

Gender Differences in Human–Animal Interactions: A Review

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ABSTRACT I review the direction and magnitude (effect sizes) of gender differences that have been reported in several areas of human–animal interactions. These include: attitudes toward the treatment of animals, attachment to pets, involvement in animal protectionism, animal hoarding, hunting, animal abuse, and bestiality. Women, on average, show higher levels of positive behaviors and attitudes toward animals (e.g., attitudes towards their use, involvement in animal protection), whereas men typically have higher levels of negative attitudes and behaviors (e.g., hunting, animal abuse, less favorable attitudes toward animal protection). The effect sizes of gender differences range from small (e.g., attachment), to medium size (e.g., attitudes toward animal use) to large (e.g., animal rights activism, animal abuse by adults.) In most areas, there is considerable overlap between men and women, with much greater within-sex than between-sex variation. Research on the roles of gender in human–animal relationships is hindered by the omission in many reports of gender difference effect sizes and basic descriptive statistics.

Keywords: activism, animal abuse, animals, attitudes, gender, sex differences



In many ways, men and women interact with animals similarly. For example, roughly the same proportions of males and females live with companion animals, grieve at the loss of a pet, and visit zoos.

In other ways, however, sex differences in human–animal relationships loom large. More men than women support animal research, hunt animals for recreation, and engage in animal cruelty. In contrast, women nearly always outnumber men at animal rights demonstrations, and they are more likely to hoard large numbers of cats or dogs in their homes.

While gender differences have been reported in many studies of human–animal interactions, there has been little effort to tie this body of research together. A first step in developing an explanatory model of sex differences is to document the direction and magnitude of gender differences across different categories of behaviors. Here I compare gender differences in several types of human–animal interactions including attitudes toward the treatment of animals, attachment to pets, involvement in animal protection activities, and perpetration of animal abuse. My intent is to document patterns of gender

differences that are consistent across different types of animal-related attitudes, relationships, and behaviors. It is not to account for the origins of these differences.

When discussing psychological differences between men and women, words take on particular importance. Consider, for example, the terms “gender difference” and “sex difference.” Some writers assume that a *gender* difference results from socialization whereas a *sex* difference is innate (LaFrance, Paluk and Brescoll 2004). In reality, the factors responsible for male/female differences defy simplistic nature/nurture dichotomies. Behavioral and cognitive differences between males and females are the result of numerous forces that interact in complex ways (Maccoby 1998). These include genes, prenatal exposure to sex hormones, and a host of postnatal environmental and cultural influences. In this review, I often use the term gender difference. This usage does not imply that I think these differences are the consequence of environmental rather than biological factors. Similarly, I use the phrase “gender effect size” when discussing the results of published studies. This phrase has become common parlance; it refers only to the magnitude of average differences between the sexes and not to the causes of the observed differences.

Gender Differences and Effect Size: A Primer

For decades, some statisticians have questioned the utility of the traditional model of hypothesis testing in which a null hypothesis is rejected if a difference between group means is statistically significant (Huberty 2002). The finding of a demonstrable difference in group means does not, in itself, shed any light on the magnitude or practical significance of the difference. This determination requires an additional statistical step—the estimation of the effect size. While the inclusion of effect sizes is rare in studies of human–animal interactions, they have become routine in many areas of science. Indeed, the *Publication Manual of the American Psychological Association* states, “For the reader to fully understand the importance of your findings, it is almost always necessary to include some index of the effect size or strength of relationship in your Results section” (American Psychological Association 2001, p. 25). In addition, the reporting of effect sizes allows findings from different studies to be compared. Unfortunately, in the anthrozoological literature, effect sizes are almost never reported. Given sufficient information, however, effect sizes can be retrospectively calculated from published studies in which they were not originally reported. There are many methods for estimating effect sizes (see Cohen 1988 for examples). Here I will use two effect size measures, Cohen’s *d* and *g*.

Cohen’s *d* is the most commonly reported effect size index in studies of gender differences. It is the ratio of the difference between means divided by the pooled standard deviations of the two groups (Rosnow and Rosenthal 1996)¹. Gender differences in Animal Attitudes Scale (AAS) scores provide an example of the calculation and interpretation of *d*. The AAS is a 20-item survey that assesses attitudes toward the treatment of animals. The scale was developed by Herzog, Betchart and Pittman (1991)² and has subsequently been used by a number of other researchers. In the original study, women obtained higher scores ($M = 68.3$, $SD = 10.3$) than men ($M = 63.7$, $SD = 11.6$), and Cohen’s *d* = 0.41 (Herzog, Betchart and Pittman 1991).

What does *d* = 0.41 mean? Cohen (1988) offered the following guidelines for interpreting effect sizes: *d* = 0.20—small effect; *d* = 0.50—medium size effect; *d* = 0.80—large effect. In common sense terms, a *d* of 0.20 may be statistically significant but the difference is not apparent to the casual observer, a *d* of 0.50 is noticeable to the average person, and a *d* of 0.80 or higher is quite obvious (Lippa 2002). Thus in this administration of the AAS, the average woman in the sample was moderately more concerned about animal welfare issues than the average man.

Gender researchers often point out that for almost all behavioral traits, there is considerable overlap in the distributions of men and women; that is, differences between the sexes are smaller than differences within sexes. Thus, a particularly useful way of interpreting Cohen’s *d* is in terms of the degree of overlap of the distributions of scores. As *d* increases, there is less overlap in the distributions. When *d* = 0.20, 58% of women exceed the score of the average man, when *d* = 0.50, 69% of women score higher than the average man, and when *d* = 0.80, 79% of women have scores greater than the average man (Cohen 1988).

A second measure, **g**, is used here as an index of the effect size of differences in proportions of men and women involved in animal-related activities in which the null hypothesis predicts a 50:50 split. **g** is easily calculated: $g = P - 0.50$ where **P** is the proportion for the sex with the highest representation (Cohen 1988). As an illustration, consider a hypothetical study of individuals involved in breed-specific purebred dog rescue. Suppose that 75% of a sample of greyhound rescuers are women and 25% are men, a female to male ratio of 3:1. In this case **g** equals 0.25 ($g = 0.75 - 0.50$). Cohen (1988) suggested the following guidelines for interpreting **g**: **g** = .05—small effect (gender ratio of 1.2 to 1); **g** = 0.15—medium-sized effect (gender ratio of 2 to 1); **g** = 0.25—large effect (gender ratio of 3 to 1). Hence, the difference in the proportion of men and women involved in our hypothetical greyhound rescue study would be considered large.

