

Research Going to the Dogs!

Canine Research Unit, Memorial University

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Canine Research Unit: The “CRU”

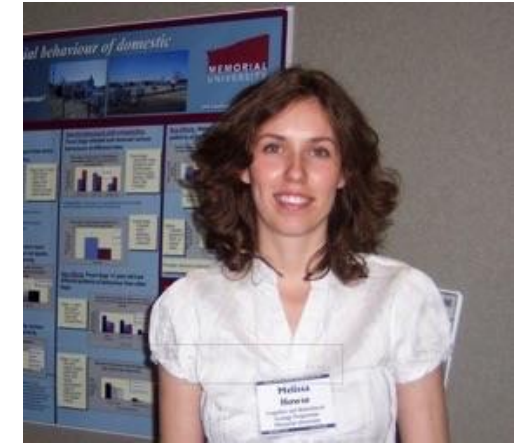
- Developed from collaboration between Carolyn & Rita and CAFE MSc student Melissa Howse
 - 8 graduate students
 - 12 BSc honours students (Psychology & Biology)
 - 18+ research assistants (NSERC, SURA, MUCEP)
 - Sandra Wright, PhD; Psychology, Grenfell campus
- Original idea was to examine social behaviour occurring between dogs under “limited control” by owners...

I. Quidi Vidi Dog Park



Question 1: What do dogs do in a dog park?

- Melissa Howse- first CRU MSc student
 - video-recorded 69 focal dogs
 - total of 220 dogs in videos



- Watched and “coded” each video for the presence of **42 motivationally-neutral behaviours** that focal dogs initiated and received

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Social behaviour of domestic dogs (*Canis familiaris*) in a public off-leash dog park



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Table 1

Description of coded behaviours. Focal dogs and partners were within approximately 1 m, except when noted. All discrete behaviours initiated (I) or received (R) by focal dogs were coded with the exception of elimination (focal dog initiated only) and wrestle (focal dogs were both initiators and recipients). Similar behaviours studied by other researchers are noted in parentheses.

| Behaviour Category | Behaviour | Description |
|----------------------|--|---|
| Snout-muzzle contact | Snout-muzzle to anogenital area (I, R) | Places snout or muzzle toward or on the area underneath partner's tail or mid to rear underbelly (i.e., anal or genital areas). Mouth opens and closes slightly; licking may occur (see Bradshaw and Lea, 1992; Scott, 1950). |
| | Snout-muzzle to head (I, R) | Places snout or muzzle toward or on partner's head or face. Mouth opens and closes slightly. Licks may also occur (see Bradshaw and Lea, 1992; Scott, 1950). |
| Non-contact | Drop belly to ground (I, R) | From standing, fully lowers fore- and hind-limbs to the ground simultaneously so that belly touches ground; tail base in neutral position or higher; oriented toward partner; excludes drops combined with hunched posture. |
| | Exaggerated away (I, R) | 1) Leaps away from partner; head toward partner (same as "exaggerated retreat" in Horowitz, 2009) or in direction of movement. Or, 2) moves away from partner with looks back (i.e., orients head toward partner) and reduced pace/loping stride (same as "chase me" in Horowitz, 2009). In both cases tail base in neutral position or higher and entire tail may be laterally wagging, or looping in circles. |
| | Hunched posture (I, R) | Rounds shoulders or whole back; partially lowers head and/or body (bends all legs or just hind legs) toward ground. Tail base lower than a neutral position; entire tail may laterally wag. |
| | Lunge approach (I, R) | Runs or leaps toward front of partner while rapidly thrusting the head forward toward partner to vocalize; frequently combined with a snap (quickly brings teeth to touch; see Zimen, 1982) almost invariably toward other dog's head. If behaviour was repeated without pause, counted as same event. |
| | Play bow (I, R) | Crouches down touching (or almost touching) forelimbs to ground with rear end high in air; oriented toward partner (see Bauer and Smuts, 2007; Bradshaw and Lea, 1992; Horowitz, 2009). |
| | Pull-rear away (I, R) | As partner approaches or contacts rear end, focal dog swings rear end away from partner, ending up with head oriented toward partner's head/face. |
| | Roll-over (I, R) | From standing, rolls onto back or side with forelegs pointing in air or pulled in close to the chest; genitals exposed (see Bradshaw and Lea, 1992; Norman et al., 2015; Scott, 1950). |
| | Run/leap self-present (I, R) | Runs or leaps toward front of partner (see "self-present" by Horowitz, 2009). In contrast to lunge approach, no rapid head thrust with vocalization or snapping. In contrast to pull-rear away, partner was not approaching or contacting rear upon initiation. |
| | Sit (I, R) | Lowers rear to ground with hind legs folded, forelegs straight so that the front end of dog is held erect (see Anderson et al., 2001; Bradshaw and Lea, 1992; Scott, 1950). |
| Joint movement | Chase (excludes when walking) (I, R) | Initiator follows partner (recipient) at a pace faster than walking for a minimum of two strides (see Bradshaw and Lea, 1992). |
| Physical contact | Unidirectional <i>Leap-on</i> (I, R) | Rears up and places front paws around partner's head; back not rounded and no pelvic thrusting (see Horowitz, 2009). |
| | <i>Mount</i> (I, R) | Rears up and places forelegs on the back of partner in a front, lateral or rear mount position; back is rounded and may be accompanied by pelvic thrusting (see Bauer and Smuts, 2007; Bradshaw and Lea, 1992; Scott, 1950). |
| | <i>Open-jaw contact</i> (I, R) | Places open jaw on partner's body so that teeth may make contact, excluding activity toward neck or abdomen of partner laying belly up on ground (when component of pin). Does not cause obvious injury. |

