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Owner Sex and Human–Canine Interactions at the Park

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13
14 **Abstract**

15
16 The purpose of this exploratory study was to investigate if and what types of differences exist
17 between men and women when interacting with their dogs in a “natural” setting. In the case of
18 this study, we defined “natural” as visiting a public park with their dog. To do this, we completed
19 a series of 10-minute focal follows ($n = 177$) on human-canine dyads at local leashed and off
20 leash dog parks from December 2018 to March 2019. Data collection included counting
21 incidences of 14 specific interactions (i.e., “baby talks to dog” or “scolds/speaks harshly to
22 dog”), observable demographics (sex, age cohort, sex of dog), and additional notes (i.e.,
23 extended play sessions, talking to other park visitors, cell phone use). Women were more likely
24 to “baby talks to dog” and “speaks gently/whispers to dog”, while young adults were more like
25 to use “collar correction/jerks leash.” The results also suggest young adults may be more likely
26 to “throws toy/plays with dog” though more data are needed to confirm. Given the increase in

27 invested pet dog ownership, we suggest that sex differences in interactions with pet dogs mirror
28 the literature on sex differences in human parenting. This is particularly relevant as decreasing
29 birth rates and climbing pet ownership give rise to the practice of applying parenting strategies to
30 pets, suggesting the need to better understand potential welfare concerns that may mirror those in
31 the parenting literature.

32
33 *Keywords:* dogs, sex, age, pet parenting, focal follows
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35 **Introduction**

36

37 The purpose of this exploratory study is to investigate if and what types of differences exist
38 between men and women when interacting with their dogs in a “natural” setting. In the case of
39 this study, we define “natural” as visiting a public park with their dog. This is because the park
40 provides the ability to observe these interactions in a mostly nonintrusive way, with little to no
41 immediate influence on the owner’s behavior (i.e., they are not aware of being observed and less
42 likely to “perform” for the researcher). While literature exists observing sex and gender
43 differences in human-canine dyads (i.e., Kotrschal, Schöberl, Bauer, Thibeaut, & Wedl, 2009;
44 Prato-Previde, Fallani, & Valsecchi; 2006), this is the first known study to attempt to observe
45 these interactions without observant awareness and the potential performative biases that
46 knowledge can induce.

47

48 The American Pet Products Association (APPA) estimates Americans will have spent over \$75
49 billion in 2019, with increases in food, medication and supplies, veterinary care, and other
50 services like training, grooming, and pet sitting (APPA, 2019). This estimate constitutes a nearly
51 five-fold growth since the association first began tracking the pet market, with the most notable
52 increase over the last decade. Likewise, while cats, fish, and small animals (i.e., hamsters,
53 ferrets, gerbils), increase in popularity, dogs continue to be the most commonly kept pet in
54 American homes (APPA, 2019; Statista, 2019).

55

56 Reflecting these trends in spending, a phenomenon known as pet parenting has been noted in
57 previous literature (Laurent-Simpson, 2017; Owens & Grauerholz, 2018; Volsche, 2018a). These

58 human-canine relationships often reflect Blouin's (2013) "humanistic" orientation toward dogs,
59 with its emphasis on elevating the dog's status to one of cherished pet or child, and the owner's
60 use of "parent" as part of their identity within the relationship (Volsche, 2018a; Volsche & Gray,
61 2016). As a result, people who view themselves as pet parents report an increase of temporal,
62 financial, and emotional investment, as well as a focus on species-specific needs (Volsche,
63 2018b). The identity of "pet parent" can alter the ways in which an owner may invest their time
64 and money, and the presence of a pet may also influence a single person's dating choices (Gray,
65 Volsche, Garcia, & Fisher, 2015), with women perceiving men with dogs as potentially more
66 caring mates.

