

## Implications of Cat Ownership Statistics and Social Changes: A Longitudinal Study in Taiwan from 2001 to 2009

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### *Abstract*

Pet ownership statistics in Taiwan had not been investigated until Animal Protection Act was announced on November 4, 1998. This longitudinal study aims to investigate the demographic information of household cats in Taiwan and discuss its implications with social changes from 2001 to 2009 biennially. Household cats were surveyed biennially by randomly dialed telephone survey. A structured questionnaire was designed to obtain household demographics and population-associated data on pet ownership. Related social changes data were obtained from the Statistical Yearbook of the Ministry of Interior, Taiwan. Results showed that household cat ownership increased from 2001 to 2009, but the average number of household cats owned by each household decreased every year. The study concluded that the increase in cat ownership might be caused by the following reasons: (1) dramatic rise in life stress and social/environmental/economic pressures of owners who had strong needs of self-objective fulfillment and comfort, (2) less care and attention required for cats than dogs, and (3) the availability of care-giving for cat is decreasing with the declining of the number of people within a household in Taiwan.

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**Keywords:** cat ownership, household cats, human-animal bound, pet, social change

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## บทคัดย่อ

### ผลกระทบจากสถิติเจ้าของแมวและการเปลี่ยนแปลงทางสังคม: การศึกษาระยะยาวในไต้หวัน 2001-2009

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สถิติเจ้าของสัตว์เลี้ยงในไต้หวันไม่ได้รับการตรวจสอบจนพระราชบัญญัติคุ้มครองสัตว์ได้มีการประกาศเมื่อ 4 พฤศจิกายน 1998 การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อตรวจสอบข้อมูลประชากรของแมวในครัวเรือนในไต้หวันในระยะยาวและหาหรือเกี่ยวกับผลกระทบต่อ การเปลี่ยนแปลงทางสังคมทุกสองปีระหว่างปี 2001-2009 ทำการสำรวจแมวเลี้ยงทุกสองปีโดยการสอบถามด้วยการสุ่มโทรทางโทรศัพท์ แบบสอบถามถูกออกแบบมาเพื่อให้ได้ข้อมูลประชากรในครัวเรือนและข้อมูลที่เกี่ยวข้องกับประชากรจากเจ้าของสัตว์เลี้ยง ข้อมูลที่เกี่ยวข้องกับการเปลี่ยนแปลงทางสังคมที่ได้รับจากรายงานประจำปีทางสถิติของกระทรวงมหาดไทย ประเทศไต้หวัน ผลการศึกษาพบว่าจำนวนผู้เลี้ยงแมวเพิ่มขึ้นจากปี 2001-2009 แต่จำนวนแมวเฉลี่ยต่อครัวเรือนลดลงทุกปี ผลการศึกษาสรุปได้ว่าการเพิ่มจำนวนของเจ้าของแมวอาจเกิดจากสาเหตุดังต่อไปนี้ (1) ประชากรแมวอาจเพิ่มขึ้นจากความเครียดและความกดดันทางสังคม / สิ่งแวดล้อม / เศรษฐกิจของเจ้าของที่ต้องการบรรลุเป้าหมายของตนเองและความสะดวกสบาย (2) การที่การดูแลแมวสามารถใช้เวลาน้อยกว่าการดูแลสุนัข และ (3) การลดลงของความพร้อมในการดูแลแมวลดลงพร้อมกับการลดลงของจำนวนคนในครัวเรือนในไต้หวัน