It is important to examine gender effects in human–animal interactions in the context of gender differences in other areas of human behavior. Meta-analyses have revealed that, depending on the type of behavior, gender differences can be small, moderate, or large (see Lippa 2002 for an excellent overview of this topic). For example, small gender differences in favor of women have been reported in verbal ability (average $d = 0.11$, Hyde and Linn 1988), self-disclosure (average $d = 0.18$, Dindia and Allen 1992), and self-esteem (average $d = 0.21$, Kling et al. 1999). Moderate gender difference in favor of men have been reported in assertiveness (average $d = 0.50$, Feingold 1994), visual-spatial ability (average $d = 0.54$, Linn and Petersen 1986), and unprovoked aggression (average $d = 0.43$, Bettencourt and Miller 1996). Large difference exist in facial expressiveness (women are higher; average $d = 1.01$, Lippa 2002), “tender mindedness” (women are higher; average $d = 0.97$, Feingold 1994), and frequency of masturbation (men are higher; average $d = 0.96$, Oliver and Hyde 1993). The effect size of gender differences in height is extremely large ($d = 2.61$, Lippa 2002).

Note that this review is not a formal meta-analysis of gender differences in human–animal interactions. Rather, my goal is to depict general trends that have emerged thus far in studies of how humans think, feel, and behave towards other species. In describing gender differences in areas that literally range from A (attachment) to Z (zoophilia), I have elected to go wide rather than deep. True meta-analyses are based upon a large number of studies that are methodologically comparable. There are hundreds of studies reporting gender differences in areas such as cognitive abilities and aggression. Anthrozoology, however, is a new field, and there are many fewer papers on gender differences in areas like attachment to pets or attitudes toward animal research. Further, many of these articles are not appropriate for meta-analysis; they use non-comparable samples, or very different outcomes measures, or are of poor quality. In addition, many of the studies that report gender differences in human–animal interactions do not include the basic statistical information needed for the post hoc calculation of effect sizes. Despite these problems, an examination of gender effect sizes in human–animal relationships does reveal interesting and potentially important patterns. But, given the present limitations of studies in anthrozoology, the patterns of gender differences described here should be regarded as preliminary descriptions of trends rather than established conclusions.

This review focuses on two types of studies. The first includes questionnaire-based research reports which included sufficient information to allow the calculation of Cohen's d . As noted above, many authors omitted the requisite descriptive statistics (means and standard deviations for groups or t values and degrees of freedom). In a few cases I was able to obtain these data by directly contacting the authors. Also included are studies reporting the proportions of men and women involved in animal-related activities such as hunting, animal protection activities, and animal abuse. In these cases, **g** is used to estimate gender effect size.

In studies in which experimental treatments are compared with control groups, d is typically calculated by subtracting the control group mean from the experimental group mean. This procedure typically results in a positive d . In the case of gender differences, however, it is arbitrary whether male scores are subtracted from female scores or vice versa. In this report, I calculated d s by subtracting male means from female means. Thus, positive d s indicate a difference in favor of women and negative d s indicate a difference in favor of men.

Results

Attitudes Toward the Use of Animals

The patterns of gender differences in attitudes towards the use of animals are complex. For example, in an early investigation, Kellert and Berry (1987) found that gender differences varied widely over nine “nature values.” While women were more humanistic and moralistic about animals, they were also more negativistic. And while women expressed more concern for the welfare of individual animals, men were more concerned with species preservation and habitat conservation.

Most investigations of attitudes toward the use of animals have found that women are more sympathetic than men towards animal welfare and are less supportive of animal research. These differences transcend national boundaries. Pifer, Shimizu and Pifer (1994) assessed the attitudes of adults in Japan, the United States, and 13 European countries towards biomedical research on dogs and chimpanzees. In 14 of 15 countries, women were significantly more opposed to animal experimentation than were men. Similar results were obtained by Franklin, Tranter and White (2001) in a study of attitudes toward animal research in six nations. Hagelin, Carlsson and Hau (2003) reviewed 56 studies of attitudes toward animal experimentation conducted in 23 countries. Men were significantly more supportive of animal research than women in 84% of the studies which found gender differences; in no study did women have more favorable attitudes towards animal research than men.

Table 1 summarizes the effect sizes of gender differences reported in 18 studies of attitudes towards animal use. Several trends are evident. First, there are no negative *d*s in the table—in every study, women were more sympathetic toward the treatment of animals than men. Second, while there is some variation, most effect sizes are in the medium range (mean $d = 0.49$). These preliminary results suggest that the size of gender differences in attitudes toward the treatment of animals is roughly similar to male/female differences in areas such as aggression and spatial ability.

Attachment to Companion Animals

Compared with the number of studies on attitudes toward animal use, there are fewer investigations of attachment to pets that lend themselves to the analysis of gender differences. Men and women are generally similar in their desire to live with animals. Several large telephone surveys of adults have found that nearly identical proportions of men and women in the United States keep pets (Marx et al. 1998; Poresky and Daniels 1998). Similar results were obtained in surveys of adults in Australia (Parslow et al. 2005) and in Northern Ireland (Wells and Hepper 1997). Melson (1988) reported that gender did not predict pet ownership in a large sample of pre-school through pre-adolescent children in the United States. Siegel (1995) in the United States and Wells and Hepper (1995) in Northern Ireland found that boys and girls did not differ in frequency of pet ownership.

Most studies using surveys to assess global attachment to pets have found relatively small gender differences, though there are some discrepancies between studies (Stevens 1990). In a large national telephone survey of older Americans, Stallones et al. (1988) did not find gender difference in companion animal attachment. Poretzky and Daniels (1998) found that there was a statistically significant but small gender difference in attachment to pets in a telephone survey of 1,800 adults in a Midwestern state. Neither Melson (1988) nor Stevens (1990) found gender differences in involvement with pets among children. In a particularly well-done study, Melson, Peet and Sparks (1991) concluded that few differences exist in the behavioral, cognitive, and affective components of attachment to companion animals in children.

Like the literature on attitudes toward the use of animals, studies of attachment to pets frequently omit information necessary for the calculation of gender effect sizes. Table 2 summarizes gender effects for studies in which I was able to calculate Cohen's *d*. In these studies, *d* averaged 0.22, which is indicative of a small male/female difference.

Table 1. Effect sizes of gender differences in studies of attitudes toward the use of animals.