67
68 Veevers (1985) identified three different social meanings for pets: "pets as statements," "pets as
69 social lubricants," and "pets as people." The role of "pets as people" includes the concept that
70 dogs may serve as surrogate children or replace or supplement missing or insufficient human
71 relationships. This supports the value of visiting a dog park as a form of relationship building
72 with the dog as "friend" or "child." Additionally, Bekoff (2018) discusses the frequency with
73 which visitors to the park enjoy human-human interactions while observing their dogs playing,
74 seeking advice from other dog owners on nutrition and behavior, and generally enjoying a social
75 outing. This suggests the dog park serves as a "social lubricant" by bringing together individuals
76 with a shared interest in dogs for social contact. As a result, the amount of time spent, combined
77 with the type of interactions one displays, may help individuals make a "statement" about
78 themselves as a particular type of dog owner (whether "pet parent" or other role).

79

80 While present in multiple interspecific relationships, the deeply invested practice of pet parenting
81 is most common with people who own dogs (Volsche, 2018b), and results in notable parenting
82 styles that appear to mirror those in the human parenting literature (Herwijnen, Borg, Naguib, &
83 Beerda, 2018; Volsche & Gray, 2016). For example, Volsche and Gray (2016) found that women
84 who reported higher attachment to their pet dogs also reported slightly elevated uses of aversion
85 when training (i.e., saying “no” or withholding a treat for misbehavior), but did not report the use
86 of extreme aversions or abuse (i.e., jerking the dog’s leash/“collar corrections” or hitting the
87 dog). This mirrors their childed counterparts who use authoritative parenting styles with a
88 balance of warmth/support and discipline/guidance (for a discussion of this overlap see
89 Cimarelli, Turcsán, Bánlaki, Range, & Virányi, 2016). Herwijnen and colleagues (2018) found
90 similar authoritative parenting styles among a sample of Dutch dog owners in which
91 responsiveness to the dog’s needs and emotions was present. Relatedly, Schöberl et al. (2012)
92 found that owner-dog cortisol levels in relationships where dogs are viewed as “meaningful
93 companions” and “social partners” mirror those of human parent-offspring attachment when
94 dogs are removed from their caregivers.

95
96 The decision to apply parenting strategies to one’s dog also has implications for relationships
97 with other people. In 2013, Steiner and colleagues found that the investment of care from a new
98 intimate partner toward an existing pet in the home is often less than if a couple adopts a new pet
99 together. This is reflective of men’s investment differences toward biological children and
100 stepchildren in the home (Gray & Anderson, 2010). Additionally, in a survey of approximately
101 1200 single Americans, women reported perceiving men with pets (especially dogs) as more
102 caring and likely to make better partners and future fathers (Gray et al., 2015).

103

104 Surprisingly, with this data on pet dogs, the development of pet “parent” as an identity, and the
105 application of parenting strategies toward pet dogs in the home, little work has been done to
106 investigate sex and gender differences in these relationships. This may be in part due to the
107 difficulty in motivating men to participate in research on pets, attachment, and interactions (see
108 Herzog, 2007 for a discussion). Commonly, women are more likely to complete surveys and
109 volunteer to participate in studies involving dogs and other pets. This results in the need to
110 specifically target men as a sample population. In a study designed to understand men’s
111 attachment to their dogs, Blazina and Kogan (2019) found that men often have difficulty
112 verbalizing their relationships with their dogs, and frequently underreport or understate these
113 attachments as a result of conforming to norms of masculinity. This may explain the difficulty in
114 obtaining men as participants in a generalized sample. This also speaks to the importance of
115 utilizing behavioral research to understand sex and gender differences, as self-report surveys
116 may simply not be the best way to approach these questions.

117

118 A difference in human-dog interaction style between men and women would make evolutionary
119 sense. Archer (2019) completed an extensive review of the literature on human psychological sex
120 differences and found women were more likely to display social and emotional skills related to
121 caretaking while men were more likely to seek status and engage in impulsive displays of skill.
122 Likewise, human parenting investment is often divided between direct care (i.e., feeding,
123 holding, grooming) and indirect care (i.e., obtaining resources, providing shelter) with women
124 being more involved in direct care and men more involved in indirect care (Gray & Anderson,
125 2010; Hrdy, 2009; Kleiman & Malcolm, 1981). Miller et al. (2009) found that women’s, but not

126 men's, oxytocin (OT) levels responded to interactions with their dogs when arriving home after
127 work. This evidence supports potential sex differences in human-canine bonding, as the authors
128 hypothesized that sex differences in the style of greeting and ways of interacting with their dogs
129 may impact changes in OT versus other hormones (i.e., cortisol, testosterone, progesterone).