**คำสำคัญ:** เจ้าของแมว แมวในครัวเรือน ความสัมพันธ์ระหว่างคนและสัตว์ สัตว์เลี้ยง การเปลี่ยนแปลงทางสังคม

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### Introduction

Public data published on domestic pet demographics have been investigated and available in many countries (Downes et al., 2009) such as the US (AVMA, 2007), Australia (Baldock et al., 2003) and Brazil (Serafini, 2008). It is important to understand and analyze the trends and size of domestic pet population for government and industry to plan or make decision (Nassar and Mosier, 1991). For example, related pet-associated issues such as pollution and zoonotic disease, which become more relevant to increase in pet population (Stirling et al., 2008). Moreover, domestic pets which are abandoned and become free-roaming animals have long caused principally public-health problems and animal welfare concerns (Slater, 2000). To regulate and control pet population problems, a regularly recurrent investigation into pet population is essential. The size of pet population must be established and the information can assist in pet population control (Nassar and Fluke, 1991). Reliable estimations of the populations of dogs and cats are very crucial to efficient enforcement as well as assessment of animal welfare, veterinary epidemiology, potential risks of zoonoses, market of pet food, governmental budget, and animal policy. In Taiwan, the Animal Protection Act was announced and enforced on November 4, 1998, making Taiwan the 54<sup>th</sup> country in the world to put animal protection into legislation and mandating

that the competent authority is the Council of Agriculture, the Executive Yuan (Phipps, 2005; Animal Legal and Historic Center, 2010). However, Taiwan had not surveyed populations of pets and other related works regularly as well as lawfully until Animal Protection Act was announced. Therefore, this study complied with the law and discussed sourced data from the surveys on household cats from 2001 to 2009.

### Materials and Methods

In the years from 2001 to 2009, household cats were surveyed biennially by telephone survey which was randomly dialed and followed the method developed by Murray et al. (2010). A structured questionnaire was designed to obtain household demographics and population-associated data on pet ownership. The selection methods of sample were designed by random rules based on the official annual census of national household distribution. There are 99% confidence level for all surveys and margin of error was plus and minus 3%. Calculations of the questionnaire results were made by using database Visual FoxPro version 6.0. The estimates of the total Taiwan cat populations every two years from 2001 to 2009 using the descriptions shown in Table 1. The estimates of the number of total household cats were affected by two factors, the number of total households in Taiwan and cat ownership percentage

which is the average number of cats owned by cat-owning household. According to a study of dog population in Taiwan (Tung et al., 2010), the number of household cats per 100 people in Taiwan could be estimated as: (Total household cats/Total human population)\*100%. Annual resident populations and numbers of households in Taiwan from 2001 to 2011 were cited from the Statistical Yearbook of Interior, the Executive Yuan, Taiwan, file code 2 - y02\_12 in Chinese. Annual total number of national domestic violence of Taiwan from 2005 to 2011 were cited from the Statistical Yearbook of Interior, the Executive Yuan, Taiwan, file code y09\_02 in Chinese.

### Results and Discussion

As shown in Table 1, our study investigated household cat population biennially from 2001 to 2009, in total of five times. Our biennial investigations of cat populations from 2001 to 2009 were 238,727 cats, 276,037 cats, 266,859 cats, 345,623 cats and 346,667 cats. The corresponding percentages of cat owning households in Taiwan were 2.06%, 2.31%, 2.20%, 2.76%, and 2.80%. For every one hundred people investigated, there were 1.07 cats, 1.22 cats, 1.17 cats, 1.51 cats, and 1.50 cats. Figure 1 is summarized from Table 1, showing the trends of total cat population from 2001 to 2009, and the number of cats per household. As Figure 1 shows, total cat

population in Taiwan increased since 2007, but the average number of cats per household decrease from 1.71 cats per household in 2005 to 1.59 cats per household in 2009.

As shown in Table 2, the numbers of people per household declined from 3.29 people/household to 2.88 people/household during 2001 to 2011. Table 3 shows that the annual total number of national domestic violence of Taiwan increased every year from 2005 to 2011, as shown subsequently, 66,080 cases in 2005, 70,842 cases in 2006, 76,755 cases in 2007, 84,195 cases in 2008, 94,927 cases in 2009, 112,798 cases in 2010, 117, and 162 cases in 2011.

