Review

Interspecies Relational Theory: A Framework for Compassionate Interspecies Interactions

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Interspecies Relational Theory: A Framework for Compassionate Interspecies Interactions

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Simple Summary: There is a rising interest in the welfare and perspective of animals in domestic settings and within animal-human interactions. Most studies involving humans and animals focus on either the benefit to the human or the impact on the animal. By combining studies in human friendship with knowledge on animal friendship, communication, and animal-human interaction, this paper introduces a new framework around interspecies relationships, how they are formed and how they are maintained. The process is broken down into stages of the relationship corresponding to existing models of human relationships and behaviors and perspectives on trust and social bonding, providing a basic framework for approaching and building relationships between humans and nonhuman animals.

Abstract: Most studies on relationships between humans and nonhuman animals focus on the benefits of the relationship to humans, the potential detriment or stress to the animal, or how humans can better improve husbandry or handling practices in the domestic setting. By comparing existing research in human working relationships and friendships with animal friendships and studies on human-animal interactions, this paper proposes a new framework of an Interspecies Relational Theory that provides approaches for identifying, developing, and maintaining different levels of relationships between humans and nonhuman species. The framework is broken into three stages aligned with existing research in human levels of trust ranging from strategic/calculus-based to working/knowledge/information-based to friendship/affect-based. These levels are also aligned with stages of Maslow's Hierarchy. The suggested framework can help provide insight into both human and animal perspectives of the human-animal relationship in a variety of veterinary and animal-assisted settings.

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1. Introduction

Most studies on relationships between human and non-human animals focus on the benefits of the relationship to humans, the potential detriment or stress to the animal, or how we, as humans, can better accommodate husbandry welfare protocols for domestic or captive animals [1,2]. Even in the context of animal-assisted services, most of the literature focuses on the impact of interactions and animal-human relationships on humans [3]. More scientists, however, are shifting focus of research and application to understanding components of relationships between humans, animals, and environments from all perspectives, not just the human [2,4,5] to help improve our understanding of both human and animal perspectives in all areas in which animal-human interactions occur.

Even in animal-assisted work where relational dynamics are often seen as the justification for incorporating animals into therapeutic practices, the methods of interacting are more in line with instrumentalizing the animal (as a form of exploitation) rather than partnership [6–11]. Partnership and relationship are, however, seen as important factors in the role of animals in animal-assisted services. In 2018 Chandler [3] introduced the Human-Animal Relational Theory (HART) to help practitioners in animal-assisted mental health better understand the relationship between humans and animals from

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the human perspective to better facilitate therapeutic outcomes. The nuances of the relationship and how they develop for the animal, however, are usually overlooked. Literature in animal-assisted services, often cites the relationship between human and non-human animals as a primary source of therapeutic outcomes [3,12] but little work has been done to consider how this relationship develops in ways that align with theories in relational development or friendship from both the human and animal perspectives. Although friendships in animals is a known phenomenon, it's relatively new to research with few studies focusing exclusively on behavioral or hormonal indicators of proximity, time, and specific interactions indicating friendships in nonhuman animals [13] .

Research acknowledges that animals live in more complex environments and many animal studies have contributed to how we view and understand cultures. Current animal social behavior studies suggest that social species generally live in cooperative settings, avoid conflict, and engage in reconciliation to maintain order, reduce overall long-term stress, and maintain relationships [14–16] . These studies often rely on previous studies of cooperative interactions and reciprocity [17] where social behaviors of friendship overlap with research in human relationships to potentially provide additional insights into animal social structures.

Trust is a huge component of these social structures and plays a big role in how we integrate animals into our lives. Although companionship is an important part of animal-human interactions, in Western culture we also build trust in human-non-human animal interactions with the deliberate intention of breaking it to serve human needs [18]. Interactions and management styles, especially under laboratory, agriculture, and even some domestic settings focus almost exclusively on the needs of humans rather than interspecies mutuality or relational growth. This includes husbandry, handling, and training where the desired outcomes are focused on serving human needs rather than the relational growth between humans and non-humans.

The relational side from the animal perspective has grown and its importance in domestic and captive settings continues to grow. Research in animal welfare has improved in recent years including the expansion of the understanding of the five domains to include mental state and finally animal-human interactions [19] . Concepts of One Welfare have also risen in popularity with more thought given to how human actions impact the environment and animals [4] and how these impact our relationships within our homes [20,21]. The complexity of the interactions and impacts on the animal are not always considered, however [2] so it's critical to consider the elements that contribute to the relationships that are developed between humans and nonhuman species to better recognize the ways these contribute to the well-being of humans and nonhuman species in domestic and captive environments.

