Play between children and domestic animals

Gail F. Melson

Play is the activity most emblematic of childhood. Children across cultures devote considerable time to play. Since the 1930's, theory (Erikson, 1977; Piaget, 1962; Vygotsky, 1967) and research have explored the significance of play for children's development. Social play, in particular, has been linked to reciprocity, empathy, perspective taking, social skills, moral reasoning, and cognitive growth (Johnson, Christie, & Wardle, 2005). Yet fundamental questions about play persist. Definitional issues remain contested (Smith, et al., 1985). Developmental effects, once seen as far ranging, are now in question (Power, 2000).

Our understanding of play has been impeded further by an overly narrow focus on selected contexts of and participants in children's play. Most attention continues to focus on peer play, that is, play between children of roughly the same age and developmental stage, with limited study of the features and developmental impact of play between children of differing ages, including siblings (Farver, & Wimbarti, 1995; Howe, Fiorentino, & Gariepy, 2003), or between parent (caregiver) and child (Fogel, 1993). Thus, both theory and research need to expand their focus to include multiple play partners and play contexts for children.

Especially missing from scholarly attention is children's play with non-human animals (hereafter, referred to as *animals*). As with many other areas of development, what I have called an anthrocentric bias (Melson, 2001) has restricted scholarly inquiry to children's interactions only with other humans. This bias obscures an important aspect of children's experiences. More broadly, attention to children's experiences across, not just within species, can aid understanding of developmental phenomena, such as play. In considering child-animal play, we can shed light on unresolved issues such as the definition of play, the features of play, and the developmental significance of play.

In this chapter, I explore children's play with animals, particularly with those most commonly kept as pets—dogs and cats. Five major questions guide this inquiry: (1) how might child-animal play be conceptualized? (2) What are the features of play between children and pets? (3) How is this play similar to and different from social play that children engage in with other humans? (4) What are some sources of variation in child-animal play? (5) What might be the developmental significance of children's play with non-human play partners such as animals? Because empirical support relevant to these questions is limited at present, my focus will be on setting out a conceptual framework and research agenda to guide future work.

The Importance of Pets and Other Animals in Children's Lives

The relative neglect in the research literature of the topic of children's play with animals is surprising, given the pervasive presence of pets as part of the ecology of childhood, particularly in North America and Western Europe. For example, in the U.S., over 75% of households report at least one resident animal. It is estimated that over half of all households in the European Union have at least one pet (Serpell, 1996). In both the U.S. and the E.U., households with children

under 18 years of age are most likely, compared to other household types, to have animals (Humane Society of the United States, 2006). Even in countries like Japan and China, where pet ownership rates historically have been lower than in North America and Western Europe, keeping animals is rapidly rising, particularly among families with children. In sum, the demographic data on animal presence within the home environments of children suggests that pets are an important component within the ecology of child development. At minimum, pets are available at home, every day, as *potential* play partners.

Beyond the home environment, animals are found within other microsystems (Bronfenbrenner, 1979) or family and community settings that form the fabric of children's lives. For example, seven and ten-year-olds included pets in their neighborhood along with those in their own homes as among the ten most important individuals to them and as among their "special friends" (Bryant, 1985). Classrooms, particularly in preschools, day care centers, and elementary schools, often have resident or visitor animals. In a survey of 37 Northern California elementary school teachers in 30 schools, 59% reported having animals in the classroom, most commonly small 'pocket pets,' such as hamsters, gerbils, and guinea pigs, or small reptiles, such as iguanas, snakes and lizards, and fish (Zasloff, Hart, & DeArmond, 1999). Rud and Beck (2003) report survey results that about half of the Indiana elementary school teachers had or wanted to have classroom pets. More broadly, places to observe and interact with animals are popular with families with children. Nature parks, zoos, and aquariums draw millions of children and their families annually, more than to any professional sports event (Melson, 2001).

