

ROBOTIC *Life*

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# Defining Relationships

Summary of week 2 readings

# Questions to Ponder for Relational Machines

# What is an Authentic Human-Machine Relationship?

- Our interactive technologies are not animals or humans.
- What might be the basis of a “authentic” or “believable” relationship with a relational machine?
- Must we define a novel form of relationship?

# How is that relationship established and maintained?

- What is the benefit to human (and machine) to participate in it?
- What is the cost to human (and machine) for sticking with it?
- How is this trade-off determined?
  - Is an economic model the right framework?
  - Is an ethological model the right framework?

# Human-Human Relationships

# Importance of Relationships

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- Majority of people say that relationships matter most to them and gives life fullest purpose
  - Positive (Benefits: pleasure, comfort, purpose, etc.)
  - Negative (Costs: burdoned demands, dissolution, etc.)

# Social Psychology of Personal Relationships

- Dyadic approach to relationship
- Define relationship as referring to 2 people whose behavior is **interdependent**
  - The change in state in one will produce a change in the other
  - Resides in their **unique** interaction with each other

# Expected Benefits of Friendship

- Sense of belonging and a “reliable alliance”
- Emotional integration and stability: anchor points for beliefs, emotions, etc.
- Opportunities for each to self-disclose and self-express
- Provision for support
  - Physical: e.g, doing favors
  - Psychological: e.g. showing appreciation, valuing our opinions
  - Emotional: e.g., attachment, intimacy, affection
- Reassurance of worth, opportunity to help others

# Provisions and Exchange Theory

- An economic framework for the provisions a relationship provides
- Social Exchange Models
  - Costs
  - Benefits
  - Investments
  - Alternatives
  - And how these relate to commitment
- Relationships only exist when there is this “economic” exchange
- Predictions of longevity of relationship can be predicted from cost/benefit analysis

# Dimensional models

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- Characterize relationship by important dimensions
  - Social distance, solidarity, like-mindedness
  - Power
  - Affect, degree of liking
  - Equality
  - Friendliness (vs. hostility)
  - Intensity (vs. superficial)
  - Formality (vs. informal)
  - Familiarity (breadth and depth of communication)

# Collaboration

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- Relationships involve collaborative behavior
- Agents work jointly to achieve common goal
  - Tasks
  - Negotiation of roles
  - Reminiscing...

# What is Collaboration?

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- Theoretical Foundations
  - Grosz, Shared Plans
  - Cohen & Levesque, Joint Intention Theory
  - Bratman, Shared Cooperative Activity

# Joint Action is not merely Coordinated Action

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## Convoy vs Traffic:

It appears that the group acts more like a single agent with beliefs, goals, and intentions of its own, over and above the individual ones.

# SharedPlans

- **Shared Plans** (Grosz 1996)
  - A performance model for how agents incrementally form and execute a SharedPlan that then guides and coordinates their activity toward the shared goal
- Have a SharedPlan when
  - Agents have a common goal
  - Agree on recipe for accomplishing that goal
  - Each intends to do their assigned part
  - All are committed to success of the shared goal
- SharedPlans are dynamic and more than the sum of individual plans

# Joint Intention Theory

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- **Joint Intention Theory** (Cohen & Levesque, 1991)
  - Teamwork requires **commitment** to shared goal
    - Goals maintained over time, resisting capricious abandonment
  - Teamwork Requires **Communication for Grounding Mutual Beliefs**
    - Held by all teammates about the state of the task
    - To handle changing circumstances
    - To handle when things go wrong

# Shared Cooperative Activity

- **Shared Cooperative Activity** (Bratman 1992)
  - **Commitment to the joint activity** to accomplish shared goal
  - **Mutual responsiveness**, take other's actions into account
  - **Mutual support**, helping each other, not getting in other's way
  - **Meshing sub-plans**, coordinate joint actions in service of shared goal

# Accomodation

- How can agents assess whether potential collaborators will be likely to help?
- **Accommodation**: one agent infers the goals/desires of the second and takes action to help without explicitly being asked
  - Mutual belief that “other” desires P (not satisfied yet)
  - Mutual belief of a recipe to achieve P
  - Mutual belief they can collaborate to achieve P
  - Agent adopts the intention to help other (resisting capricious abandonment, can depend on mutual support)
- Note that “keeping score” is explicit. All know when accommodation is intentionally going on.

