticipated regret is different from other affective aspects of attitudes, as it is a negative and unwanted emotion that can motivate people to behave in ways to avoid or minimize its occurrence (Sandberg & Conner, 2008). In other words, the study shows that a person anticipating regret may feel more obliged to offer food to free-roaming cats, which means their degree of control of the feeding becomes relatively lower. This inference is supported by previous studies, which demonstrate the importance of emotions and feelings in human–animal relations, as well as the enhanced prediction of intention for a wide range of behaviors when anticipated regret is included in the TPB (Sandberg & Conner, 2008). Therefore, future studies of people's interactions with animals, such as free-roaming cats, should take account of affective and emotional antecedents of behavior, such as anticipated regret, to improve the TPB's explanatory power.

The Malaysian public's benevolence toward animals and animal welfare largely accounts for their favorable attitudes toward feeding free-roaming cats. This is shown in their salient behavioral beliefs about being able to exercise compassion and kindness to animals, and disagreement with criticisms of feeding. It is also shown in salient normative beliefs which reveal support from family and close acquaintances, and control beliefs as participants were only likely to be discouraged from feeding cats when they were afraid or encountered hostile cats. This concurs with previous studies in other countries, which reveal affection and love for cats and living things in general, and sympathy and pity for disadvantaged animals, are major reasons for feeding free-roaming cats (Centonze & Levy, 2002; Haspel & Calhoun, 1990; Stammbach & Turner, 1999). These findings are important because they challenge commentary on free-roaming cats in the literature, which tends to emphasize their negative rather than positive implications (Brown, 2013; Centonze & Levy, 2002; Hakim, 2015; Haspel & Calhoun, 1990; Slater et al., 2008).

Another important finding was the absence of sex differences in public perceptions, in contrast with previous studies (Ash & Adams, 2003; Centonze & Levy, 2002; Finkler & Terkel, 2012; Gunaseelan et al., 2013; Kellert & Berry, 1987). The suggestion in the literature that women are more affectionate and caring toward animals is likely an artefact of gender stereotyping, either by researchers or respondents conforming to stereotypes about their sex when answering surveys (Hyde, 2014).

Previous experience of cat ownership was associated with positive public perceptions of free-roaming cats, in agreement with previous studies (Centonze & Levy, 2002; Lord, 2008). One explanation might be that cat ownership enhances emotional concern and responsibility for the welfare of free-roaming cats (Fifield & Forsyth, 1999; Melson, 2003; Stammbach & Turner, 1999; Toukhsati et al., 2012). Also, as cat owners presumably like cats, and are more actively involved in caring and spending money on them, they probably find it easier to extend this care and concern to free-roaming cats. However, these propositions cannot be confirmed in this study, as it is correlational and participants were only asked about current cat ownership (non-cat owners might have been past cat owners). Therefore, future research should explore the role of cat and pet ownership further (Zito et al., 2015). For example, it is possible that cat owners who allow their cats to roam outside might have more favorable attitudes to unowned free-roaming cats than owners of indoor cats. Others with concerns for wildlife predated by cats (Hall et al., 2016) or owners of other species may also have emotional concern and responsibility for animal welfare, but not for cats (especially if their pets are vulnerable to cat predation or if they are dog-lovers who dislike cats).

The findings have important implications for managing free-roaming cats and their welfare in ways congruent with public perceptions. On the whole, the results show that all of the predictors in the extended-TPB can be targeted in behavior-change strategies. As changing behavior requires changing underlying beliefs, Table 4 lists valuable information to identify beliefs that can be targeted in interventions. In addition, it may be possible to change public perception and feeding by reducing or provoking anticipated regret. While strategies could simply encourage people to stop feeding free-roaming cats, for example by increasing awareness of nuisance and public health issues (as these beliefs have low mean scores for the sample), the participants' strong and positive relationship with the cats, and emotional rewards they gained from caring for them, suggest such attempts might be unsuccessful. Similarly, the normative belief that Government is not an important source of social pressure guiding the decision to feed cats, implies official feeding bans might be ineffective.

Another point to consider is the assumption that the public feeding of free-roaming cats leads to overpopulation. Although based on a logical premise, and widely accepted in the literature, it is not yet supported with robust empirical evidence, and the public does not necessarily perceive there is overpopulation (Ash & Adams, 2003; Slater et al., 2008). This requires further research to ensure animal management strategies are evidence-based. An alternative strategy, therefore, is to make the most of the Malaysian public's positive attitudes and emotional concern for free-roaming animals, namely to redirect current feeding practices toward more constructive actions to improve welfare (Finkler & Terkel, 2012; Li & Davey, 2013; Toukhsati et al., 2007). For example, as the free-roaming cat population is partly the result of owned cats abandoned, lost, or allowed to wander outside, strategies which inform the public about responsible pet ownership, such as finding a better match between pets and owners, discouraging unsupervised roaming, micro-chipping, and remedying pet behavioral problems (to reduce pet abandonment), should help to reduce it (Denny & Dickman, 2010; Robertson, 2008; Slater, 2007). Also, the salient normative beliefs identified in the study suggest strategies which include family, partners, close friends, and colleagues, and target their social norms regarding feeding, are also likely to be effective. It is important, however, to be careful about making assumptions about which practices are culturally acceptable in Malaysia, and therefore further research is needed to examine whether ethnic and religious differences influence the acceptability of strategies, especially sterilization and TNR programs (Denny & Dickman, 2010; Lord, 2008; Slater, 2007; Toukhsati et al., 2007; Wallace & Levy, 2006). An investigation of education, ethnic, religious and other demographic categories was not an aim of the study, and they were excluded from calculations due to low sample sizes. However, the preliminary findings demonstrate feeding behavior is different in most demographic groups, an avenue for further research.

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Conflict of Interest

The authors state there are no conflicts of interest.

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