Motivationally Neutral Behaviours:

- Coding/describing what is SEEN, without (prematurely) assigning a motivation to the behaviour
- What we *think* we know about dog behaviour is often not supported by evidence...
- One source of misunderstanding is Schenkel's (1947) work on captive wolves
 - Co-opted by dog community seeing dogs as 'urban wolves'



Fig. 20. "Alpha wolf". Confident look, self-assured head posture and ear positioning as well.



Fig. 21. Mid-ranking wolf. Gaze not self-assured "straight ahead", slight "backwards-pull" in the brow region, ears with a backwards tendency.



Fig. 22. Threat. compare Figs. 13 and 14. Staring look, pupils large, raised towards the brows.



Fig. 23. Anxious submissiveness.



Fig. 24. Readiness to escape. The rough forehead (compare Fig. 23) indicates that this is not concerned with social insecurity.



Fig. 25. Suspicion and defensive-tendency (resembling Fig. 19).



Fig. 42. Types of threats to attack: a) this posture also occurs in play; b) threatening posture, which is assumed at a short distance (approximately 1 metre) during the course of a confrontation (compare to Fig. 3).



Fig. 43. Threat to attack between rival females.



Fig. 44. High-ranking male frightens a lower ranking male by assuming a "lying in wait position".

An example: Mounting/Roll-over

- Meaning of behaviour can change; context is important!
- Mounting & Roll-overs
 - Clip from *Secret Science of the Dog Park* (2015) Stornaway Productions
 - Roll-overs: Norman et al. (2016)





Down but not out: Supine postures as facilitators of play in domestic dogs



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ABSTRACT

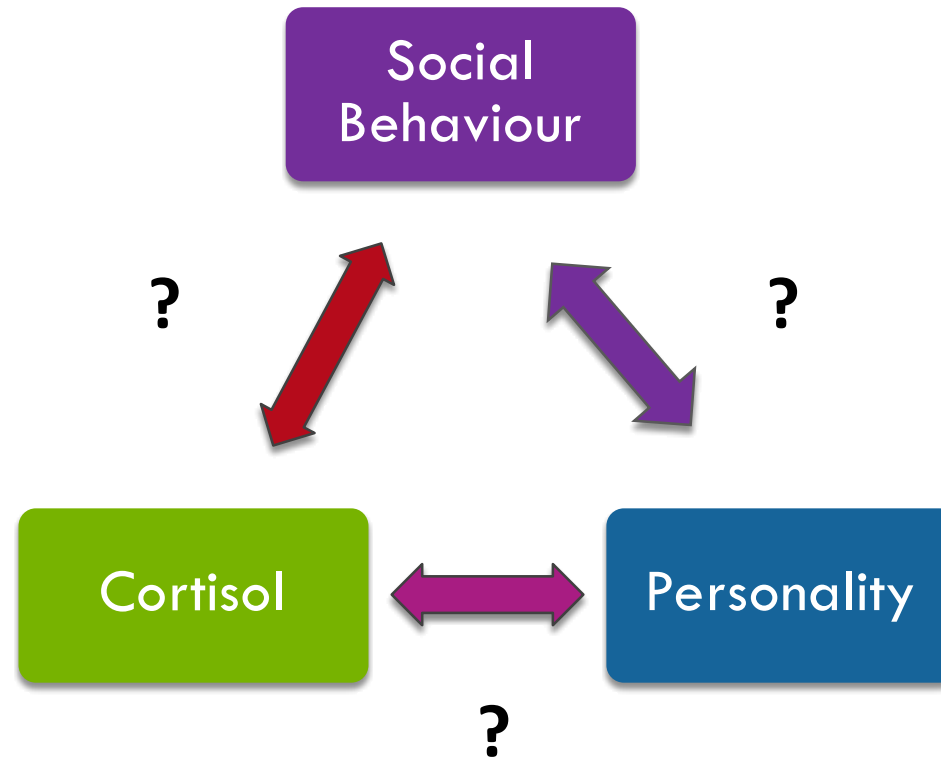
We used two sets of videotaped data of playing domestic dog dyads to determine whether rolling over during play served as a signal of submission or whether it was a combat maneuver adopted as part of an ongoing play sequence. Our results provide strong support for the latter. In the absence of any overt indication of agonism, the frequency with which rollovers occurred was determined primarily by play bout length. The discrepancy in partner size had no effect on the probability that rollovers would occur and there was no evidence that smaller dogs were more likely to rollover or to sustain a supine posture for longer, if they did. The supine phase of rollovers was significantly skewed to short durations. Most rollovers were either defensive (evading a nape bite) or offensive (launching an attack). None could be categorized as submissive. We conclude that asymmetries in the performance of rollovers cannot be assumed to point to asymmetries in the relationships between play partners.

