Journal of Youth and Adolescence (2021) 50:820–823
https://doi.org/10.1007/s10964-020-01366-z

BOOK REVIEW

Nancy R. Gee, Aubrey H. Fine, and Peggy McCardle (Eds.): How Animals Help Students Learn: Research and Practice for Educators and Mental-Health Professionals

New York, Routledge, 2017, 220 pp, ISBN 978-1-138-64863-0

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Received: 19 November 2020 / Accepted: 26 November 2020 / Published online: 9 January 2021

How Animals Help Students Learn: Research and Practice for Educators and Mental-Health Professionals, edited by Gee et al. (2017b), summarizes up-to-date research establishing the impact of animals on children and in educational settings. The work also makes clear what gaps exist in the research and provides guidance to further our understanding and investigation into human–animal interactions, especially those involving children. This book is certainly geared toward educators and those working closely with children in educational settings, as it includes recommendations for incorporating animals into classrooms. On the other hand, this book also likely serves as a helpful resource for researchers—or those simply interested in the research—as it compiles lists of tools and resources, as well as specific areas of research needing growth.

In the first chapter, "How Animals Help Children Learn: Introducing a Roadmap for Action", Gee and Fine (2017) introduce the idea of human–animal interaction, explaining that research on the topic is still in its infancy, only really picking up in the last half-century. They believe that because this is a newer area of research, there seems to also be a lack of policy regarding human–animal interaction. They provide the example that there is currently no system for tracking or regulating animals in U.S. schools; however, they also point out that a majority of the members of the National Association for the Education of Young Children reported having animals in the classroom. They then note that teachers may choose to have animals in the classroom because of the positive effects that animals may have on children, including promoting language, imagination, self-reflection, increased empathy, increased responsibility, lower anxiety and stress, and improved behavior and social skills.

In the second chapter, "Animals in Education Settings: Safety for All", contributors Meints et al. (2017), claim that there are shortcomings and gaps across studies investigating human–animal interaction, including a lack of scientific rigor and variations in methodologies, making it difficult to make comparisons or draw conclusions. They explain that research has shown that bringing animals into classrooms has a slew of positive benefits and effects on children, ranging from improved mood and motivation to the opportunity of teaching responsibility and conscientiousness. However, they also warn about the potential risks of certain animals in classrooms and state that these risks should be considered before bringing an animal into a classroom. The authors advise that, to avoid these potential dangers, a strict action plan should be developed and abided by in order to keep human–animal interactions safe. For example, they recommend that everyone should be well-informed about procedures regarding the animal, adults should be active in monitoring children's interactions with the animal, and parents should consent and have the option to have their questions and concerns clarified.

Further, Huss and Fine (2017) explain, in the third chapter, "Legal and Policy Issues for Classrooms with Animals", that a major legal implication regarding animals in classrooms is potential injury. They make clear that "[s]tate laws determine liability for injuries caused by animals," and "[e]ach state has its own body of law to determine the circumstances under which liability could be assessed" (Huss and Fine 2017, p. 28). Some states impose strict liability in these situations; however, some statutes have a "one bite rule", a standard imposing liability on owners who knew or should have known that their dog was likely to cause an injury. It is common that programs involving

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animal interaction require signed waivers, and Huss and Fine explain that well-drafted waivers would shift the risk of liability away from the educator or animal owner. Further, they warn that animal bites must be filed with state or other local health authorities or appropriate agencies, which may lead to the quarantining of the animal or the deeming of its status as "dangerous". However, they also explain that incidents in public schools may be "protected by the doctrine of governmental immunity", potentially protecting governmental authorities and schools from liability in the absence of gross negligence (Huss and Fine 2017, *p*. 30).

In the fourth chapter, "Does Animal Presence or Interaction Impact Social and Classroom Behaviors Conducive to Student Educational Success?", Pendry et al. (2017) explain that poor social competence may have detrimental effects on several aspects of a child's health and wellbeing, including cognitive abilities, relationships, and emotional regulation, for example. They describe studies that suggest that programming with equines provide for opportunities for building children's social competence, as equines have high senses of awareness, so children are encouraged to be reflective of the consequences of their behavior on the animal. Further, they point to empirical evidence suggesting that children that completed social training sessions with dogs demonstrated lower levels of aggression than groups of children that completed the training without the dogs. They highlight an additional study which found that children demonstrated higher levels of social interaction, productivity, and attentiveness when a dog was present in the classroom, compared to when a dog was not present.

