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Title: Impact of Therapy Dogs on Sophisticated Categorization Abilities of Children

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Impact of Therapy Dogs on Sophisticated Categorization Abilities of Children

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Impact of Therapy Dogs on Sophisticated Categorization Abilities of Children

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Abstract

This experiment used a trained therapy dog as a learning tool to encourage adult-like cognitive processing in children. The children either categorized stimuli by focusing on overall family resemblance or by focusing on a single-feature rule, with or without the presence of a dog. Test stimuli were used that would belong to one group based on family resemblance but also had the single-feature rule of the other group. Overall, there was a general trend towards use of the rule to categorize the stimuli in the conditions with and without the dog present. There were no significant differences between the groups on this measure. After completion of testing both with and without the dog present, children answered a series of questions to determine their attachment to the dog. We hypothesized that increased attachment would lead to increased attention and therefore executive processing. The children viewed the dog similarly to a best friend or teacher, indicating that the presence of the therapy dog did increase the children's overall happiness.

Impact of therapy dogs on sophisticated categorization abilities of children

Categorization, the ability to for psychological equivalence classes, is a fundamental human activity. Almost every decision or cognitive process requires us to separate things into groups and form concepts based on those groupings. Numerous studies have shown that humans use multiple systems in order to learn categories and place information into these categories (Ashby & Maddox, 2011). Two strategies of categorization that are commonly used are family-resemblance categorization and rule-based categorization. Family-resemblance categorization is an implicit process (Rosh & Mervis, 1975); whereas, rule-based categorization is an explicit process which involves the use of executive functioning. Rule-based categorization, then, is a more sophisticated process than family-resemblance, requiring more cognitive resources and explicit processing. This categorization process is more readily used by adults than young children, and, when used by young children, display sophisticated increases in cognitive functioning (Minda & Miles, 2009).

Family-resemblance categorization involves attending to a large set of stimulus properties and implicitly calculating the overall similarity of group members (Rosh & Mervis, 1975). This approach is mediated by dopamine reward signals in the basal ganglion and does not rely on executive attention, hypothesis testing, verbal mediation, or other aspects of explicit processing (Ashby & Maddox, 1992). For example, music is often categorized by family resemblance. No specific rule distinguishes country music from rock music, and indeed, they have many overlapping features. Wittgenstein (1953/2001) used the concept “game” to illustrate this principle. Games can be competitive or leisurely, they can involve multiple players or just one person, they can have dice/cards/boards or no equipment, they can have strict rules or loose ever-changing rules, etc. There is no single definition of a game, and yet everyone can easily tell

whether or not something is a game because we process the concept implicitly based on resemblance to other games. This is not the preferred process for adults, but it does come up in many daily activities and is typically used when observing naturally occurring categories in the environment (Medin, Wattenmaker, & Hampson, 1987). However, in a series of seven different categorization experiments, Medin, Wattenmaker, and Hampson (1987) found that when purposefully categorizing, participants used a "single dimension" (p. 242), or rule. This was true across various sets of procedures and materials. Rule-based categorization was even used by participants more so than family resemblance in procedures which were purposefully designed to promote family resemblance use. Family resemblance processing is sometimes referred to as information integration because it uses a wide range of stimulus properties rather than a specific attribute or rule (Couchman, Coutinho, & Smith, 2010).

Rule-based processing involves explicit attention to a single or small set of defining rules. Rules are usually simple to use once learned and easy to transmit to others but are more difficult to acquire because they rely on executive attention, hypothesis testing, sometimes verbal mediation, and other aspects of higher-order processing (Ashby & O'Brien, 2005). These aspects of rule-based learning are mediated by connections between the prefrontal cortex, anterior cingulate, caudate nucleus, and the hippocampus (Ashby & Maddox, 2011). Using rule-based categorization, for example, a person might learn to categorize fish vs. mammals by the rule that mammals breathe air above water while fish can breathe underwater. It is fairly difficult to learn this, especially when you encounter a dolphin, whale, or land-walking epaulette shark. But, once learned, it appears to be easy, trivial even, to determine whether something is a fish or mammal and to communicate this to another person.