This article is part of a Special Issue entitled: Canine Behavior.

Back to the Dog Park

- Howse et al. (2018) found:
 - dogs spend time engaging with other dogs and being alone in the park
 - some behaviours were shown by virtually ALL dogs (e.g., snout-muzzle contact; 99% dogs)
 - some behaviours were rare (e.g., mounting; 4% dogs)
 - **little to no aggression displayed by any dog**; corroborated by other work (Northern California, Indiana dog parks)

Question 2: What are the relationships among dog...



Ottenheimer Carrier et al. (2013)

- 60 dogs (36 M, 24 F) (mean age = 3.2 years old \pm 3.0; 81% altered)



Methods



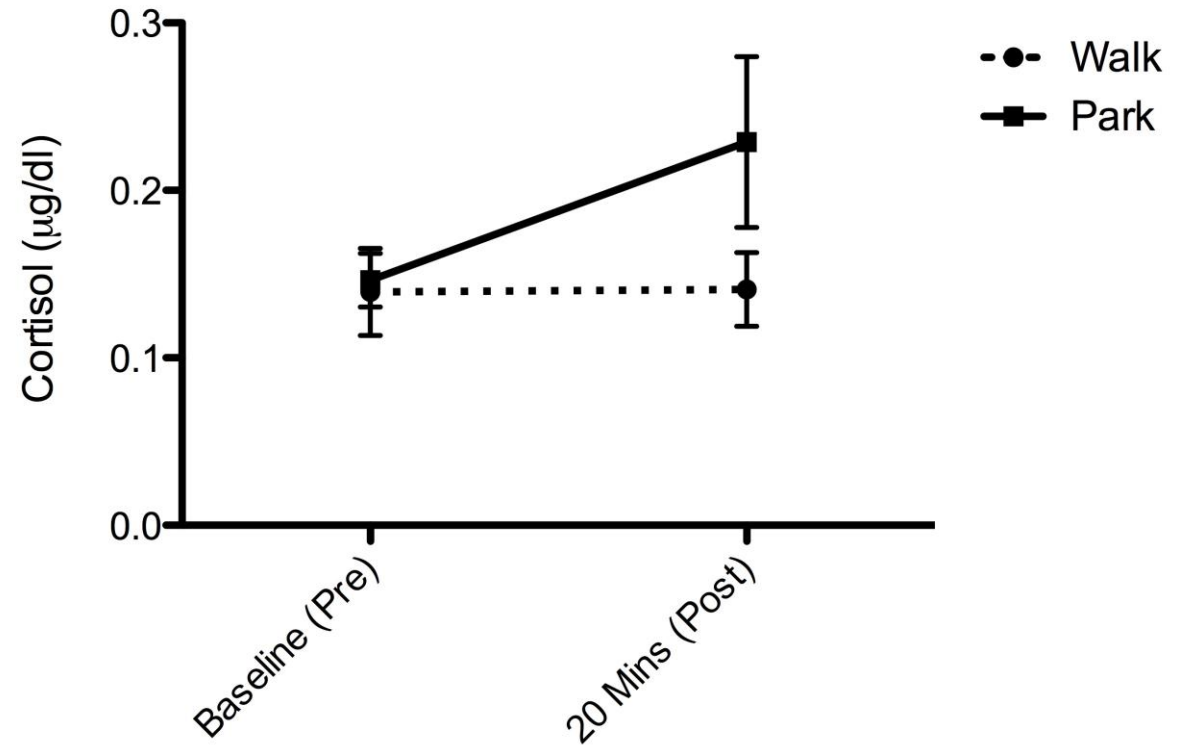
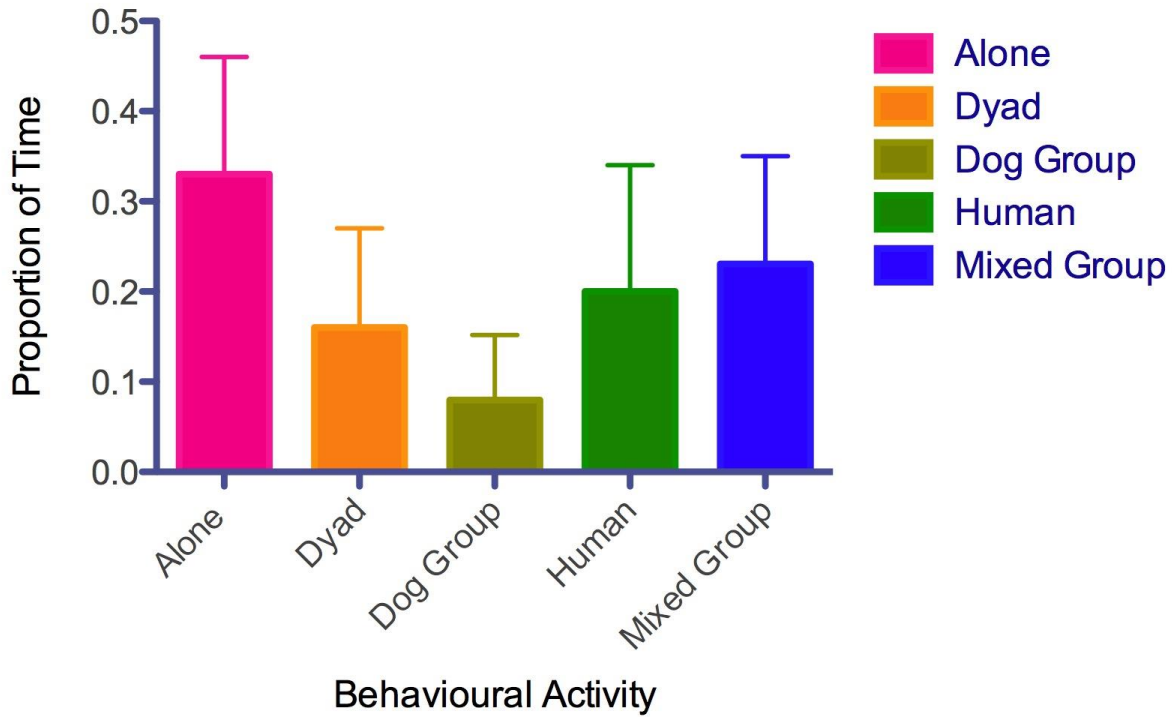
MCPQ-R