Hediger et al. (2017) then explain, in the fifth chapter, "Do Animals in the Classroom Improve Learning, Attention, or Other Aspects of Cognition?", that in the last two decades, research on the effects of animal interaction on human cognition has grown. They describe studies showing that children's task performance is improved in the presence of a dog, compared to in the presence of a stuffed toy dog or a human. They also explain that high cortisol levels can have negative effects on memory and attention, echoing that studies show that interactions with dogs can reduce cortisol levels in stressful situations. Additionally, the authors speculate that the strong bonds between children and animals likely have positive effects on children's cognitive processes. They conclude that much more research is to be done regarding the impact of animals on children's cognition, as well as their physiological well-being and development.

In the sixth chapter, "School-based Animal-Assisted Interventions for Children with Deficits in Executive Function", Schuck and Fine (2017) make clear that while there is not a lot of research to demonstrate the effectiveness of dogs on children with impaired emotional function, some preliminary research suggests that participating in dog training may enhance social competence and reduce problem behaviors, such as anger management and frustration tolerance, in children and teenagers with ADHD. They point to literature and research concluding that the mere presence of a registered therapy animal can reduce stress in learning environments, which they believe would be incredibly beneficial for children impaired by hyper-sensory stimulation. They further suggest that, while dogs often have a calming effect on people, studies have shown that dogs may also promote productivity and task completion in individuals with an otherwise "sluggish cognitive tempo". (Schuck and Fine 2017, *p*. 78).

O'Haire and Gabriels (2017) claim, in the seventh chapter, "The Impact of Animals in Classrooms Assisting Students with Autism and Other Developmental Disorders", that there has been a recent surge of research in the last decade exploring the connection between animals and people with autism. They further explain that, so far, research has shown that interacting with animals can have a plethora of benefits on autistic children, including increased language and communication, less social withdrawal, and reduced social anxiety, to name a few. However, O'Haire and Gabriels warn that animals may distract some children from class work or cause the child extreme stress or fear. Thus, they urge the importance of educators taking an incredibly individualized approach when it comes to animals in the classroom.

In the eighth chapter, "Companion Animals and Moderators of Stress Responses: Implications for Academic Performance, Testing, and Achievement", Friedmann and Gee (2017) summarize studies showing that children have lower blood pressure when reading aloud to a dog, compared to reading to another person. They further summarize several studies of college students demonstrating that being in the presence of a pet reduced stress responses compared to being in the presence of a friend or some other supportive person. Here, the authors ultimately conclude that the results of studies in this area indicate that animals can moderate stress responses in many different situations, and by reducing stress and anxiety, they believe that animal presence may improve academic performance and productivity. However, again, they remind readers that it is important to consider that animals may have a high-stress impact on some people.

Further, as Beetz and McCardle (2017) detail in the ninth chapter, "Does Reading to a Dog Affect Reading Skills?", studies have reported improved reading comprehension in groups of children reading to dogs, which may indirectly positively impact reading motivation and an improved reader self-concept among children. Although reading programs are fairly popular globally, training for dog-assisted reading seems to primarily exist in German-speaking countries, as school dogs are quite common

there. These reading programs have suggested positive effects on children, but Beetz and McCardle believe that more peer-reviewed research with larger samples is needed before the general effectiveness of reading with dogs can be determined.

In today's classrooms, which Rajan et al. (2017, p. 125) characterize as "hotbeds for 'learning'", incorporating animals can engage children by capitalizing on their attention and interests. In the tenth chapter, "Children's Play, Self-Regulation, and Human–Animal Interaction in Early Childhood Learning", they explain that self-regulation is a skill that involves the volitional control of emotion, attention, and executive functions in order to reach a goal or obtain an end result. One possible way that human–animal interaction could influence a child's development of self-regulation is through stress-regulation. Again, the authors describe studies that have repeatedly shown that the presence of animals promotes calmness and reduces fear, anxiety, and stress, as well as influence the emotional and cognitive aspects of self-regulation. The authors suggest that future studies should focus on whether hands-on activities using animals in education lead to greater gains in academic performance.