# Defining Relationship

- A relationship is the set of all accommodation relations that hold between agents.
  - Being in a relationship is not a SharedPlan, but a set of expectations for future collaborations should the need arise.
  - However, establishing and maintaining a relationship is a collaborative activity that could be modeled as a SharedPlan

# Assessments of Accommodations

- Constant uncertainty of whether accommodating relations hold (what agents will and will not do for each other)
  - Update beliefs of when and if “partner” will be there to help when needed
  - Update beliefs of whether it is worth it for agent to help other when needed and for what circumstances
- Agreement of assessments of accommodations between partners ultimately defines their relationship
  - Friend, Colleague, Acquaintance, etc.

# Keeping Score

- Relationships can be maintained by periodic performance of typical activities common to that relationship
- Can perform explicit tests to assess status of relationship (check for uptake)
- Relational stereotypes establish expectations
- Past history (weaker influence)
- Trust in relational partner

# Trust

- Generalized relational expectation about the likelihood of a partner to meet relational expectations
- Trust involves an analysis of benefits vs. potential costs of trustor for taking a particular action
  - When negative consequences potentially outweigh positive
  - But subjective probability of achieving benefit is sufficiently high
    - Deutsch, 1973
    - Marsh, 1994

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# Strategic Self-Disclosure

- Scripts theory: we reveal more information as appropriate to stage (scheduled self-disclosure)
  - “Peeling of an onion”
  - Verbal (reveal secrets or private attitudes)
  - Non-verbal (sitting closer, crying, etc.)
- Intimate disclosure & reciprocal disclosure is expected as normal progression
  - indicates trust of other
  - Women expected to do this more than men
  - Reciprocal aspect wears off as relationship matures (don't owe it to each other as politeness...)

# Intimacy (Montgomery, 1981)

- Open communication rather than just self-disclosure
  - **Negative openness**: showing disagreement or negative feelings
  - **Nonverbal openness**: facial expressions, tone of voice, postures
  - **Emotional openness**: ease with communicating moods and concealment of emotional states
  - **Receptive openness**: willingness to listen to other's personal information
  - **General-style openness**: overall impression
- Varies with relational context (doctor-patient)

# Emotional Support

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- Empathy: the process of attending to understanding, and responding to another person's expression of emotion
- Emotional Support provisions
  - Accommodation
  - Social support
  - Intimacy
  - Effective communication and problem solving

# Working Alliance

- Trust and belief that the therapist and patient have in each other as team-members in achieving a desired outcome
- Physician empathy is highly correlated with patient compliance
- Physical lack of empathy is most frequent source of patient complaints

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# Human-Animal Relationships

# Theoretical Framework

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- Survival activities occur on individual level (getting food, etc.) as well as on species level (reproduction)
- **Competition** gives rise to selfish, agonistic behavior (food chains, parasitism)
- Law of the jungle “only the strongest survive”.

# Theoretical Framework

- Not the only rule!
- Organisms organize into **cooperative** systems, too.
  - Symbioses, contribute to mutual ecological order.
  - Beneficial and affiliation interactions

# Attentionis Egens

- Attention-need behavior is clearly identified in advanced and well-developed social systems as a universal emotional need.
  - Birds,
  - Dogs,
  - Humans, etc.
- **Attentionis egens**: the need for attention on a normal, basic emotional level.
  - Pre-requisite for successful social interaction
- **Positive or affiliative interaction is mutually beneficial**

# Intraspecies Benefit

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- Intraspecies social systems are not necessarily closed – they can include other species
- The success of companion animals results from two-way fulfilling of attentionis-egens
  - Highly social animals (esp. dogs)
- The greater need for attention of the animal, the better suited to establishing a successful bond with human.
- Social symbiotic relationship: Mutually beneficial interaction between species

# Social Symbiotic Relationships

- Social symbiotic relationships work for species that do not compete
  - Human provides dog food, shelter, care
  - Dog provides utility, security
- Species can interact on an emotional level because not competing on physiological level
- **Positive feedback cycle** of need and fulfillment of attention is established