| | Really does not describe my dog | | | | | Really describes my dog |
|----------------|---------------------------------|---|---|---|---|-------------------------|
| friendly | 1 | 2 | 3 | 4 | 5 | 6 |
| persevering | 1 | 2 | 3 | 4 | 5 | 6 |
| nervous | 1 | 2 | 3 | 4 | 5 | 6 |
| energetic | 1 | 2 | 3 | 4 | 5 | 6 |
| attentive | 1 | 2 | 3 | 4 | 5 | 6 |
| easy going | 1 | 2 | 3 | 4 | 5 | 6 |
| independent | 1 | 2 | 3 | 4 | 5 | 6 |
| trainable | 1 | 2 | 3 | 4 | 5 | 6 |
| non-aggressive | 1 | 2 | 3 | 4 | 5 | 6 |
| hyperactive | 1 | 2 | 3 | 4 | 5 | 6 |
| submissive | 1 | 2 | 3 | 4 | 5 | 6 |
| determined | 1 | 2 | 3 | 4 | 5 | 6 |
| relaxed | 1 | 2 | 3 | 4 | 5 | 6 |
| tenacious | 1 | 2 | 3 | 4 | 5 | 6 |
| timid | 1 | 2 | 3 | 4 | 5 | 6 |
| biddable | 1 | 2 | 3 | 4 | 5 | 6 |
| active | 1 | 2 | 3 | 4 | 5 | 6 |
| intelligent | 1 | 2 | 3 | 4 | 5 | 6 |
| sociable | 1 | 2 | 3 | 4 | 5 | 6 |
| restless | 1 | 2 | 3 | 4 | 5 | 6 |
| fearful | 1 | 2 | 3 | 4 | 5 | 6 |
| obedient | 1 | 2 | 3 | 4 | 5 | 6 |
| lively | 1 | 2 | 3 | 4 | 5 | 6 |
| reliable | 1 | 2 | 3 | 4 | 5 | 6 |
| assertive | 1 | 2 | 3 | 4 | 5 | 6 |
| excitable | 1 | 2 | 3 | 4 | 5 | 6 |

Monash Canine Personality Questionnaire-Revised (Ley et al., 2008)

| Extraversion | Motivation | Training Focus | Amicability | Neuroticism |
|---------------------|-------------------|-----------------------|--------------------|--------------------|
| Active | Assertive | Attentive | Easy going | Fearful |
| Energetic | Determined | Biddable | Friendly | Nervous |
| Excitable | Independent | Intelligent | Non-aggressive | Submissive |
| Hyperactive | Persevering | Obedient | Relaxed | Timid |
| Lively | Tenacious | Reliable | Sociable | |
| Restless | | Trainable | | |

Over 20 minute sessions,



- Cortisol increase could be interpreted as ***arousal***, not “bad stress”
 - can be a useful but blunt instrument (especially in acute situations)
- No strong relationships between alleged “stress-related” behaviours and cortisol levels- ***except for hunched posture***



- ***Familiarity*** with the park and with other dogs present related to lower cortisol levels

Personality

- **Extraversion** and **Amicability** are related to:
 - the amount of time dogs interact with other dogs in the dog park: +
 - # play behaviours: +
 - # “stress” behaviours: -
- When dogs are familiar with each other, **Neuroticism** correlates with # “stress” behaviours

Dog Parks- should I go?