There is accumulating evidence that pets are not merely present in children's home, neighborhood, and school environments, but they also play important roles for both adults and children. Parental estimates of children's time spent with pets in care and play indicate that on

average, children devote as much time to their animals as to younger siblings, if present. Moreover, children without younger siblings spend more time playing and caring for pets than do pet-owning children who have younger siblings (Melson & Fogel, 1996). These findings suggest the possibility that pets may function as outlets for play and nurture in some of the ways that younger siblings do.

Such a possibility is strengthened by findings that pet owners overwhelmingly consider their pets to be family members. For example, in a random sample of households in Providence, Rhode Island, 80% of pet owners identified their pet as a "very important" member of their household (Albert & Bulcroft, 1986). Children also identify their resident animals as family members and generally report high attachment (in the sense of feeling a close emotional bond) to their pets (Poresky, et al, 1988).

In surveys, parents say they acquired an animal principally "for the children," although other motivations also are cited (Melson, 2001). This view is strongest among adults who had pets during childhood (Serpell, 1981). Children report that their pets provide important, intimate, and rewarding relationships. Studies of social support that include questions about animals (or about "individuals," thereby avoiding an anthropocentric bias) show that children identify support functions that pets provide. For example, Furman (1989) found that elementary school age children chose ties to pets over those to friends or parents as most likely to last "no matter what" and "even if you get mad at each other." Similarly, in a study of five year olds with pets at home, 42% spontaneously mentioned their animal when asked: "Who would you turn to if you felt sad, angry, happy, or need to tell a secret?" (Melson, & Schwarz, 1994). On average, ten-year-olds named nearly two pets (M = 1.89) as "special friends" and included one pet among the ten individuals most important in their lives (Bryant, 1985).

Children not only view pets as providing social support but also as providing sources of wellbeing, in effect making children feel good. When children aged eight to twelve were asked to take photographs reflecting their own sources of wellbeing, the children included pictures of pets more frequently than did parents or teachers reporting on the children's sources of wellbeing (Sixsmith, et al, 2007). Thus, the emotional, affective, and social roles that pets play for children make it likely that these animals would be part of children's play.

Research on the contexts most likely to elicit children's play directs further attention to animals. Rubin, et al., (1983) identify the features of play-friendly contexts: availability of play partners or engaging materials, child-directed choices, and a secure environment where basic needs are met. Pets are not only present in the majority of children's environments, as discussed above, but they are readily available. Children's interactions with pets, once basic safety concerns are met, are generally not structured by adults but are child-directed. Finally, there is evidence that children may derive a sense of security from pet presence and attention (Melson, 2001).

Children's involvement with pets takes place within the context of attentiveness to animals in general. The *biophilia hypothesis* (Wilson, 1984; Kellert & Wilson, 1993; Kellert, 1997) posits that because humans coevolved with other life forms, humans have an innate predisposition to attend to living things. There is accumulating evidence in support of this hypothesis. Infants, toddlers, and preschoolers respond with heightened interest to unfamiliar live animals as compared to unfamiliar adults (Ricard & Allard, 1992), or novel toy animals (Kidd & Kidd, 1987; Nielsen & Delude, 1989). This differential attentiveness means that animals, when present, are likely to be salient aspects of a child's environment.

Defining Child-Animal Play

Children's play with other humans has been notoriously difficult to define, but often easy for observers to recognize (Smith, Takhvar, Gore, & Vollstedt, 1985). Nonetheless, there is general consensus (Rubin, et al., 1983; Spodek & Saracho, 1987) that common characteristics of play include: intrinsic motivation (satisfaction in the activity itself), child versus external control, flexibility and creativity, active engagement by the child, and a quality of "playfulness," i.e., physical, social, and cognitive spontaneity. Others, from Parten (1932) to Elkind (2007), have conceptualized play in terms of a typology of categories. This typology generally distinguishes among manipulative or exploratory play (with toys or other objects), practice play, and social play of varying degrees of coordination, symbolization, and organization (Pellegrini, & Bjorklund, 2004; Smilansky, 1968). Definitions of play among animals—the young of many non-human species spend considerable time in play—show many similarities with those proposed for child-human play (Power, 2000).