This paper aims at creating a framework for compassionate interspecies interactions by proposing an Interspecies Relational Theory that helps to organize the components of relationship development between humans and non-human animals in a variety of domestic contexts.

2. Alignment with Maslow's Hierarchy

The order of building interspecies relationships aligns with ideas set forth in Maslow's Hierachy of Needs as it applies to all animals. In the Hierarchy, physical needs comes first since nothing can take place unless physical needs are met. This includes air, water, and food [22]. If an animal (or human) has insecurities around basic needs, it may be difficult to consider forming or maintaining more complex social relationships. If basic needs are met, however, then additional physical and psychological factors can be considered and used to build the foundation of relationships, both within and between species.

The second tier of the Hierarchy focuses on Safety. In the paper by Griffin et al. [22], dogs' safety needs are described as including having physical health and safety, having choices/having agency, feeling physically safe, and feeling psychologically safe (predictable environment). The Five Domains [19] also include these options when discussing welfare in animals as primary components of animal welfare, especially when looking at welfare from the perspective of the animal (Domain 5: Mental State). While humans can provide what is considered a safe and healthy physical environment, it is

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ultimately up to the animal to decide whether they feel safe in that environment. The subjective sense of both physical and psychological safety therefore serves as the foundation for concepts of trust within Interspecies Relational Theory. As a larger concept, however, trust is broken down into stages that build over time and overlap with other elements of relationships that cover the higher levels of the Hierarchy. At the lower levels of Maslow's Hierarchy, the concepts outline in Interspecies Relational Theory cover the development of subjective feelings of physical safety, building a sense of psychological safety through consistent predictable interactions including the development of mutual language/communication, and consistent exchanges of interactions over time that align with expectations and repercussions.

The third tier of the Hierarchy encompasses love and belonging or, more specifically, social needs [22]. In this category humans and animals (especially those belonging to social species) seek out social interactions with others and potentially seek companionship. In Maslow's Hierarchy of needs for humans, this category includes love and belonging in a way that goes beyond just companionship and includes levels of emotional bonding. When overlapping Interspecies Relational Theory with this level, we move beyond basic physical trust and exchanges and move into emotional support and seeking emotional safety with others, especially when environmental or social conditions threaten senses of safety (the lower tier of the Hierarchy).

3. Relationship Stages

All stages of relationships are defined by different levels of trust and interactions. Trust, as defined by Schilke et al. [23] can be described as "the willingness of an entity (i.e., the trustor) to become vulnerable to another entity (i.e., the trustee). In taking this risk, the trustor presumes the trustee will act in a way that is conducive to the trustor's welfare despite the trustee's actions being outside the trustor's control." In a broader sense, trust can be defined as a willingness to be vulnerable to another party based on the expectation of positive behavior or intentions [24].

This concept of trust builds on the relationship lens using Maslow's Hierachy; if the feeling of safety is not present, then concepts around trust cannot be established. Trust in physical safety therefore needs to be established prior to other levels of trust.

When considering trust within a relational setting, social sciences focuses most often on the role of trust in human-human interactions and how this may carry over into human-animal interactions (focusing on the human perspective). In these contexts, the concept of trust usually starts with concepts of "trustworthiness" and abstract ideas of trust prior to interactions [25] . When defining trust from both human and animal perspectives the concept should be broken down even further. Rault et al. [26] provides insights into how humans can gain insight into the animal's perception of relationship quality by observing behavioral signals and indicators of positive experiences based on interactions. These signals will ultimately differ based on species and individualized expressions.

3.1. Stage 1: Physical Trust, Communication Development, and Initial Engagement

3.1.1. Trust – Physical Safety

All animals, humans included, have to assess physical threat prior to engaging in trust at higher levels. In trust research in humans, this level can be called Strategic Trust or Calculus-Based Trust [27,28] where basic physical safety is established and individuals recognize that the other party is not a threat. This stage also includes a level of fragility where trust is subject to changes based on continued interactions, exchanges, and experiences [29] and basic concepts of trust within interactions that align with threat assessment (physical safety). For animals, this stage is established when either the fear response is evident via avoidant or flight behaviors, or the animal is willingly to engage. The engagement and subjective establishment of physical safety is evident through behaviors indicating curiosity and exploration that help individuals of all species to acquire new knowledge about novel objects or beings [30].

