

## **A Transdisciplinary Perspective on Dog-Handler-Client Interactions in Animal Assisted Activities for Children, Youth and Young Adults**

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A growing body of research has linked the inclusion of dogs in Animal-Assisted Activities (AAA) for children and young adults to a diverse range of positive social emotional and cognitive outcomes. However, many studies have focused exclusively on aspects directly related to dog-client interactions. There is a need to gain a better understanding of how dog-handler teams have been described, conceptualized and incorporated into the analysis in previous research. In addition, few studies have investigated the mutual adjustments inherent to dog-handler-client triadic relationships. This paper explores if and how the unique characteristics of dog-handler teams have been conceptualized and measured in previous studies. First, this paper undertakes a scoping review to map what, if any, characteristics of dogs, handlers, and dog-handler teams have been described and incorporated into the assessment of AAAs from 2004 to 2019 including: demographic characteristics, formal training and certification, handlers' or dogs' behavioral and physiological responses to AAAs, handlers' roles during activities, and configuration of AAA teams. This scoping review also highlights key features of AAA teams requiring further investigation. In addition, this paper proposes the incorporation of a transdisciplinary framework to the analysis of AAAs. Such a holistic framework can inform the field of human-animal interactions by prioritizing a relational and contextual focus to the study of AAAs.

*Keywords:* Animal-Assisted Activity, Animal-Assisted Intervention, Dog-Handler Team, Transdisciplinary, Children, Youth, Young Adults

The diversity of terms used to describe the presence of dog-handler teams in schools, hospitals, universities and other therapeutic settings reflects the complexity and heterogeneity of interventions where an animal may be included. Regardless of conceptual divergences, the inclusion of a dog in therapeutic interventions has been associated with positive social emotional and cognitive outcomes for children and youth (e.g., Nammalwar & Rangeeth, 2018; Brelsford, Meints, Gee, & Pfeffer, 2017; Friesen, 2010). However, as it will be discussed here, caution should be exercised in generalizing these results to different contexts and cultures in which children and young people are included.

An essential element of interventions involving a dog is the presence of a handler or another professional responsible for the dog. In this context, the analysis of how dog-handler teams have been conceptualized and measured can illuminate interconnected individual and contextual factors contributing to the success of Animal-Assisted Activities (AAAs) for different types of populations. Accordingly, this paper begins with a scoping review of studies on canine-assisted activities involving children, youth and young adults in a variety of settings and involving more than one session. The main goal of this scoping review was to gather information about dog-handler teams as reported in research studies and to determine if, and how, the relationship between dog-handler teams has been analyzed in past studies. Second, this paper argues that a transdisciplinary lens can be usefully applied to advance research in the field of AAAs among children and youth.

Globally, and for the period from 1991 to 2011, studies focusing on Animal-Assisted Interventions (AIs) have often been conducted in English and within North America and European countries. An analysis of 228 studies carried out by Borrego et al. (2014) revealed that 70% of these studies were conducted within the USA, 15.35% were conducted in the United Kingdom and 5.70% were conducted in Germany. Also, studies involving AIs obtained data in other contexts including Holland (2.63%), France (1.75%), Croatia and Japan (0.88 each), and Australia, Hungary, Italy and Switzerland (0.44% each). Studies focusing on AIs are also being carried out in countries located in North America, South America, Africa and Oceania (e.g., Banks, McCoy, & Trzcinski, 2018; Pendry, Carr, Roeter, & Vandagriff, 2018; Binfet & Passmore, 2016; Ichitani & Cunha, 2016; le Roux, Swartz & Swart, 2014; O'Haire, McKenzie, McCune, & Slaughter, 2013).

Despite the proliferation of studies on AIs, a universal governing body overseeing AIs does not exist. In terms of locations of the implementation of AI programs, the American non-profit organization Animal & Society Institute cites the existence of 25 organizations and a variety of training programs across different countries (Animal & Society Institute, 2019). The list includes several organizations from the USA, but also involves some organizations from Europe, Asia and one organization in South America, in Brazil. Another international organization widely known is the International Society for Animal Assisted Therapy, which offers full accreditation programs in Germany, Italy, Israel, Austria and Switzerland. These programs are offered in English, German and Japanese (International Society for Animal Assisted Therapy, 2019). At the same time, there is a wide range of AI

training courses in organizations not mentioned on this list (e.g., Japan Animal Therapy Association, Centro de Actividades y Terapias Asistidas con Caninos).