As Bekoff and Byers (1998) note, inter-species play, like play among con-specifics (individuals/organisms of the same species), also is easy to recognize but difficult to characterize. Two approaches may be distinguished: (1) an *ethological* approach that defines play behaviors based on close observation of human-animal interaction; and (2) a *social constructivist* approach emphasizing human creation of meaning. In the first approach, certain observed behaviors occurring between child and animal are labeled 'play.' In the second approach, the child's intentions, understandings, and 'creation of meaning' (e.g., we are now "playing") are most important (Samuelson & Johansson, 2006).

From the ethological approach, Horowitz and Bekoff (2007) provide a useful definition of human-animal play, “Voluntary, coordinated behavior, which often follows 'routines' or games

containing identified play behaviors that last for two or more turns by each participant." They derive this definition from observations of adult human play with dogs in which examples of *routines* include object retrieval games (fetch), object possession games (tug-of-war), feigning games (wrestling, growling), and parallel behavior (running alongside one another) (Horowitz and Bekoff, 2007).

The second, social constructivist, approach considers participants' intentions and meanings as crucial in defining an interaction as play. Many animal species use specific behaviors as play signals of the intent to play (e.g., the dog's play 'bow') or intent to stop playing (Power, 2000). Similarly, children employ behavioral, affective, and cognitive signals that frame an interaction as play. Thus, the two approaches—ethological and social constructivist—are complementary rather than opposing. Specific behaviors, such as play signals, can reliably portray internal states of intention and emotion.

Definitions of child-animal social play may be compared to definitions of child-human social play. The features characteristic of the child-human social play—creative, releasing, reciprocal, symbolic, communicative, unpredictable, joyous, and with an 'as if' quality (Samuelson & Johansson, 2006)—overlap considerably with both the ethological and social constructivist approaches to defining child-animal play.

However, because play signals and other play behaviors evolved within species for play between con-specifics, there are particular challenges in defining and understanding interspecies play. Children must 'read' the intentions and affect of an animal from its behaviors and vocalizations, and vice versa. When children accurately do so, one might define the interaction from the perspective of both participants as play. However, children also may impose a play

frame on interactions with a pet. (Of course, inaccurate 'reading' of the play intentions of another human also occurs.)

The tendency to impose a play frame on interactions with pets may stem from several sources. One reason is the well-documented human inclination toward *anthropomorphism*, whereby nonhuman behavior is characterized in terms of human feelings, thoughts, and actions (Guthrie, 1997). Thus, a parrot tilts its head and its owner believes this is evidence of puzzlement. A dog licks its owner's hand and its owner is sure it is a sign of affection.

Although humans tend to anthropomorphize broadly, attributing intentions and feelings to computers, machines, cars, and even abstract blobs, pets and domestic animals have features that especially elicit anthropomorphic attributions. Those species more similar to humans—mammals, for example, in contrast to invertebrates—are more likely to be anthropomorphized in Western cultures (Eddy, Gallup, & Povinelli, 1993; Horowitz & Bekoff, 2007). Moreover, attributions of human characteristics are likely to be directed toward species that show *neoteny*, or the persistence of juvenile features, such as large round eyes and a disproportionately large head relative to torso. Apart from physical cues, behaviors such as autonomous, goal-oriented, and adaptive movement reliably elicit biological and psychological attributions. Even videos of two-dimensional shapes (Scholl & Tremoulet, 2000) or abstract blobs (Rakison & Poulin-Dubois, 2001) that appear to move in smooth trajectories toward an apparent goal lead children and adults to interpret the shapes as intentional agents with personality and emotions.