Source	Instrument	Sample	n	d***
Broida et al. 1993	survey – animal research	students – USA	1055	0.33
Driscoll 1992	survey – animal welfare	adults – USA	495	0.30
Eldridge and Gluck 1996**	survey – animal protection subscale	students – USA	139	0.34
Eldridge and Gluck 1996	survey – animal research subscale	students – USA	139	0.24
Fideli 2005 (unpublished data)	AAS*	dog owners – Italy	267	0.49
Galvin and Herzog 1992	approval of research proposals	students – USA	160	0.40
Henry 2004a	ATTAS* – survey animal welfare	students – USA	206	0.49
Henry in press**	ATTAS – cruelty subscale	students – USA	286	0.77
Henry in press	ATTAS – utilitarian subscale	students – USA	286	0.86
Henry in press	ATTAS – care giving subscale	students – USA	286	0.39
Herzog et al. 1991	AAS	students – USA	366	0.41
Hills and Lalich 1998**	judgments – cruelty of person	students – Australia	501	0.37
Hills and Lalich 1998	judgments – cruelty of act	students – Australia	501	0.40
Hills and Lalich 1998	judgments – cruelty – anger	students – Australia	501	0.34
Hills and Lalich 1998	judgments – cruelty - sadness	students – Australia	501	0.80
Knight et al. 2004**	survey – experimentation subscale	adults – UK	96	0.71
Knight et al. 2004	survey – entertainment subscale	adults – UK	96	0.69
Knight et al. 2004	survey – management subscale	adults – UK	96	0.64
Knight et al. 2004	survey – financial gain subscale	adults – UK	96	0.59
Peek et al. 1996**	GSS* – animal rights question	adults – USA	807	0.40
Peek et al. 1996	GSS – animal test question	adults – USA	807	0.39
Pifer 1996	three item animal research survey	adolescents – USA	1850	0.25
Robertson et al. 2004	survey – animal welfare	students – Canada	134	0.77
Signal and Taylor in press	AAS	adults – Australia	550	0.65
Taylor and Signal 2005	AAS	students – Australia	171	0.70
Vigorito 1996	survey – animal research	students – USA	175	0.19
Vollum et al. 2004**	Concern About Cruelty Index	adults – USA	821	0.36
Vollum et al. 2004	Cruelty Punitiveness Index	adults – USA	821	0.42
Walker 1998	AAS	students – USA	84	0.74
Walker 1998	AAS	Internet users	984	0.81
Wuensch, et al. 1998	research justification scale	students	315	0.46

*AAS = *Animal Attitudes Scale*; ATTAS = *Attitudes Toward the Treatment of Animals Scale*; GSS = *General Social Survey*

** The following studies include multiple measures of the same sample: Eldridge and Gluck, 1996; Henry in press; Hills and Lalich 1998; Knight et al. 2004; Peek et al. 1996; Vollum et al. 2004

*** Cohen (1988) suggests the following guidelines for interpreting *d*: 0.20 = small effect; 0.50 medium size effect; 0.80 = large effect.

Animal Hoarding

Animal hoarders live with more pets than they can adequately support in their homes. Hoarding can be thought of as pathological over-attachment to animals, and has been considered to be a manifestation of several forms of psychopathology. These include dementia, delusional disorder, addiction, and obsessive compulsive disorder (Frost 2000). Given the consequences of hoarding for both animal welfare and public health, there are surprisingly few demographic profiles of hoarders. The available studies suggest that between two-thirds and three-quarters of hoarders are women. The

Table 2. Effect sizes of gender differences in attachment to companion animals.

Source	Instrument	Sample	Total n	d
Al-Fayez et al. 2003	PAS*	teenagers – Kuwait	128	–0.05
Al-Fayez et al. 2003	PAS	adults – Kuwait	268	–0.14
Bagley and Gonsman 2005	LAPS*	students – USA	163	0.30
Daly and Morton 2003	CABS*	dog owning children – Canada	137	0.00
Daly and Morton 2003	CABS	cat owning children – Canada	137	0.73
Johnson et al. 1992	LAPS	adults – USA	412	0.39
Marks et al. 1994	PAS	students – Canada	94	0.27
Kidd & Kidd 1989	WPI*	adults – USA	498	0.30
Schenk et al. 1994	PAS	Adults – USA	142	0.24
Robertson et al. 2004	10-item survey	students – Canada	134	0.37
Stallones et al. 1990	8-item scale	adults – USA	816	0.02
Vidović et al. 1999	15-item scale	children – Croatia	449	0.20

*PAS = Pet Attitude Scale; LAPS = Lexington Attachment to Pet Scale; CABS = Companion Animal Bonding Scale; WPI = Wilson Pet Inventory

proportion of animal hoarders that were women in these studies are as follows: Gerbasi (2004) 67% women ($g = 0.17$), Patronek (1999) 76% women ($g = 0.26$), and Worth and Beck (1981) 64% women ($g = 0.14$). These effect sizes are in the medium to large range.

Involvement in Animal Protectionism

Virtually all studies of the animal rights movement have noted that women outnumber men among rank and file activists. Table 3 summarizes the proportions of women in nine of these reports. [Note that Galvin and Herzog (1992), Jamison and Lunch (1992), and Plous (1991) are based on the same event—the 1990 March for the Animals. Data reported by Galvin and Herzog (1998) and Plous (1998) were also gathered at the same demonstration—the 1996 March for the Animals.] These studies indicate that about 75% of grass roots activists are women. With a sex ratio of three to one, the effect size of gender differences in active involvement in animal rights is large.

Table 3. Effect sizes of gender differences (g) in studies of animal activism.

Source	Sample	% female	g^{***}
Galvin and Herzog 1992*	1990 March for Animals	77	0.27
Galvin and Herzog 1998**	1996 March for Animals	74	0.24
Groves 1997	“College town” activists	70	0.20
Groves 1997	“Larger city” activists	80	0.30
Jamison and Lunch 1992*	1990 March for Animals	68	0.18
Jasper and Poulsen 1995	Demonstration – Berkeley, CA	77	0.27
Jasper and Poulsen 1995	Demonstrations – New York	67	0.17
Munro 2001	Activists – Australia/NZ	79	0.29
Plous 1991*	1990 March for Animals	80	0.30
Plous 1998**	1996 March for Animals	76	0.26
Richards and Krannich 1991	Animal Agenda readers	78	0.28

* *Activists at the 1990 March for Animals, Washington, DC.*

** *Activists at the 1996 March for Animals, Washington, DC.*

*** *Cohen (1988) suggests the following guidelines for interpreting g : 0.05 = small effect; 0.15 = medium size effect; 0.25 = large effect.*

The preponderance of women in organizations involved in animal issues dates to the 19th century. Women made up between 70% and 75% of the Victoria Street Society, the most prominent early British animal protection organization (Elston 1987). French (1975) observed that Victorian women were attracted to animal protectionism in greater numbers than to any other social cause, with the possible exception of the feminist movement. Thus, the 3 to 1 female-to-male ratio characteristic of contemporary grass roots animal activism is not a recent phenomenon.

While women have made up the bulk of animal activists since the mid-19th century, historically, men have predominated among the political and philosophical leaders of this movement. Women made up 78% of subscribers to *The Animal Agenda*, animal rights magazine in the United States (Richards and Krannich 1991). However, 60% of authors of books reviewed in the magazine were men, as were 60% of the magazine's profiles of prominent activists (Herzog 1999). This pattern is also characteristic of biographic listings of famous activists. Men made up 65% of 143 prominent intellectual and political leaders of the animal protection movement that Guither (1998) included in his book *Animal Rights: History and Scope of a Radical Social Movement*. Similarly, 75% of the entries for notable animal rights writers, organizers, and philosophers in *The Encyclopedia of Animal Rights and Animal Welfare* (Bekoff 1998) are of men.