As defined by the American Pet Partners (2017), which is a widely cited organization (Kuzara, Pendry, & Gee, 2019; Linder, Mueller, Gibbs, Alper, & Freeman, 2018; Kirnan, Sinimerio, & Wong, 2016; Bassette & Doughty, 2013) responsible for the certification of animals and professionals, AAI encompasses both Animal-Assisted Therapy (AAT) and Animal-Assisted Activity (AAA). Animal-Assisted Therapy is a formal and goal-oriented intervention carried out by healthcare professionals with expertise in a particular field such as psychotherapy and medicine (Charry-Sanchez, Pradilla, & Talero-Gutierrez, 2018; Fine, 2010). All AAT programs include sessions tailored to each client, and outcomes must be measured. In contrast, AAAs are usually carried out by a trained professional (usually a volunteer handler), and involves unspecified goals, rather than individual therapeutic goals. Compared to AAT, in AAA the setting is more flexible and may involve the presence of other people. Common settings in which AAAs take place include dog-handler team visits implemented in hospitals or schools (Nammalwar & Rangeeth, 2018; Friesen, 2010). This paper begins with a scoping review focusing only on studies about AAAs for children and youth (ranging in age from 3 to 17 years) and university students (with an average age of 19 years).

Regarding tools used for assessment, human-animal interactions have been measured mostly through the use of questionnaires (self- or other-reports), behavioral observations, as well as physiological measures. The use of questionnaires and behavioral observations usually involve the adaptation of standard paradigms from other fields such as psychology. For example, it is common to use questionnaires or behavioral observations to assess psychological constructs such as attachment and affiliative behaviors (Rodriguez et al., 2018), and these studies are mostly grounded in developmental perspectives. More studies combining the use of multiple validated standard tools could help in reducing “the bias of one single method” (Rodriguez et al., 2018, p. 13). However, “multimodal assessments” (Rodriguez et al., 2018, p. 13) are not historically common in this field.

Past literature reviews of AAAs in schools and healthcare settings with dogs have focused on the cost-effectivity and the social emotional, physical and cognitive impact of these interventions for children and youth (Brelsford et al., 2017; Lundqvist, Carlsson, Sjö Dahl, Theodorsson, & Levin, 2017). In these reviews the emphasis is placed on dog-client interactions. This paper argues that it is also important to consider aspects of the handler in dog-client interactions (e.g., handlers’ perceptions of AAA, characteristics of dog-handler interactions) and how these are related to the outcomes of these interventions. In this sense, there is a gap in the knowledge of how these interventions are shaped by characteristics related to the dog and the handler, and the dynamic interactions among dog-handler teams and the participants engaged in these interventions. Arguably, the success of these interventions requires consideration of the dynamic interactions among all the participants involved, which includes not only the dog and handler dyad but also the dog-handler-client triad.

Increasingly, researchers are focusing on issues related to animal health and welfare. Most of these studies are emerging from Europe and the USA (Clark, Smidt, & Bauer, 2019; Glenk et al., 2013; Marinelli, Mongillo, Salvadoretti, Normando, & Bono, 2009), and emphasize that predictable environments and interactions can minimize dogs' stress responses (Ng et al., 2014). Nevertheless, there are still important gaps in our knowledge of how AAAs are shaped by the dynamic interactions among all stakeholders in dog-handler-client teams. Only recently have studies focused on handlers' perceptions of AAAs.

For example, in one study, handlers from Norway working in nursing homes emphasized the importance of collaboration from other professionals in either directly or indirectly facilitating AAAs. The handlers described the importance of preparing nurses for the AAA visits and including these visits on the hospital schedule. Some handlers also wanted more information about participants in terms of their health condition, interests and life history, which could not be shared by nurses for confidentiality restrictions (Gundersen & Johannessen, 2018).

One qualitative study with sixty handlers from an on-campus canine-assisted activity program analyzed handlers' motivations to volunteer and their perceptions about their role. Overall, handlers described social and psychological benefits both to themselves and to their dogs. When addressing their reasons to continue volunteering they mentioned not only their own well-being but also students' and dogs' well-being, (Tardif-Williams, Binfet, Rousseau, & Green, 2019). Furthermore, this study found that, overall, handler volunteers had high levels of wellbeing as reflected by high connectedness, high level of positive affect and high quality of life and pet attachment when their scores were compared to normative data obtained from comparable samples (Rousseau, Draper, Binfet, Tardif-Williams, & Green, 2019).

