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Interactions with Animals in an Educational Setting: Children's Perspectives

A B S T R A C T : This study explored how children perceive their interactions with pets raised in school premises: a) Which animals do they choose to interact with and why? (b) What goals do they set for themselves in these interactions? (c) How do they interpret and respond to the animals' noncompliance? (d) What considerations constrain their behaviors towards the animals? (e) Do they perceive interactions with animals as generally positive or negative experiences?

The participants were 15 kindergarteners and first graders (7 boys and 8 girls) who were videotaped while they individually interacted with animals in their educational institute for 20–30 minutes. They were interviewed about their experiences a few minutes later, as they watched their filmed interactions. Thematic analysis was used to analyze the interviews.

Most of the children chose to interact with small furry mammals. They attempted to establish affiliative relationships with the animals by touching, petting or holding them, or by providing them with food or shelter. However, the animals often tried to escape or were otherwise non-compliant. The children proposed four types of interpretations for the animals' behaviors: (a) Beliefs about animals' minds (b) Animals' traits (c) Reframing the behaviors as cooperative or (d) Animals' rejection of the child. The children were very careful not to harm the animals, persevered, and remained in good spirits. Overall, the children's conceptualizations of and behaviors towards the animals were guided by anthropomorphism. Socio-emotional competence and cognitive control were evident in their reasoning.

K E Y W O R D S : Animals, Children, Experiential Learning, Interactions, Persistence, Prosocial Behavior.

Introduction

Children's interactions with animals and the associated beneficial cognitive, social and emotional effects for them are mainly studied in the context of companion animals. However, interactions with pets raised in school premises is an understudied area (Hosey and Melfy, 2014; Myers, 1996). Within educational contexts, several studies showed that even short interactions with animals had beneficial effects on children's attitudes towards animals and appreciation of biodiversity (cf. Ballouard et al., 2012; Lindemann-Matthies, 2005). In addition, interactions with live animals allows children to make sense of the animal world through direct exploration (Larimore, 2020), instead of basing their ideas on books and popular media that are often very inaccurate (Beaumont, Briers & Harrison, 2019; Melson, 2001). Teachers believe that the use of live pets in the classroom contributes positively to the children's empathy, as well as their socio-emotional development (Daly and Suggs, 2010). Nonetheless, children (as well as adults) often misinterpret animals' behaviors (Meints, Brelsford and De Keuster, 2018). It is therefore important to learn about children's expectations while interacting with animals, and their interpretations of the animal's behaviors in order to plan effective learning from experience programs. From a developmental perspective, studying children's interactions with pets raised in school premises is important, since it can provide significant information about children's developing social interactions with 'others' (Myers, 1996).

Interactions with animals can have positive, negative or neutral affective quality (Hosey and Melfy, 2014). Children (as well as adults) tend to attribute human feelings and thoughts to animals (Melson, 2001; Serpell, 2003), and often perceive them as friends or social partners (Triebenbacher, 1998). Myers (1996) investigated preschool children's interactions with animals. The preschool had a toad, a guinea-pig, and two doves. In addition, turtles, snakes, a dog, ferrets, tarantulas and a monkey were brought to class on separate, single sessions. The children could observe, ask questions and interact with them under supervision. Myers (1996) concludes that children view animals as subjective agents. Each animal has its own characteristics and behaviors, and the children behave differently with each one. Furthermore, the children's behaviors towards the animals also varied. For example, some children babied the Guinea pig, whereas others teased her. It is therefore clear that both parties shape the resultant interactions. In another study, we (Axelrad-Levy et al., 2014) looked into a series of contingent behaviors between 6–8 year-

old children and pets raised in school premises, most of which were small furry mammals. Similar to Myers (1996), we found that children attempted to interact with animals in diverse forms, and that the most prevalent ones were petting, holding and feeding. These behaviors are typical of intimate and caring situations, fostering positive emotions and regulating behavior (Cekaite & Bergnehr, 2018; Montagu, 1986). However, during many of the interactions the animals were non-compliant, and in a few cases, physically unpleasant. In response to non-compliance, the children behaved in different ways: some tried to catch the animals and hold them tight; others initiated new forms of play and nurturing behaviors, talked to the animals, or returned them to their cages. The children's responses were therefore contingent upon the animals' behaviors, but they were not determined by them. Instead, they were probably shaped by the children's interpretations of the animals' behaviors, their own goals, readily available means, and perceived likelihood of success and risks. It became evident that the children's own perspectives on their interactions with the animals need to be studied.

