

# Is There Any Science To This Therapy Dog Thing?

**Kevin T. Blake, Ph.D., P.L.C.**



# Vital Statistics

- **68% of U.S. Households have pets**
- **46% of British Households have pets**

**Gee, N.R. et al. (2017). Introduction. In L.S. Freund et al. (Eds.), The Social Neuroscience of Human-Animal Interaction. American Psychological Association, Washington, DC, 3.**

# The History of Dogs

**“Dogs and Humans have coexisted for at least 14,000 years...Early on, dogs were likely provided with discarded food from humans as a means of garbage disposal, making the understanding of human gestures indicating the availability of food critical...Dogs evolved to live and breed in human societies, and that human environment and social settings now the domesticated dog’s own ecological niche” (p. 134-135).**

**Brown, C. et al. (2017). The Social Regulation of Neural Threat Responding. In Freund, L.S. et al (Eds.), The Social Neuroscience of Human-Animal Interaction. American Psychological Association, Washington. 147-146.**

# Seizure Alert Dogs

Some specially trained dogs can detect an oncoming seizure in humans.

**Grandin, T et al. (2005). Animals in Translation: Using the Mysteries of Autism to Decode Animal Behavior. New York, NY: Scribner.**

# Dogs and Humans

- **Dogs have been domesticated and enculturated at least 10,000 years**
- **They have significantly more attentional bias toward humans than wolves**
- **They are capable of far more gaze direction following with humans as well as communication with them than any ape.**
- **This may indicate convergent cognitive evolution**

**Guo, K. (2017). Visual Attention and Facial Identification in Human and Nonhuman Animals. In Freund, L.S. et al (Eds.), The Social Neuroscience of Human-Animal Interaction. American Psychological Association, Washington. 34.**

# Dogs and Faces

- **The typical dog has 20/50 to 20/100 vision**
- **This does not impair their ability to read human faces, however.**
- **Dogs can recognize individual human faces and some facial expressions**
- **Like humans, dogs have a left gaze bias when processing human faces.**
- **They do not have this for the faces of dogs**

**Guo, K. (2017). Visual Attention and Facial Identification in Human and Nonhuman Animals. In Freund, L.S. et al (Eds.), The Social Neuroscience of Human-Animal Interaction. American Psychological Association, Washington. 50 -72**

# Loneliness and Sadness Plus Executive Function

**Both of the above negatively effect Executive Functions.**

**Guo, K. (2017). Visual Attention and Facial Identification in Human and Nonhuman Animals. Freund, L.S. et al (Eds.), The Social Neuroscience of Human-Animal Interaction. American Psychological Association, Washington. 50-72.**

# Pet Care Increases Executive Functions

- **Responsibility for care of animal**
- **Cuts impulsivity**
- **Empathy**

Guo, K. (2017). Visual Attention and Facial Identification in Human and Nonhuman Animals. Freund, L.S. et al (Eds.), The Social Neuroscience of Human-Animal Interaction. American Psychological Association, Washington. 50-72.



# Stress and Human-Animal Interaction

- **Human-Animal Interaction lowers stress in humans.**
- **Having dogs in the workplace can reduce employee stress.**
- **Dogs can induce joy in humans**
- **Dogs can help children perform better academically when the dog is in the classroom**
- **Animals can help children with cognitive impairments.**

Guo, K. (2017). Visual Attention and Facial Identification in Human and Nonhuman Animals. Freund, L.S. et al (Eds.), The Social Neuroscience of Human-Animal Interaction. American Psychological Association, Washington. 50-72.

# Empathy Between Humans and Animals

**“humans and companion species can be reciprocally sensitive to the types of sounds made by each other and can often use these signals to judge emotional intent and to relate emotions.” (p. 93).**

**Carter, C.S. et al. (2017). Neural Mechanisms Understanding Human-Animal Interaction: An Evolutionary Perspective. In Freund, L.S. et al. (Eds.), The Social Neuroscience of Human-Animal Interaction. American Psychological Association, Washington. 89-105.**

# Effects of Animal Therapy

- **Socially connected animals heal faster than those who are loners.**
- **Animal Assisted Therapies have been shown to help humans with bereavement.**
- **Animal therapy can reduce pulse, cortisol, blood pressure and catecholamines.**
- **Mental illness, autism, schizophrenia, cancer, dementias, and heart disease all can improve with animal assisted therapy.**

**Carter, C.S. et al. (2017). Neural Mechanisms Understanding Human-Animal Interaction: An Evolutionary Perspective. Guo, K. (2017). Visual Attention and Facial Identification in Human and Nonhuman Animals. In Freund, L.S. et al. (Eds.), The Social Neuroscience of Human-Animal Interaction. American Psychological Association, Washington. 89-105.**