In the eleventh chapter, "Methods for Bridging Human–Animal Interactions and Education Research", McDonald Connor and Herzog (2017) attempt to expedite the development of research in this field by suggesting research methodologies and providing guidance for researchers. For example, they explain that research questions must be identified and specified. Additionally, they suggest that researchers be flexible in designing studies involving animals, especially if the animal is a highly-trained service dog, as the dog may serve a number of purposes. They also suggest researchers try to recruit larger sample sizes in order to render strong statistical findings. However, a likely problem researchers will face is getting enough school principals and teachers to participate in studies involving animals. McDonald Connor and Herzog suggest that one way around this problem is to build and foster a researcher-school partnership, which often creates "win–win" situations for both the researcher and the school.

Further, Gee and Schulenburg (2017) use the twelfth chapter, "Recommendations for Measuring the Impact of Animals in Education Settings", to summarize several assessment tools to measure academic outcomes, cognition, emotional health, and relational health. They explain that previous research has suggested that the presence of a therapy dog can have positive effects on children performing memory tasks, and they believe that future research incorporating some of the cognitive research tools listed in this chapter, such as the *Weschler Preschool and Primary Scale of Intelligence—Fourth Edition (WPPSI-IV)*, could productively build on that earlier work (Gee and Schulenburg 2017, pp. 167–68). Gee and Schulenburg also highlight that the research tool list in their book is not exhaustive, and they recommend researchers consider other possible well-established research tools in formulating studies.

In the thirteenth chapter, "Selecting Animals for Education Environments", MacNamarara and MacLean (2017, p. 183) propose that animals employed in animal-assisted education programs "should be selected based on how well their natural and trained skills, and capabilities, fit what they are expected to *do* with, and for, the students with whom they interact". They advise that educators seeking particular animals for animal-assisted education programs craft and circulate a "job description" for the animal, making clear the goal of including that particular animal, session logistics, and ideal animal characteristics. They then describe the MacNamara Animal Capability Assessment Model (MACAM), which is designed to help create ideal animal profiles for those attempting to initiate an animal-assisted education program. MACAM focuses on four major categories of an animal: (1) response gradient, (2) capacity, (3) skills, and (4) attributes.

Gee et al. (2017c), detail, in the fourteenth chapter, "Caring for Classroom Pets", the care and living environments necessary for many popular classroom pets, including small domesticated rodents, fish, amphibians, reptiles, birds, and insects. They press that animal welfare is important for two main reasons: (1) animals should be able to have their needs provided for so that they are able to live a life free from pain, suffering, and distress; and (2) it is important for children to develop senses of empathy and responsibility toward animals. However, they urge that, regardless of the type of animal, educators consider whether they can provide a healthy, safe life for that animal, including on the weekends, over extended breaks from school, or in emergency situations. They further urge that educators research the needs of the animal they wish to implement into their classroom. It is also important that the educator prepare their students and the classroom for the arrival of the animal to ensure the safety and well-being of the animal.

In the final chapter, "Creating an Atmosphere of Acceptance for HAI in Education—Future Directions", Gee et al. (2017a) conclude by addressing ways to create an atmosphere of acceptance for human–animal interaction in education in the future. They repeat that there is a great need for advances in research in the field of human–animal interaction. They also advise researchers to consider methodological rigor and the well-planning of research in order to determine when, where, why, and how animals may impact a variety of dimensions of child development.

Although there are several gaps that remain in the research of human–animal interaction, the authors leave their readers well-equipped with knowledge of what has already been

studied and established in regard to human–animal interactions. Throughout the book, the authors effectively summarize key findings, while also making clear what gaps or needs for advances exist, as a way of calling on researchers. Based on these summaries, it is established that safe interactions with animals can have a multitude of positive benefits on children, even those with behavioral disorders or cognitive disabilities. With those summaries, Gee et al. (2017b) as well as the contributing authors, hypothesize the successful, productive future of human–animal interaction in education and the growth of research to come.

Compliance with Ethical Standards

Conflict of Interest The author declares that she has no conflict of interest.

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