The aim of the current study was to learn about children's perceptions of their interactions with pets raised in school premises: What goals do they have? How do they interpret animals' behaviors and decide how to respond to them? We videotaped kindergartners and first graders' interactions with animals in their educational institute, and then interviewed the children as they watched their filmed interactions. We analyzed the interviews in order to find out: (a) Which animals do they choose to interact with and why? (b) What goals do they set for themselves in these interactions, and to what extent are they successful in achieving their goals? (c) How do they interpret and respond to unsuccessful attempts? (d) What types of considerations constrain their behaviors towards the animals? (e) Do they perceive interactions with animals as generally positive or negative experiences?

Method

Participants

The participants were 15 children, 8 girls and 7 boys from an upper middle class neighborhood in Jerusalem. Seven were kindergarteners (4 boys, 3 girls) and eight were first graders (3 boys, 5 girls). Their ages ranged from 5;07 to 7;04 (M = 6;04, SD = 6.14 months). This cohort was a convenience sample. The children were recruited by their teachers, who were asked to choose children with typical development (i.e. without any major health or psychological problem/diagnosis).

Data Gathering Processes

This research was approved by the Ministry of Education's IRB, and the parents signed consent forms before the children were approached. We asked the children to help us learn about animals from children's point of view. We told them that their participation was voluntary, and that they were free to leave at any time.

The school in which the study took place is attached to a teacher education college that has an 'educational zoo'. The idea of the educational zoo is relatively new, having emerged in Israel in the past twenty years (Mayyan, 2013). The construction of the educational zoo is based on the theoretical ideas about the safe and protected potential therapy space proposed by Winnicott (1971). It is a relatively small physical space surrounded by a sealed fence, or a large room in which the animals live in big cages. The animal food is kept in containers hold, there is a kitchenette for preparing food, and materials that can be used to create essential objects from the point of view of the young people for the animals (such as: a hideout, playground, toilets, food containers).

Over the past two decades, an innovative type of animal therapy has emerged in Israel – that of the educational zoo. Young people enter these enclosures and share the space with a large variety of animals – mammals, reptiles, and fowl – that are both domesticated and tame (Parish-Plass & Bar-On, 2013). The leading criteria mentioned in the literature guided us in choosing the animals. (a) All were domesticated animals, raised in a human environment and supervised by a veterinarian; b) Animals that could be appropriately cared for while maintaining their wellbeing and ethical standards; c) They were small, diverse, and a permanent collection of species that evoke free associations, transferal issues, and patterns of behavior (e.g., rabbits – dependency, mice – disgust, hamster – loneliness, snake – fears, tortoise – home, animals' offspring – nurturing).

The animals in our 'educational zoo' are mainly domestic animals: 5 rabbits, 6 cavies (guinea pigs), 4 chinchillas, several hamsters, 15 mice, 2 cats, 2 cockatiel parrots and two corn snakes. Only the snakes are considered wild animals. Our snakes are at list 10 generations in captivity. All but the cats are in cages. They are hand-raised, habituated to handling by people, and are supervised by a veterinarian. We follow the WAZA (World Association of Zoos and Aquariums) standards and guidelines for animal welfare. We also follow the guidelines of EAZA, the European Association of Zoos and Aquaria, and regularly monitor every individual animal, their behavior, habitat use, and appearance, in order to improve their welfare (Wark et al., 2019).

Interactions with animals took place at the educational institute's 'educational zoo'. A year before this study began, the children became familiar with the animals over the course of a few guided visits, accompanied by a teacher or teacher in training. The children participated in project-based learning. Each guided group selected an animal and conducted a weekly study of that animal over a period of one semester.

The 'educational zoo' is padded with acoustic fabric and five video cameras and microphones are installed at fixed spots. Following their consent, each child was picked up from school by the third author and taken into the 'educational zoo'. The third author is a certified animal assisted therapist and educator. She was trained to notice the children and animals' stress manifestations and behave accordingly. The third author and the 'educational zoo' were familiar to the children because they took some classes there as part of their regular school curriculum. Before they interacted with animals, they were informed that they were being video-taped and were shown the five cameras placed around the room. Then, they interacted with the animal(s) they chose for 20 (kindergarteners) to 30 (first graders) minutes, while the third author watched out for their and the animals' safety. She responded to children's requests but did not initiate activities.

After the interaction was over, the children were given a 15-minute break. Then they proceeded with the third author (henceforth, the interviewer) to a quiet office for the second part of the study, the interview. The goal of the interview was to explore the children's subjective experiences and interpretations of their interactions with the school raised pet animals. In the beginning of the interview, the children were informed that the interview was being recorded by an audiotape, and after receiving their consent, the children were instructed to watch their video recordings via a computer screen and to freely stop whenever they wanted to comment. They were also told they could go freely back and forth and switch between the five cameras' viewpoints. The interviewer followed up on the children's comments with questions regarding their goals, actions, thoughts and feelings. In addition, the interviewer stopped the video whenever she felt a significant event was taking place and asked for the children's explanations. Near the end of the interview, the children were asked to rank their overall feeling during the interaction session on a scale from 1 (very unpleasant) to 10 (very pleasant) and provide a title to their 'movie'. Upon completion, the children were thanked and escorted back to their classroom.