The predominance of men among movement leaders has decreased in recent years. Munro (2001) reported that about half of the animal protection organizations he studied were led by women. Herzog (1999) found that in the United States, gender parity varied with the goals of the organization. Groups having an animal rights focus were more likely to have women in prominent leadership positions than organizations with an animal welfare or animal shelter orientation.

While these studies focused on animal activism, more women than men are also actively involved in other types of humane behaviors. For example, 85% of members of the American Society for the Prevention of Cruelty to Animals are women ($g = 0.35$) (Zawistowski, personal communication). Arluke (2003) studied a group of young "supernurturers"—children with unusually high commitment to animals who were attending an animal-oriented summer camp. The female-to-male ratio of the 30 participants in the study was four to one (Arluke, personal communication). According to Capaldo (2004), 76% of students who call the Dissection Hotline for information about conscientious objection to dissection in biology classes education are female ($g = 0.26$). Women are also more likely than men to change their diets for ethical reasons; Beardsworth et al. (2002) found that twice as many women as men in a probability sample of UK residents had modified their diets for animal welfare reasons (17% vs. 8%).

Recreational Hunting

Vastly more men than women engage in recreational hunting. Seventeen million men hunt in the United States compared with 2.6 million women (gender ratio = 6.5 to 1, $g = 0.36$) (United States Census Bureau 2004–2005). Eighty-four percent of General Social Survey participants questioned between 2000 and 2004 who indicated that they hunted were men (gender ratio = 5.2 to 1, $g = 0.34$) (General Social Survey 2004). Lauber and Brown (2000) found that 93% of deer hunters in New York state were men (gender ratio = 12 to 1, $g = 0.43$). These very large effect sizes indicate that interest in hunting is an area in which gender differences are particularly pronounced.

Animal Abuse

Statistics on the incidence of animal abuse are clouded by reliance on small samples, ambiguity about the definition of abuse, and under-reporting in self-reports of animal cruelty (Piper 2003; Becker and French 2004). Estimates of prevalence of cruelty in children vary widely depending on whether they are based on observations of parents, teachers, or self reports (Offord, Boyle and Racine 1991; Guymer et al. 2001; Dadds, et al. 2004). It is particularly difficult to obtain accurate data on gender differences in the incidence of animal cruelty in non-clinical populations.

There is disagreement about the meaning and frequency of cruelty toward animals in children. While some researchers argue that childhood animal abuse is closely linked to later pathology (e.g.,

Merz-Perez and Heide 2004), others believe that it is a rite of passage often seen in essentially normal individuals (Arluke 2002). While most studies in children have found that boys exhibit higher rates of animal abuse than girls, the magnitude of gender differences have varied widely. Guymer et al. (2001) found no gender difference in parental reports of cruelty in Australian children under the age of 10 ($d = -0.02$) and medium-size gender effects among 10-years-olds ($d = -0.47$), 11-year-olds ($d = -0.42$) and 12-year-olds ($d = -0.54$). In another Australian study, Dadds et al. (2004) found that gender differences in cruelty in children aged three to five and five to ten years were of similar magnitude ($ds = -0.37$ and -0.34 , respectively). In a study based on parental reports of the behavior of 540 children aged six to 12 years, Ascione et al. (2003) found that the abuse rate among women (3.3%) was only slightly higher than in men (2.9%). In a large-scale epidemiological investigation of antisocial behavior in Canadian children, Offord, Boyle, and Racine (1991) found that the rates of self-reported animal cruelty among 12- to 16-year-olds were similar among boys (10.2%) and girls (9.1%). In a survey of 1,396 Italian adolescents, Baldry (2004) reported moderate-size gender effects in the incidence of five types of animal cruelty (mean $d = -0.42$).

Animal cruelty is more common in children with anti-social personality traits (Gleyzer, Felthous and Holzer 2002). These traits occur more often in boys. Luk et al. (1999) reported that 85% of animal abusing children who were referred to a community mental health center for behavior problems were boys ($g = -0.35$). However, girls with conduct disorders have higher rates of animal cruelty than normal boys (Ascione 2001).

Some researchers studying non-clinical samples have found large gender differences in animal cruelty. In a longitudinal study of animal cruelty and fire setting in a non-clinical sample of boys and girls, Becker et al. (2004) reported a 4 to 1 male/female ratio among animal abusers. Retrospective studies of recollections of college students have reported similar findings. Flynn (1999) reported that 35% of male and 9% of female students admitted having abused animals. In a second study of college students, Flynn (2002) found abuse incidence rates of 29% in men and 4% in women. Henry conducted three retrospective studies on animal cruelty among college students. The proportions of respondents who admitted to having abused animals were, respectively: 35% of males and 3% of females (Henry 2004a), 25% of males and 7% of females (Henry 2004b), and 37% of males and 7% of females (Henry in press). Miller and Knutson (1997) reported that 69% of male and 33% of female undergraduates reported that they had “personal direct exposure to some form of animal cruelty” (p. 77).

Among adults charged with animal cruelty, men vastly outnumber women across most types of abuse. Arluke and Luke (1997) examined 268 prosecutions for physical animal cruelty by the Massachusetts Society for the Prevention of Cruelty between 1975 and 1996. Of these cases, 259 involved men and nine involved women, a sex ratio of 29 to one ($g = -0.47$). Similar results were obtained by Gerbasi (2004) in an analysis of press reports of animal abuse listed on petabuse.com, an Internet site that tracks press reports of animal abuse cases. Table 4 is based on Gerbasi’s data, and indicates that gender ratios are highly skewed toward men for most types of abuse. Categories including violent behaviors directed towards animals (e.g., beating, shooting, burning, drowning and mutilation/torture) had male to females ratios ranging from 8-to-1 to 20-to-1. These effect sizes are very high, with gs in excess of -0.40 . Animal hoarding and neglect/abandonment of pets are the exceptions. As noted above, hoarding is more characteristic of women than men, and the effect size for gender differences in neglect and abandonment is small ($g = -0.07$).

Bestiality

Bestiality is among the least studied forms of animal abuse. The few empirical studies of bestiality indicate that that sexual contact with animals is more common in men than women (see Miletski 2002 and Beetz and Podberscek 2005 for critical reviews). In their well-known studies of the sexual behavior of American men, Kinsey and his colleagues reported that 8% of males and 3.6% of post-pubescent women had sexual contact with animals (Kinsey, Pomeroy and Martin 1948; Kinsey et al. 1953). Hunt (1974), in a study of the sexual behavior of a representative sample of 982 men and 1044

Table 4. Gender differences in involvement animal cruelty. Data from Gerbasi (2004).