# Effects of Animal Therapy

**Oxytocin can decrease stress, anxiety, and depression as well as increase pain threshold.**

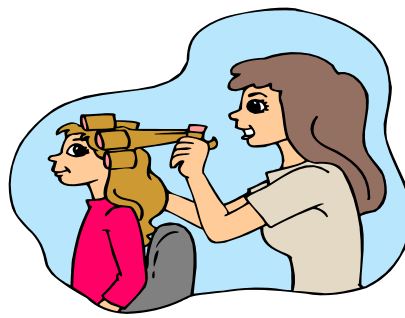
**Oxytocin levels increase in humans and dogs after 5 to 24 minutes of stroking the dog.**

**Human levels of oxytocin are higher with their own dog.**

**Grooming a dog can help a child with attachment issues.**

**Beetz, A. et al. (2017). Affiliation in Human-Animal Interaction. In Freund, L.S. et al. (Eds.), The Social Neuroscience of Human-Animal Interaction. American Psychological Association, Washington.107-125.**

# Compassion



- **Three things make humans behaviorally different from all other species:**
  - **Our capacity to delay our response to our environment (Bronowski, 1977).**
  - **Our capacity for compassion (Leakey, 1995).**
  - **Our capacity for long-term compassion (Grandin, 1995).**

Bronowski, J. (1977). Human and Animal Languages: In a Sense of Future. Cambridge, MA: MIT Press. pp. 104-131.

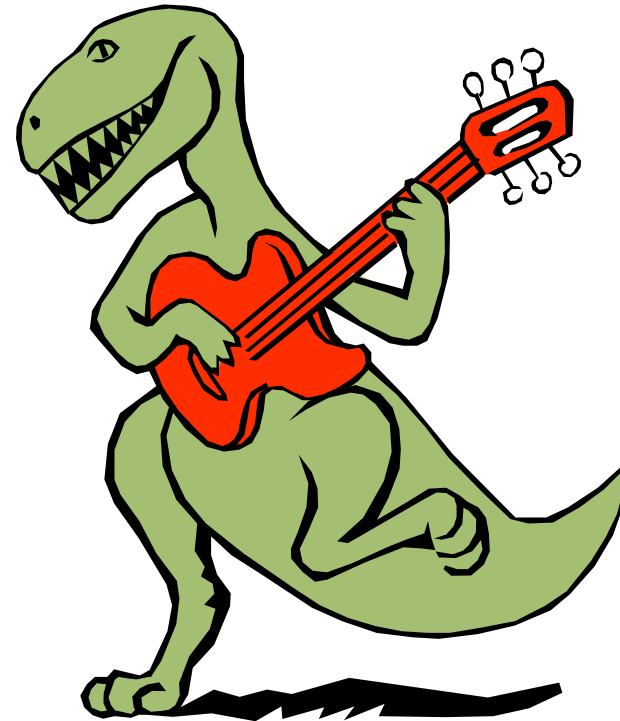
Leakey, R. (1995). Speech given to the National Press Club, Washington, DC, Played on National Public Radio.

Grandin, T. (1995). Thinking In Pictures: And Other Reports From My Life With Autism. New York, NY: Vintage.

# *Kinder, Gentler, T-Rex*

- **There is now evidence that some dinosaurs nested and raised offspring similar to modern birds. Hence, they had some capacity for compassion.**

**Horner, J. (2000). Dinosaur Reproduction and Parenting. Annual Review of Earth and Planetary Sciences, 28, p. 19-45.**



# *Compassion*

- Does a toothless Homo Erectus skull found at Dmanisi that was over 1,800,000 years old show evidence of human compassion?



Fischman, J. (April, 2005). Family Ties: Dmanshi Find. National Geographic, 202 (4), 18-27.

# Compassion

- “Scientists figured out decades ago that chimps are our nearest evolutionary cousins, roughly 98% to 99% identical to humans at the genetic level. When it comes to DNA, a human is closer to a chimp than a mouse to a rat” (pp. 25-26).

Lemonick, M.D., and Dorfman, A. (October 9, 2006). What makes Us Different? Time, 168 (15), pp. 44-53.





# Compassion



**“The findings command attention, as the bonobo is just as close to us as its sibling species, the chimpanzee. According to DNA analysis, we share over 98 percent of our genetic profile with each of these two apes...the genetic makeup of a chimpanzee or bonobo matches ours more closely than any other animal...In terms of family resemblance, only two options exist: either we are one of them or they one of us.” (p. 5)**

DeWaal, F. and Lanting, F. (1997). Bonobo: The Forgotten Ape. Berkley, CA: University of California Press, p. 5.

# Compassion

**“In the summer of 1982 Kat was newly pregnant and Washoe doted over her belly, asking about her BABY. Unfortunately, Kat suffered a miscarriage. Knowing that Washoe had lost two of her own children, Kat decided to tell her the truth. MY BABY DIED, Kat signed to her. Washoe looked down to the ground. Then she looked into Kat’s eyes and signed CRY, touching her cheek just below the eye. When Kat had to leave that day, Washoe would not let her go. PLEASE, PERSON HUG, she signed.” (Fouts, 1997; Edwards, 2000)**

Fouts, R. (1997). Next of Kin: My Conversations with Chimpanzees.  
New York, NY: William Morrow.