Data Analysis

In this study, we only analyzed the interviews that took place after the session with the pets raised in the school. We used thematic analysis (Braun and Clarke, 2006; Soldana, 2016). Although thematic analysis is often conducted as a component of other qualitative research methods, it can also be viewed as a research method in its own right that is particularly assign to them (Braun and Clarke, 2006).

First, we watched the children's video-recordings, listened to the i audio-recordings of the interviews with them and read the transcriptions thoroughly. In order to describe the children's comments as concerning particular events, we divided each interview into sections (Soldana, 2016) which we named 'episodes'. An episode is a topic-centered discourse (Sperry and Sperry, 1996) about a specific event or state of affairs during the children's interactions with the animals. Following the Aristotelian unities of time, place, and action, each episode refers to a particular combination of time, place within the 'educational zoo', feelings of the participating animals and children feelings and goal directed actions. An episode begins when the screening of the video-recording is paused and the child and interviewer start talking, or when at least three of the abovementioned aspects change. When only two of the aspects changed, we discussed the extent to which the new aspects were developed well enough to be treated as a separate episode. Episodes end by a verbal announcement (for example: 'and this is all I have to say'), by a long silence during which the video plays forward, or by introducing a new topic. Parts of the discourse that do not belong to an episode (for example, discussions of technical aspects of the video-recordings or the children's descriptions of their social activities) were not included in further analysis (Soldana, 2016). Such digressions could occur beyond, as well as within, episode boundaries.

This division of each interview text into episodes enabled us to identify individual experiences or events, follow the conversation turns that relate to them, and interpret ambiguous child expressions by referring to previous or later expressions within the same episode. After we identified all the episodes, we started the analysis by coding the children's choices of animals, as well as their comments about reasons for choosing these animals. Then, we carefully coded the children's stated goals while they were interacting with the animals: touching, picking up, holding, petting, playing, feeding, etc., and self-attributed degrees of success in achieving them. The children's descriptions of the animals' characteristics were coded and then grouped into pleasant and unpleasant. For example, having soft fur was described as pleasant, whereas having sharp

claws as unpleasant. The animals' behaviors were coded and then grouped into those referred to as compliant behaviors (such as eating the food the child provided) and non-compliant behaviors (such as running away from the child). In addition, we coded the children's expressed concerns for themselves or other people, as well as for their chosen and other animals. The children's disclosure of deliberately refraining from actions that may harm the animals (such as stepping on their tail) were also noted.

As we were looking for themes, we identified that trying to form affiliative relationships with animals is a central theme that can explain the children's stated goals in many of the episodes, and that their attempts were often met with animals' non-compliant behaviors. At this stage, we returned to the data and coded the children's cognitive interpretations of, and behavioral and emotional reactions to, the animals' non-compliant behaviors. These responses were also analyzed linguistically, looking at linguistic hedges, lexical choices, syntactic structures and pragmatic turns as indicators of the children's emotional states and as a means of regulating them.

Coding proceeded in repeated cycles, going back and forth from data to codes (Braun and Clarke, 2006; Soldana, 2016). In every phase of the analysis, each of us, the four authors, analyzed the transcriptions individually, then we discussed our differences, refined the code definitions, re-checked previously coded data and finally reached an agreement.

Results

The chapter has five sections: (a) Choosing animals, (b) The children's attempts to establish affiliative interactions with the animals they chose, (c) The children's interpretations of and responses to the animals' non-compliant behaviors, (d) The considerations that constrain the children's behaviors towards the animals, and (e) The children's overall satisfaction with the interaction activity. Figure 1 represents these themes and their relationships schematically and will be referred to throughout the chapter. In the following, 'I' refers to the interviewer and 'C' to the child. The interview extracts were translated from Hebrew.