Adults tend to use explicit, rule-based processing when categorizing stimuli; however, young children tend to rely on implicit family resemblance (Minda & Miles, 2009). This is likely because children have limited aptitude to use executive functioning and, therefore, rule-based processing (Minda & Miles, 2009). Different areas of the prefrontal cortex have been linked to varying complexities of executive functioning and rule use. As the prefrontal cortex (PFC) develops throughout childhood, children's ability to use executive function develops as well. For example, activation patterns in the prefrontal cortex for a rule-based task involving children ages 8 – 12 differed from 13 – 17 year olds and both groups differed from young adults. With these differing activation patterns, the children were able to use more and more complex sets of rules as the prefrontal cortex developed into young adulthood. These patterns included greater activation in the lateral PFC as the age group increased. Additionally, the fMRI study showed that children in the youngest age group had an "immature pattern of activation in the rostrolateral PFC" (Bunge & Zelazo, 2006, p. 121) during the task. Rule-based categorization is less readily used by even younger children: According to Nelson (1984), children as young as five favor family resemblance-based categorization over rule-based and even have difficulty learning rules to correctly categorize stimuli. However, these difficulties tend to dissipate by age 10 (Nelson, 1984). Little is known, however, of the cognitive shift from young children's use of implicit family resemblance categorization to their use of sophisticated, explicit rule-based processing. Do they build on a foundation of previously-formed family-resemblance categories or, more importantly, can these skills can be improved to help prevent developmental delays and disorders?

Previous research indicates that animals may play an important role in people's overall health. For example, research has linked pet ownership with lowered blood pressure (Anderson,

Reid, & Jennings, 1992), especially in response to stress (Allen, Shykoff, & Izzo, 2001), and the presence of an animal has been linked with lower anxiety ratings in psychiatric patients as well (Barker & Dawson, 1998). These results indicate that the animals likely affect cortical and subcortical brain structures in the stress and anxiety responses of their human counterparts (Anderson, Reid, & Jennings, 1992; Allen, Shykoff, & Izzo, 2001; Barker & Dawson, 1998; Lang, Bradley, & Cuthbert, 1998). It stands to reason, then, that the presence of animals may impact the cognitive functioning of their human counterparts as well. This reasoning is supported by an overlap in brain regions which deal with anxiety and cognition. For example, the hippocampus, which plays a large role in cognition, specifically declarative and spatial memory (Eichenbaum, 2004), has also been shown to play a role in affect as well (Cornwell, Arkin, Overstreet, Carver, & Grillon 2012). Specifically, Cornwell et al. (2012) found that magnetoencephalographic (MEG) data showed that increased anxiety also indicated increased left hippocampal theta. Numerous studies have indicated that hippocampal activity plays a role in anxiety, in addition to its role in cognition (Gray & McNaughton, 2003; McNaughton, Kocsis, & Hajos, 2007; Cornwell et al. 2012;). The hippocampus has also been found to play a role in mood disorders, such as depression (Cornwell, Salvadore, Colon-Rosario, Latov, Holroyd, Carver, ... & Grillon, 2010). Cornwell et al. (2010) showed that those suffering from depression exhibited less left posterior hippocampal theta activity, and consequently impaired spatial navigation, than those without depression. The overlap in certain brain regions involved in anxiety, mood disorders, and cognition may indicate that the presence of animals, which decreases stress and anxiety responses, may subsequently affect people's cognitive functioning.

Therapy dogs have been a common topic of research, especially within child healthcare and educational settings. For example, studies have examined the physical, social, and emotional

effects of therapy dogs on children. Currently, research indicates that the presence of a therapy dog may have an impact on the social, emotional, and physical functioning of children; however, research into their effects on the cognitive function of children is still lacking.

Gee, Harris, and Johnson (2007) tested whether the presence of a therapy dog impacts preschool-aged children's performance on a motor task. In most of the tasks studied, the presence of the therapy dog had significant effects on the children's outcomes: Children performed the tasks faster and with more accuracy in the presence of the therapy dog. This indicates that the presence of the dog may have had an impact on the children's performance in the task. Therapy dogs have not only been found to increase children's performance on motor tasks, research also indicates that they may impact children both socially and emotionally.