# Domestication

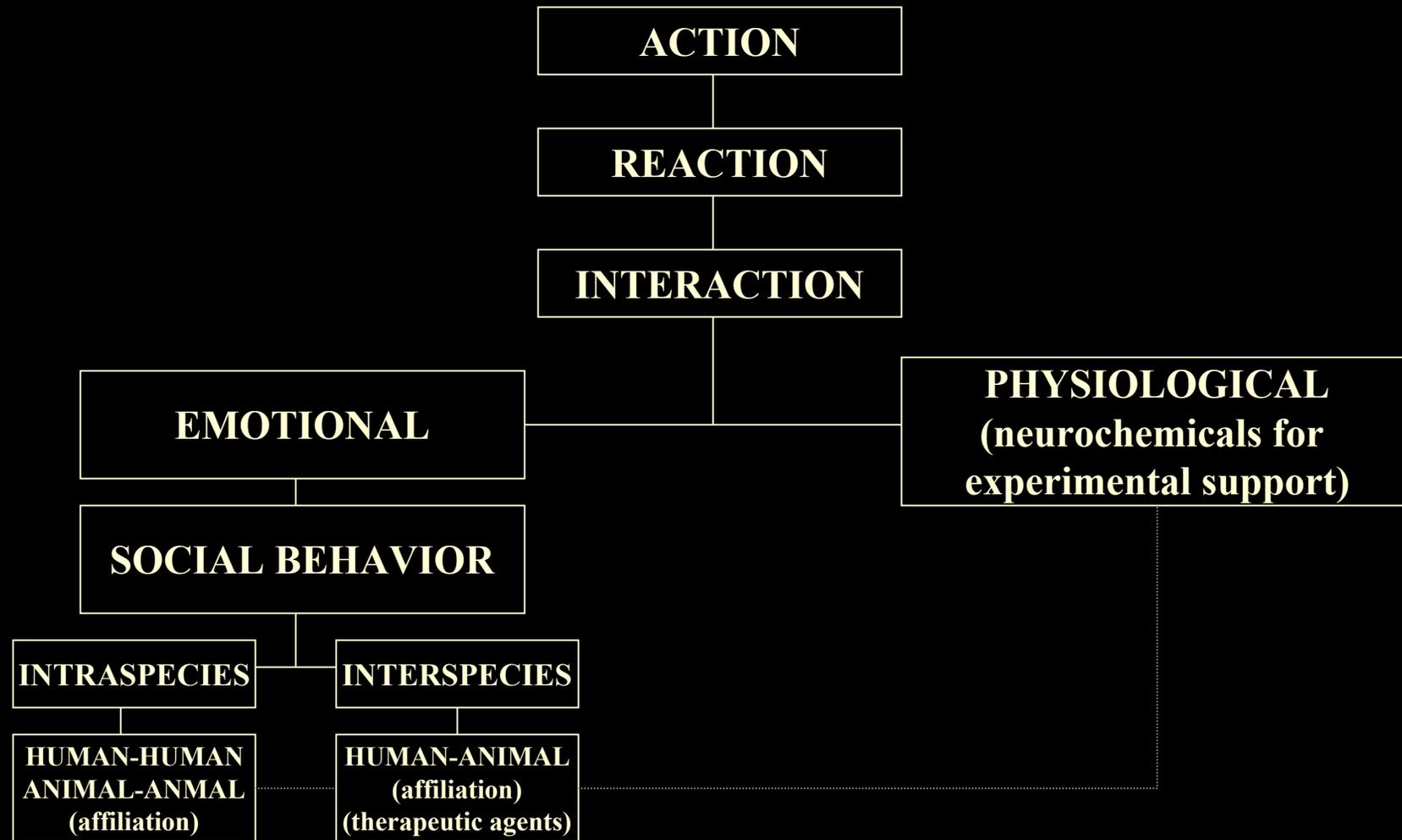
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- Historical evidence that domestication of animals occurred naturally (without human coercion)
  - A natural process, not a unilateral decision to tame them
- The interaction of humans with *canis familiaris* developed into a beneficial (utilitarian) and meaningful (emotional) interaction that has lasted > 10,000 years.