(a) Choosing animals

The children seemed to prefer small furry mammals. The animals that were most frequently chosen were chinchillas (7), rabbits (6), hamsters (6) and guinea pigs (4). The numbers in parentheses refer to the number of children who interacted with each type. The snake was chosen by three boys. None of

Choosing animals:

Small furry cute mammals, or unfamiliar and interesting

Constraining concern

Children's own safety

Children attempt to establish affiliative relationships with animals

through touching, feeding, building a house, playing

BUT

most animals are non-compliant: they run away, hide, don't eat and don't stay where the children want them to be

Constraining concern

Animals' safety

Children's interpretations:

Beliefs about animal minds:
The animal is frightened
It forgot who I was
Animal's traits:
The animal is a coward
All the animals here are runaways
Positive reframing:
The animal is playing hide and seek / catch with me
Rejection:
The animal doesn't want to be my friend

Behavioral responses

Persistence
Attempting other ways to interact with the animal
Replacing the animal

Emotional responses
Downgrading negative feelings
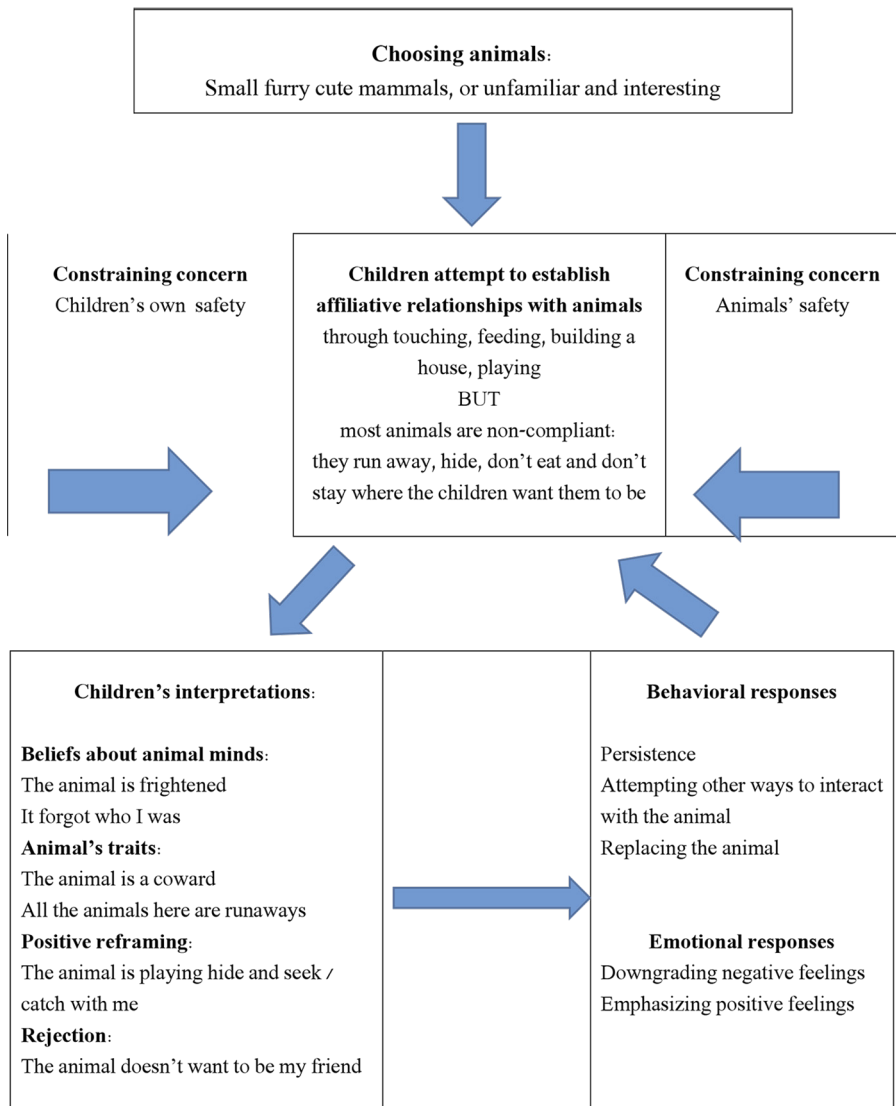Emphasizing positive feelings

Figure 1. Children's interactions with animals

the children chose a cat or the parrots. About a half of the children chose one type of animal, whereas the others interacted with two – five types. Only 10 of the 15 children provided reasons for choosing an animal. The most frequently mentioned reasons for choosing an animal were related to its external

characteristics: cute (4), pretty (2), small (2), pleasant to touch (1) or easy to pick up (1). The numbers in parentheses refer to the number of children who mentioned these reasons. The children also chose animals because they were unfamiliar (4) or piqued their interest (3). Interestingly, two of these responses were related to snakes: One boy wanted to find out whether the snake had shed snakeskin (sloughing) in its cage, and was influenced by Harry Potter, as he wanted to find out what effects looking into the snake's eyes would have. The second boy said he used the computer to search information about snakes. The third boy said he chose the snake because he likes dangerous animals.