Both the physical and behavioral characteristics of pets and domestic animals make them prime candidates for anthropomorphism. Indeed, children (and adults) overwhelmingly attribute psychological states (e.g., intentions), emotions, and personality to pets (Melson, et al, 2009). While this is true across species commonly kept as pets, dogs and cats are particularly likely to

be seen as full social partners, at least potentially. From the social constructivist perspective, these anthropomorphizing attributions mean that children can and often do construct the meaning of interactions with animals as social play, even when the animal is not engaging in play behaviors. Just as children attribute a variety of intentions and emotions to animals, children also are likely to project specific *play* intentions, emotions, and behaviors onto the animal, thus casting the animal as a social play partner.

A second reason that children may impose a play frame on interactions with pets stems from the cultural and social roles that companion animals play in human society. For many pet owners, pets are a source of amusement, pleasure, diversion, leisure activity, and fun. They are, among other things, *play objects*. Historically, the role of animals as play objects has become more salient as some of the other reasons for keeping animals—work, transportation, hunting, and food production—have waned (Grier, 2006). Hence, both children and adults frequently approach pets within a play frame.

From the social constructivist perspective, child-animal social play may be defined as: *Any interaction with an animal which the child constructs or defines as social play.* A child's play with a pet might be seen as analogous to a mother's scaffolding of social interactions with her infant (Kaye & Charney, 1981). As an example, a mother engages in ‘conversation’ with her infant, by supplying, on behalf of the infant, appropriate verbal and nonverbal responses to her social bids. In the case of a child with a gerbil, the child might rub the animal's fur, pause, observe the animal's behavior, and then say, "Oh, so you like that? You want another rub?" The child may then pause again and answer "OK." In this way, the child 'scaffolds' or provides both sides of an interactive routine.

The more limited interactive repertoire of animals (with respect to play with humans) and the dependent status of pets within human families may make scaffolded play interactions more likely with pets than with human peers or adults. In addition, the status of pets as inherently dependent upon human care is likely to affect play interactions in other ways. For example, there may not be a clear distinction between play behaviors and care-giving behaviors. Thus, in observations of children aged seven to fifteen interacting with an unfamiliar, friendly dog, petting and stroking the dog occurred frequently along with play routines such as 'fetch' with a ball (Melson, et al, 2009). Similarly, research observations of adults with their own dogs showed that the pet owners engaged in care and comfort giving behaviors, similar to those usually directed at human young. Along with play behaviors, such observations led the researchers to characterize the behavior of adult pet owners as "interspecific parental behavior." (Prato-Previde et al, 2006).

Characteristics of Child-Animal Play

From the ethological perspective, Horowitz and Bekoff (2007) have identified key features of human play with dogs: (1) regular and reliable mutual responsiveness, including coordinated joint attention; (2) behaviors signaling intent to play or to stop playing; (3) mutuality, in which each play partner reacts dynamically to the actions of the other; and (4) contingent activity, in which each partner reacts to what the other has just done. However, these features may not provide a full taxonomy of human social play with dogs, since the observations were of adults, not children, interacting with their own dogs in outdoor spaces such as dog parks. Laboratory observations of children during a short 'free play' time with an unfamiliar but friendly dog observed 'tummy rub' routines of dog inviting petting by rolling on its back, and the child

rubbing the dog's proffered stomach and petting the dog while scaffolding a conversation (Melson, et al, 2009). Different contexts may elicit different play routines with dogs.

Species differences also are important. Dogs, compared to other species including primates, are particularly skilled in interpreting human social signals because dogs have co-evolved in human environments (Hare & Tomasello, 1999; Miklosi, Topal, & Csanyi, 2004). Thus, the observed coordinated, responsive, mutual, and contingent routines are unlikely to occur when children play with pets such as cats, rabbits, hamsters, gerbils, lizards, etc. In the case of these species, we might expect children more frequently to exhibit scaffolded play routines, in which the child provides, usually in a pretend fashion, the responses of the play partner.