Edwards, M. (Spring, 2000). Book Review. The Harvard Brain. From website:  
[hcs.harvard.edu/~husn/BRAIN/vol7-spring2000/fouts.htm](http://hcs.harvard.edu/~husn/BRAIN/vol7-spring2000/fouts.htm).



# Compassion



- **Bonobo: Pan paniscus**
  - Shares 98% of its genetic profile with humans.
  - They have been compared to australopithecines
  - “In physique, a bonobo is as different from a chimpanzee as a Concorde is from a Boeing 747.” (p. 3 of 14)

DeWaal, F.B.M. (March 1995). Bonobo Sex and Society. Scientific American. pp. 82-88. From Website: <http://primates.combonobos/bonobosexsoc.html>.

# Compassion



- “Apparently as intelligent as chimpanzees, bonobos have, however, a far more sensitive temperament. During World War II bombing of Hellabrun, Germany, the bonobos all died of fright from the noise; the chimpanzees were unaffected.” (p. 4 of 14)

De.Waal, F.B.M. (March 1995). Bonobo Sex and Society. Scientific American. pp. 82-88. From Website:  
<http://primates.combonobos/bonobosexsoc.html>.

# Bonobos View Eyes More than Chimpanzees

**Japanese and British researchers evaluated Bonobos and Chimps for eye gaze behavior. Chimps tend to be more behaviorally biased toward foraging for objects (i.e., food, etc.), and Bonobos tend to be more biased toward showing affection and social activities. When eye tracking was done with members of both species the Bonobos looked into the eyes of members of their species much more than Chimps did to their own. The scientists said this represented species specific behaviors and happened in a relatively short time evolutionarily.**

**Kano, F. et al. (June 15, 2015). Social Attention in the Two Species of Pan: Bonobos Make More Eye Contact than Chimpanzees. PLOS One. DOI: <http://dx.doi.org/10.1371/journal.pone.0129684>.**

# Empathy, Bonobos, and Chimps

**Franz De Waal was recently interviewed by Adrian Bye recently and De Waal said regarding empathy, ...” In my discussions about empathy in animals we get the same process going because when I say chimpanzees have theory of mind people would object to it. But if I say they have empathy they say, oh, that is a more basic feature that you are sensitive to the emotions of others, that you adopt the emotions of others. People can understand that chimpanzees and many other mammals may have that capacity. Your average dog has that capacity to be sensitive to your emotions. So we are now looking at these much more basic features of where do things go wrong in autism, so to speak. Is it sort of a cognitive process, like theory of mind? Or is it more an emotional process, like empathy? And I think we are coming down on the emotional side at this point.”**

**Bye, A. (No Date). <http://meetinnovators.com/2013/05/12/frans-de-waal-emory-university/>.**

# Compassion



**The dominate male bonobo at the Great Ape Trust in Iowa, Kanzi, can communicate by using 348 symbols and knows the meaning of up to 3000 words!**

Raffaele, P. (November, 2006). The Smart and Swinging Bonobo. Scientific American. **37** (6), pp. 66-75.

# Bonobos & Vasopressin



**“Interestingly, this same polymorphic microsatellite in the human *AVPR1A* that has been associated in autism is absent in the common chimpanzee, but present in the bonobo. Bonobos are known for high levels of psychosexual reciprocity and they appear to use sexuality to promote social reconciliation as well as social bonding within the group. Therefore, it is intriguing to consider that as in voles, variations in unstable microsatellite sequences in the promoters of the primate vasopressin receptor may contribute to species difference in expression and social behaviour, as well as to individual differences in social behaviour.” (p. 2195)**

Hammock, E.A.D. and Young, L.J. (December, 2006). Oxytocin, Vasopressin and Pair Bonding: Implications for Autism. *Philosophical Transactions of the Royal Society of Biological Sciences*, 361 (1476), pp. 2187-2198. From Website: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1764849>.



# Chimpanzee, Bonobos, Humans & Vasopressin



**“Similar genetic variation in the human *AVPR1A* may contribute to variations in human social behavior including extremes outside the normal range of behavior and those found in autism spectrum disorders.” (p. 2187)**

Hammock, E.A.D. and Young, L.J. (December, 2006). Oxytocin, Vasopressin and Pair Bonding: Implications for Autism. *Philosophical Transactions of the Royal Society of Biological Sciences*, 361 (1476), pp. 2187-2198. From Website: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1764849>

# *Chimpanzee, Bonobos, Humans & Vasopressin*



**“Our two closest primate cousins – chimpanzees and bonobos –also have different lengths of this gene, which match their social behaviors. Chimpanzees, who have the shorter gene, live in territorially based societies controlled by males who make frequent, fatal war raids on neighboring troops. Bonobos are run by female hierarchies and seal every interaction with a bit of sexual rubbing...”**

# *Chimpanzee, Bonobos, Humans & Vasopressin*



**“...they are exceptionally social and have a long version of the gene. The human version of the gene is more like the bonobo gene. It would seem that those with the longer version of the gene are more socially responsive. For example, this gene is shorter in humans with autism...” (p. 74)**

**Brizendine, L. (2006). The Female Brain. New York, NY: Morgan Road.**

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**Bye, A. (No Date). <http://meetinnovators.com/2013/05/12/frans-de-waal-emory-university/>.**

# Oxytocin & Autism



Those with Autism Spectrum Disorders (ASD) have been found to have a genetic anomaly in a gene that makes oxytocin. As a result they have too little of the hormone and have difficulty relating to others.