130

131 The minimal literature on sex and gender differences in human-canine interactions supports this
132 to some extent. For example, Prato-Previde, Fallani, and Valsecchi (2006) found that women
133 were more likely to use "motherese" (a form of baby-talk consisting of high-pitched
134 vocalizations and repetition of words) to soothe their stressed dogs, while men were more likely
135 to engage silently, using physical contact to soothe rather than vocalizations. These differences,
136 together with personality differences, were also found to influence attachment styles between
137 owners and their dogs. Kotrschal et al. (2009) found that female owners were higher in
138 neuroticism and hence, more likely to touch their pets while male owners were higher in
139 extraversion and more likely to engage in shared activities. Interestingly, male dogs with female
140 owners also responded by being less sociable with strangers. Similarly, while they did not
141 explicitly find that owner gender influenced interaction style, Cimarelli et al. (2016) found that
142 owners who displayed more warmth influenced a dog's likelihood of seeking support in a
143 threatening situation. Combined with Archer's (2019) findings that women tend to display more
144 warmth and empathy; we would expect that women are more likely to display warmth toward
145 their dogs.

146

147 Considering the literature above, we hypothesized that women would be more likely to engage in
148 direct interactions and caretaking displays while men would be more likely to engage in status

149 displays (demonstrations of “control” over dog such as collar corrections or hitting) and rough
150 and tumble play. We also hypothesized that age cohort may influence these interactions, with
151 younger individuals (especially men) more likely to be concerned with demonstrations of
152 strength, control, and masculinity involving their dogs (as suggested by Blazina & Kogan, 2019)
153 and middle-aged women being more likely to engage in maternal displays (i.e., kissing and
154 hugging, redirecting inappropriate behavior).

155

156 **Methods**

157

158 *Observations and Data Collection*

159

160 Observations and data collection occurred at various public dog parks in the Las Vegas
161 metropolitan area from December 2018 to March 2019. All parks were in urban and suburban
162 communities, and consisted of dirt/sand, pea gravel, or grass (natural, and in some cases,
163 artificial). Each observation consisted of a 10-minute focal follow of a unique human-canine
164 dyad. Human observants were limited to individuals who appeared to be healthy and age 18
165 years or older, who did not display a visible disability (e.g., the dog was not a service dog), and
166 who voluntarily visited a public dog park. Dog observants were determined based upon who was
167 holding the leash, or in cases of off leash interactions, whom they arrived with at the park or
168 interacted with the most during the target follow. While we acknowledge visiting dog friendly
169 parks immediately impacts sampling (more likely to be invested pet dog owners), we accept this
170 bias since our goal is to investigate differences in invested owners (and potential pet parents).

171 Since we are answering a question regarding sex differences in invested owners, we feel this is a
172 negligible sampling issue.

173
174 Initial data included start and stop time of observation, date, day of week, park type (leashed or
175 off leash), whether the dog was leashed, and whether other dogs related to the observed dyad
176 were present (i.e., the owner arrived with two dogs). The observed dog's sex ("male," "female,"
177 or "uncertain") was collected if visible (intact male, leg lifting, etc.), though most observations
178 list "uncertain" as sexing a dog is difficult from a distance. The age group of the human observed
179 was generalized as "young adult," "middle aged adult," and "elderly adult" and based upon
180 outward appearance of dress style, hair color and style (i.e., presence and amount of gray),
181 visible signs of aging (i.e., wrinkles), and behavior (i.e., use of cell phone, mode of locomotion).
182 The sex of the human observed ("male," "female," or "uncertain") was recorded based upon
183 displays of masculinity and femininity, dress and hair type, and presence of secondary sex
184 characteristics (i.e., facial hair, breasts, etc.). In order to account for the potential presence of
185 transgendered, non-binary, or queer individuals, an option for "uncertain" was also provided to
186 record interactions in which the person's sex could not be confidently determined (although this
187 only occurred in six observations).