Research has found that the presence of a therapy dog may increase the playfulness, positive mood, awareness, and sociability of children with developmental disorders such as autism (Martin & Farnum, 2002). The presence of a therapy dog has been linked with increased emotional stability and positive attitudes towards school in children with emotional disorders, including bipolar disorder, attention deficit hyperactivity disorder (ADHD), and in children diagnosed on the autism spectrum (Anderson & Olson, 2006). The presence of a dog also appeared to invoke greater responses of empathy in students with emotional disorders (Anderson & Olson, 2006). Therapy dogs have been shown to increase the sociability of young children suffering from developmental disorders. Walters, Esteves, and Stokes (2008) found that, within a classroom of children aged 5 – 9 with developmental disorders, there was an increase in "overall positive initiated behaviors" (p. 5) and a decrease in "negative initiated behaviors" (p. 5) in the presence of a therapy dog.

Therapy dogs have also been found beneficial in helping children with learning disorders. In comparison to the presence of a stuffed dog, the presence of the therapy dog in a classroom of children with learning disorders increased visual attention, verbal and nonverbal initiation, more sustained focus, and more cooperation with adults (Limond, Bradshaw, & Cormack, 1997). Because these studies have indicated that therapy dogs may increase important aspects of everyday life, such as sociability, attention, empathy, and motor skills, they likely can be a crucial classroom tool to increase both learning and development in children. However, the specific cognitive impact therapy dogs have on children is not yet fully understood, and this potentially beneficial learning tool, subsequently, is not employed in the majority of classroom settings.

This study aimed to further the understanding of the cognitive impacts of therapy dogs on children through two categorization tasks in which children could correctly group stimuli based on family resemblances or based on a rule. Children were tested both in the presence and absence of a therapy dog in order to determine whether the presence of the dog promotes use of the sophisticated, rule-based categorization over the implicit family resemblance process. We hypothesized that the children would categorize the stimuli based on the rule more frequently in the presence of the therapy dog, indicating that the presence of the dog promoted more sophisticated categorization. This indication would further show that therapy dogs may increase cognitive functioning in children. These findings have the potential to benefit both the educational and healthcare settings by improving children's learning and functioning, especially in children with developmental and learning disorders, with the addition of a therapy dog.

Method

Participants

The experiment was conducted at the Albright Early Learning Center. Permission to conduct the study at the Early Learning Center was obtained from the Learning Center director, Mrs. Laura Heckart.

Parental consent forms were sent home with the children at the Learning Center. After parental consent was given, consent was also obtained verbally from the children within the Pre-K and kindergarten classes. It was made very clear to the children that they did not have to participate if they did not want to, and we essentially obtained a new verbal consent each session by always asking the child whether they wanted to participate. Only one child who had parental consent did not want to participate at all in the experiment, and only on very rare occasions did a child not want to participate in a session.

Participants in this experiment were 23 children ranging in age from 3 to 5 enrolled in Pre-K 4 and kindergarten. Nine were female (39%). Nine of the participants were 5 years old (39%), 11 of the participants were 4 years old (48%), and 3 of the participants were 3 years old (13%). The average age was 4.3 years old, SD = 0.67.

Stimuli

Two different sets of stimuli were used for this experiment. For each set of stimuli, different categories were created for five sets of attributes (Figures 1 & 2). The stimuli were presented to the children as a game they were playing or helping Blue the therapy dog play, depending on whether they were in the *with* or *without* condition. For example, for the dog stimuli set (Figure 1), the dogs were presented as "lost" and the children had to help them find their homes. The dogs either lived in the forest or in the doghouse. For the dog stimuli, the different attributes were: ears up/down, face smiling/frowning, tail up/down, body black/mixed, and legs black/white. For this stimuli set, the rule the children could find was based on ears

up/down. According to the rule, dogs with their ears up lived in the forest, whereas dogs with their ears down lived in the doghouse. The stimuli could be categorized with equal accuracy based on a family resemblance process using all the attributes. The leftmost dog in each category is the prototype, having 5/5 of the features indicative of the category; the other four dogs have 4/5 of the features indicative of the category. Participants saw each stimulus, one at a time, and were told whether they made the correct classification after they placed the stimulus (which was a paper card) into one of the home locations. Each home location had 5 stimuli that could correctly be placed there, and thus the experimental sessions began with 10 trials in random order.

For the bug stimuli (Figure 2), the attributes were: wings jagged/smooth, legs bent/straight, tail straight/zigzagged, antennae facing left/right, and head shape square/circle. For this stimuli set, the rule the children could find was based on head shape: square or circle. The bugs had a similar story to the dogs, but they could either live on the moon or in a tent. According to the rule, bugs with square faces lived on the moon, and bugs with circle faces lived in the tent. All other aspects of this stimulus set were the same as the dog stimulus set.