Jacob, S., Brune, C.W., Carter, C.S., Leventhal, B.L., Lord, C. and Cook, E.H., Jr. (April 24, 2007). Association of the Oxytocin Receptor Gene (OXTR) in Caucasian Children and Adolescents with Autism. *Neuroscience Letters*, 417 (1), pp. 6-9. From Website: [http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6T0G-4MYVGBW-5&](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6T0G-4MYVGBW-5&)

Yrigollen, C.M., Han, S.S., Kochetkova, A., Babitz, T., Chang, J.T., Volkmar, F., Leckman, J.F. and Grigerko, E.L. (January 21, 2008). Genes Controlling Affiliative Behavior as Candidate Genes for Autism. *Biological Psychiatry*. From Website: [http://www.journals.elsevierhealth.com/periodicals/bps/article/S0006-3223\(07\)01143-2ab](http://www.journals.elsevierhealth.com/periodicals/bps/article/S0006-3223(07)01143-2ab).



# *Creating More Oxytocin*

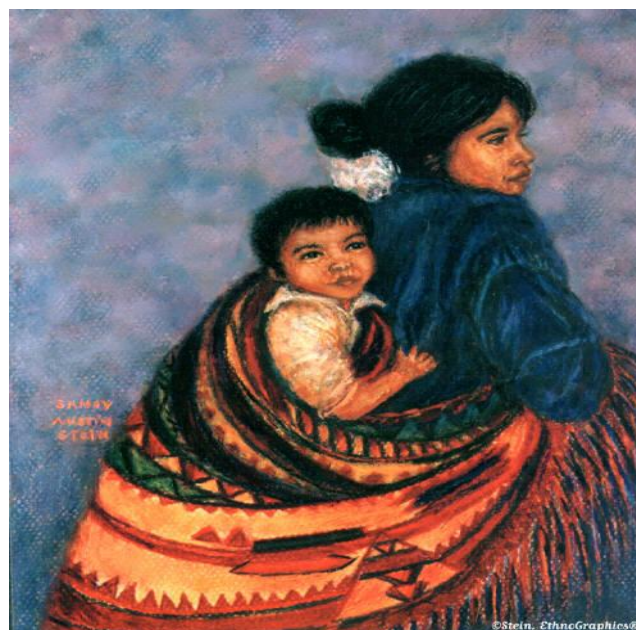
- Interactive touch between humans can produce more oxytocin in the brain.

Author (2008). Oxytocin: World's Expert Talks About This Calming Hormone: An Interview with Kerstin Uvas-Moberg, M.D., Ph.D. Life Science Foundation. From Website: <http://www.lifesciencefoundation.org/coxytocin.html>.



# *Oxytocin and Squeezing*

Many Native American cultures used cradleboards to carry their infants.





# Emotional Salience Landscape Difficulties-Mirror Neurons

- Temple Grandin’s “squeeze machine”
- Hirstein’s “squeeze vest”  
Elmhurst College
- Risperidone, MDMA (ecstasy)
- Biofeedback
- Under Armor-- Compression underwear: [www.underarmour.com](http://www.underarmour.com)



Grandin, T (1992). Calming Effects of Deep Touch Pressure in Patients with Autism, College Students, and Animals. Journal of Child and Adolescent Psychopharmacology, 1 (2). From website: [www.grandin.com/inc/squeeze.html](http://www.grandin.com/inc/squeeze.html)

Ramachandran, V.S. and Oberman, L.M. (November, 2006). Broken Mirrors. Scientific American, 296(5), pp. 62-69.

Author (1997). Use of “Atypical” Neuroleptics in the Treatment of PDDs. MedScape Psychiatry & Mental Health e Journal, 2 (4): [www.medscape.com/viewarticle/430897\\_5](http://www.medscape.com/viewarticle/430897_5)

***THE ABOVE ARE EXPERIMENTAL TREATMENTS!!!!***

# Oxytocin and Prosopagnosia



**“Very recently research has indicated an alternative manner in which face-processing skills can temporarily be improved: Using Intranasal inhalation of the hormone oxytocin. Oxytocin is naturally produced and broken down within the human body, and is involved in regulation of basic social and reproductive behaviors, such as cohabitation, gestation and breastfeeding...”**

# Oxytocin and Prosopagnosia



**“...Recently, synthetic forms of oxytocin have been manufactured that can be nasally inhaled, and these sprays have been used in studies that have examined whether oxytocin can improve face-processing abilities in both health and impaired patients” (p. 195).**

**Bate, S. (2013). Face Recognition & Its Disorders. New York, NY: Palgrave Macmillan.**

# Teco, The Autistic Bonobo Toddler



- **Recently the researchers at the Great Ape Trust in Iowa report that an 18 month old male bonobo toddler shows significant signs of autism spectrum disorder.**
- **Additionally recent research has demonstrated that the bonobo social brain is much more similar to that of humans than to chimpanzees.**