- CRU position- it depends on the dog!
- Trainers and others with negative experiences may develop a “confirmation bias”
- Both risks and benefits likely present in the dog park
- Owners need to:
 - determine whether the benefits outweigh the possible risks
 - consider the dog’s personality & watch their body language
 - become experts in trying to evaluate the emotional state of their dog when approaching the park and when inside the park- relaxed and active? vs. anxious/fearful and quiet?

Other CRU MSc Student Projects:

- Julie Posluns, MSc, A/CAAB
 - evaluated correspondence between dog owner and dog walker assessments of canine personality
 - work on dog-dog greetings (cortisol, personality)
 - first Associate Certified Applied Animal Behaviorist in Canada
 - designation by the Animal Behavior Society
- Mariana Kroll de Castro & Mari Kinnunen
 - examination of social status asymmetries among dogs in multi-dog homes & owner perceptions of behaviour and relationship to cortisol, testosterone, and personality
 - separate talk! (next Fall)

II. Dog-Owner Attachment

- Humans and dogs have cohabitated for >14,000 years (shared evolutionary history)
- **Attachment:** one individual seeks/maintains close-proximity to another individual
- 75% of dog owners consider their dogs like children



II. Dog-Owner Attachment



- 29 owner-dog dyads to a variation of **Ainsworth's Strange Situation**
 - Series of separation and reuniting episodes from owner + intro to stranger
 - Saliva samples taken before and after
- Saliva samples analyzed for stress hormones:
 - **Cortisol** – slower (HPA axis)
 - **Chromogranin A** – faster (SAM)
- Personality measurements:
 - NEO-FFI-3 (owners)
 - MCPQ-R (dogs)



Ainsworth's Strange Situation Test (study room)



II. Dog-Owner
Attachment:
Paper 1

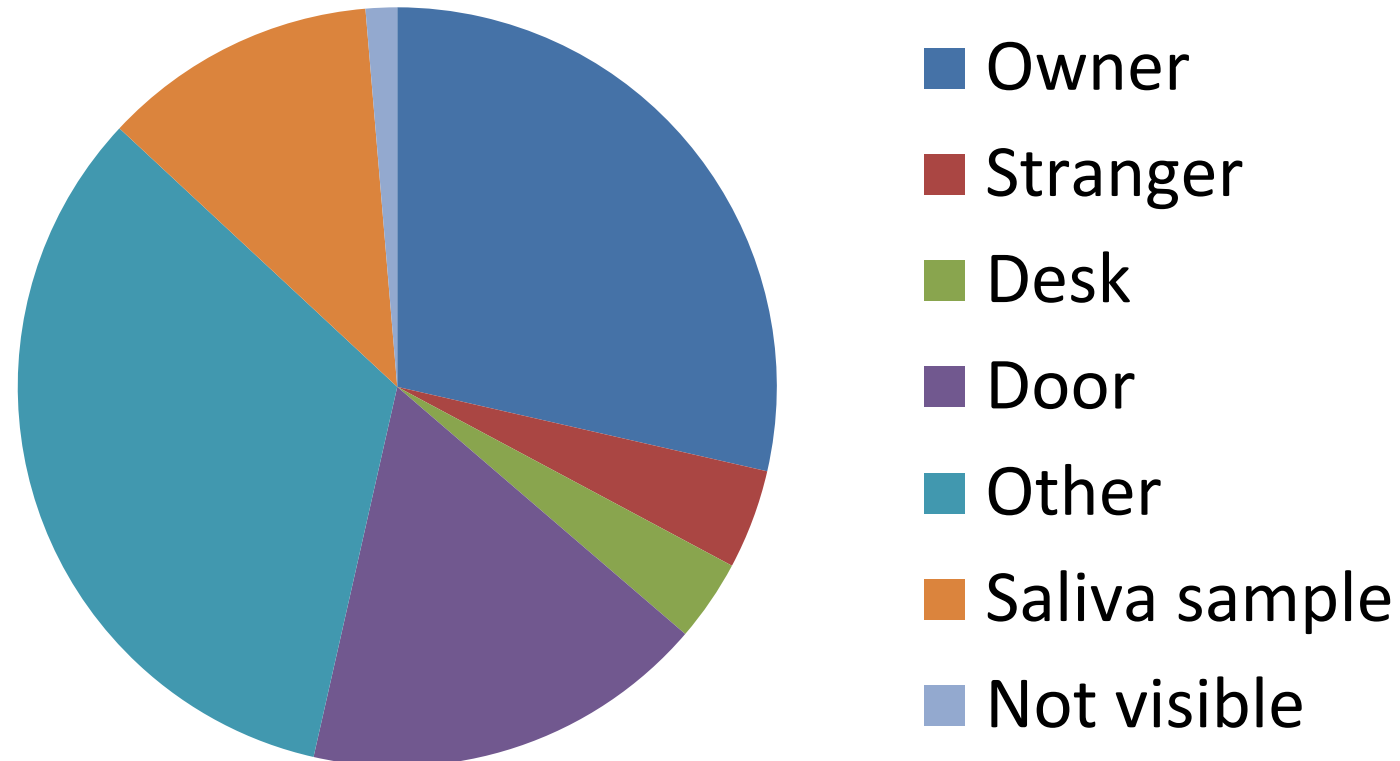
Physiological Indicators of Attachment in Domestic Dogs (*Canis familiaris*) and Their Owners in the Strange Situation Test