Design

Participants were tested in their natural classroom settings. The Pre-K was set up such that the children would move from activity to activity at designated intervals, and the experiment was set up to be one stop in the assortment of activities. For the kindergarten class, children were pulled one at a time from their group work to participate in the experiment. Sessions occurred once per week.

For the first two weeks, no testing was done. This was used as a time for the children to become familiar with the experimenters and, more importantly, with Blue the therapy dog. Blue,

a 3-year-old Blue Heeler, is a trained and certified female therapy dog. During these two visits, the children were able to meet with Blue in groups and were shown how to pet her, what tricks she could do, etc. so that they could become comfortable around the dog. This also helped to prevent novelty effects.

After this familiarization period, children were asked to begin the experiment. One experimenter showed the children stimuli and recorded both correct and incorrect placement of each stimulus, while the other was in charge of watching/holding the dog. In conditions where the dog was not present, she was positioned a few feet behind the participant, out of sight, but still relatively close and still in the classroom.

Overall, there were four conditions: Bug stimuli in the presence of the therapy dog, bug stimuli without the dog, dog stimuli with the dog, and dog stimuli without the dog. The participants were tested twice in the two different conditions: Once with the dog and either the dog or bug stimuli, and once without the dog and with the stimuli they did not use in the other session. For example, if a child started in the bug stimuli in the presence of the therapy dog condition, their second test condition would be dog stimuli without the therapy dog present. The order of stimuli and dog presence was randomized before the experiment.

Analysis

The participants were given the 10 trials each session until they were at least 80% correct in their classifications, or until they had gone through the set of stimuli six times. We then asked them to classify two "test" stimuli (at the end of a session) that shared the family resemblance of one group but the single-attribute rule of the other. They are shown in the far right of Figure 1 and 2. These "test" stimuli were presented in such a way that children did not recognize that they were special. We recorded accuracy for the 10 category stimuli when the

therapy dog was and was not present and focused particularly on how the children classified the two "test" stimuli. The classifications of the "test" stimuli were a key indicator of implicit family-resemblance versus explicit rule-based processing. Participants could spread their attention equally to each attribute, and thus attend to the overall family resemblance, or they could have attended only to a single defining attribute that also produces perfect categorization.

After the children had been tested twice (two sessions that included the test stimuli) in their first condition, they then began their second condition and underwent the same procedures. Once they were 80% correct in their classifications or had gone through the stimuli six times, they were asked to classify the test stimuli. Again, they went until they had run through the stimuli in testing conditions twice.

After participants were entirely finished both conditions, they were given an attachment scale. This was also presented to the children as an activity. Cards with faces on them displayed a very happy face, a semi-happy face, a neutral face, a semi-sad face, and a very sad face. The different faces corresponded to a 5 point Likert-type scale (see Figure 3): Very happy = 5, Very sad = 1. Participants were asked a series of questions to gauge their attachment to and focus on the therapy dog.

Results

To examine whether there was a significant difference between the conditions in which the dog was and was not present, we ran a mixed-models ANOVA. There was no significant difference in categorization between groups with the dog present and without the dog present, F (30, 1) = .261, p = .631, *ns*. Additionally, there was no significant difference between the two stimuli sets (dog vs. bug), F (30, 1) = 1.466, p = .235, *ns*. For both sets of stimuli, the children tended to use the criterial attribute as grounds for categorization: Overall, for the bug stimuli,

participants generally used the rule to categorize stimuli, with 94% of categorization responses being rule-based. For the dog stimuli, the rule was used to categorize stimuli approximately half of the time, accounting for 53% of responses. A two-tailed binomial sign test showed that there were significantly more rule-based responses overall, $p < .001$. This means that there were significantly more criterial attribute responses than chance would allow. Overall, while the dog did not improve rule-based categorization in the dog condition specifically when categorization of the test stimuli, children did perform better than expected in both conditions. This suggests that the dog might have had a beneficial effect by being in the classroom, even though being directly next to the dog did not increase the effect for the test stimuli. Overall for the non-test stimuli, children performed significantly better in the presence of the dog ($M = 0.83$, $SD = 0.38$) than they did in the *without* condition ($M = 0.74$, $SD = 0.44$): $t\ (329) = 2.623$, $p < .05$.