# Teco, The Autistic Bonobo Toddler



**“When Teco was 2 months old, Elikya handed the baby off to his aunt, as if asking for help. The aunt, Panbanisha, brought him to institute staff, who took on more of the responsibility for rearing Teco.**

**That's when they began to notice that he also showed various autism-like symptoms: lack of eye contact, strict adherence to rituals or routines, repetitive behaviors and an interest in objects rather than in social contact...”**

# Teco, The Bonobo Toddler



- **"...A blanket, for example, has to be arranged just so or else Teco becomes agitated, says scientific director William Fields. Teco also shows repetitive movements similar to those seen in some children with autism."**
- **"He seemed to be fascinated by parts of objects, like wheels and other things and he wasn't developing joint attention," Fields adds. "The baby was avoiding eye contact — it was like it was painful for him."**

**Deweert, S. (April 15, 2011). An Ape With Autism. New York, NY: Simons Foundation, Autism Research Initiative (SFARI). From website: <https://sfari.org/about-sfari/contact-us> .**

# ASD Fruit Fly?



**Scientists at the University of Arizona have discovered a mutant fruit fly which constantly flies in circles and grooms itself. Other identical flies have been bred. In some ways it is genetically similar to those with ASD. They are trying to develop a medication that will change its behavior. In the future they hope to do the same with rats.**

Huonker, M. (April 10, 2012). University of Arizona Neuroscience professor and team are doing research with fruit flies to find drug for autism. Tucson, AZ: Arizona Public Media. YouTube video:

[http://www.youtube.com/watch?v=42PVK7TnhVg&list=PL212BA630A5E8E1B4&index=9&feature=plpp\\_video](http://www.youtube.com/watch?v=42PVK7TnhVg&list=PL212BA630A5E8E1B4&index=9&feature=plpp_video).

# Williams Syndrome



**“Williams Syndrome is a genetic condition that is present at birth and can affect anyone. It is characterized by medical problems, including cardiovascular disease, developmental delays and learning disabilities. These occur side by side with striking verbal abilities, highly social personalities and an affinity for music... Individuals with Williams Syndrome have a very endearing personality. They have a unique strength in their expressive language skills and are extremely polite. They are typically unafraid of strangers and show a greater interest in contact with adults than with their peers.”**

Author (No Date). What Is Williams Syndrome? From Williams Syndrome Association website:  
[http://www.williams-syndrome.org/what-is-williams-syndrome.](http://www.williams-syndrome.org/what-is-williams-syndrome)



# Williams Syndrome



**Williams Syndrome is a rare condition caused by missing genes. Parents may not have any family history of the condition. However, a person with Williams syndrome has a 50% chance of passing the disorder on to each of his or her children. The cause usually occurs randomly.**

**Williams Syndrome occurs in about 1 in 8,000 births.**

**One of the 25 missing genes is the gene that produces elastin, a protein that allows blood vessels and other tissues in the body to stretch. It is likely that having only one copy of this gene results in the narrowing of blood vessels seen in this condition.**

**A.D.A.M. Medical Encyclopedia (November 14, 2011). Williams Syndrome (Williams-Beuren Syndrome). Bethesda, MD: National Center for Biotechnology Information, U.S. National Library of Medicine. From website: <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0002105/>.**

# Williams Syndrome



**Those with Williams Syndrome have brains that are 20% smaller, particularly in the back of the brain which includes the occipital and parietal lobes. The temporal lobes are either normal in size or larger than normal. Their planum temporale is larger than normal and hence they often have perfect pitch. Finally, they use their cerebellum, brain stem and amygdala to process music thus it provides them an uniquely emotional experience when they hear it.**

**Sacks, O. (2007). Musicophilia:Tales of Music and the Brain. New York, NY: Alfred A Knopf.**

# ASD and Williams Syndrome

**ASD and Williams Syndrome, “two sides of the same coin,” Allan Reiss Stanford Medical School professor said. Social behavior and communication are underdeveloped in ASD and overdeveloped in Williams Syndrome.**

**Inman, E. (May 20, 2010). New Findings About Williams Syndrome May Shed Light On Autism Research. The Stanford Daily. From website: <http://www.stanforddaily.com/2010/05/20/new-findings-about-williams-syndrome-may-shine-light-on-autism-research/>.**

# Williams Syndrome and Neurology

**We found that the FFA was approximately two times larger among WS (Williams Syndrome, sic.) than TD (Typically Developing, sic.) participants (both absolutely and relative to the fusiform gyrus), despite apparently normal levels of face recognition performance on a Benton face recognition test. Thus, a larger FFA (Fusiform Face Area, sic) may play a role in face recognition proficiency among WS.**

**Golarai, G., et al (May 12, 2010). The Fusiform Face Area is Enlarged in Williams Syndrome. Journal of Neuroscience, 30(19), 6700-6712.**