	Male Only	Female Only	% Male	Male/Female Ratio	g
Beating	77	2	97	39:1	-0.47
Shooting	33	2	94	17:1	-0.44
Torture	78	4	95	20:1	-0.45
Drowning	7	1	88	7:1	-0.38
Fighting	45	1	98	45:1	-0.48
Burning	17	1	94	17:1	-0.44
Bestiality	17	1	94	17:1	-0.44
Neglect/Abandonment	121	90	57	1:7	-0.07
Hoarding	8	39	17	2:1	0.33

women, found lower frequencies of sexual contact with animals than did Kinsey (4.9% of men and 1.9% of women). Flynn (1999) reported that 2.4% of male and 1.1% of female college students he surveyed acknowledged sexual contact with animals. Williams and Weinberg (2003) conducted a sociological study of individuals having sexual interest in animals. Using snowball sampling, they were able to contact 159 volunteers for their research; however, because only five were women, they elected to restrict their research to male participants. Miletski (2005) recruited participants for a study of bestiality through the Internet. Of the initial respondents, 132 were men and 18 were women. Peretti and Rowan (1983) interviewed 27 male and 24 female zoophiles. Female respondents were much more likely than males to express emotional involvement with animal partners. Media reports of arrests for sex crimes involving bestiality also give insight into gender differences in the incidence of bestiality. Gerbasi (2004) reported that of 20 cases of bestiality listed on the website petabuse.com, 17 involved only men, two involved men and women, and one involved only a woman.

The over-representation of men among zoophiles is not surprising given that the overwhelming majority of individuals with sexual deviations are men (American Psychiatric Association 1994). However, the actual extent of this gender difference should be interpreted with caution due to differences between the sexes in the likelihood of admitting to or being arrested for deviant forms of sexuality. Paradoxically, while researchers have consistently found that more men than women are involved in bestiality, nearly all Internet pornography sites devoted to bestiality depict sexual interactions between women and animals (Jenkins and Thomas 2004). It is quite likely that this sex difference reflects the interests of male consumers of pornography rather than the proclivities of female participants.

Discussion

Several issues are raised by this survey of gender differences in human–animal interactions.

The size and direction of gender differences in the way humans think about and behavior towards other species vary with the type of interaction. These are summarized in Table 5. Because of the variation in the quantity and quality of the available data, I am more confident in some of the conclusions in Table 5 (e.g., that there is a large preponderance of women among animal rights activists) than others (e.g., that gender differences in attachment to pets are typically small). Further, there will be exceptions to these generalizations depending on factors such as age, species, and nationality. For example, Daly and Morton (2003) found no differences in the attachment of boys and girls to dogs, but large differences in attachment to cats, and Al-Fayez et al. (2003) reported that gender differences in pet attachment patterns were reversed among adults in Kuwait.

In many areas of human–animal interactions, the sexes are more similar than they are different. For all but very large gender effect sizes, there is enormous overlap in the distributions of the men and women when it comes to human–animal interactions. While this principle applies to many areas

Gender Differences in Human–Animal Interactions

Table 5. Summary of gender differences in human/animal interactions. Interpretations of the magnitude of effect sizes are based on Cohen (1988).

Area	Direction	Effect Size
Attitudes toward animal use	Females > Males	Medium
Attachment to companion animals	Females ≥ Males	None to Small
Grass roots animal activism	Females > Males	Large
Recreational hunting	Males > Females	Very Large
Adult animal cruelty	Males > Females	Large to Very Large
Childhood animal cruelty	Males > Females	Unknown
Animal hoarding	Females > Males	Medium

of psychology (Eagly 1995; Hyde 2005), it is sometimes forgotten by researchers. Take Peek, Bell and Dunham's (1996) statement, "Women support animal rights more than men do" (p. 473). This conclusion was based on responses to a single General Social Survey question. Sophisticated readers will realize that this sentence is actually a convenient way of saying, "In our sample, the average woman showed more support for animal rights than the average man." However, the wording of the sentence suggests that the great majority of women show more concern with the plight of animals than the great majority of men—or worse, that all women care more about animal welfare than all men.

Peek, Bell and Dunham's (1996) statement was based on responses to a survey item in which respondents were asked on a five point scale (Strongly Agree to Strongly Disagree) how they felt about the statement "Animals should have the same moral rights that human beings do." The mean response for women was 2.91 ($SD = 1.15$) and the mean response for men was 2.46 ($SD = 1.11$), a difference which is statistically significant with a medium effect size ($d = 0.40$). Figure 1 shows normalized distributions plotted using the means and standard deviations reported by Peek, Bell, and Dunham. Clearly, the difference between the average responses of men and women pale in comparison with the variation within the sexes. Thus, while it may be technically correct to say that

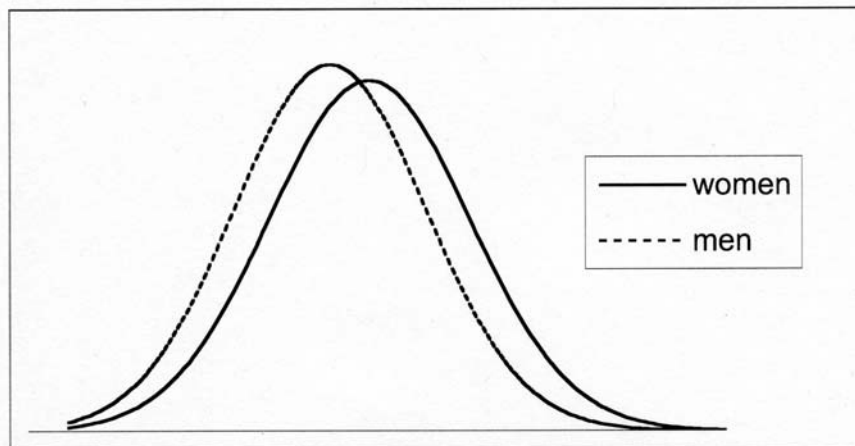


Figure 1. Normalized distributions of men's and women's responses to the General Social Survey statement "Animals should have the same moral rights that human beings do." The graph was drawn using the means and standard deviations reported in Peek, Bell and Dunham (1996). In this data set, $d = 0.40$.

“women support animal rights more than men,” the statement is misleading. Similar overlaps in male/female distributions are characteristic of most types of human–animal interactions.

Reports of gender differences should include effect sizes. Most reports of gender differences in human–animal interactions are inadequately documented. Almost none of these articles I examined for this review included an index of gender effect size, and most omitted basic descriptive statistics. These omissions make it difficult for readers and researchers to assess the size and, hence, practical significance of male–female differences. Our understanding of the roles that gender plays in human–animal interactions will be greatly facilitated if researchers include effect sizes as well as means and standard deviations in their publications.