For the attachment questionnaire, playing with dog rated significantly higher in overall happiness than playing a video game, $t(35) = 2.9$, $p < .01$ and significantly higher than reading a book, $t(36) = 2.3$, $p < .05$ (Figure 4). When giving ratings of happiness, the children found the presence of the dog to be comparable to the presence of their best friend or teacher. They also rated the dog's sadness in response to pain as similar to their own responses, indicating that they believed that she felt pain similarly to them. There was a moderate correlation between how the children felt when they saw the dog and how they think the dog felt when she saw them, $r\ (33) = .36$, $p < .05$. Additionally, the children gave happy ratings when they did not have to go to school, but they believed Blue would be significantly less happy when she does not go to school, $t(16) = 5.2$, $p < .001$.

Discussion

This study explored whether the presence of a therapy dog would influence use of sophisticated methods of categorization in young children. Children could either categorize stimuli based on overall family resemblance, which is an implicit process that previous studies have shown children favor (Miles & Minda, 2009; Nelson, 1984), or based on a rule, a sophisticated, explicit process which requires use of executive functioning (Minda & Miles, 2009; Bunge & Zelaso, 2006).

Therapy dogs likely increased the overall happiness in children, while possibly reducing stress. Blue was rated by the children similarly to a best friend or a teacher. Additionally, the kids rated their happiness when playing with Blue as significantly higher than common "fun" activities like reading a book or playing a videogame. Previous research has already shown that the presence of animals in general has many positive physiological effects on humans: lowering of blood pressure (Anderson, Reid, & Jennings, 1992), stress response (Allen, Shykoff, & Izzo, 2001), and anxiety (Barker & Dawson, 1998). Therefore, this study has confirmed these findings, showing that the presence of the therapy dog significantly increased the overall happiness of the children.

Therapy dogs are important to study in relation to children's physical, emotion, social, and cognitive wellbeing and development because they could have a positive impact on children's mental and cognitive performance. Because of these potential positive impacts, many studies have assessed what benefits children receive from the presence of therapy dogs. Studies have shown that children perform better on motor tasks in the presence of a therapy dog (Gee, Harris, & Johnson, 2007). Additionally, research has shown that therapy dogs positively impact children with developmental, emotional, and learning disorders, which include increased playfulness and awareness (Martin & Farnum, 2002), emotional stability and positive attitudes

(Anderson & Olson, 2006), sociability (Walters, Esteves, & Stokes, 2008), and attention (Limond, Bradshaw, & Cormack, 1997). These studies show physical, emotional, and social benefits of therapy dogs on children, especially children with developmental disorders. These benefits imply that therapy dogs could have an impact on the cognitive functioning of children as well (Gee, Belcher, Grabski, DeJesus, & Riley, 2012), although these effects are still not totally understood.

Although the hypothesis that the children would make more rule-based categorizations in the presence of the dog as opposed to without was not supported in the categorization of the test stimuli, there was an overall trend of rule use in the children's categorization of stimuli. In addition to this, children performed significantly better in the non-test learning phase in the presence of the dog. A majority of the children used the rule to categorize the bug stimuli, regardless of condition. Additionally, over half of the children used the rule in order to categorize the dog stimuli as well. A two-tailed binomial sign test showed that there were significantly more criterial attribute responses overall, meaning that there were significantly more criterial attribute categorizations than chance would predict. This could be for a variety of reasons. Firstly, although previous research has indicated that children as young as five favor the use of overall family resemblance (Nelson, 1984), it is possible that the children were too mentally sophisticated for the task. The mean age of the children was 4.3, and none of the children were older than 5. This result would also support the task being too easy. This is especially apparent with the bug stimuli in which most of the categorizations were based on the rule (square head versus circle head). The bug stimuli, however, did not significantly differ from the dog stimuli in task performance, in which children categorized based on the rule just over half of the time (53%). The dog stimuli did appear to be more difficult for the children to learn

the rule (ears up versus down). Almost all test categorizations for the bug stimuli (94%), both in the presence and absence of the dog, were based on the rule (square versus circle head). Another explanation for this greater-than-chance use of the rule could be the setup of the experiment and the defining of the dog's presence.