The existence of such anthropomorphism and scaffolding should not lead us to assume that child-animal play is equivalent to children's play with stuffed animals or toys. From infancy, children perceive and respond to animals as other subjectivities or persons. As Myers (2007) notes: "Crucially, animals are social others not as if they were simply behaving inanimates, but rather because they display the hallmarks of being truly subjective others" (p.10). Myers' (2007) observations of preschool children responding to various species underscored children's attentiveness to and fascination with an animal's distinctive repertoire of behaviors—the snake's slither or the turtle's crawl—and children's use of these behaviors as the basis of interactions with the animal.

Types of Child-Animal Play

Existing typologies of play, derived from observations of child-child interactions, are helpful frameworks for hypothesizing about categories of child-animal play. Again, there is a paucity of empirical research on this topic.

Manipulative, Exploratory Play with Animals

Parten's (1932) typology identifies solitary, independent play with objects as the first "stage" of play. Others have defined this type of play as "sensori-motor," "exploratory," or "mastery" (Elkind, 2007). It is now clear that such play is developmental and remains a type of play activity present alongside later 'stages' of play. Do children treat living animals as toys or novel objects, engaging in exploratory, sensori-motor play with them? Existing evidence, while limited, suggests that generally, the answer is: "No." Even children under one year of age differentiate their behavior toward living things from toys or other inanimate objects (Nielsen & Delude, 1989). Exploratory, manipulative behavior is higher with objects than with unfamiliar living animals. Detailed classroom observations of preschool children with animals find that the children treat the animals as other subjectivities, with intentions, feelings, and autonomous behaviors, rather than as objects (Myers, 2007). Comparison of seven to fifteen-year-old children's unstructured "play time" with robotic dogs (objects designed to emulate living animals) and unfamiliar living dogs shows that manipulative, exploratory behavior is relatively high with the robotic dog, but it almost non-existent with the living dog (Melson, et al, 2009). There is little evidence that children interact with living animals in ways that parallel exploratory, manipulative behavior with toys or other objects. The default response to an animal is as a social other.

Some instances of exploratory play with animals, treated as novel objects, can occur with young children. Without adult supervision, young children may respond to an animal in ways that endanger the animal's welfare, for example, pulling on a cat's tail, or dumping fish out of a fishbowl "to see what happens." Such behaviors should be distinguished from cruelty toward

animals, which is defined by indifference or pleasure at the suffering of an animal (Ascione, 1998).

Social Play with Animals

Since children engage animals, both familiar and novel, as other subjectivities, most child-animal play is inherently social. As noted above, dogs can and do participate as social partners in routines such as "fetch" and "catch." Dogs are more adept, even than other primates, in maintaining joint attention with a human, signaling play intentions and behaviors and coordinating play interchanges. Other animal species are less finely attuned to human behaviors.

Most child-animal interaction differs from human interaction in specific ways that may be expected to influence child-animal play: (1) the animal is experienced as a distinct subjectivity (given qualities such as feeling, beliefs and desires created in the mind of the child) different from other humans, other living things (e.g. plants), or objects, both natural and constructed; (2) the animal's contribution to interaction is nonverbal; (3) individual species of animals have distinct repertoires of movement and interaction, what Myers (2007) calls "characteristic vitality" (p.11); (4) because animals, with the possible exception of dogs (see 'routines' above), cannot participate fully as social partners, children play an active role in structuring and constructing social play encounters; (5) because pets are dependent on human care, interactions with them often draw on the repertoire of parental care-giving behaviors, making play with and care of an animal less clearly distinguished (Prato-Previde, Fallani, & Valsecchi, 2006).

Illustrations of social play with animals, observed in young children (Myers, 2007), may help to convey the unique features of this type of play. One example is *animal-embodiment*, whereby a child pretends to be an animal and plays with the animal as with a con-specific. This can also

occur in the absence of the living animal, when several children take on animal identities in *animal pretend* play. Another is *play with objects*, such as dangling a string for a cat to swat, or offering a ball to a dog. A fourth might be called *animal conversation*, as described in an example of scaffolding above, in which the child talks with the animal, supplying both halves of the conversation.