Investigations about dog-handler relationships show that the characteristics of these interactions (e.g., communication style, attachment style) as well as the context in which they happen are both relevant to understanding dogs' emotional responses as well as dogs' engagement in different activities. For example, in one study among avalanche search teams, the likelihood of success in the search mission increased when dogs explored the environment, rather than when they hesitated and spent longer gazing at their owners. In this context, successful teams spent less time in completing the trial. Importantly, the success in the trials also was correlated to close attention from handlers toward dogs in terms of observing and guiding the dog (Diverio et al., 2017). This means that the success in the trials was linked to aspects connected to both the dog (increased exploration of the environment) and the handler (close attention toward the dog).

Another recent study found a correlation when assessing handlers' and dogs' stress in the context of AAAs for university students at the end of the interventions (Silas, Binfet, & Ford, 2019). Moreover, according to Wanser and Udel (2019), in the context of AAA sessions, insecure attachment toward the handler may lead dogs to gaze at handlers more frequently as a strategy to seek emotional comfort, guidance and social reassurance. In this way, dogs with a secure emotional base may feel more secure to interact with others, while dogs with an

insecure emotional base may need to make more frequent visual contacts with their handlers to obtain information on how to behave when interacting with unfamiliar individuals. More studies exploring this aspect of dog-handler relationships could elucidate how such behaviors will influence the session dynamics and the quality of interactions with people present into the room.

These studies indicate a possible social and emotional synchrony between handlers' and dogs' responses. Another investigation suggests that differences take place in dog-handler interaction styles when comparing the moments just before a session and during AAA sessions themselves (Kuzara et al., 2019). These observations prior to sessions helped to predict differences in dog-handler interactions styles during AAA sessions. Overall, the dog-handler teams differed in terms of interaction styles (warmth vs control), engagement with participants and degree of contact with dogs during AAAs. At the same time, differences in handlers' personality traits, dog-handlers' training to work with a particular population (e.g., children or youth with physical exceptionalities, children with communication impairments), as well as the orientations given to dog-handler teams will likely influence the relationship between all parties involved in AAAs.

An underlying assumption guiding many studies is that, far from being a neutral variable, the quality of dog-handler relationships (i.e., emotional connection and interaction style) is critical to the success of AAA programs. In fact, from a psychological perspective the particularities of dog-handler functioning in terms of attachment and communication style might impact dogs' ability to perform a task or to engage in activities with other children, youth or young adults.

Research is needed that not only incorporates more detailed information about handlers and dogs but that also investigates directly the relational features of all parties involved (the dog-handler-client triad). In addition to shedding light on the dynamic and relational elements characterizing these interactions, this type of reflection might offer insights related to the different assumptions and discourses guiding the design of AAA interventions. Clarifying these relational variables is vital to informing the design of successful AAAs.

As members of a transdisciplinary childhood studies academic department, the first three authors of this paper have epistemological and applied knowledge on the application of transdisciplinarity in scholarly and practice-based contexts. The fourth author is a faculty member in education and has extensive scholarly background in human-animal studies. As scholars we were motivated to collaborate and integrate our varied background (e.g., AAT, education, research on human-animal interaction, transdisciplinary research without previous knowledge on AAA) through a conceptual framework of transdisciplinarity to uncover new insights into the field of AAA. From our perspective, the collaborative work and direct engagement in all steps of this scoping review (e. g., definition of research questions, literature search process, methodological decisions, interpretations of findings) allows us to raise new research questions which may contribute to a more nuanced analysis.

## **Transdisciplinary Framework Applied to AAA Research**

The conceptual framework informing this scoping review of the literature engages a transdisciplinary perspective. Transdisciplinarity positions scholars to reach beyond traditional disciplinary boundaries to access knowledge from stakeholders in community and beyond the academy to address complex problems holistically (Moore & Duffin, 2020; Mitchell & Moore, 2018, Leavy, 2016). This whole systems approach is participatory and “scientists from different disciplines as well as nonscientists and other stakeholders, and through role release and role expansion” (Choi & Pak, 2006, p. 359). In the context of AAA research, such an approach acknowledges the limits of traditionally bounded disciplines which at times reinforce binary distinctions between human – nature/non- human dualism. A transdisciplinary attitude creates space for new conceptualizations of our social worlds, eases reciprocal learning patterns between theory and practice and disrupts the power relations invested in anthropocentrism (Moore & Duffin, 2020) that may obscure insights into AAA research.

The distinction between interdisciplinary and transdisciplinary views center on the degree to which disciplinary boundaries and traditional hierarchies are transcended (Leavy, 2016). Without denying the relevance of disciplinary knowledge, a transdisciplinary view questions traditional hierarchy among stakeholders (Moore, 2018; Leavy, 2016) through complex thinking and the reintegration of knowledge through ongoing collaboration “within and beyond” (Moore, 2018, p. 471) different fields.

