

ROBOTIC
Life

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

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

- 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

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

What is Collaboration?

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

Joint Action is not merely Coordinated Action

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

- **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

Accommodation

- 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

- 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

Human-Animal Relationships

Theoretical Framework

- 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

- 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

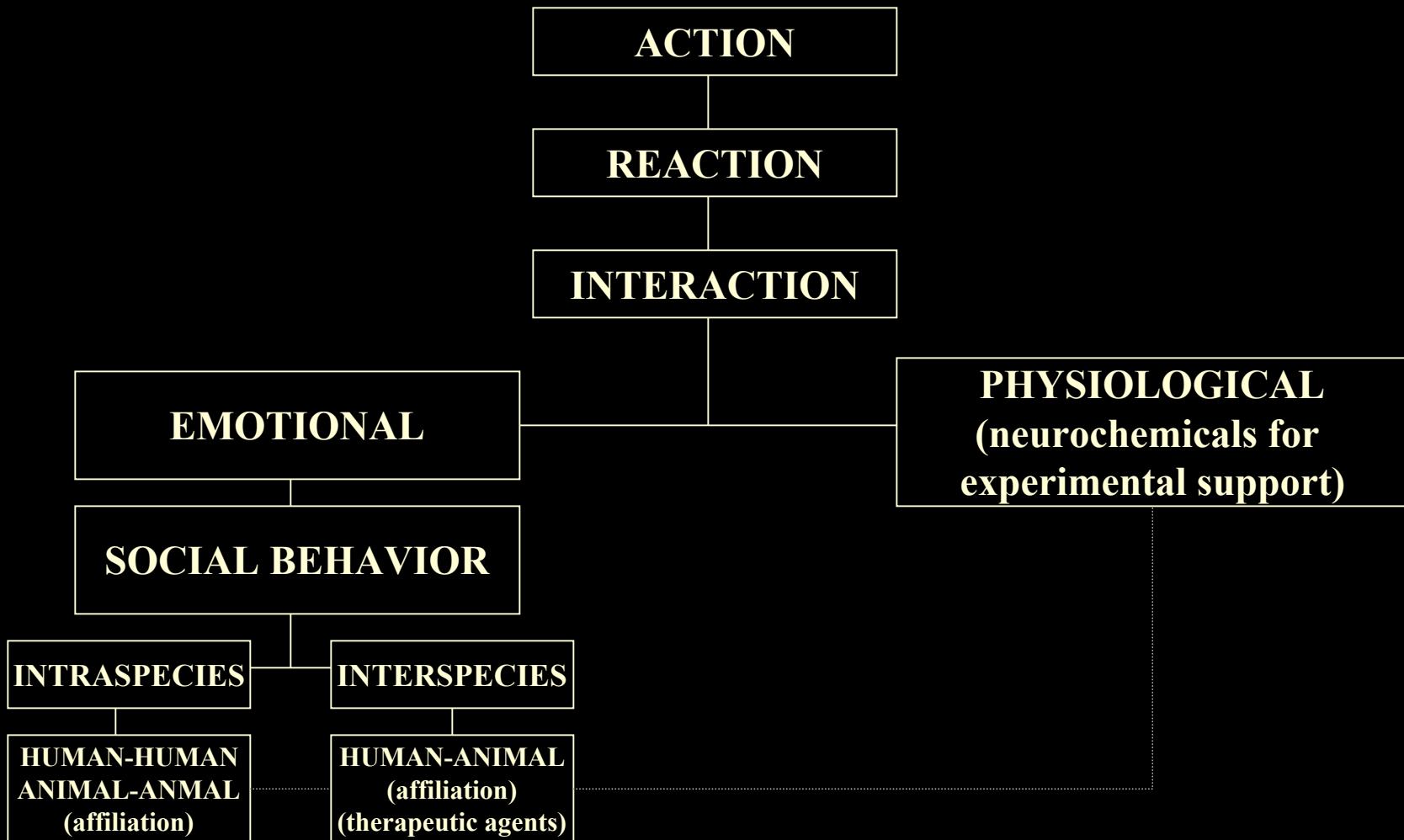
Domestication

- 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

- 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

- 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

- 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

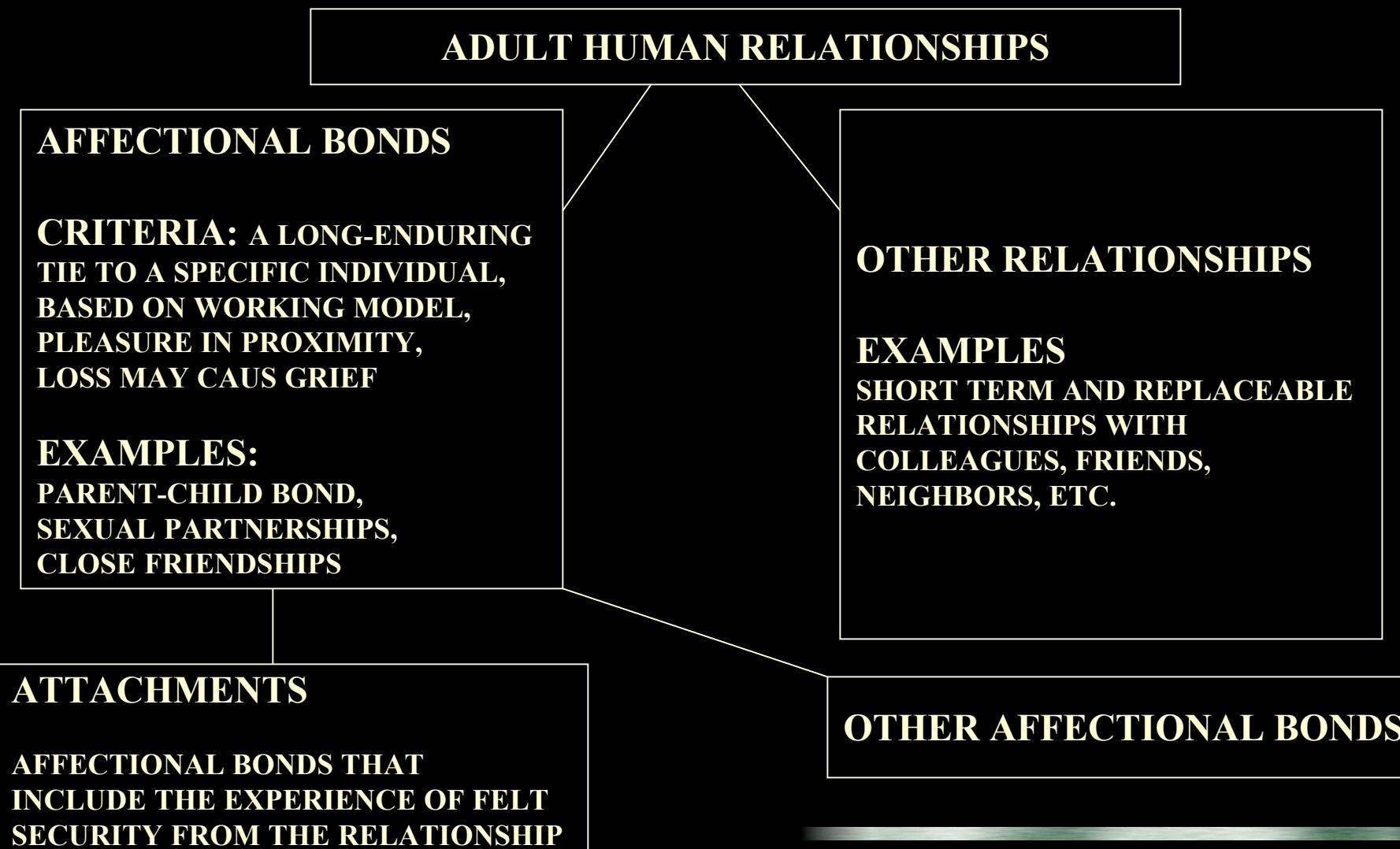
Affectional Bonds

■ 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 cases 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

- 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.