188
189 During each focal follow, 14 specific interactions were counted using a binary hash mark count
190 (one hash mark each time an interaction occurred during the follow). If interactions occurred for
191 more than 30 seconds (extended), a dash was used to note this distinction (for example, in one
192 instance, a young adult man played fetch for nearly the full 10 minutes). The specific interactions
193 were: "pets dog on head," "calls dog," "hugs/kisses dog," "baby talks to dog," "throws toy/plays

194 with dog,” “gives dog food/treats,” “speaks gently/whispers to dog,” “pets dog on rear,” “dog
195 comes when called,” “scolds/speaks harshly to dog,” “hits/spanks dog on rear,” “hits dog on
196 shoulder/head,” “collar correction/jerks leash,” and “leashes dog.”

197
198 Finally, space was available on the data collection sheets for other notes during each follow to
199 allot for unexpected interactions, environmental conditions (weather), and notations regarding
200 equipment, cell phone use, extended conversations with other people, etc. As discussed in the
201 Results, this space became equally valuable in completing the observations when compared with
202 the specific behaviors observed and counted.

204 *Research Assistant Recruitment and Training*

205
206 This study was designed to provide the opportunity for field training and research experience to
207 undergraduates at the institution under the supervision of the first author. Research assistant
208 recruitment occurred via word of mouth and through advertisement in various anthropology
209 courses during Summer and Fall 2018 semesters, and data collection occurred from December
210 2018 to March 2019. Interested parties emailed the first author, who then arranged a meeting to
211 discuss the applicant’s qualifications and reasons for joining the project. To qualify to work on
212 the project, all applicants were required to provide evidence of Social/Behavioral CITI
213 Certification training. Additionally, all applicants displayed some level of experience working
214 with or observing dogs, demonstrated attention to detail, committed to time and ability to collect
215 a minimum of 30 observations, and conveyed a willingness to attend meetings, field trainings,

216 and other team events as relevant. There were no restrictions on applicants regarding age, major,
217 or sex, though most respondents were female anthropology majors.

218
219 Ultimately, seven research assistants were recruited and trained, and five completed a minimum
220 of 30 complete observations (coauthors). All research assistants attended a mandatory field
221 training at a local, off leash dog park. The chosen park consisted of open space in which dogs are
222 expected to be leashed, as well as three fenced, off leash runs designated for 1) large dog play
223 (35 lbs. and over), 2) small dog play (35 lbs. and under), and 3) empty to allow for grass and
224 other foliage to grow back. Training included a discussion of canine body language and human-
225 canine interactions; full details of the research protocol, including line-by-line explanation of
226 how to complete the data collection sheet; and supervised observations and discussion of in situ
227 interactions of both large and small dog runs (i.e., real time discussions of what we saw as
228 behaviors occurred). The training concluded with research assistants completing their first set of
229 data collection so questions could be addressed.

230
231 Once research assistants completed training, they collected data ad libitum. The research team
232 met twice during data collection to allow for review of collection sheets and feedback on quality
233 of notations from the first author. Likewise, the first and last author (acting as project
234 coordinator) reviewed data collection to be sure an even number of men and women were being
235 observed. Finally, coding and data analysis were completed by the first and last author.

236
237 It is worth noting that any time behavior observation work is done, researchers face a dilemma
238 regarding data collection. Utilizing one researcher to complete all follows, with a second

239 researcher coding recordings of the interactions can result in consistency. This assumes,
240 however, that there is no variation in an observer's attention to detail, emphasis, or implicit bias
241 from day to day. Since, the purpose of this study included providing an opportunity for
242 behavioral observation training to undergraduate researchers, we opted to include multiple
243 researchers to obtain a larger sample in the time available. While this may reduce inter-rater
244 reliability, it provided for more follows to be completed in a wider range of parks. Likewise, in
245 order to achieve an exempt IRB status, video recording was deemed a hinderance during study
246 design. As a result, multiple research assistants, completing multiple focal follows serve to avoid
247 observer bias. This is acknowledged as a potential limitation of the work, and it is considered in
248 the Discussion.