Morag G. Ryan^{1*†}, Anne E. Storey^{2,3‡}, Rita E. Anderson² and Carolyn J. Walsh^{2*‡}

¹ Cognitive and Behavioural Ecology Program, Memorial University of Newfoundland, St. John's, NL, Canada, ² Department of Psychology, Memorial University of Newfoundland, St. John's, NL, Canada, ³ Department of Biology, Memorial University of Newfoundland, St. John's, NL, Canada

II. Dog-Owner Attachment

- Dogs displayed attachment behaviours towards owners compared to strangers:
 - More contact initiated
 - More time spent in close-proximity



II. Dog-Owner Attachment

- Dogs initiated more contact when:
 - Dogs had lower CgA
 - Owners had high CgA
- Hormonal synchrony displayed in final CORT levels for dogs and owners
- Dogs spent more time in close-proximity when:
 - Dogs had owner-reported separation anxiety
 - Owners had low CgA, but high CORT
- ? Responding to owner stress/cues



II. Dog-
Owner
Attachment:
Paper 2

Human-Animal Interaction Bulletin
2020, Vol. 8, No. 1, XX-XX

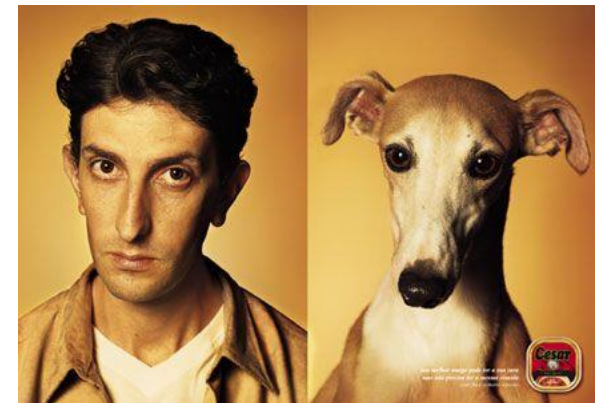
**Personality Traits and Owner-Dog Attachment in a
Canadian Sample**

Morag G. Ryan, Anne E. Storey, Rita E. Anderson, and Carolyn J.
Walsh

Memorial University of Newfoundland

II. Dog-Owner Attachment

- Personality highly impacts social interaction and relationships
- Owner personality known to influence the dog-human bond:
- Possibility for “personality matching”
- “Pet enhancement bias” – viewing their dogs more favorably



II. Dog-Owner Attachment

NEO-FFI-3

5 Factors

Openness

Conscientiousness

Extraversion

Agreeableness

Neuroticism



MCPQ-R

5 Dimensions

Training-focus

Extraversion

Neuroticism

Motivation

Amicability



II. Dog-Owner Attachment

- No predicted personality matching in our study
- Owners with ↑ extraversion initiated more contact with dogs
- Owners with ↑ neuroticism had dogs with ↑ training focus
- Owners with ↑ openness had dogs with ↓ amicability
- ?Cultural variation

III. Human-Animal Interaction (HAI)

- Owners affect dog behaviour and vice versa...
 - positive effects → possibly enhancing wellness
 - not always positive in both directions
- CRU – inclusion of more systematic research on HAI
 - Lead to conversation with Gail Wideman (Social Work) and this REG!
- Morag Ryan, MSc, MD --> awarded a Janeway Foundation Trainee Grant to conduct work specifically in this area

III. Human-Animal Interaction

- Interesting perspective as both an animal-behaviour researcher (MSc) and now MD
- Vested interest in the health-related benefits of pet ownership
- Passion for **Autism Spectrum Disorders** (ASD):
 - Kid's Club
 - TA Social and Affective Neuroscience course
 - Volunteering with Autism Society
 - Personal experience