# Attention Needs and Therapy

- Therapeutic role of companion animals is mainly established in marginalized populations
- These populations may have an additional need for positive attention-feedback interactions given their peripheral position to mainstream society:
  - Physically & mentally handicapped
  - Socially maladapted persons; Prisoners
  - Chronically ill patients; Substance-dependant addicts
  - Lonely (long-term social deprivation); Emotionally disturbed
- But also can benefit normal people, too
  - Aged, Children, Adults
- But not for everyone
  - Dislike, allergies, bad experiences with animals...

# Odendaal summary



# Health Benefits of Pets

- “Mental health is maintained by emotional hygiene”
- Posited health benefits of companion animal therapy
  - Decrease in blood pressure
  - Anxiety and stress relief
  - Mood regulation to mitigate depression, etc.
  - Changes in hormonal correlates
    - oxytocin (social attachment), cortisol (stress), B-endorphin (pain response, lifts mood), prolactin(maternal behavior), Dopamine (pleasure/reward)

# Hypothesis for Benefit

- Positive affiliative interaction decreases anxiety and sympathetic nervous system arousal by providing a pleasant external focus of attention
  - Promoting feelings of safety, providing source of contact comfort, and an impetus for nurturing.
- Highly individualized feelings of “attachment”
- Mutual relating is critical
  - Sense that facilitator/dog is being treated as much as patient

# Competing Theories

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- Are human-animal relationships seen as a version of human-human relationships?
  - Child-to-parent (attachment)
  - Parent-to-child (care-giving)
  - Child-to-child (peer)
  - Adult-to-adult (sexual)
  - Sibling?
  - Adult friendship?

# Attachment vs. Bond

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- **Attachment:** Feeling of security (felt security) & asymmetry of relationship (child attached to parent)
- **Bond:** affection and attraction felt by one individual for another particular individual

# Affectional Drives

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- Attachment as a primal motivational system (ethology)
  - Presence of attachment figure leads to felt security
  - Attachment behavior is to reestablish proximity
  - Motivational force to promote protection and safety of the child
- Natural categories of relationships
  - Affectional system inspired by ethological notion of motivational drives.