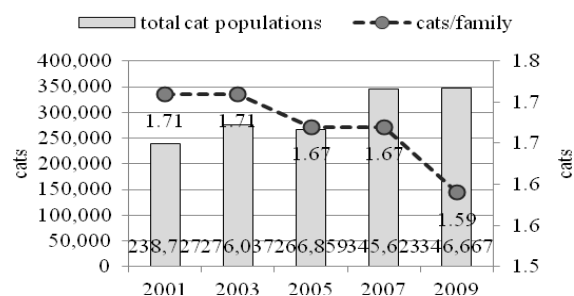


Figure 1 Trend of cat population and number of cats per household in Taiwan from 2001 to 2009.

Table 1 Values of relevant origin and estimation process of the numbers of household cats in Taiwan from 2001 to 2009.

Items	Years				
	2001	2003	2005	2007	2009
No. households being surveyed = a	9,629	10,019	11,427	10,990	16,602
Confidence level	99%	99%	99%	99%	99%
No. households owning cats = b	198	231	251	303	465
Percent of households owning cats = c (b/a)	2.06%	2.31%	2.20%	2.76%	2.80%
Total number of cats owned by surveyed families = d	339	394	419	507	740
Average number of cats for each cat-owning family = e (d/b)	1.71	1.71	1.67	1.67	1.59
Total number of human household* = f	6,780,828	7,019,327	7,277,800	7,491,916	7,777,527
Total household cats number in Taiwan = g (c*e*f)	238,727	276,037	266,859	345,623	346,667
Taiwan human population* = h	22,368,502	22,573,965	22,744,839	22,925,311	23,086,441
Number of household cats per 100 capita = g/h/100	1.07	1.22	1.17	1.51	1.50

\*Department of Household Registration, Ministry of the Interior, the Executive Yuan.

Statistical Yearbook of Interior, <http://sowf.moi.gov.tw/stat/year/elist.htm>

Table 2 Number of resident populations, numbers of households of Taiwan, from 2001 to 2011.

Years	Households (=a)	Population (=b)	Average person per household (=b/a)
2001	6,802,281	22,405,568	3.29
2002	6,925,019	22,520,776	3.25
2003	7,047,168	22,604,550	3.21
2004	7,179,943	22,689,122	3.16
2005	7,292,879	22,770,383	3.12
2006	7,394,758	22,876,527	3.09
2007	7,512,449	22,958,360	3.06
2008	7,655,772	23,037,031	3.01
2009	7,805,834	23,119,772	2.96
2010	7,937,024	23,162,123	2.92
2011	8,057,761	23,224,912	2.88

Resource: Statistical Yearbook of Interior, the Executive Yuan, Taiwan from: file code= 2 - y02\_12 in Chinese.

This study investigated the biennial total cat population and number of cats per household in Taiwan from 2001 to 2009 and noticed that the total cat population was less than total dog population (Tung et al., 2010). In Tung's study in 2009, the total dog population was 1,565,156 in 2009, but the total cat population was 346,667 (Table 1). However, since 2001, the total cat population increased (as shown in Fig 1), while the total dog population decreased simultaneously (Tung et al., 2010).

According to recent studies of Beck and Katcher (2003), Brown (2007) and White (2009), companion animals were regarded as family members with the most desired attributes to release life and social pressure and the law shall provide that abandonment of companion animals is considered criminal act against the law. Therefore, dramatic rise in life stress and social/environmental/economic pressures of owners might be one of the major reasons of the increase in cat ownership in Taiwan. According to the U.S. Census Bureau (2012), the population density (persons per sq. km.) of Taiwan ranked 15th in the whole world in 2011. The total population and total household numbers were 23,224,912 people and 8,057,761 households. The number of people per household from 2001 to 2011 decreased every year as shown in Table 2, 3.29 people/household, 3.25 people/household, 3.21 people/household, 3.16 people/household, 3.12 people/household, 3.09 people/household, 3.06 people/household, 3.01 people/household, 2.96 people/household, 2.92 people/household, and 2.88 people/household, respectively. Conversely, the total cases of domestic violence, as shown in Table 3, increased from 66,080 cases in 2005 to 117,162 cases in 2011. Observing the above data, life stress and social/environmental/economic pressures increased annually in Taiwan.