(b) The children's attempts to interact with the animals

All of the children (but one, who chose a snake) had at least one episode in which they tried to interact with the animals they chose and establish affiliative relationships with them (see figure 1). The most common type of interaction attempts was trying to touch the animals in diverse forms: touching, petting or picking the animal up and holding it. In some cases, petting the animals was a soothing experience: '*I love chinchillas very much and petting them is fun… They are very pleasant*'. However, these attempts usually failed, as the most typical response of the animals was trying to flee.

> I: *So, I would like to understand, was it pleasant to be with them or unpleasant?*
> C: *Pleasant… Even though they escape, it is still possible to touch them while getting them back or while catching them or in the very beginning*

The children perceived the diverse forms of touching the animals as ways of bonding with them. Therefore, chasing the animals was described as an unpleasant experience

> I: *Can you help me understand or tell me how it was to be with them?*
> C: *It was a little difficult.*
> I: *What was difficult?*
> C: *To take the guinea pigs out…*
> I: *Was it difficult to take them out?*
> C: *Yes, and to catch them in order to take them out.*
> …
> I: *And how was it for you to be with them when it was like difficult to catch them?*
> C: *Really, it was not so pleasant*

Holding the animals and petting them was also an attempt to play with the animals. One child, for example, chose to play with a snake. He put it around his neck, and seemed fine, but when he was asked about it, he said:

C: *I really don't know how to play with a snake… How will I play with it? Put it on my neck for two hours until it soars?*
I: *It sounds like it is not very pleasant to have it on the neck. It's difficult*
C: *It is also cold, hard. It is not very pleasant and it pricks you with its scales.*
…
I: *But in the end you stayed with it all the time*
…
C: *The only thing I thought to do with it is to caress it. What could I do?*

Another form of reciprocal interaction attempt was taking care of the animals by feeding them or building a house, a shelter for them. In these cases, compliant behaviors were eating or using the house.

I: *What did you want them to do with what you built for them?*
C: *I wanted them to have such a house and a place to relieve themselves and such. I wanted them to feel comfortable like our house, and I also wanted it to be much easier for them*
I: *And did they enjoy it? Was it comfortable for them? Did they use the house?*
C: *They used it a little, but they didn't exactly drink.*

The children were disappointed when they felt their interaction attempts were not reciprocated by the animals, even when animals' behaviors appeared compliant to the observer. For example, one of the children caressed a chinchilla that did not run away. When the interviewer asked her what she was trying to do, she said:

C: *I tried to make the chinchilla love me*
…
I: *How did you try to make it love you, can you describe that for me?*
C: *To caress it, to make it feel pleased*
I: *Do you think you succeeded, [do you think] that it loved you?*
C: *No.*
I: *No? How do you know?*
C: *Because if it had loved me, it would have followed me all the time, for sure.*

(c) Children's interpretations of and responses to animals' non-compliant behaviors

When confronted with the animals' unexpected and non-compliant behaviors, the children tried to interpret them. As can be seen in figure 1, we identified four types of interpretations:

(1) *Beliefs about Animal Minds*

The children often tried to imagine how the animals felt when they were approached by much bigger entities who entered their private space, disrupted their activities and picked them up. These descriptions helped them explain that the animals were non-compliant because they were frightened or angry.

> C: *At the beginning it was the most fun, when they were calm.*
> I: *When they were calm?*
> C: *And then they started to run around.*
> I: *Do you have any idea why they suddenly started to run around?*
> C: *They understood that someone was coming. I also once saw them [my parents] coming to pick me from a friend and I wanted to stay.*

One of the children expected a hamster to remember him, because they interacted during the previous year. He concluded that the hamster was non-compliant because it forgot who he was. He decided that next time he would bring a photograph that was taken on the previous year, showing them together, in order to help the hamster remember and resume their friendship.

(2) *Animals' traits*

Some of the children thought the animals were non-compliant because they were cowardly and tried to escape.. Most of those who tried to replace their chosen animals with others found out that many more animals were similar in this respect.

> C: *I said… maybe I should take it because it is the most beautiful and cute, and I took it, the first rabbit, and then I saw it was a coward and I took another one out, and then another one and another one, and then I had an idea to take them all out.*

(3) *Reframing the behaviors as cooperative*

Many children tried to see the bright side of the animals' non-compliant behaviors. In the previous example, the child tried to take a rabbit out but it ran away. She named that rabbit 'a coward' and tried to replace it with other rabbits, but they all fled away from her. She then decided to reframe her goal

as taking all the rabbits out, and that was obviously successful. A very typical form of reframing was explaining the animals' running away as a form of 'hide and seek' or playing 'tag'.. Nonetheless, the children's descriptions disclosed that these positive interpretations did not capture the whole experience, and that they were aware of that.