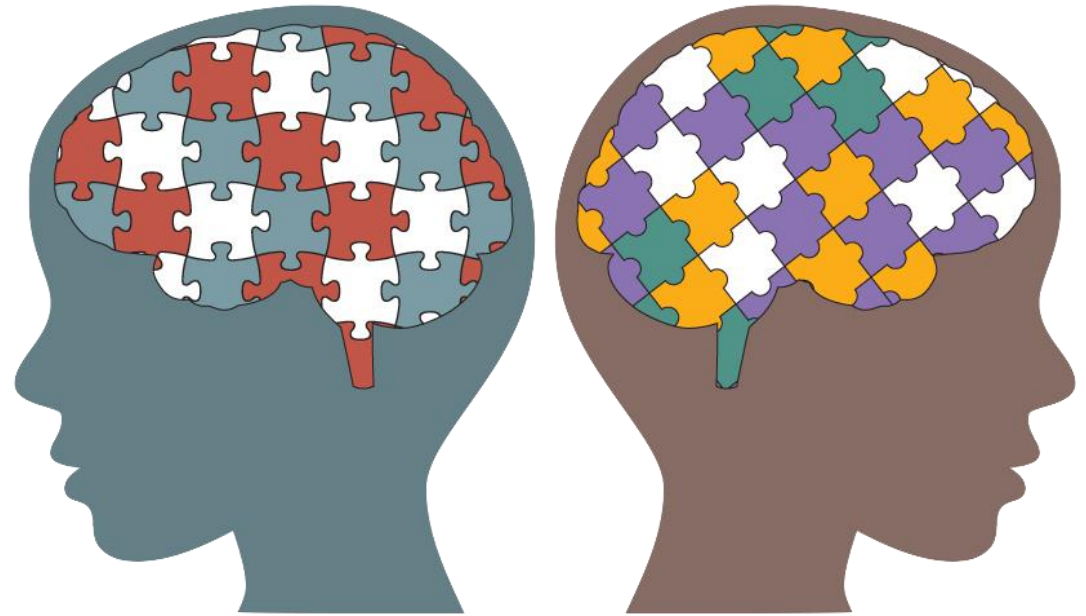


III. Human-Animal Interaction

- Envisioned a two-tiered project to understand both the:
 - Current utilization/need of animal-assisted interventions (AAI)
 - **Survey**
 - Possible physiological foundation of the perceived efficacy of AAI:
 - **Salivary oxytocin**
- Due to the ambitious nature of this project, we required an honours student to pursue these goals!
 - Abigail de Boer Vanderkloet

Autism Spectrum Disorders (ASDs)

- A collection of complex neurodevelopmental disabilities that involve persistent challenges in social interaction and communication.
- Other psychological comorbidities are common in people with ASDs
- Because there is a large variety in ASD symptomology, there is also a variety of treatment modalities



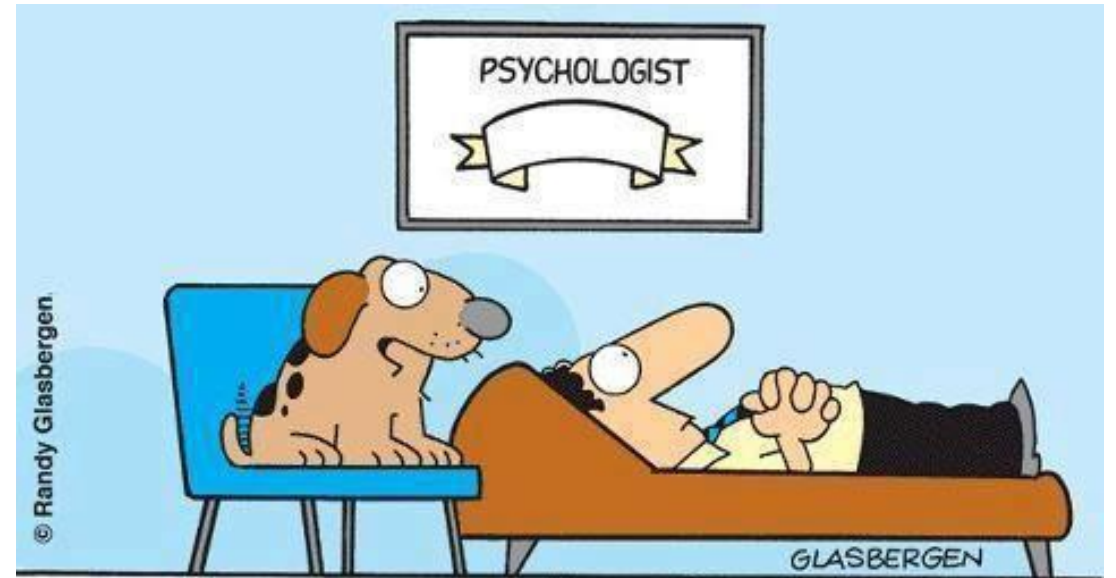
Animal Assisted Intervention as a Treatment of ASDs

- **AAT:** incorporates interactions with animals into a goal-oriented treatment plan
- **AAA:** incorporates any form of animal interaction in a formal or informal setting
 - Includes pet ownership
- Both AAT and AAA collectively fall under the category of **animal-assisted interventions (AAI)**



Animal Assisted Intervention as a Treatment of ASDs

- AAI has been found to significantly improve social interactions (conversation, eye contact) prosocial behaviours, as well as relieve symptoms of comorbid disorders in people with ASDs (Bass et al., 2009; Fine, 2006; O’Haire, 2017; Martin & Farnum, 2002; Serpell, 2010; Warren et al., 2011).



“My therapy is quite simple: I wag my tail and lick your face until you feel good about yourself again.”

AAI Might not be for Everyone!