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3.1.2. Stage 1 – Associated Interactions – Mutual Language and Communication

Language and communication is built through consistency of interactions with predictable outcomes [31,32]. At this stage only preliminary language and communication are developed, potentially as means of establishing basic understanding of threat assessment, safety, and intention. The pace at which language is built between two individuals is unique to the pair and may develop fast or slow depending on past experiences. With regards to horses and humans, for example, horses are capable of reading facial expressions, vocal cues, posture, movement, attention, and even odor from humans [33]. By recognizing signals we intentionally set and ones that are less intentional, we can start recognizing the various forms of communication that occur between ourselves and nonhuman animals that may impact the relationship development.

3.1.3. Stage 1 - Considerations

At this level, the subjective assessment of physical safety and threat assessment is based on assessing threat at different levels of physical proximity and spending time at each proximity to continue assessment. The closer the individual, the higher the threat. How an individual approaches and maintains proximity can provide additional information as to the subjective experience of safety of the individual based on their size and species.

3.2. Stage 2: Psychological Safety, Ongoing Exchanges, and Rupture and Reconciliation

3.2.1. Trust – Psychological Safety (Subjective Sense of Safety)

The development of physical safety can take time and the length of time an individual feels safe with another can be subjective and dependent on the individual's history and past experience [34]. The same can be true for the next stages of trust where, after physical safety has been established, individuals build trust through exchanges where predictability, reliability and, in the case of humans, empathy is demonstrated [35].

It is also at this stage that trust can be broken through inconsistent interactions or exchanges where one individual will choose to no longer participate in interactions or future interactions. The ability to assess and choose continued intearction is dependent on the animal or human having agency within the interaction and providing feedback to the other that they no longer choose to participate. An example of interspecies interactions of trust at this level can be seen in the paper by Pelgrim et al. [36] where domestic dogs were subjected to trustworthy vs untrustworthy humans during communication interactions. After experiences with both types of humans, the dogs, when given choice, chose not to respond to the untrustworthy human.

The role of autonomy and choice provides each participant with the abilty to express behaviors indicative of their subjective perspectives of the interactions and stage of the relationship. If individuals value communication and information from behavioral exchanges brought about through the development of each stage, then choice and agency in the interaction (and throughout the relationship development) should be maintained.

3.2.2. Stage 2 – Associated Interactions – Exchanges and Rupture and Reconciliation

Once communication and language have been established, individuals can start engaging in more complex interactions and exchanges. This level parallels with Working Trust and as defined by Lewicki & Bunker [27] and further supported by Mayer [24] and Knowledge-Based Trust as explained by McAllister [28]. Interpersonal interactions between people also show that trust builds over time based on repeated sequences of interactions that are dependent upon learned associations based on those repetitions and multiple levels of understanding (cognitive, emotional, social, contextual, etc.). The development can lead to a greater understanding of each others' goals and building of mutual goals (Information-Based Trust) [28]. This includes when one or both individuals

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experience uncertainty (whether in or outside of the relationship) and trust is either tested (as a means of support when one feels uncertain) [37] or rebuilt after conflict (rupture and repair) [38].

In animals, this stage includes the building of exchanges and associations learned through repeated interactions between animals or between humans and non-humans. For humans, this process may include positive feelings around animals at home as well as parts of animal-assisted services [39–41]

In livestock this often includes positive interactions or the willingness of humans to slowly habituate animals to new stimuli. In cattle, for example, students who took the time to work with cows to habituate them to novel objects combined with positive human interactions had more favorable outcomes when faced with new challenges [42]. Horses in unfamiliar or stressful situations showed lower stress responses when a familiar handler was nearby [43] suggesting a sense of safety through familiarity but not enough to suggest a social bond.

After repeated positive associations have been built, new levels of interactions can occur within this level of trust. These levels are still in line with economic exchanges and grow from Information-Based to Knowledge-Based [28] to facilitate ongoing collaborations that are mutually beneficial. In the human-animal world, such examples can be seen where fishermen and dolphins have learned to work together to increase catch and feeding opportunities on local fish [44]. Wild greater honeyguides have also partnered with humans to collaborate in finding beehives where both benefited from the harvest [45].

At this level of development, uncertainties and ruptures are inevitable due to inherent unpredictabilities of environments and responses/reactions. Stress, whether intentionally integrated into the interactions or accidental, will be an inevitable part of a relationship between two beings [46]. This includes conflict, social disruptions, or disagreements. According to research in human psychology, the role of trust becomes even more important as the degree of conflict or relational disruption increases [47].