# ASD and Williams Syndrome

**“We speculate that the WS (Williams Syndrome, sic) problems lie not in their difficulty to process eyes per se, but in their problems with interpreting the social meaning of the eyes, implicating dysfunction of the amygdala circuit. Finally, our results lead us to question a prevailing view that WS and autism are situated at opposite ends of the continuum with respect to social cognition” (p. 288)**

**Tsirempolou, E., et al (November 15, 2006). Understanding the Social Meaning of the Eyes: Is Williams Syndrome So Different From Autism? World Journal of Pediatrics, 2(4), 288-296.**

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Inman, E. (May 20, 2010). New Findings About Williams Syndrome May Shed Light On Autism Research. The Stanford Daily. From website: <http://www.stanforddaily.com/2010/05/20/new-findings-about-williams-syndrome-may-shine-light-on-autism-research/>.

# ASD and Williams Syndrome

**Reiss states those with ASD have smaller and less right fusiform gyrus face form areas (RtFFA) than the norm and those with Williams Syndrome larger RtFFA than the norm. He speculates the same gene may be involved in both disorders, but different mutations account for the behavioral differences.**

**Inman, E. (May 20, 2010). New Findings About Williams Syndrome May Shed Light On Autism Research. The Stanford Daily. From website: <http://www.stanforddaily.com/2010/05/20/new-findings-about-williams-syndrome-may-shine-light-on-autism-research/>.**

# ASD and Williams Syndrome

**Those with Williams Syndrome have a deletion of the 7q11.23 area of their genome that makes them highly sociable. Those with ASD have a duplication of the 7q11.23 area and have severe social deficits.**

**Sanders, S. et al (June 9, 2011). Multiple Recurrent De Novo CNVs, Including Duplications of the 7q11.23 Williams Syndrome Region, Are Strongly Associated with Autism. Neuron, 70(5), 863-865.**



# ASD and Williams Syndrome

**“Hypothetically, the gene may affect how infants learn the context for facial interactions. One version could cause excessive social drive resulting in behavior characteristic to Williams syndrome, while a different version could cause an “abnormally decreased drive to interact with people which might serve as a basis for how some people come to develop autism,” Reiss said.”**

Inman, E. (May 20, 2010). New Findings About Williams Syndrome May Shed Light On Autism Research. The Stanford Daily. From website: <http://www.stanforddaily.com/2010/05/20/new-findings-about-williams-syndrome-may-shine-light-on-autism-research/>.

# Dogs and Williams Syndrome

## **Changes in the WBSCR-17 Gene Caused Grey Wolves to Become Dogs and Humans to Have Williams Syndrome.**

vonHoldt, B.M., et al (March 17, 2010). Genome-Wide SNP and Haplotype Analyses Reveal A Rich History Underlying Dog Domestication. Nature, doi:10.1038/nature08837.

Ratliff, E. (March, 2011). Taming The Wild. National Geographic. From website: <http://ngm.nationalgeographic.com/2011/03/taming-wild-animals/ratliff-text/1>

# Domesticated Foxes?

**In the 1950's a Russian geneticist, Dmitry K. Belyaev, started a study to investigate if wild silver foxes could be domesticated. The study continues today, after the death of Dr. Belyeav. The scientists took the most docile foxes and bread them over the years. Over the next 60 plus years they noticed behavioral, physiological and morphological changes in the foxes that mirrored those seen in the domesticated dog.**

**Trut, L. et al. (March 3, 2019). Animal evolution during domestication: the domesticated fox as a model. BioEssays. 31(3), 349-360.**

# Domesticated Foxes?

**By the fourth generation of the special breeding program fox pups licked human caregivers and sought their company. Now they can read human emotions and bark like dogs. They are friendly. Domestic foxes have floppy ears, curly tails,” ...They included shortened legs, tail, snout, upper jaw, and widened skull.” In short, they are cute.**

Jones, L. (September 13, 2016). A Soviet Scientist Created The Only Tamed Foxes in The World. BBC Earth. From website: <http://www.bbc.com/earth/story/20160912-a-soviet-scientist-created-the-only-tame-foxes-in-the-world>.

# Domesticated Foxes?

**There is some suggestion the gene that causes domestication in silver foxes is the same one that changes a wolf into a dog and causes William's Syndrome in humans; the WBSCR17 gene.**

**Kukekova, A.V. et al. (2012). Genetics of behavior in the silver fox. Mammalian Genome, 23, 164-177.**

# *Emotional Seeing Eye Dogs*

- Dogs separated from wolves about 135,000 years ago.
- Dogs lived with humans 100,000 years ago; even before we were “modern humans” (Homo Habilis).
- Dog and humans co-evolved.
- Humans learned to think and act like dogs.
- Dogs allowed humans to hunt big game while they acted as guards and lookouts. Humans did more planning and organization activities.
- 14,000 years ago humans domesticated dogs.
- Homo Sapien Neantathalensis did not have dogs; they are extinct.
- In the past 100,000 years dogs brains shrunk by 10 to 30%; mostly in their forebrains. Humans’ brains shrank by 10%; mostly in the midbrain, sensory and smell areas.
- Dogs have a symbiotic relationship with humans and have a genetic predisposition to understand human emotions.