Whatever their source, gender differences can change. A discussion of possible sources of gender differences in human–animal interactions is beyond the scope of this review. Suffice it to say that there are many competing theories to account for male/female differences. These are discussed in detail elsewhere (Unger 2001; Lipka 2002; Eagly, Beall and Sternberg 2004). It is clear to me that gender differences result from the interaction of factors that operate at multiple levels, and it is unlikely that any single factor can account for the array of differences in human–animal relationships that have been documented over different behaviors and cultures.

More importantly, the common assumption that “genetic” sex differences are permanent whereas “learned” differences are easily modified is simply wrong (Ridley 2003). And, whatever their source, gender differences in attitudes and behaviors toward animals are not immutable. The ability of male/female sex roles to rapidly change is exemplified by the shifts in gender demographics of veterinary medicine. In the mid 1960s, there were fewer than 300 female veterinarians in the United States. This pattern began to change in the 1970s, and by the end of the 1980s more than half of students entering veterinary school were women (Slater and Slater 2000). By 2002, nearly 85% of first-year veterinary students were women (Rucker 2002), and the pattern of gender differences evident only three decades earlier had completely reversed.

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Notes

1. The following formula was used for calculations of d in this report:

Cohen's $d = M_1 - M_2 / s_{\text{pooled}}$ where $s_{\text{pooled}} = \sqrt{[(s_1^2 + s_2^2) / 2]}$.

2. A copy of the Animal Attitudes Scale can be found at <http://wcuvox1.wcu.edu/%7Eherzog/AnimalAttScale.pdf>

References

- Al-Fayez, G., Awadalla, A., Templer, D. I. and Arikawa, H. 2003. Companion animal attitude and its family pattern in Kuwait. *Society & Animals* 11: 17–28.
- American Psychiatric Association. 1994. *Diagnostic and Statistical Manual of Mental Disorders*. 5th edn. Washington DC: American Psychiatric Association.
- American Psychological Association. 2001. *Publication Manual of the American Psychological Association*. 5th edn. Washington DC: American Psychological Association.
- Ascione, F. R. 2001. Animal abuse and youth violence. *Juvenile Justice Bulletin*. United States Department of Justice.
- Ascione, F. R., Friedrich, W. N., Heath, J. and Hayashi, K. 2003. Cruelty to animals in normative, sexually abused, and outpatient psychiatric samples of 6- to 12-year-old children: Relations to maltreatment and exposure to domestic violence. *Anthrozoös* 16: 194–212.
- Arluke, A. 2002. Animal abuse as dirty play. *Symbolic Interaction* 25: 405–430.
- Arluke, A. 2003. Childhood origins of supernurturers: The social context of early human behavior. *Anthrozoös* 16: 3–27.

Gender Differences in Human–Animal Interactions

- Arluke, A. and Luke, C. 1997. Physical cruelty toward animals in Massachusetts, 1975–1996. *Society & Animals* 5: 195–204.
- Bagley, D. K. and Gonsman, V. L. 2005. Pet attachment and personality type. *Anthrozoös* 18: 28–42.
- Baldry, A. C. 2004. The development of the P.E.T. Scale for the measurement of physical and emotional tormenting against animals in adolescents. *Society & Animals* 12: 1–17.
- Beardsworth, A., Bryman, A., Keil, T., Goode, J., Haslam, C. and Lancashire, E. 2002. Women, men and food: The significance of gender for nutritional attitudes and choices. *British Food Journal* 104: 470–491.
- Becker, F. and French, L. 2004. Making the links: Child abuse, animal cruelty and domestic violence. *Child Abuse Review* 13: 399–414.
- Becker, K. D., Stuewig, J., Herrera, V. M. and McCloskey, L. A. 2004. A study of firesetting and animal cruelty in children: Family influences and adolescent outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry* 43: 905–912.
- Beetz, A. M. and Podberscek, A. L. eds. 2005. *Bestiality and Zoophilia: Sexual Relations with Animals*. West Lafayette, IN: Purdue University Press.
- Bekoff, M. 1998. *Encyclopedia of Animal Rights and Animal Welfare*. Westport, CT: Greenwood Press.
- Bettencourt, B. A. and Miller, N. 1996. Gender differences in aggression as a function of provocation? A meta-analysis. *Psychological Bulletin* 119: 422–447.
- Broida, J., Tingley, L., Kimball, R. and Miele, J. 1993. Personality differences between pro- and anti-vivisectionists. *Society & Animals* 1: 129–144.
- Capaldo, T. 2004. The psychological effects on students of using animals in ways that they see as ethically, morally or religiously wrong. *ATLA Supplement 1*, 32: 525–531.
- Cohen, J. 1988. *Statistical Power Analysis for the Behavioral Sciences*. 2nd edn. Hillsdale, NJ: Lawrence Erlbaum.
- Dadds, M. R., Whiting, C., Bunn, P., Fraser, J.A., Charlson, J. H. and Pirola-Merlo, A. 2004. Measurement of cruelty in children: The Cruelty to Animals Inventory. *Journal of Abnormal Child Psychology* 32: 321–334.
- Daly, B. and Morton, L. L. 2003. Children with pets do not show higher empathy: a challenge to current views. *Anthrozoös* 16: 298–314.
- Dindia, K. and Allen, M. 1992. Sex differences in self-disclosure: A meta-analysis. *Psychological Bulletin* 112: 106–124.
- Driscoll, J. W. 1992. Attitudes toward animal use. *Anthrozoös* 5: 32–39.
- Eagly, A. H. 1995. The science and politics of comparing women and men. *American Psychologist* 50: 145–158.
- Eagly, A. H., Beall, A. E. and Sternberg, R. J. 2004. *The Psychology of Gender*. New York: Guilford Press.
- Eldridge, J. J. and Gluck, J. P. 1996. Gender differences in attitudes toward animal research. *Ethics and Behavior* 6: 239–256.
- Elston, M. A. 1987. Women and anti-vivisection in Victorian England, 1870–1900. In *Vivisection in Historical Perspective*, 259–294, ed. N. A. Rupke. London: Routledge.
- Feingold, A. 1994. Gender differences in personality: A meta-analysis. *Psychological Bulletin* 116: 429–456.
- Flynn, C. P. 1999. Exploring the link between corporal punishment and children's cruelty to animals. *Journal of Marriage and the Family* 61: 971–981.
- Flynn, C. P. 2002. Hunting and illegal violence against humans and other animals: Exploring the relationship. *Society & Animals* 10: 137–154.
- Franklin, A. S., Tranter, B. K. and White, R. D. 2001. Explaining support for animal rights: A comparison of two recent approaches to humans, nonhuman animals, and postmodernity. *Society & Animals* 9: 127–144.
- French, R. D. 1975. *Antivivisection and Medical Science in Victorian Society*. Princeton, NJ: Princeton University Press.
- Frost, R. 2000. People who hoard animals. *Psychiatric Times* 14: 1–7.
- Galvin, S. and Herzog, H. A. 1992. Ethical ideology, animal activism and attitudes toward the treatment of animals. *Ethics and Behavior* 2: 141–149.
- Galvin, S. and Herzog, H. A. 1998. Attitudes and dispositional optimism of animal rights demonstrators. *Society & Animals* 6: 1–11.
- General Social Survey 2004. [data file]. <<http://sda.berkeley.edu:7502/archive.htm>> Accessed 2 January, 2006.
- Gerbası, K. 2004. Gender and nonhuman animal cruelty convictions: Data from Pet-Abuse.com. *Society & Animals* 12: 359–365.
- Gleyzer, R., Felthous, M. D. and Holzer, C. E. 2002. Animal cruelty and psychiatric disorders. *Journal of the American Academy of Psychiatry and the Law*. 30: 257–265.