Sources of Variation in Child-Animal Play

At least four classes of variation can be distinguished: child characteristics, animal characteristics, relationship characteristics, and situational characteristics.

Child Characteristics

Developmental stage, as indexed by age, has been related to children's understanding of and behavior toward animals (Melson, 2001). Research on the development of naïve biology, or conceptions about animates versus inanimates, indicates that preschoolers view self-initiated movement as part of the essence of animals but not machines (Gelman & Gottfried, 1996) and attribute the causal mechanism of such movement to 'vital energy' or life force (Inagaki, 1997). According to Inagaki and Hatano (1996), children generally construct a vitalist biology by ages 5-6 and an intuitive particulate theory of inanimate matter between 8 and 12 years old. These underlying understandings lead children with increasing age to become more aware of the distinct behavioral repertoires of individual animals and to adapt their behaviors accordingly. Emerging conceptions of naïve biology, naïve psychology, and naïve physics influence children to treat living animals as autonomous, self-directed beings with intentions, emotions, and thoughts.

In addition to a child's developmental stage, behaviors with an animal may reflect the individual child's temperament, experience, and adaptive behaviors. There is limited evidence at present to support this hypothesis, however. For example, attachment to one's pet predicted some differences in seven to fifteen-year-olds' behaviors toward and cognitions about an unfamiliar but friendly dog during a short play session (Melson, Kahn, Beck, & Friedman, 2009). Specifically, children who were more strongly attached to their pets directed more verbalizations including greetings, commands, and questions toward the unfamiliar dog. Pet attachment was associated with children's attributions of mental states and moral standing. Children with higher pet attachment (as compared with pet owning children with lower attachment) were more likely to describe the unfamiliar dog as having intentions and feelings (mental states), and the children judged the dog as more deserving to be treated fairly and justly and kept from harm (moral standing).

Children with specific disabilities respond with recognizable patterns of interaction to a therapy dog. In observations of children and adolescents with anorexia, bulimia, anxiety disorder, or autism with a therapy dog, distinct patterns of interaction allowed observers, blind to the child's diagnosis, to correctly assign 77.5% of the children to their diagnostic group (Prothmann, et al, 2005). Children with autism engaged in many brief interaction episodes while children with anxiety disorder interacted less often but for longer periods.

Animal Characteristics

Little is known about how animal characteristics—species differences and individual differences within species—might affect children's behaviors, including play behaviors with animals. Naturalistic observations of preschool children with various species of classroom animals showed that the children were sensitive to the varying behavioral repertoires of the species

present—turtles, snakes, gerbils, etc. (Myers, 2007). Parents, in their choice of companion animals, place emphasis on the right 'match' between the animal and the child's needs (Melson, 2001), indicating a broad belief that children respond differently to animal characteristics. Case studies of children's responsiveness to therapy animals are replete with examples of children who differ in their reactions to different species and to individual members of the same species (Melson, 2001).

Relationship Characteristics

Although supporting research is currently lacking, it can be hypothesized that as with any relationship, over time a child and his or her pet would develop a distinct pattern of mutual responsiveness. The play routines of dog and dog owner observed by Horowitz and Bekoff (2007) imply that over time and experience, the two play partners have coordinated and integrated their behaviors into mutually satisfying 'games' such as 'catch' and 'fetch.' To properly document the dynamic relationship patterns of humans and animals in play, there is need for longitudinal research, particularly during the early stages of the relationship.

Situational Characteristics

The context of interaction is likely to be influential in a number of ways. Some situations are framed as "play," and when both participants enter that frame, they would be expected to engage in play behaviors. Second, as noted earlier, there are specific cultural and social contexts that encourage human-animal play responses. Consider a pet owner taking his or her dog to a dog park "to play" and then taking the same dog to the veterinarian for shots. Finally, some animals are viewed by their owners as primarily objects of play and companionship, while other animals have working roles, such as hunting dog, sheep-herding dog, therapy dog, barnyard mouser cat, or race horse. While play behaviors occur between humans and those animals who 'work' for

them, it is likely that both the frequency and quality of play may differ depending on the context of the human-animal relationship. Again, the paucity of research leaves us with speculation on this point.