249 *Consent and IRB Approval*

252 Given the public nature of the data collection sites, this study was deemed exempt by the
253 institution's Social/Behavioral IRB (protocol #1239311-1). This means that formal consenting
254 processes or direct interactions were neither necessary nor encouraged. As such, research
255 assistants were instructed not to approach or directly interact with the dyads they observed.
256 Should a curious observant approach the research assistants, team members were instructed to
257 identify themselves, provide a copy of the "Exempt Research Study Information Sheet," and
258 discontinue the follow to avoid capturing data on aware subjects.

259 *Analysis*

261

262 Upon collection of data sheets, the first and last author numerically coded all data and recorded
263 the results in Google Sheets (a freeware counterpart to Microsoft Excel). Initially, all data
264 collection sheets were coded and recorded, with incomplete observations (those that lasted less
265 than nine minutes) and sheets with missing data (i.e., no human sex recorded) later deleted from
266 the file. The final, “clean” Google Sheet was then exported to IBM’s SPSS V.25 for statistical
267 analysis.

268
269 We used non-parametric tests (Mann-Whitney *U*-test for “sex” and Kruskal-Wallis for “age
270 cohort”) on the 14 specific interactions which we counted. Unfortunately, the density of our data
271 makes it inadvisable to use parametric tests to determine whether an interaction existed between
272 “sex” and “age cohort.” When analyzing and reporting data, we sought results with *p*-values
273 of .05 or lower. However, acknowledging the growing debate on accepting slightly higher values
274 as suggestive of data trends (for discussion see Amrhein, Greenland, & McShane, 2019; Halsey,
275 2019; Olsson-Collentine, van Assen, & Hartgerink, 2019), we also report *p*-values between .05
276 and .075. We also include effect sizes for the Mann-Whitney and Kruskal-Wallis tests for
277 deeper consideration of potential trends (see Sullivan & Feinn, 2012). Effect sizes allow us to
278 consider the actual size of the differences. In general, an effect size up to and including $r = 0.19$
279 is considered extremely small, suggesting that the difference between groups is minimal ($r = 0.2$
280 is small; 0.5 is medium; 0.8 is large).

281
282 Finally, thematic analyses of additional notes were completed to determine the presence of other
283 behaviors and interactions not otherwise captured. This included the frequency of cellular phone
284 use by owners, presence of conversations between various individuals, interacting with other

285 dogs (owner or dog), and frequency with which dog checked-in with or ignored the owner during
286 their visit to the park.

287

288 **Results**

289

290 A total of 219 focal follows were collected between December 2018 and March 2019. Of those,
291 we excluded 42 as incomplete (either missing data or shorter than 10 minutes in length). This
292 resulted in a remaining sample of 177 10-minute focal follows of human-canine dyads. We
293 observed an equal number of men ($n = 87$, 49.2%) and women ($n = 84$, 47.5%), with six
294 observations reporting uncertainty regarding owner sex (3.4%). Likewise, age cohort was
295 relatively equally distributed with slightly more “middle age adults” ($n = 70$, 39.5%) than “young
296 adults” ($n = 58$, 32.8%) or “elderly adults” ($n = 49$, 27.7%; Table 1 provides the distribution of
297 sex and age cohort for our sample). Efforts were made to visit an equal number of park types
298 (“leashed,” $n = 64$, 36.2%, and “off leash,” $n = 113$, 63.8%). However, due to the comfort level
299 of some research assistants, more visits were made to “off leash” parks. This is likely due to the
300 ability to observe from a distance while the dyad being observed remained in an enclosed area.

301

302 Of the 14 specific interactions counted, there was no statistical significance in owner sex except
303 for “baby talks to dog” ($U = 3193.00$, $p = .062$, $r = .143$) and “speaks gently/whispers to dog” (U
304 $= 3155.50$, $p = .055$, $r = .147$). In both cases, women were slightly more likely to engage in these
305 behaviors than men. This concurs with previous research on sex differences in evolutionary
306 psychology (Archer, 2019), and we consider these results further in the Discussion section.
307 Despite p -values slightly over .05 and very small effect sizes of these differences, anecdotal

308 observations made by the team members suggest these effects would become stronger with more
309 observations. Table 2 contains a full list of Mann-Whitney results on the 14 specific interactions
310 by sex.