- Groves, J. M. 1997. *Hearts and Minds: The Controversy over Laboratory Animals*. Philadelphia, PA: Temple University Press.
- Guither, H. D. 1998. *Animal Rights: History and Scope of a Radical Social Movement*. Carbondale, IL: Southern Illinois University Press.
- Guymier, E. C., Mellor, D., Luk, E. S. L. and Pearse, V. 2001. *Journal of Child Psychology and Psychiatry* 42: 1057–1063.
- Hagelin, J., Carlsson, H. and Hau, J. 2003. An overview of surveys on how people view animal experimentation: some factors that may influence the outcome. *Public Understanding of Science* 12: 67–81.
- Henry, B. C. 2004a. The relationship between animal cruelty, delinquency, and attitudes toward the treatment of animals. *Society & Animals* 12: 185–207.
- Henry, B. 2004b. Exposure to animal abuse and group context: two factors affecting participation in animal abuse. *Anthrozoös* 17: 290–305.
- Henry, B. In press. Empathy, home environment, and attitudes toward animals in relation to animal abuse. *Society & Animals*.
- Herzog, H. 1999. Power, money and gender: Status hierarchies and the animal protection movement in the United States. *ISAZ Newsletter* (November) 18: 2–5.
- Herzog, H. A., Betchart, N. S. and Pittman, R. B. 1991. Gender, sex role orientation, and attitudes toward animals. *Anthrozoös* 4: 184–191.
- Hills, A. M. and Lalich, N. 1998. Judgments of cruelty towards animals: Sex differences and effect of suffering. *Anthrozoös* 11: 142–147.
- Huberty, C. J. 2002. A history of effect size indices. *Educational and Psychological Measurement* 62: 227–240.
- Hunt, M. 1974. *Sexual Behavior in the 1970s*. Chicago, IL: Playboy Press.
- Hyde, J. S. 2005. The gender similarity hypothesis. *American Psychologist* 60: 581–592.
- Hyde, J. S. and Linn, M. C. 1988. Gender differences in verbal ability. *Psychological Bulletin* 104: 53–69.
- Jamison, W. V. and Lunch, W. M. 1992. Rights of animals, perceptions of science, and political activism: Profile of American animal rights activists. *Science, Technology, and Human Values* 17: 438–458.
- Jasper, J. M. and Poulsen, J. D. 1995. Recruiting strangers and friends: Moral shocks and social networks in animal rights and anti-nuclear protests. *Social Problems* 42: 493–512.
- Jenkins R. E. and Thomas, A. R. 2004. Deviance online: Portrayals of bestiality on the Internet. <<http://www.oneonta.edu/academics/ssr/Deviance%20Online.pdf>> Accessed 3 January, 2006.
- Johnson, T. P., Garrity, T. F. and Stallones, L. 1992. Psychometric evaluation of the Lexington Attachment to Pets Scale (LAPS). *Anthrozoös* 5: 160–175.
- Kellert, S. R. and Berry, J. K. 1987. Attitudes, knowledge, and behaviors toward wildlife as affected by gender. *Wildlife Society Bulletin* 13: 363–371.
- Kidd, A. H. and Kidd, R. M. 1989. Factors in adult's attitudes toward pets. *Psychological Reports* 65: 903–910.
- Kinsey, A. C., Pomeroy, W. B. and Martin, C. E. 1948. *Sexual Behavior in the Human Male*. Philadelphia, PA: W.B. Saunders.
- Kinsey, A. C., Pomeroy, W. B., Martin, C. E. and Gebhard, P. H. 1953. *Sexual Behavior in the Human Female*. Philadelphia, PA: W.B. Saunders.
- Kling, M., Hyde, J. S., Showers, C. J. and Buswell, B. N. 1999. Gender differences in self-esteem: A meta-analysis. *Psychological Bulletin* 125: 470–500.
- Knight, S., Vrij, A., Cheryman, J. and Nankoosing, K. 2004. Attitudes towards animals and belief in animal mind. *Anthrozoös* 17: 43–62.
- LaFrance, M., Paluk, L. and Brescoll, V. 2004. Sex changes: A current perspective on the psychology of gender. In *The Psychology of Gender*. 2nd edn, 328–344, ed. A. H. Eagly, A. E. Beall and R. J. Sternberg. New York: Guilford Press.
- Laubert, T. B. and Brown, T. L. 2000. *Deer Hunting and Deer Hunting Trends in New York State*. HDRU Series, No. 00-1, Department of Natural Resources: Cornell University.
- Linn, M. C. and Peterson, A. C. 1986. A meta-analysis of gender differences in spatial ability: Implications for mathematics and science achievement. In *The Psychology of Gender Advances Through Meta-analysis*, 67–101, ed. J. S. Hyde and M. C. Linn. Baltimore: Johns Hopkins University Press.
- Lippa, R. A. 2002. *Gender, Nature, and Nurture*. Mahwah, NJ: Lawrence Erlbaum.
- Luk, S. L., Staiger, P. K., Wong, L. and Mathai, J. 1999. Children who are cruel to animals: a revisit. Australian and New Zealand. *Journal of Psychiatry* 33: 29–36.