The resolution of these stressors will come into play at this stage of trust and relationship building. Conflict resolution, or the temporary dissolution and restoration of trust, is evident in most social species with preferred partners often engaging in affiliative behaviors after conflict [14], a behavior aligned with social stress responses of tend and befriend [48–52].

When human relationships are disrupted due to conflicts, individuals are likely to attempt reconciliation if the future of the relationship requires ongoing connection and collaboration [53]. Reconciliation (affiliative behaviors that occur between two members who were in conflict) also takes place between other social species such as lemurs [54], other nonhuman primates [55], wolves [15], and other social species [14].

The disruption of trust can occur as an accidental occurrence (e.g. environmental stimuli that becomes associated with the partner) or as a result of interactions within the dyad. The disruption of trust may be accidental (e.g. accidentally tripping on a cat) or deliberate (the use of positive punishment in training). The other in the pair may not know if the occurrence of aversive interactions was deliberate or accidental. The result, however, may be a disruption of trust. For example, dogs are less likely to follow the cues of an inconsistent informant when following signals for treats [36,56], suggesting that previous interactions build on trust. Furthermore, dogs from aversive training programs showed more stress behaviors than those from positive training methods [57] potentially linking stress with human interactions and affecting trust towards humans. Additionally, as a means of rebuilding and reconciling after conflict, dogs have been shown to demonstrate affiliative behaviors towards humans after conflict as a sign of reconciliation [58].

Trust building, disruption and reconcilation are not limited to humans and domestic animals. Some species of cleaner fish have evolved to learn how to cooperate, demonstrating that fish can develop levels of relationships with different species [59]. Cleaner fish are more likely to engage in beneficial (less cheating) behavior when interactions are more regular with clients [60] aligning with predictability and consitency in building trust and working relationships. Additional experiments with cleaner fish also indicated that feeder fish can learn from the behavioral responses of their clients

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under experimental conditions if their behavior is undesirable [61], thereby building trust or reconciling.

3.2.3. Stage 2 - Considerations

At this level physical safety is still assessed over repeated exposure (time) spent in closer proximity to the other. This stage includes more physical interactions where touch (from humans or others) is often part of the interaction. In this sense, the ability for the animal to choose the type and duration of interaction may also play a larger role in continued development of trust based on ongoing mutual communication [62]. Much like in Stage 1, the level of disruption the relationship can withstand is only as great at the level of trust achieved (i.e. the relationship cannot withstand more disruption that the level of trust built to this point).

3.3. Stage 3: Deeper Relationship and Friendship

At the deepest level, two individuals establish a relationship that is based on mutual vulnerability, emotional affect, and shared support [28,63]. Repeated interactions over longer time periods provide not only associations and predictability (or lack thereof), but also facilitate opportunities for alignment of values, mutual goals, and emotional affects (Affect-Based Trust) [28] that can result in both emotional and physiological changes in partners [64,65]. When considering the quality of the components of friendships at this level, human research indicates that support of the other's goals and autonomy are among the most important components of friendship [66].

At this level, two bonded individuals have built physical safety and have undergone the slow growth of psychological safety. This includes the experience of rupture and repair that helps individuals recognize that predictable physical and psychological safety within the relationship with an individual are stable despite uncertainties that occur within or outside of the relationship. Under these circumstances, humans and animals will associate their friends with physical and psychological safety if other uncertainties are present. This means they will gravitate towards their friends under stressful conditions to find comfort in social interactions [48–52].

3.3.1. Stage 3 – Associated Interactions – Time, Proximity, and Seeking Safety

During the initial stages of relationship building, both individuals in the relationship built trust though repeated choice of spatial sharing (proximity) over time, thereby creating associations of close spatial proximity with both physical and psychological safety. At this stage, time spent in close proximity is also an indicator of close partnership and strong social bonds. This is true for intraspecies relationships in humans and nonhuman animals [67,68] as well as in animal-human pairs [69,70]. The desire of one to seek closer proximity and remain in close proximity to another has also been observed between cats and humans [70], dogs and wolves and humans [69] and horses and humans [43].

4. Additional Factors

4.1. Subjective Experiences

Relationships and the building of relationships is a subjective experience since the stages often play out differently based on species-specific behaviors and individual differences. The subjective experience plays a key role in Domain 5: Mental State of the Five Domains [19] which includes how animals experience interactions with other animals as well as with humans. Merkies et al [33] emphasize the importance of umwelt in horse-human interactions and the role of not just individual experiences, but also the senses and perceptions of horses in horse-human interactions. History between horses and humans also influences the individual relationships since both positive and negative experiences affect future interactions [33,62,71,72].