311
312 Of the 14 specific interactions counted, there was also no statistical significance in age cohort
313 except for “collar correction/jerks leash” which was more likely among young adults ($H = 6.913$,
314 $p = .032$, $r = .028$). “Throws toy/plays with dog” may also be more likely among young adults
315 ($H = 5.108$, $p = .078$, $r = .018$), but did not quite trend close enough to our p -value threshold for
316 us to feel confident more data would not change the results. Anecdotal observations made by the
317 team suggest this may be the case, and it would stand to reason that younger individuals have
318 more energy and physical health to keep up with their young dogs. However, it is equally
319 reasonable that older adults come to the park specifically to give their dogs room to run, and
320 throwing a toy makes this easy to accomplish with less physical energy expenditure. Table 3
321 contains a full list of Kruskal-Wallis results on the 14 specific interactions by age cohort.

322
323 In order to rule out an interaction between owner sex and age cohort, we hoped to complete a
324 factorial two-way ANOVA for each of the 14 specific interactions. However, due to the density
325 and binary counts of our data, non-parametric tests were more appropriate. As we are not aware
326 of any non-parametric equivalent to an ANOVA, we did not complete this analysis and
327 acknowledge it is a potential limitation of our study.

328
329 In addition to the 14 specific interactions, “other notes” were collected on the observations.
330 These notes regarded the type of equipment (collar types, harnesses, leashes, doggy strollers),

331 cellular phone usage, regularity of dogs “checking in” with their owners (see Horn, Huber, &
332 Range, 2013, for a discussion on dogs and the secure base effect), and other personal
333 observations from the research assistants. While this is subjective and less consistent, some
334 notable trends still emerged. For example, more men ($n = 62$) than women ($n = 16$) were
335 observed ignoring their dogs for part or all the observation. Relatedly, dogs were more likely to
336 ignore their male owners ($n = 30$) than their female owners ($n = 10$). The combination of these
337 observations could indicate a difference in the attachment style created by men or women and
338 their dogs and is worthy of additional research. Likewise, these differences further support the
339 sex differences found, as it makes sense that attentive women owners would be more likely to
340 baby talk to or hug/kiss their dogs.

341

342 **Discussion**

343

344 In this exploratory study, we investigated sex and age cohort differences in owner interactions
345 with dogs at the park. We hypothesized that women would be more likely to engage in direct
346 interactions and caretaking displays while men would be more likely to engage in status displays
347 (demonstrations of “control” over dog) and rough and tumble play. We also hypothesized that
348 younger men would be more concerned with demonstrations of masculinity involving their dogs
349 (as suggested by Blazina & Kogan, 2019) and middle-aged women being more likely to engage
350 in maternal displays (i.e., kissing and hugging, redirecting inappropriate behavior). While data
351 constraints limited our ability to test for an interaction between “owner sex” and “age cohort,”
352 some interesting sex differences presented themselves.

353

354 Our findings are consistent with Prato-Previde et al.'s (2006) study that women are more likely
355 to engage in motherese and other forms of verbal communication, touching, and kissing their
356 dogs. Likewise, a thematic review of the "other notes" suggests that men are more likely to
357 ignore their dogs for periods of time at the park, while women may be more prone to "helicopter
358 parent" their dogs. Considering prior work on the secure base effect and dogs (see Horn et al.,
359 2013), it is possible these observations combine to suggest men and women cultivate different
360 attachment styles in their dogs. This would be consistent with Kotrschal et al.'s (2009) findings
361 that women are higher in neuroticism and men are more extraverted, resulting in different
362 interaction and attachment styles with their dogs. However, more research is needed to confirm
363 this hypothesis.