Gender Differences in Human–Animal Interactions

- Maccoby, E. E. 1998. *The Two Sexes: Growing Up Apart, Coming Together*. Cambridge, MA: Belknap Press.
- Marks, S. G., Koepke, J. E. and Bradley, C. L. 1994. Pet attachment and generativity among young adults. *Journal of Psychology* 128: 641–650.
- Marx, M. B., Stallones, L., Garrity, T. F. and Johnson, T. P. 1998. Demographics of pet ownership among U.S. adults 21 to 64 years of age. *Anthrozoös* 2: 33–37.
- Melson, G. 1988. Availability of and involvement with pets by children: Determinants and correlates. *Anthrozoös* 2: 45–52.
- Melson, G. F., Peet, S. and Sparks, C. 1991. Children's attachment to their pets: links to socio-emotional development. *Children's Environments Quarterly* 8: 55–65.
- Merz-Perez, L. and Heide, K. M. 2004. *Animal Cruelty: Pathway to Violence Against People*. Walnut Creek, CA: AltaMira Press.
- Miletski, H. 2002. *Understanding Bestiality and Zoophilia*. Bethesda, MD: East-West Publishing.
- Miletski, H. 2005. Is zoophilia a sexual orientation? In *Bestiality and Zoophilia: Sexual Relations with Animals*, 82–97, ed. A. M. Beetz and A. L. Podberscek. West Lafayette, IN: Purdue University Press.
- Miller, K. S. and Knutson, J. F. 1997. Reports of severe physical punishment and exposure to animal cruelty by inmates convicted of felonies and by university students. *Child Abuse and Neglect* 21: 59–82.
- Munro, L. 2001. Caring about blood, flesh, and pain: Women's standing in the Animal Protection Movement. *Society & Animals* 9: 43–61.
- Offord, D. R., Boyle, M. C. and Racine, Y. A. 1991. The epidemiology of antisocial behavior in childhood and adolescence. In *The Development and Treatment of Childhood Aggression*, 31–54, ed. D. J. Pepler and K. H. Rubin. Hillsdale, NJ: Lawrence Erlbaum.
- Oliver, M. B. and Hyde, J. S. 1993. Gender differences in sexuality: A meta-analysis. *Psychological Bulletin* 114: 29–51.
- Parslow R. A., Jorm A. F., Christensen H., Rodgers B. and Jacomb P. 2005. Pet ownership and health in older adults: Findings from a survey of 2551 community-based Australians aged 60 to 64. *Gerontology*, 51: 40–47.
- Patronek, G. J. 1999. Hoarding of animals: An under-recognized public health problem in a difficult-to-study population. *Public Health Reports* 114: 81–87.
- Peek, C. W., Bell, N. J. and Dunham, C. C. 1996. Gender, gender ideology, and animal rights advocacy. *Gender and Society* 10: 464–478.
- Peretti, P. O. and Rowan, M. 1983. Zoophilia: Factors related to its sustained practice. *Panminerva Medica* 25: 127–131.
- Pifer, L. K. 1996. Exploring the gender gap in young adult's attitudes about animal research. *Society & Animals* 4: 37–52.
- Pifer, L., Shimizu, K. and Pifer, R. 1994. Public attitudes toward animal research: some international comparisons. *Society and Animals* 2: 95–113.
- Piper, H. 2003. The linkage of animal abuse with interpersonal violence: A sheep in wolf's clothing? *Journal of Social Work* 3: 161–177.
- Plous, S. 1991. An attitude study of animal rights activists. *Psychological Science* 2: 194–196.
- Plous, S. 1998. Signs of change within the animal rights movement: Results from a follow-up survey of activists. *Journal of Comparative Psychology* 112: 48–54.
- Poresky, R. H. and Daniels, A. M. 1998. Demographics of pet presence and attachment. *Anthrozoös* 11: 236–241.
- Richards, R. T. and Krannich, R. S. 1991. The ideology of the animal rights movement and activists attitudes towards wildlife. *Transactions of the 56th North American Wildlife and Natural Resources Conference*. 56: 363–371.
- Ridley, M. 2003. *The Agile Gene: How Nature Turns on Nurture*. New York: HarperCollins.
- Robertson, J. C., Gallivan, J. and MacIntyre, P. D. 2004. Sex differences in the antecedents of animal use attitudes. *Anthrozoös* 17: 306–320.
- Rosnow, R. L. and Rosenthal, R. 1996. Computing contrasts, effect sizes, and counternulls on other people's published data: General procedures for research consumers. *Psychological Methods* 1: 331–340.
- Rucker, M. J. 2002. Gender changes and the future of our profession. *Journal of Veterinary Medical Education* 29: 63–65.
- Schenk, S. A., Templer, D. I., Peters, N. B. and Schmidt, M. 1994. The genesis and correlated of attitudes toward pets. *Anthrozoös* 7: 60–68.

- Siegel, J. M. 1995. Pet ownership and the importance of pets among adolescents. *Anthrozoös* 8: 217–223.
- Signal, T. D. and Taylor, N. In press. Attitudes to animals: Demographics within a Community Sample. *Society & Animals*.
- Slater, M. R. and Slater, M. 2000. Women in veterinary medicine. *Journal of the American Veterinary Medical Association* 217: 472–476.
- Stallones, L., Johnson, T. P., Garrity, T. F. and Marx, M. B. 1990. Quality of attachment to companion animals among U.S. adults 21 to 64 years of age. *Anthrozoös* 3: 171–176.
- Stallones, L., Marx, M. B., Garrity, T. F. and Johnson, T. P. 1988. Attachment to companion animals among older pet owners. *Anthrozoös* 2: 118–124.
- Stevens, L. T. 1990. Attachment to pets among eighth graders. *Anthrozoös* 3: 177–183.
- Taylor, N. and Signal, T. D. 2005. Empathy and attitudes toward animals. *Anthrozoös* 18: 18–27.
- Unger, R. K. 2001. Handbook of the Psychology of Gender. New York: John Wiley & Sons.
- United States Census Bureau. 2004–2005. *Statistical Abstract of the United States*. 124th edn. Washington, DC: US Department of Commerce.
- Vidovic, V. V., Stetic, V. V. and Bratko, D. 1999. Pet ownership, type of pet and socio-emotional development of school children. *Anthrozoös* 12: 211–217.
- Vigorito, M. 1996. An animal rights attitude survey of undergraduate psychology students. *Psychological Reports* 79: 131–142.
- Vollum, S., Buffington-Vollum, J. and Longmire, D. R. 2004. Moral disengagement and attitudes toward animals. *Society & Animals*. 12: 209–235.
- Walker, M. W. 1998. Attitudes Toward the Use of Animals in Research. Thesis: Western Carolina University.
- Wells, D. L. and Hepper, P. G. 1995. Attitudes toward animals in children. *Anthrozoös* 8: 159–170.
- Wells, D. L. and Hepper, P. G. 1997. Pet ownership and adult's view on the use of animals. *Society & Animals* 5: 45–63.
- Williams, C. J. and Weinberg, M. S. 2003. Zoophilia in men: A study of sexual interest in animals. *Archives of Sexual Behavior* 32: 523–535.
- Worth, D. and Beck, A. 1981. Multiple ownership of animals in New York City. *Transactions and Studies of the College of Physicians of Philadelphia* 3: 280–300.
- Wuensch, K. L. and Poteat, G. M. 1998. Evaluating the morality of animal research: Effects of ethical ideology, gender, and purpose. *Journal of Social Behavior and Personality* 13: 139–150.