The Developmental Significance of Child-Animal Play

The contributions of play to children's development continue to be explored and remain subject to debate. As Power (2000) notes, "play is not *essential* for normative development, but instead has evolved as one pathway through which individuals can learn about their environment, establish relationships with others, and practice and refine skills that facilitate their survival or otherwise increase their reproductive success…its effects on development may be general and/or specific" (p.8).

Building on Power's (2000) conceptualization of play as one among many pathways in development, a number of questions about child-animal play in relation to children's development can be posed: (1) Are play experiences with animals compensatory, additive, reflective, or unrelated to play experiences with other humans, especially other children? The theoretical rationale behind much animal-assisted therapy with children is that guided therapeutic play experiences with animals can *compensate* for dysfunctional or abusive experiences with humans (Fine, 2006). However, the *additive* hypothesis should also be considered. Perhaps play experiences with animals provide certain unique enrichment not readily available in human-human interactions. For example, play with animals relies on the non-verbal channel (at least from animal to human) and requires 'reading' the behavioral signals of a different species, thereby perhaps contributing to perspective-taking and empathy development (Daly & Morton, 2006). Similarly, children may have opportunities to engage in specific types of play, such as

rough and tumble play, with certain animals. Alternately, the *reflective* hypothesis is also tenable. Specifically, the child-animal play experience may reflect or be a consequence of the child's development in other areas. Thus, a child who is already more skilled in perspective-taking and empathy may thereby be more able to "read" an animal's play signals. Finally, the *unrelated* hypothesis suggests child-animal play may be unrelated to other types of play and also unrelated to developmental outcomes of interest.

(2) Is child-animal play associated with simultaneous or delayed outcomes? Katcher and Wilkins (2000) have suggested that animal assisted therapeutic interventions generally result in symptom reduction and other beneficial outcomes only when the animals are present. They caution that developmental effects may not persist in the absence of animal. Until longitudinal evaluations demonstrate delayed or long term changes in children's development as a result of involvement with pets or other animals, this point must be taken seriously.

(3) Can child-animal play be isolated, even theoretically, from other aspects of interaction between child and animal and from the entire context? Attributing developmental outcomes to child-animal play alone may not be possible. Katcher and Beck (2006) note that children's experiences with animals, particularly educational or therapeutic experiences, almost always take place in situations with adults, perhaps teachers and therapists, and often in natural settings, such as parks. It is not possible to separate effects due to the other humans and to the setting from the experiences with the animal itself.

Limitations and Cautions

Despite the importance of animals in children's lives, the study of child-animal relationships remains in its infancy. Basic descriptive studies are lacking. The range of play experiences that

children have with pets is far from clear. There is virtually no longitudinal research to describe play within the context of child-animal relationships over time.

As scholars address these gaps in evidence-based knowledge, there are some guidelines to consider: (1) the focus on developmental effects on children should not obscure attention to animal welfare issues. We need to know more about ways that children play with animals that may harm, neglect, or not properly optimize care for the animal's wellbeing. Such findings can then aid in designing humane education efforts to support public knowledge and nurturance of animals. (2) Studies of child-animal play should adopt a dynamic systems perspective, recognizing the complexity of contextual effects (Melson, 2008). (3) Cultural, historical, and social diversity in children's relationships with animals mandate that these sources of variation be examined more closely in the study of child-animal play. (4) Children's interactions with animals should be studied not in isolation but rather in relation to children's relationships with other humans, with artifacts, such as computers and robotic pets, and with broader involvement with the natural world. Only by doing so, can we identify the unique contributions of involvement with animals to children's development.

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