364
365 Since women are more likely to engage, at least publicly, in direct care of their offspring and
366 displays of empathy (Archer, 2019; Gray & Anderson, 2010; Hrdy, 2009) it stands to reason that
367 this difference would translate to interactions with their pet dogs. This remains particularly true
368 in the case of parenting pet dogs, when there may not be children in whom to invest these
369 energies (Volsche & Gray, 2016). This would also provide an explanation as to why there is no
370 sex difference in "throws toy/plays with dog," but there is a potential age cohort difference with
371 young adults more likely to engage in play with their dogs ($H = 5.108, p = .078$). Elderly adult
372 dog owners may be more likely to be parents and empty nesters, while young adults and middle
373 age adults may be more likely to be 1) practicing with a dog for future parenting roles or 2)
374 childless/childfree individuals choosing to have dogs in lieu of children (Gray et al., 2015;
375 Laurent-Simpson, 2017; Owens & Grauerholz, 2018; Volsche & Gray, 2016; Volsche, 2018a,
376 2018b). This may also explain the age cohort difference with young adults being more likely to

377 use “collar correction/jerks leash” ($H = 6.913, p = .032$), as young adults may be more sensitive
378 to the judgments of others regarding their dog’s behavior. However, this is speculation and needs
379 more research to confirm.

380
381 Additionally, since these interactions would be mitigated by species-specific needs (Volsche,
382 2018a), young adult women who visited the park with their dogs likely chose dogs over other
383 species with this type of relationship in mind (for example, a dog is perceived to require more
384 play and training than a cat). As such, based upon additional notes regarding the types of play,
385 we found no sex differences in how men and women played with their dogs at the park (“throws
386 ball/fetch,” men $n = 21$, women $n = 14$; “plays chase,” men $n = 4$, women $n = 6$; “wrestles,” men
387 $n = 1$, women $n = 1$). This may explain why our hypothesis that men would engage more in
388 rough and tumble play was not supported. It is also possible that visiting the dog park engages
389 owners in a form of identity communication which preferences displays of “good owner” and
390 overcommunication of one’s role (see Eriksen, 2010, for a discussion of identity communication)
391 or that visiting the park simply attracts a pet owner who is more invested in spending quality
392 time with their dog.

393
394 Our findings on owner sex differences support the hypothesis that women will be more likely to
395 engage in direct interactions and caretaking displays (ignored the dog less, more likely to “baby
396 talks to dog” and “speaks gently/whispers to dog”, played chase and fetch with dog). Though our
397 findings on men were more variable as they were no more likely to “throws toy/plays with dog”
398 or ultimately, wrestle, chase, or play fetch. However, this may be an artifact of the data
399 collection, as research assistants noted anecdotally that it seemed young adult men more

400 frequently had dogs off leash in leashed parks and demonstrated a dog's training (giving
401 commands, asking for tricks such as climbing rocks). This would also be more consistent with
402 Blazina and Kogan's (2019) findings on demonstrations of masculinity involving young men and
403 their dogs.

404

405 As with any research, there are limitations with this study. These include ultimate sample size,
406 the choice to use multiple data collectors and no recordings, and the sampling bias toward
407 invested dog owners who already self-sampled by visiting a public park. Most of these study
408 design choices were made in order to expedite the project as an undergraduate training. Future
409 work would benefit from a more extensive, detailed design and the lead author is already in
410 process of making changes for future, related work.

411

412 The use of binary hash marks to record each occurrence of interaction rather than measuring the
413 length of time spent engaging in an interaction created a tight distribution of results. Though the
414 data were normally distributed, the extremely small standard deviation meant that non-
415 parametric tests were the best choice for analysis. Future work should focus on time spent
416 engaging target interactions, potentially producing a wider distribution of data that can be
417 analyzed via *t*-tests and ANOVA. While we acknowledge these limitations, it is relevant that our
418 findings are consistent with or supported by previous literature on sex differences and human-
419 canine interactions. Accordingly, we strongly suspect that even with a larger sample size, two
420 observers, and video recordings, our findings would be similar, and perhaps, even stronger.