> C: *There was a part that was not real fun.*
> I: *Yes…*
> C: *But it was also fun, so-so, to run after the chinchilla that didn't let [me] touch it when it was about here, and then I managed to catch it.*
> I: *Aha, so running after it was not much fun but a little fun too?*
> C: *Yes.*
> I: *Can you explain to me why that's not fun?*
> C: *Why it was not real fun? Because I wanted to be with it, not to chase it all the time.*
> I: *Ah, and how come it was also fun in spite of that?*
> C: *And how come it was fun? Because sometimes I'm used to playing like that… playing 'tag'*

(4) *Animal's rejection of the child*
　　One child thought the animal did not like her. As described above, she tried to make the chinchilla love her by petting it and trying to make it feel pleased.

> I: *And what do you think about that it doesn't always follow you?*
> C: *I don't know, I didn't succeed in having it as my friend.*

　　In accordance with their interpretations, the children continued trying: some persisted with the same behaviors, others tried to interact in different ways than those with which they started the interaction or they replaced the animal. In addition to their active attempts to establish affiliative relationships with the animals and overcome their non-compliant and challenging behaviors, the children enacted emotional coping strategies that strengthened positive feelings and downgraded negative feelings. Reframing is a cognitive strategy that has positive emotional consequences. Another strategy, enacted by many children, was using moderating adjectives while describing non-compliant behaviors or negative feelings, such as 'a little difficult' and 'not so pleasant' in the second quote of section b, above. In addition, the children asserted that they loved the animals, and were enjoying themselves.
　　The example below is typical of the children's integrated coping strategies: The child is persistent; she interprets the animal's behavior as typical of its

species; she under-estimates the amount of time she spent trying; and asserts that she loves chinchillas and that the whole experience was fun.

> I: *You tried and tried to come near them… What helped you not to despair?*
> C: *It was fun.*
> I: *…You did not say: Chinchillas, you don't come so I am going to another animal.*
> C: *Because I love chinchillas, I do not give up.*
> I: *…so you try and try?*
> C: *Because it is possible that all the animals here are like that, but it is not a long time.*

(d) Considerations that constrain the children's behaviors

The children's concerns revolved around two main issues: their own and the animals' safety. As can be seen in figure 1, these two concerns constrain the children's attempts to interact with the animals, as well as their behaviors towards non-compliant animals.

Some of the children were very concerned that the animals may hurt them. As a result, they kept the animals at a safe distance from their bodies. One of the children, for example, was too frightened to touch the animals and refused to take them out of their cage:

> I: *I can see you want to come closer to them but you're very frightened…*
> C: *I'm not frightened, I'm simply worried whether they will bite me, the rabbits, or they won't.*
> I: *Hm… so you're more worried than frightened.*
> C: *Yes, and I know that rabbits don't bite, but I'm afraid that they will be mad at me because they are taken out of their cage, and will get wild.*

This child later said that the most pleasant moment during the interaction was when she *tried* to touch an animal and *almost* picked it up. It is evident that her concerns held her back. It is interesting to note how she tried to control her fear by cognitive means: referring to her knowledge that rabbits don't bite, and using a moderate term 'worry' instead of the intense verb 'fear'. Sometimes children had behavioral rules that could protect them:

> C: *I have a dog, who is my neighbor's, who is 11 or 10 and she doesn't bite, but she doesn't like her tail to be touched. Every animal doesn't like its tail to be touched. They either bite or chew or hit.*
> I: *Yes…*
> C: *So never hold an animal's tail. This is something I really know.*

This child tried hard to avoid a chinchilla's claws. Her stress is evident from the syntactic disruption of her speech towards the end of the second turn. Immediately after that turn, she changed the subject abruptly and started a new episode.

> C: *Their nails are very pointed, really.*
> I: *Pointed?*
> C: *Yes, That is why I tried to stop it from getting near my pants, because when it climbs… I still feel [it], because it is like a very pointed triangle, right? There is like a thorn, like a thorn, it is simply very hard for me to have it into my hand because it is already on the toes, hands and toes of the chinchillas.*

The animals' safety was also a major concern for the children. One child shared that she refrained from choosing an animal because she thought it could get into trouble:

> C: *I wanted to choose an animal and then it [the chinchilla] got stuck here, and then I thought that it [the animal she considered choosing] runs faster and it could get stuck in the place, so I chose another animal that [lives] here*

The children monitored their own behaviors to make sure they did not harm the animals. For example, a child who was chasing an animal that ran away slowed down to avoid stepping on its tail by accident. Another child who was slightly bitten by an animal she was holding overcame her urge to drop it, because she realized 'a fall could break its limb'.