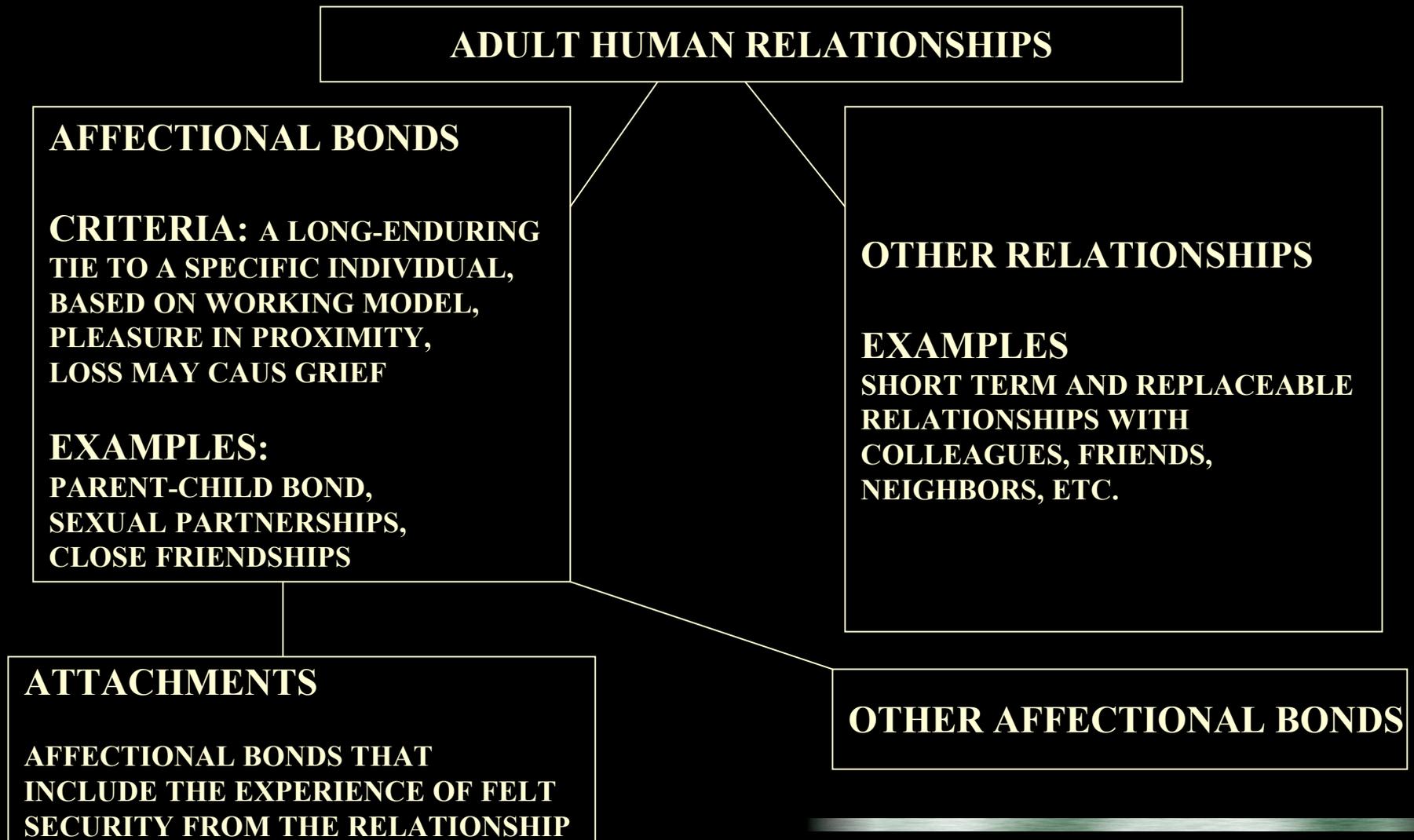
# Internal Working Models

- Internal working models
  - Borrow concept of mental model from cognitive psychology
  - Child organizes experiences into social expectations to create working models of self, other, and relationship
  - Models of attachment relationship forms basis of mental models for other kinds of relationships that develop later

# Affectional Bonds

- Affectional Bonds
  - Based on long-enduring tie in which partner is important as a unique individual
  - Key psychological process underlying the tie is an internal working model of relationship
  - Can be maintained during absences
  - Desire to come together and pleasure in doing so.
  - Separation causes stress, loss causes grief
- Some but not all affectional bonds are attachments

# Ainsworth Typology of Attachment



# Are Human-Pet Relationships Based on Attachment?

- Collis & McNicholas argue “No”
- Current HAI metrics do not really assess attachment
  - CENSHARE pet attachment survey
  - Lexington Attachment to Pets Scale
  - Companion Animal Bonding Scale
- Suggests that main dimension resembles a generalized measure of close and affectionate relationships, not attachment

# Social Support

- Rather than rely on category descriptions of relationships, focus on functional aspects and the benefits derived
  - Health benefit
  - Quality of life benefit
- Support is a process-oriented concept covering a range of transactions in social relationships
- A framework for understanding how person-pet relationships provide benefit --- Cobb (1976)
  - Feelings of being cared for
  - Belief that one is loved, esteemed, valued
  - Sense of belonging to a reciprocal network

# Social Support as Buffer to Stress

- Hypothesis: Social support provides protection from pathological states and accelerates recovery from illness by acting as a buffer in a time of crisis
  - Major stress in life increase incidence of adverse physical and psychological responses resulting in illness, depression, etc.
  - Social support may alleviate such reactions and acts as an important resource for dealing with stress
  - Absence of social support leads to additional stresses that exacerbate existing stresses (loneliness, isolation)

# Advantages of non-human relationships

- Animals as stable providers of social support
  - No fear that relationship can be damaged by displays of weakness, emotion, or excessive demands
  - Perceived as always available
  - Perceived as nonjudgmental
  - Perceived as caring about owners
  - Perceived as needing their owners regardless of their status as perceived by self or others, contributes to sense of self-worth
  - Provide tactile and recreational distraction from stressors
  - Less subject to provider burnout
  - Catalysts for social-networking
  - No social skills required to elicit this support from animal

# Promise of Companion Animals

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- Plenty of promising anecdotal evidence
- Growing number of studies in Human-Animal Interaction (HAI) that confirm, challenge said benefits
- Merits in-depth empirical research to understand range of benefits, and why and how they can be achieved, and for who.