- Apparent bias in literature that assesses AAI as a treatment for ASDs and other disorders
 - assumption that AAI always elicits positive outcomes
 - little discussion of any potential risks, limitations, or disadvantages

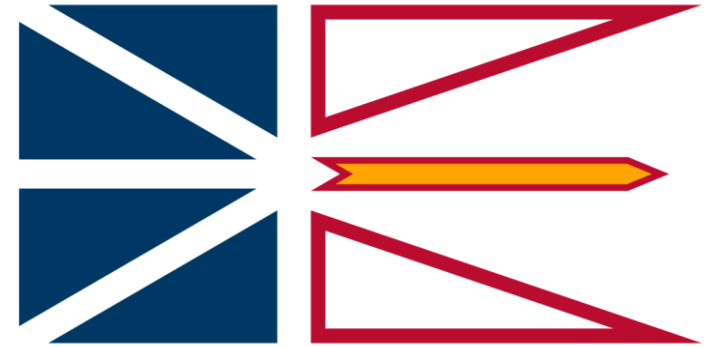


A Plan



- Bibliometric analysis of papers that examine AAI as a therapeutic intervention for ASD in an attempt to uncover why these biases may exist
 - Any mention of risks, negative outcomes, disadvantages?
 - Was the study balanced in expected outcome (e.g., bias in the survey questions)?
 - Evaluating journal citation reports (category/rank), department/research area of the first author, country of research, etc.

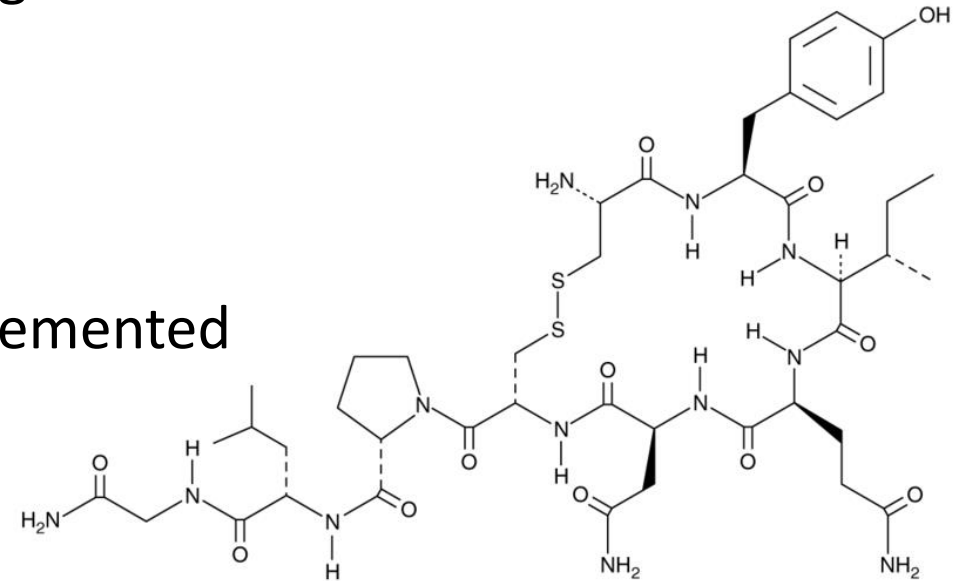
Survey of NL Families



- Under review by ICEHR
- Expected to be ready for release in March 2020
- Includes assessment of interest in and perceived need for access to AAA programming, including service dogs; “informal” use of pets
- May help us determine if there is a HAI program we can target for Part 2 of study

Oxytocin & ASD (Part 2) - Morag

- Large neuropeptide hormone (exhibits neuromodulatory effects)
- Oxytocin implicated in:
 - **Muscular contractions** of the uterine wall (parturition, orgasm)
 - **Prosocial hormone**, which enhances social bonding
- Thought to be deficient in those with ASD:
 - Lower circulating levels
 - Facilitates social engagement/fair play when supplemented



Other Current CRU Research:

- Collaboration with James Serpell (USA) and Therese Rehn (Sweden) on the basis of pet-owner relationships (dogs and cats!)
 - 16 countries participating
 - Canadian content; cultural diversity in nature of relationships?
- Carolyn, Dawn Bignell (Biology), Lourdes Pena-Castillo (Computer Science/Biology) – MUN Multidisciplinary Grant to evaluate the relationship between gut microbiota and anxiety-like behaviours in dogs
 - recruiting a MSc student for Sept 2020

- Carolyn & Ken Fowler (Psychology) co-supervising Honours student Rebecca Lawrence
 - evaluating the *Canadian Community Health Survey- Healthy Aging*- ~31,000 respondents (2009)
 - relationships between pet ownership and health-related indicators among individuals 45 years+, using an age- and sex-matched design
 - focus on **loneliness** and **satisfaction with life**

Some Future Plans

- **Applied:** Seniors and the Benefits/Costs of Pet Ownership
 - Interested in seeking community input on what aspects need to be evaluated locally
- **Theoretical:** Evolution of Social Bonds
 - examining the dog-owner relationship longitudinally over time + using it as a model to expand our knowledge about the neurohormonal basis of social bonding (parental? social partnership?)



Future Plans?

- What are the research gaps- especially local ones- that CRU can help fill?
 - Capacity to find students and lend our skills to answering questions of interest.
- Talk to us!



Questions? Ideas?



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Canine Research Unit



Perhaps more than ever before, people are sharing their lives with dogs as companions. Worldwide, there are approximately half of a billion domestic dogs. In North America alone, over 40% of all households report having a dog!