One of the children wanted to be with a hamster that hid itself in its shelter. The interviewer asked him why he did not take off the cage's cover. The child's answer attests his concern for the animal's emotional well-being, as well as his wish to be with an animal that stays with him of its own free will, and not by force.

> C: *Just think [of being in] a people's shelter – a giant comes and lifts it up.*
> I: *Wow [that] sounds unpleasant to me. No? What do you think?*
> C: *So think! Think if the hamster would have wanted me to lift its house, its shelter*
> I: *What do you think?*
> C: *I think it does not want that.*

The children also tried to protect the animals from each other. One child told the interviewer how he used carrots to distract some chinchillas that he thought were about to attack a trapped guinea pig. Another child devised an

educational plan for a poisonous spider that her father put in a jar at home, to convince it not to bite. The spider was not really with her in the session.

> C: *So, can we bring that spider we brought over there?*
> I: *Bring where?*
> C: *To the [rabbits'] house, but not to release it, because when it is released it bites, a little poison, so we'll put it in a cage high up so they [the rabbits] will not be able to reach it/*
> I: *And what will it [the spider] do [up] there?*
> C: *Just look or take a walk there.*
> I: *Look at what?*
> C: *It will take a walk or look at the rabbits.*
> …
> I: *And what will it see when it looks at the rabbits?*
> C: *That they are having fun, and that it's not worthwhile to bite.*

(e) The children's overall satisfaction with the interaction

Although many of the animals were non-compliant, most of the children enjoyed interacting with them and asked to have more interaction sessions in the future.

> I: *Was there a moment that was very pleasant and that you wish to tell me about?*
> C: *Generally with all the animals, all the time, even now.*
> I: *Yes? Is there anything else that is important for you to tell me and didn't have time to say?*
> C: *I don't know if I have, I think that I simply prefer to have many more [such] lessons.*

Discussion and Conclusions

In the context of school based encounter with animals, most of the children chose to interact with small furry mammals. The children's interaction attempts assumed diverse forms of touching and caring, and often failed, because the animals tried to escape or seemed otherwise non-compliant. The children offered four types of explanations for these behaviors: (a) The animals were frightened or angry (b) The behaviors are characteristic of the individual animal or its species (c) The behaviors were actually cooperative or (d) The animals are unwilling to befriend the individual child. Based on these interpretations, the children tried other ways to interact, or replaced the animals they chose, maintaining their own, as well as the animals' safety. Despite their recurrent failures, the children persevered, remained in good spirits, and asked for additional interactions with the animals.

Choosing Animals

The children's animal choices were in line with previous studies that looked at animal preferences in children (Borgi and Cirulli, 2015; Hawkins and Williams, 2016) and adults (Serpell, 2004; Tisdell, Wilson and Nantha, 2006) using responses to verbal questionnaires or photographs. Similar to their findings, the children tended to choose furry animals that are phylogenetically similar to humans. The parrots were not chosen at all, and snakes were chosen by three children. The chosen mammals had an aesthetic appeal: they were 'cute' and 'pretty', and had pleasant-to-touch fur (Howard and Vick, 2010). They were also small and therefore vulnerable. This characteristic evokes 'parental' (Serpell, 2003) and protective responses in humans (Borgi and Cirulli, 2015; Serpell, 2004, Tisdell et al., 2006). In alignment with these claims, the children in our study behaved in a 'parental' manner when they nurtured the animals: they offered food to the animals they chose, prepared a shelter for them and viewed themselves as responsible for their safety.

The second most frequent category explaining the children's choices was interest. This finding points at the children's openness and the potential value of 'hands on' interaction with animals (Larimore, 2020).

A few boys chose to interact with snakes. This choice is consistent with Borgi and Cirulli (2015) who found that some children liked snakes and preferred them to other animals (Almeida, Vasconcelos and Strecht-Ribeiro, 2014; Ballouard et al., 2013). Our study corroborates this finding that is based on the children's verbal answers to surveys, and adds evidence that the children actually interacted with snakes. By choosing the snakes, they inevitably preferred them. Why did these boys choose snakes? They provided several answers: Snakes were unfamiliar and therefore interesting. By interacting with snakes, they could examine information they received from other sources, such as that snakes shed their skin, or that the snakes' eyes have a hypnotic effect. Finally, snakes were chosen because they are dangerous. This could be related to boys' engagement in, and attraction to, aggressive behaviors (Maccoby and Jacklin, 1974) or to a more specific wish to make sense of aggression (Bartsch and Mares, 2014).