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4.2. Hormonal Correlations

Research in neurobiology and endocrinology provides insights into some of the hormonal markers of emotional bonding. Research has shown that both oxytocin and vasopressin play important roles in familial bonding and friendship [73–77] while cortisol can often sync between two members in a bonded pair [78].

The same hormones play important roles for animals, too. Much of the research in humans was originally performed on animal subjects so there is already a large body of research on the roles of oxytocin and vasopressin in rodent species used in psychological research, especially prairie voles. Research in rhesus macaques suggests that oxytocin and vasopressin are also present and provide hormonal indications of social bonding with friends [79]. Additional research suggests that oxytocin promotes social proximity (and decreases conflict) in lions [80].

In domestic species, recent research has focused on the role of oxytocin in dogs and humans in social contexts. Dogs, unlike wolves, engage in eye-contact that can increase oxytocin and affiliative behaviors between dogs and their owners [81]. As part of the co-evolution of dogs and humans, this cohabitation and relationship development between humans and dogs may have contributed to the findings that dogs are less likely than wolves to seek reconciliation with another dog after conflict [15] but will seek reconciliation with humans [58]. In a study of dogs with owners, the co-evolution of some dog breeds combined with long-term relationships with a human resulted in cortisol levels that related to both the relationship with the owner as well as the owner's personality [82]. A well-known study by Nagasawa et al. [81] showed a positive loop of oxytocin when owners and their dogs shared eye contact as a means of shared social engagement. With regards to interspecies relationships, it's important to recognize the role of hormones and their effect on behavior and emotional associations.

4.3. Framing Training and Veterinary Treatment in Interspecies Relational Theory

Animals can experience levels of stress (whether excitement or distress) during structured human interactions involved in structured training (operant conditioning) or regular handling practices such as those in veterinary clinics. It's important, therefore, to prepare nonhuman animal partners for these types of interactions since they include close proximity, levels of uncertainty, forms of communication, and often include physical touch. All of these components require the building trust, predictability, and communication prior to exposing the animal to these stressors. This also includes providing adequate choice and room to adequately adapt to the "discomfort" and stress that are part of training and procedures. This means building the levels of trust and relationship that can withstand these levels of stress. It also means building towards friendship where nonhuman animals can find safety and comfort in their human companions during stressful or uncertain occasions. If we, as humans, are the ones acting in strange and potentially unpredictable ways, it's important to recognize the level of relationship that has been built and then engaging in reconciliation (from us to them) to build back trust in the appropriate ways and at the appropriate speed tailored to the individual.

These types of stressors and reconciliations are not unique to the relationships between humans and nonhuman animals. The cleaner fish experiment by Bshary et al. [61], for example, provides some insights into how animals can use behavioral shaping with each other when they find the behaviors of their partner to be misaligned with their own desires. Much like with humans and nonhuman animals, a level of trust must be built prior to adding stressors and reconciliation is perfomed if the trust is broken.

4.4. The Role of Choice

The literature on healthy friendships, including animal-human relationships, continues to emphasize the importance of choice and autonomy [5,66,83]. Levels of distress decreases learning and performance in animals [84,85] whereas providing choice also allows for the ability of the other

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to control their environment, their place within the environment, and types and durations of interactions with humans which can decrease stress, promote natural behavior, and increase feelings of safety [83].

Following Maslow's Hierarchy and studies on trust, autonomy is essential for individuals, both human an nonhuman to act on their own subjective associations within the development of relationships in order to feel physically and emotionally safe and to continue to act as an independent agent in building mutual relationships. This suggests that autonomy supports a larger role of intrinsic motivation rather than coercion, luring, or behavioral shaping.

5. Conclusions

As concepts of One Health and One Welfare become more popular as a way of contextualizing our effect on others and others' effects on us [4], we need to take a closer look at the types of relationships we have with other beings and how we can better understand and develop these relationships as mutually beneficial not just in production and exchange, but also at a social and emotional level. By deconstructing what we know about relationships between people and compare them to what we know about relationships and friendships in animals we can develop a sense of the components of these relationships and how they can be used in domestic settings to facilitate interactions that are seen as emotional and social growth by both humans and nonhumans. The development of an Interspecies Relational Theory provides a framework for building stronger social bonds between humans and nonhuman animals. This is especially critical in animal-assisted and veterinary fields where interspecies interactions sit at the core of the work.

Conflicts of Interest: The authors declare no conflicts of interest.

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