Why dogs?
Dogs in the media

Is all this information about dogs true?
Dog behavior and psychology

-The psychology of dog ownership
  - What does being a “dog person” say about you?
  - Can owning a dog make you healthier?

- The canine experience
  - Do dogs have a personality?
  - Do dogs experience emotions?

- Canine intelligence
  - How do we communicate with dogs?
  - Smelling danger: cancer sniffing dogs
“Dog people” vs. “cat people”
Dog people vs. cat people

Survey

Rated participants based on five factor model of human personality

Looked for correlations
Five factor model of human personality

Questionnaire assigns you a numerical value on five spectrums:

- Neurotic ↔ Stable
- Agreeable ↔ Antagonistic
- Extroverted ↔ Introverted
- Open-minded ↔ Closed-minded
- Conscientious ↔ Impulsive
Dog people vs. cat people

15% more extroverted
13% more agreeable
11% more conscientious

12% more neurotic
11% more open-minded

http://www.utexas.edu/news/2010/01/13/personality_dogs_cats/
Dog people vs. cat people

What does this actually mean?

- First study to demonstrate a quantitative personality difference between dog and cat people
- Based on self-reporting of personality traits
- Differences are fairly small and are an AVERAGE!
Health & psychological benefits?

• Short term effects: stress relief
  – Lowered blood pressure
  – Slowed heart rate
  – Regular breathing
  – Muscle relaxation
  – Lower stress hormone levels

• Long term effects of dog ownership
  – Better heart health and recovery after heart attacks
  – Lower blood pressure and cholesterol levels
  – Lower levels of depression and anxiety

[Image: http://www.flickr.com/photos/emeryway/2932992750/]
Dog behavior and psychology

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The canine experience

What can we know about dogs?

http://www.wichita.gov/CityOffices/Park/Aquatics/Pools/SpecialEvents.htm
Anthropomorphism

(n.) an interpretation of what is not human or personal in terms of human or personal characteristics

-Merriam-Webster dictionary

Ancient Egypt: Anubis

Modern: Coolidge’s Dogs Playing Poker paintings

http://www.uncp.edu/home/rwb/lecture_ancient_civ.htm
What makes us anthropomorphize animals?

1.) Relatedness
Anthropomorphism

What makes us anthropomorphize animals?

1.) Relatedness
2.) Physical features
3.) Behavior

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Marissa Harris (Penn State Harrisburg)
What are these yawning dogs thinking?

Yawning can be a sign of stress!

http://www.flickr.com/photos/davefayram/3149990464/sizes/z/in/photostream/
http://www.flickr.com/photos/theogeo/562588114/sizes/z/in/photostream/
http://www.flickr.com/photos/springfieldhomer/83584239/sizes/z/in/photostream/
The canine experience

Do dogs have personality and emotions...

OR

...are we projecting human characteristics on them?

http://www.wichita.gov/CityOffices/Park/Aquatics/Pools/SpecialEvents.htm
Do dogs have personalities?

**Personality:** an individual's distinctive pattern of behavior that is consistent across time and situations (Family Dog Project)

What traits are measured in dogs?
- Dominance
- Aggressiveness
- Activity
- Impulsivity
...and others

Genetic differences may underlie some of these personality traits!

Ex. German Shepherds: dopamine receptor gene
Dog emotions: can dogs feel guilt?

• **Experiment:**
  — Dog is told not to eat a treat
  — Owner cannot see if dog obeys
  — Owner is told to scold or praise the dog

• **Outcome:** all dogs act “guilty” when scolded, whether or not they ate the treat!

• **Conclusion:** Dogs do not experience guilt!

Alexandra Horowitz (Columbia University)
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Human-dog communication

• Communication: behavior from one individual that produces a predictable response from another

• Dogs often rely on communication with humans while trying to solve problems

Hand gestures

Duke Canine Cognition Center
(Brian Hare)

http://www.flickr.com/photos/dogrando/4432766565/
http://evolutionaryanthropology.duke.edu/dogs/research
Human-dog communication

• Communication: behavior from one individual that produces a predictable response from another

• Dogs often rely on communication with humans while trying to solve problems

Hand gestures

Eye contact

http://www.flickr.com/photos/dogrando/4432766565/
Dogs can smell...

- Explosives...
- Drugs...
- Missing humans...
- Bedbugs...

http://www.flickr.com/photos/equitus/3758253216/
http://www.flickr.com/photos/mashleymorgan/3876845244/
http://www.flickr.com/photos/soldiersmediacenter/3120568548/
Can dogs smell cancer?

• **Anecdotal evidence:** dog owners have claimed to have sought medical care because their dogs have obsessively sniffed at moles or regions of their bodies that were revealed to have internal tumors.

• **Scientific studies:** the caveats
  - Very new field of study
  - Studies were small in size
  - Results are cautiously optimistic
  - Larger, better controlled studies are necessary

*Pine Street Foundation*
Can dogs smell cancer?

Training period: dogs are rewarded for identifying cancerous samples

Testing period: dogs are presented with new samples and their accuracy is assessed

• Trial 1: Identifying bladder cancer from urine samples
  ─ Tested 6 dogs, 54 times total
  ─ Dogs are presented with sets of 7 samples, 1 cancerous
  ─ If selection is random, expect 14% success rate

Observe a success rate of 41%

Carolyn Willis (Amersham Hospital, UK)
Can dogs smell cancer?

Training period: dogs are rewarded for identifying cancerous samples

Testing period: dogs are presented with new samples and their accuracy is assessed

• Trial 2: Identifying lung & breast cancer from breath samples
  - Tested 5 dogs on about 80 cancer samples and 80 healthy samples

  Observe a success rate of 88% for breast cancer, 99% for lung cancer

Michael McCulloch (Pine Street Foundation)
Can dogs smell cancer?

• **Conclusion**: Dogs, with variable accuracy, do seem to be able to use scent to detect cancer.

• **How is this possible?** Cancerous cells produce chemicals dogs, but not humans, can smell.

• **What does this mean for medicine?** We can now try to identify these chemicals & design an “electronic nose” that can detect them.
Want to learn more about the sense of smell?

LAB TOUR: Datta Lab

The Datta Lab studies how the brains of lab mice respond to odors and other environmental signals.
Summary: The Science of Dogs

• Domestication:
  – Dogs evolved from wolves ~15,000 years ago, probably in East Asia
  – Domestication can be recapitulated within 60 years by selection of non-fearful animals

• Genetics:
  – Dogs are genetically diverse between, but similar within, breeds
  – Dog and human genetics can be used to inform and advance each other

• Psychology:
  – While it is important to remember that dogs are not people, they are clearly complex, intelligent creatures
  – Humans benefit personally and as a society from our relationship and communication with dogs
Thank you!

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- SITN is a student organization at Harvard GSAS