421

422 **Conclusion**

423
424 As financial, temporal, and emotional investment in pet dogs continues to increase, more owners
425 are beginning to negotiate familial, and even parent-child, relationships with their dogs. As such,
426 we should expect to see sex and age cohort differences reflective of their childed counterparts,
427 with variations in behavior that are attentive to species-specific needs while also echoing
428 differences found in the parenting and evolutionary psychology literature. Using 10-minute focal
429 follows of human-canine dyads at public dog parks, our study is one of the first to demonstrate
430 these sex and age cohort differences may exist, while also establishing that it is possible to
431 complete non-intrusive observations in a “natural” setting of invested dog owners and their dogs.
432 Future research should seek more nuanced understandings of these interactions, utilizing
433 behavior observation methods to investigate human-canine relationships using naturalistic
434 methods.

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Table 1. Basic demographics of data set.

	Age Cohort			
	Young Adult	Middle Age	Elderly Adult	Total by Sex
Owner Sex				
Male	29 (33.3%)	25 (28.7%)	33 (37.9%)	87 (49.2%)
Female	25 (29.8%)	43 (51.2%)	16 (19%)	84 (47.5%)
Uncertain	4 (66.7%)	2 (33.3%)	0 (0%)	6 (3.3%)
Total by Age Cohort	58 (32.8%)	70 (39.5%)	49 (27.7%)	

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Table 2. Full list of Mann-Whitney results of 14 interactions by gender.

Interaction Type	μ rank: men	μ rank: women	<i>U</i> score	<i>p</i> -value	<i>r</i>
Pets dog on head	83.77	88.31	3460.00	0.508	0.051
Calls dog	80.22	91.99	3151.00	0.102	0.125
Hugs/Kisses dog	85.41	86.61	3603.00	0.732	0.026
Baby talks to dog	80.70	90.53	3193.00	0.062*	0.143
Throws toy/plays with dog	89.55	82.33	3345.50	0.265	0.085
Gives dog food/treats	87.30	84.65	3540.50	0.445	0.058
Speaks gently/whispers to dog	80.27	91.93	3155.50	0.055*	0.147
Pets dog on rear	86.12	85.88	3643.50	0.966	0.003
Dog comes when called	81.88	90.27	3295.50	0.205	0.097
Scolds/speaks harshly to dog	83.94	88.13	3475.00	0.299	0.079
Hits/spanks dog on rear	86.47	85.52	3613.50	0.582	0.042
Hits dog on shoulder/head	86.00	86.00	3654.00	1.00	0.000
Collar correction/jerks leash	86.93	85.04	3573.00	0.684	0.031
Leashes dog	83.91	88.17	3472.00	0.204	0.097

*Notes statistically significant interactions observed. As mentioned in text, we accepted *p*-values between .075 and .05 as “trending” based upon current debates in the literature.

540

541

Table 3. Full list of Kruskal-Wallis results of 14 interactions by age cohort.

Interaction Type	μ rank: young adults	μ rank: middle age adults	μ rank: elderly adults	<i>H</i> score	<i>p</i> -value	<i>r</i>
Pets dog on head	88.47	92.19	85.08	0.686	0.709	0.008
Calls dog	93.26	88.21	85.08	0.779	0.677	0.007
Hugs/Kisses dog	86.47	89.61	91.12	1.073	0.585	0.005
Baby talks to dog	85.78	91.96	86.72	1.077	0.584	0.005
Throws toy/plays with dog	98.24	88.36	78.98	5.108	0.078	0.018
Gives dog food/treats	89.08	89.16	88.67	0.012	0.994	0.011
Speaks gently/whispers to dog	87.82	89.56	89.60	0.072	0.965	0.011
Pets dog on rear	95.41	88.61	81.97	3.261	0.196	0.007
Dog comes when called	87.97	88.02	91.61	0.227	0.893	0.010
Scolds/speaks harshly to dog	91.93	91.54	81.91	4.730	0.094	0.016
Hits/spanks dog on rear	87.50	91.29	87.50	4.638	0.098	0.015
Hits dog on shoulder/head	89.00	89.00	89.00	0.000	1.00	0.011
Collar correction/jerks leash	97.21	82.50	88.57	6.913	0.032*	0.028
Leashes dog	90.69	89.29	86.59	0.915	0.633	0.006

* Denotes a statistically significant interaction.