**Grandin, T. (2005). Animals in Translation. New York, NY: Simon & Schuster.**

# Dog-Human Interaction

“Domestic dogs...have a remarkable sensitivity to human actions and intentions” (p. 102).

“...dogs can effectively cue their human caregivers to find a food item or toy that the dog, but not the human had seen hidden” (p. 103).

Dogs pay attention to human body language and gaze.

**Wynne, C., Dorey, N.R., and Udell, M.R. (2011). The Other Side of the Bond: Domestic Dogs' Human-Like Behaviors. In P. McCarde, S. McCune, J.A. Griffin, and V. Maholmes (Eds.), How Animal Affect Us: Examining the Influence of Human-Animal Interaction on Child Development and Human Health. Washington, DC: American Psychological Association, 101-115.**

# Dog-Human Interaction

**“In general, this literature shows that a human –dog interaction has a positive influence on human social interaction and also acts as a stress reducer in humans” (p. 53).**

Uvnas-Moberg, K., Handlin, L., and Petersson, M. 2011). Promices and Pitfalls of Hormone research in Human-Animal Interaction. In P. McCarde, S. McCune, J.A. Griffin, and V. Maholmes (Eds.), How Animal Affect Us: Examining the Influence of Human-Animal Interaction on Child Development and Human Health. Washington, DC: American Psychological Association, 53-81.



# Dog-Human Interaction

**“Our results indicate that concentrations of beta-endorphin, oxytocin, prolactin, beta-phenylethylamine, and dopamine increased in both species after positive interspecies interaction, while that of cortisol decreased in the humans only” (p. 296).**

**Odendaal, J.S., and Meintjes, R.A. (2003). Neurophysiological Correlates of Affiliative Behavior Between Humans and Dogs. Veterinary Journal, 165(3), 296-301.**

# Empathy in Dogs

**Italian scientists investigated play, play motivation, rapid mimicry, and social modulations in dogs and determined dogs possess the building blocks of empathy of rapid mimicry and emotional contagion.**

Palagi, E., et al. (December 23, 2015). Rapid mimicry and emotional contagion in domestic dogs. Royal Society Open Science. DOI: [10.1098/rsos.150505](https://doi.org/10.1098/rsos.150505).

# Dogs Empathy, Love and Humans

**Japanese researchers recently found when humans bond emotionally they gaze into each other's eyes. This raises the level of the hormone oxytocin in both individuals. The scientist discovered when humans gaze into a dog's eyes it raises the level of oxytocin in the humans and when dogs sniff oxytocin spray it raises their. However, when wolves sniff oxytocin it does not raise their oxytocin levels. Wolves rarely look into other members of their species eyes. The human dog eye gazing causes a loop of affection. The researchers speculated this loop may have contributed to the survival of both species.**

**Nagasawa, M. et al. (April 17, 2015). Oxytocin-gaze positive loop and the coevolution of human-dog bonds. Science. DOI: 10.1126/science.1261022.**

# Dogs Understand Human Emotions

**Brazilian and British researchers recently discovered, “...The findings are, we believe, the first evidence of the integration of heterospecific emotional expressions in a species other than humans, and extend beyond primates the demonstration of cross-modal integration of conspecific emotional expressions. These results show that domestic dogs can obtain dog and human emotional information from both auditory and visual inputs, and integrate them into a coherent perception of emotion. Therefore, it is likely that dogs possess at least the mental prototypes for emotional categorization (positive versus negative affect) and can recognize the emotional content of these expressions. Moreover, dogs performed in this way without any training or familiarization with the models, suggesting that these emotional signals are intrinsically important. This is consistent with this ability conferring important adaptive advantages.”**

**Albuquerque, N. et al. (January 16, 2016). Dogs recognize dog and human emotions. Biology Letters. DOI: 10.1098/rsbl.2015.0883.**

# ASD and Dogs

- **Children with autism and pervasive developmental disorders are significantly more present, playful and aware of social interactions when a dog is present.**

Martin, F, and Farnum, J. (2002). Animal Assisted Therapy for Children with Pervasive Developmental Disorders. Western Journal of Nursing Research, 24(6), 657-670.

# ASD and Dogs

**“The themes were (a) the dog as a sentinel of safety, (b) gaining freedom through enhanced safety, facilitating public outings and family activities, and (c) improving social recognition and status, in which the presence of the dog promoted awareness of autism and affected social interaction. The triadic relationship between parent, autistic child, and service dog constantly evolves” (p. 1642).**

**Burrows, E., Adams, C.L., and Spiers, J. (November 13, 2008). Sentinels of Safety: Service Dogs Ensure Safety and Enhance Freedom and Well-Being for Families With Autistic Children. Quantative Health Research, 18(12), 1642-1649.**

# Therapy Dogs and ASD

**“When the therapy dog was present, the children (with ASD, sic.) were significantly more focused, more playful, and more aware of interactions than either of the other conditions (stuffed dog, or ball present)” (p. 185).**