A major confound in this experiment, as aforementioned, was the defining of the dog's presence. Although the children participated in the task without the dog present in one condition, the dog was still in the room. In addition to this, children were given a chance to say hello to Blue after they participated in the study without the dog present. Therefore, the children knew they would have an opportunity to sit with her. Perhaps this "presence" of the dog was enough to promote sophisticated rule use in the children. In order to assess the true effect of the dog's presence on the children's categorization, we recommend that future research implement a setup in which children who are in the *without dog* condition do not have access to the dog in any way while being tested. Truly separating the *with* and *without dog* conditions so that the dog is completely absent in the latter will give greater insight into the cognitive effects of the dog's presence on categorization.

Because previous research indicates that therapy dogs have many positive effects on children, particularly children with developmental disorders, it is crucial to continue to build an understanding of what these effects are. They may also increase children's use of rule based categorization, and, consequently, executive functioning; however, this study did not show these effects. Research indicates that therapy dogs may have a cognitive impact on children, but more exploration into the specific cognitive effects therapy dogs have on children is still needed This may represent the promotion of executive functioning, reduction of stress and anxiety, or perhaps a combination of these factors. More research into the cognitive effects of therapy dogs is

necessary to understand the specific impact the dogs may have. Categorization tasks lend themselves to displaying cognitive effects of the presence of the dog because, within the tasks used, the children could either use the implicit process of overall family resemblance categorization or the more sophisticated rule-based process, which requires executive functioning. If the presence of the therapy dog can be shown to increase children's use of rule-based categorization, then it also implies that the dog increases the children's use of on executive attention, hypothesis testing, sometimes verbal mediation, and other aspects of higher-order processing (Ashby & O'Brien, 2005).

If the cognitive impact of therapy dogs on children can be further understood, the use of dogs can be incorporated into educational policy and programs and into interventions for developmental and learning disorders. For example, depressed individuals show a deficit in rule-based processing (Smith, Tracy, & Murray, 1993), as do adults who have their working memory taxed by another task (Waldron & Ashby, 2001). Young, impulsive children with mental retardation tend to favor family resemblance category-learning, probably because they lack the attentional resources to develop a sophisticated strategy (Kemler, 1982; Kemler Nelson & Smith, 1989; Shepp, Burns, & McDonough., 1980; Smith & Kemler Nelson, 1988; Smith & Kemler, 1977; Ward, 1983). If a therapy dog intervention could improve attention and executive processing, it could potentially benefit all of these issues. These children in particular would benefit from increases in executive functioning and the ability to use the sophisticated rule-based categorization.

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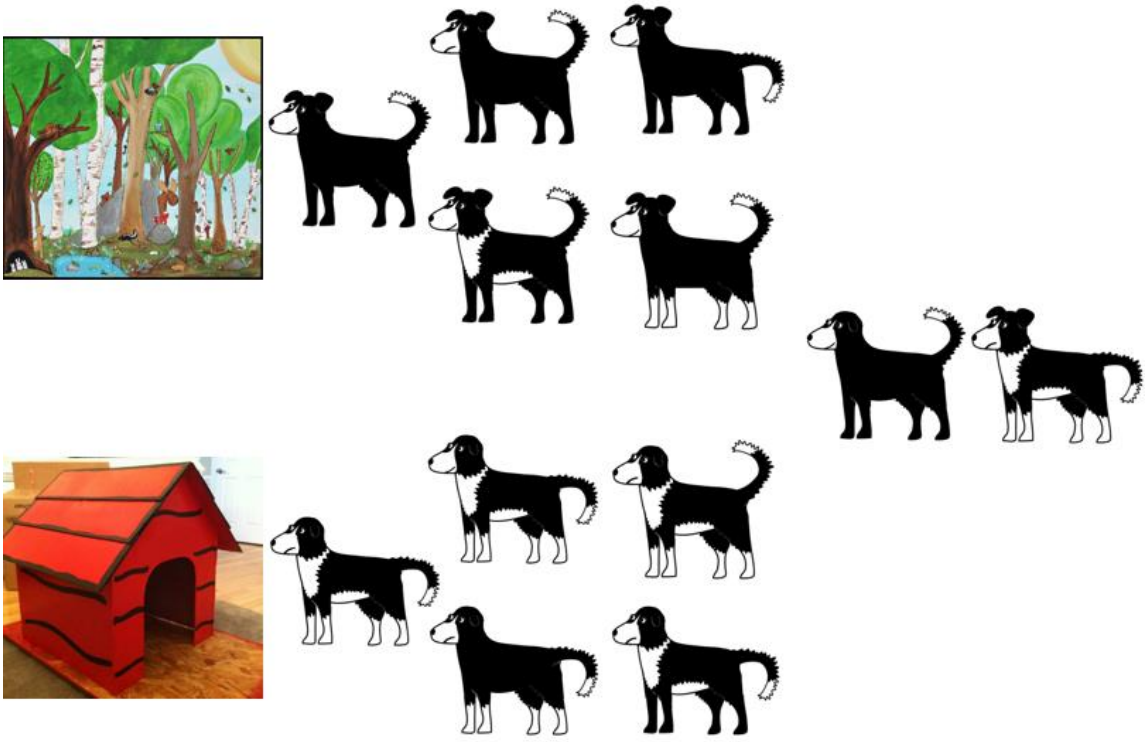