The Children's Attempts to Establish Affiliative Relationships with the Animals

After choosing an animal, the children attempted to form affiliative relations with the animals through touch and care (see figure 1). Within affiliative contexts, touch transmits messages of positive feelings, closeness, comfort and support. It reduces anger and stress and has positive effects on

emotional well-being (Cekaite & Bergnehr, 2018; Montagu, 1986) as well as physical health (Ellingsen et al., 2016). Touching the animals, feeding them and building a house or shelter for them are humane actions (Hawkins and Williams, 2016). The children's deliberate avoidance of behaviors that could harm the animals, even at the expense of their own comfort, is further evidence of their compassion. Care, empathy, love and friendship are closely related to each other in children as well as in adults, and are signs of secure attachment, emotional stability and agreeableness (Haslip, Allen-Handy and Donaldson, 2019). However, these behaviors seem to be associated with anthropomorphism, i.e. attributing human thoughts, feelings and motivations to animals (Hawkins and Williams, 2016; Serpell, 2003), instead of biological knowledge about animals' needs (Almeida et al., 2016; Muldoon, Williams and Lawrence, 2016).

Owners of companion animals, mainly cats and dogs, readily assign emotions to them. The level of attachments correlates positively with the complexity of emotions that are assigned to companion animals. Some animals evoke similar emotions as if they were a human member of the family (Martens, Enders-Slegers and Walker, 2016). In this study, the children did not own the animals, which belonged to the institute. Their anthropomorphism does not emanate from emotional attachment to the animals, but from their belief that animals have minds. In most cases, their anthropomorphism is expressed through humane interactions, in which the animal assumes the place of a human interactor in a communicative situation. However, there was one case in which the child expressed her belief that the spider can learn to improve its behavior by watching the rabbits enjoying themselves (Airenti, 2018). Such beliefs are typical of children who do not have frequent contact with live animals. Such children lack biological knowledge, and are exposed to books, cartoons and movies with anthropomorphic animal characters that deal with moral and other human issues (Ganea, Canfield, Ghafari and Chou, 2014). The ability to imagine and explain the animal's behavior or emotional state, may be a step towards 'constructive anthropomorphism'. Constructive anthropomorphism is interested in similarities and differences between humans and animals that leads to animal research and deeper understanding of animal behavior (Arbilly and Lotem, 2017).

The Children's Interpretations of Non-compliant Behaviors

The children's anthropomorphism was also evident in their interpretations of the animals' non-compliant behaviors. Many of these interpretations attributed human traits to the animals, such as cowardice. Other interpretations

attributed human feelings and thoughts to the animals. For example, reframing the animals' behaviors as if they were playing 'hide and seek'. Some children attributed anger to the animals over invasion of their private space and interference with their activities, or fear resulting from the huge size differences between the children and the animals. These interpretations imply that the children tried to adopt the animals' perspectives that were clearly different from their own. These particular forms of 'Beliefs in Animal Minds' (Hawkins and Williams, 2016), are akin to mature human 'Theory of Mind' (Wellman, 1992).

The Children's Responses to Non-compliant Animal Behaviors

The children were concerned with their own safety throughout their interactions with the animals. Nonetheless, contrary to Serpell's (2004) hypothesis, the children's fears were not diametrically opposed to their positive feelings towards the animals. Instead, these fears only constrained their physical proximity to the animals and willingness to hold them tight. Overall, the children liked interacting with the animals, despite their fears and recurrent failures to affiliate with them. When confronted with failure they persisted, tried other ways to interact with the animals, or replaced the animals and kept trying. Such behaviors are typical manifestations of 'Mastery Motivation' (McCall, 1995), i.e. motivation to acquire knowledge and skills or achieve social goals. Mastery motivation arises when children pursue challenging goals they feel they could achieve after multiple attempts and then master after sufficient practice. Goal setting and persistence are also the two major components of self-efficacy and grit, non-cognitive traits that predict academic success (Tynan and Harms, 2017; Zimmerman, 2000).

To conclude, our study shows that the young children attempted to affiliate mostly with small furry animals, and were eager to interact with unfamiliar ones. Their behaviors towards the animals were guided by anthropomorphism and indicated empathy and care. Concerns for their own, as well as the animals', safety constrained children's behaviors. Most of the animals were non-compliant. Attempting to understand these behaviors, the children tried to adopt the animals' perspectives and used anthropomorphic interpretations and reasoning. The children viewed their interactions with the animals as positive experiences, exhibiting mastery motivation and grit. Their keen interest in the animals and choice of unfamiliar ones attests to the fact that they are open to learning and could benefit from zoological instruction. The study limitations are the small size and homogeneity of the children's sample. It is therefore recommended to replicate this study in the future with larger and more diverse cohorts of children (in terms of age

and socio-economic status) and animals (including less popular ones). Such studies will provide information about the children's perspectives that is vital for understanding the children's social development and planning successful educational programs.

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