**Johnson, R.A. (2011). Animal-Assisted Interventions In Health Care Contexts. In P. McCardle, McCune, S., J.A. Griffin and Maholmes, (Eds.), How Animal Affect Us: Examining The Influence of Human-Anial Interaction on Child Development and Human Health. Washington, DC: American Psychological Association.**

# Temple Grandin, Ph.D. Says...

**“Unlike other autism interventions that can be more easily started and stopped embarking on the journey to find a service dog for a child is a long-term commitment on the part of the entire family. A service dog is much more than a well trained pet”.**

**❖ Companion dog; Therapy dog; Safety dog**

**Grandin, T. (2011). The Way I See It: A personal Look at Autism & Aspergers, Second Edition. Arlington, TX Future Horizons.**



# Dog and Children with AD/HD

**Dr. Sabrina Schuck, a University of California Irvine scientist is studying whether interacting and being in the presence of dogs can have a therapeutic effect on children with AD/HD. She states she has come across significant anecdotal evidence they can.**

**Bold, K. (2012). Different Breed of Therapist. Irvine, CA: University of California Irvine. From website: [http://www.uci.edu/features/2012/02/feature\\_dogtherapy\\_120213.php](http://www.uci.edu/features/2012/02/feature_dogtherapy_120213.php).**

# Therapy Dogs and AD/HD

**“Objective: The objective of this study was to provide preliminary findings from an ongoing randomized clinical trial using a canine-assisted intervention (CAI) for 24 children with ADHD. Method: Project Positive Assertive Cooperative Kids (P.A.C.K.) was designed to study a 12-week cognitive-behavioral intervention delivered with or without CAI. Children were randomly assigned to group therapy with or without CAI. Parents of children in both groups simultaneously participated in weekly parent group therapy sessions...”**

# Therapy Dogs and AD/HD

**“... Results: Across both treatment groups, parents reported improvements in children’s social skills, prosocial behaviors, and problematic behaviors. In both groups, the severity of ADHD symptoms declined during the course of treatment; however, children who received the CAI model exhibited greater reductions in the severity of ADHD symptoms than did children who received cognitive-behavioral therapy without CAI. Conclusion: Results suggest that CAI offers a novel therapeutic strategy that may enhance cognitive-behavioral interventions for children with ADHD.**

Schuck, S.E.B., et al. (September 23, 2013). Canine-Assisted Therapy for Children With ADHD: Preliminary Findings From The Positive Assertive Cooperative Kids Study. Journal of Attention Disorders, doi: 10.1177/1087054713502080 .

# Dogs' Understanding of Human Language

**Researchers from the University of Vienna trained dogs to lie quietly in an fMRI scanner while being exposed to human voices. The scanner measured their brain activity. Like humans they processed meaningful words in their left hemisphere, and processed voice intonation in their right hemisphere. Their reward centers (nucleus of accumbens) activated when they heard words of praise with matched intonation. The scientists believe this indicates dogs can analyze and integrate word meaning and intonation without being able to speak.**

**Andics, A. et al. (September 2, 2016). Neural mechanisms for lexical processing in dogs. Science. DOI: [10.1126/science.aaf3777](https://doi.org/10.1126/science.aaf3777).**

# Dogs, Stress and Smell

**Dogs can detect increasing cortisol levels in humans, what is a hormone connected to stress and anxiety. Beagles and basset hounds have around 4 billion smell receptors in their nose; humans have about 12 million. Dogs can smell cancer, diabetes and other diseases.**

Hollow, M.C. (October 22, 2014). Stressed? This Dog Can Help. New York Times. From website:  
[http://well.blogs.nytimes.com/2014/10/22/stressed-this-dog-may-help/?mwrsm=Email&\\_r=0](http://well.blogs.nytimes.com/2014/10/22/stressed-this-dog-may-help/?mwrsm=Email&_r=0).

# *Emotional Seeing Eye Dogs*

**(WEBSITE: 105-111)**



- **4Paws For Ability**  
**253 Dayton Avenue**  
**Xenia, OH 45385**
- **Training Center:**  
**937-374-0385**
- **Website:**  
[www.4pawsforability.org](http://www.4pawsforability.org)

Dogs may have a rudimentary mirror neuron system!

Blakeslee, S. (January 10, 2006). Cells That Read Minds. New York Times; From website:  
[www.nytimes.com/2006/01/10/science/10mirr.html?pagewanted=1&r=1](http://www.nytimes.com/2006/01/10/science/10mirr.html?pagewanted=1&r=1).

# Service and Therapy Dog Organizations

- International Association of Service Dog Partners: [www.iaadp.org](http://www.iaadp.org)
- Autism Service Dogs of America:  
[www.autismservicedogsofamerica.com](http://www.autismservicedogsofamerica.com)
- Wilderwood Service Dogs for Autism: [www.wilerwood.org](http://www.wilerwood.org)
- Northstar Foundation/Service Dogs for Autism:  
[www.northstardogs.com/autism.shtml](http://www.northstardogs.com/autism.shtml)
- Pet Partners (formerly Delta Society): [www.petpartners.org](http://www.petpartners.org)