Figure 1. For the dog stimuli, the different attributes are: ears up/down, face smiling/frowning, tail up/down, body black/mixed, and legs black/white. The rule the children could find was based on ears up/down. According to the rule, dogs with their ears up lived in the forest, whereas dogs with their ears down lived in the doghouse. The five dogs immediately by the forest and the five dogs immediately by the doghouse are the category stimuli, which the children had to classify until they had at least 80% correct. The two dogs between the category stimuli to the far right are the test stimuli. Each of the test stimuli shares the overall family resemblance of one group but the rule of the other group, so children could correctly categorize either based on family resemblance or based on the rule.

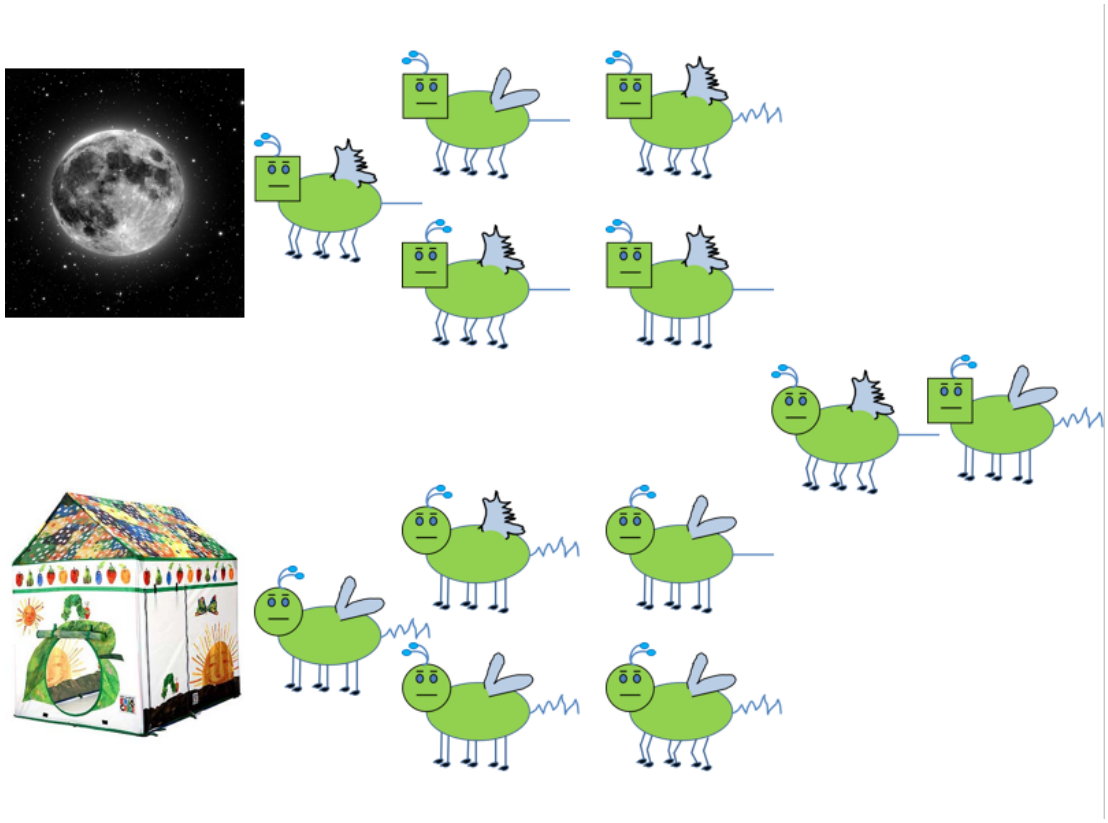

Figure 2. The attributes for the bug stimuli are: wings jagged/smooth, legs bent/straight, tail straight/zigzagged, antennae facing left/right, and head shape square/circle. For this stimuli set, the rule the children could find was based on head shape: Square or circle. The bugs