Recent research identified that companion animals played an important role in general well-being, including physical, psychological, and social aspects of human kinds. Several studies stated that companion animals had positive physical and emotional impacts on patients who have chronic diseases, heart diseases, dementia, or cancer (Kaminsky et al., 2002; Johnson et al., 2005; Friedmann and Tsai, 2006). Pets could also alleviate depression in the elderly and HIV patients psychologically (Jessen et al., 1996; Siegel, 2011). Furthermore, they provide assistance in children's medicine and palliative care (Geisler, 2004). Most pet owners choose to have pets to fulfill their psychological needs rather than for physical health purposes. Based on self-psychology perspective, the cohesion of the owner's sense of self is maintained because pets can play an important role as self-objects. Pet owners' sense of self was affirmed by the subjective psychological reality of emotional reliance to the pet (Brown, 2004<sup>a</sup>). In other words, companion animals provide a calming effect when a pet owner encounters stress and negative emotions (Allen et al., 1991). The calming effect of companion animals to their owners may be a self-object function that helps the owner in maintaining an aspect of the

self. In addition, some studies also identified that consistent and long-term petting and stroking of a companion animal could bring relaxation and comfort to combat emotional stress (Virués-Ortega and Buéla-Casal, 2006). The interaction between human and animals alleviates anxiety, depression, and loneliness; moreover, it brings a sense of social support and fulfillment (Friedmann and Tsai, 2006). A study showed that pets increased neighbor interactions and senses of community because pet owners might have more chances to interact with others by taking their pets out (Wood et al., 2007). Companion animals provide a temporary harbour to our emotions where people live under tremendous stress and economic crises (Walsh, 2009). Regardless of the age group within a family, either children, adults, or elders, they all benefit from animal interaction physically, psychologically and socially.

Highly sociable animals like dogs and cats are most suitable as self-object companion animals (Palley et al., 2010). However, because civilized cities around the world are mostly composed of apartments, cats are more chosen as pets than dogs because cats are more independent, require less space for exercising, rely less on their owners, and are less controversial, especially when it comes to barking and implicating neighbour quarrels (Schwartz, 2002; Hare, 2004; Milani, 2004; Fuh et al., 2012). Investigation in the United Kingdom by Murray and his colleagues (2010) showed that the more people in a household, the greater the possibility of possessing a pet dog; there is a strong positive correlation between the two factors ( $p < 0.001$ ); however, the more people who achieve higher education in a household, the greater the possibility of possessing a pet cat than a pet dog ( $p = 0.001$ ). Furthermore, in a family with pet dogs, the chance of having another pet cat doubles when there is an 11 to 15 year-old child in the family. Similarly, Westgarth (2007) and Leslie (1994) both discovered that families which had exceed five family members and no children under the age of six had greater possibility to have a dog than those families with less than five individuals and with children under age of six. Researchers believed that the major reason for these data was the greater responsibility of dog ownership in time devotion than in cat ownership. In general, the availability of time for companion animals is one of the crucial factors in having a pet (Brown, 2004<sup>b</sup>).

**Table 3** Annual total number of national domestic violence of Taiwan, from 2005 to 2011

Unit: individual case	
Years	National total cases
2005	66,080
2006	70,842
2007	76,755
2008	84,195
2009	94,927
2010	112,798
2011	117,162

Resource: Statistical Yearbook of Interior, the Executive Yuan, Taiwan from: file code y09\_02 in Chinese.

According to the high density of population and the increase in domestic violence in Taiwan, this study concluded that (1) residents with life stress and social/environmental/economic pressures in Taiwan need self-object to achieve self-fulfillment and comfort, and dogs or cats are appropriate companion animals to be self-objects, (2) Taiwanese choose cats over dogs for companion because it takes less time to give care to a cat than a dog, and (3) the availability of care-giving for pets declines because the number of people within a household has decreased over recent 11 years. These may be three conceivable reasons that caused the increasing cat population, decreasing dog population, and decreasing average numbers of dogs or cats owned by households. Further research is suggested to employ different approaches (i.e. qualitative research methodology) to examine those reasons, and possible clinical implications are outlined.

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