had a similar story to the dogs, but they could either live on the moon or in a tent. According to the rule, bugs with square faces lived on the moon, and bugs with circle faces lived in the tent. The bugs are displayed above similarly to the dog stimuli in Figure 1. The five bugs immediately by the moon and the five bugs immediately by the tent are the category stimuli, which the children had to classify until they had at least 80% correct. The two bugs between the category stimuli to the far right are the test stimuli. Each of the test stimuli shares the overall family resemblance of one group but the rule of the other group, so children could correctly categorize either based on family resemblance or based on the rule.

Figure 3. Rating system for the attachment scale. Each face was shown on an individual card, and the cards were spread out in order in front of the participant. They pointed to a face after each attachment scale question.

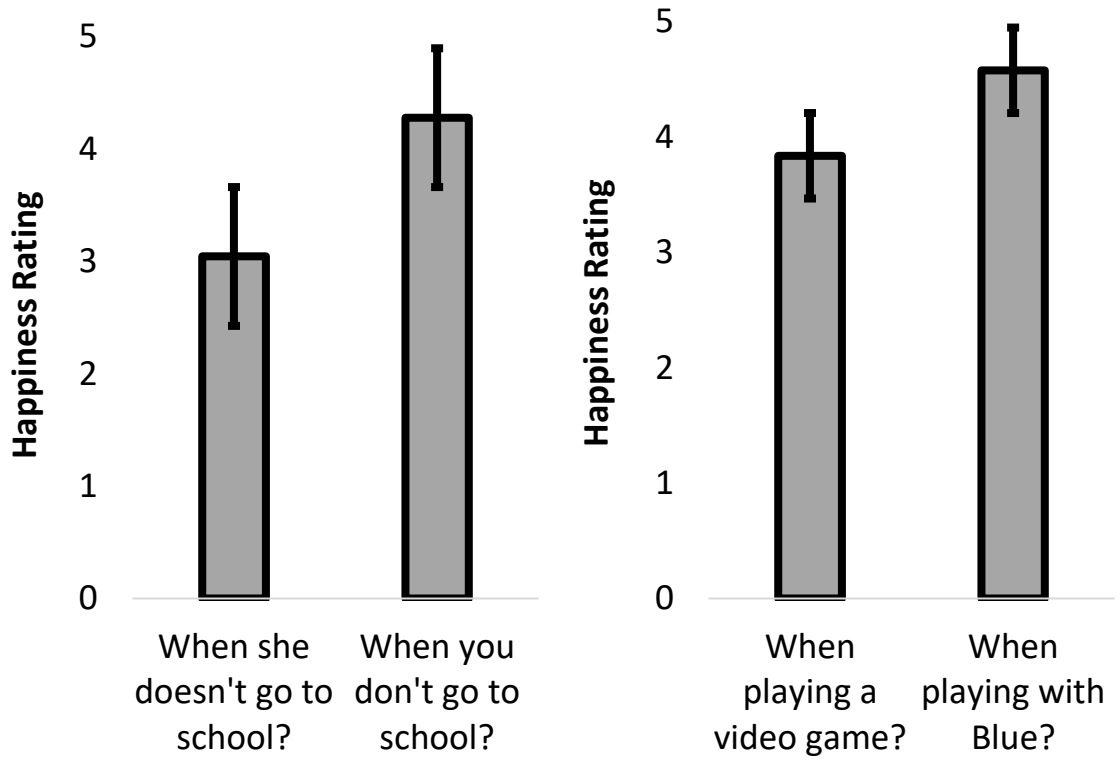

Figure 4. Happiness ratings for scenarios involving the therapy dog or other comparable things. Error bars indicate standard error.