The central motivation for implementing AAA interventions in different settings has been linked to the desire to promote the well-being of children and youth. However, the emergence of AAA programs with dogs brings a variety of new and complex research questions that transcend dog-client interactions. Variations exist in terms of the client populations that participate in AAA interactions. Nevertheless, many interventions involve at least one client, one dog and one handler (or another professional) with expertise in interspecies communication and who is able to balance the dog's and the participant's needs. In this way, exploring these interventions requires the ability to integrate multidimensional layers of interspecies and intraspecies interactions (e.g., dog-handler interactions, child-handler interactions, child-dog interactions, and child's reactions to dog-handler interactions) as well as contextual variables (e.g., the room design, the presence of other professionals, dogs' freedom - or lack of - to roam around and spontaneously interact). In this context, linear and dualist perspectives are by themselves unable to capture the complex interactions inherent to AAAs. Conversely, transdisciplinary frameworks propose a “new way of thinking” (Giri, 2002, p. 103) about the research process, one that embraces contradictions and reintegrates knowledge to “more effectively address real problem-issues” (Leavy, 2016, p. 24).

According to Purser, Park and Montuori (1995) the emergence of linear perspectives as well as the belief in a fundamental “human-nature dualism” (Purser et al., 1995, p. 1054) are “contemporary manifestations of anthropocentrism” (Purser et al., 1995, p. 1055). Although placing humans at the center of our concern seems natural, this perspective obscures the interconnections between different dimensions while creating rigid contradictions. In this

way, anthropocentric worldviews highlight visible and measurable dimensions of experiences and prioritize ontological distinctions between human and nature (Purser et al., 1995). This model has privileged technological forms of knowledge in which it is assumed that the “subjective observer” is ontologically separated from the observed phenomena. In this way, “facts and values” are seen as being “incommunicable ontological categories” (Purser et al., 1995, p. 1959). A dichotomy in which some aspects of interactions are assessed and other aspects are assumed to be neutral can hide questions related to “value, power, funding, special interests and so forth” (Purser et al., 1995, p.1960).

Anthropocentric orientations in AAA studies with children and youth may inadvertently reproduce fragmented perceptions of experiences in which humans are placed as subjects of action and animals are positioned as tools to achieve a given outcome. In addition, anthropocentric views may obscure a full consideration of some aspects of the constant adjustments and potential mutual benefits that can emerge from dog-handler-client interactions. For example, by focusing only on the observable aspects of dog-client interactions, other less easily observable dimensions of dog-client interactions (e.g., dog-handler communication, handler-client emotional connection) may be overlooked. Similarly, aspects of the handler-dog relationship (e.g., what motivates the dog-handler team, how clients perceive the handler and dog) might also be overlooked.

From a transdisciplinary perspective, however, the assumption of interdependency between different dimensions of reality replaces the belief in a reality naturally fragmented and hierarchized (Nicolescu, 2014). From this perspective, the observer and the observed phenomenon are ontologically connected and should be integrated into the inquiry. In this way, transdisciplinary research is inquiry-driven and involves ongoing collaboration with other fields. It is also important to ensure that all the fields are directly engaged in each step of the decision-making processes involved in the research and interpretation of findings. In the scenario of AAA studies, collaboration among professionals with practical experience in AAA (e.g., handlers, researchers with practical experience in the field), experts in animal behavior (e.g., veterinarians) and professionals from the social sciences or the healthcare field might be essential to promote a more holistic approach. The ultimate goal is to create innovative knowledge and adequate tools to respond to a complex reality (Leavy, 2016). The worldview guiding different investigations will reflect on the types of research questions formulated (Montuori, 2013) and on the tools used to explore dog-handler-client interactions.

Our scoping review analysis offers one possible application of transdisciplinary concepts to the AAA field. As outlined in this paper, our analysis does not aim to deny or to minimize the relevance of more positivist methodologies which are often adopted in studies of AAAs with children and youth (Purser et al., 1995). Also, this is not the only framework that can foster a deeper analysis of triadic interactions within AAA. Rather, the argument presented here aims to demonstrate how the application of transdisciplinary concepts (e.g., complex thinking, reintegration of knowledge through ongoing collaboration between fields, role expansion) can promote more holistic and integrated methodologies when exploring aspects

of dog-handler-client interactions within the context of AAAs. A shift toward a more hybrid perspective may open up space for dialogue and collaboration wherein the perspectives of all stakeholders (handler, dog and client) are prioritized. Involving researchers from different fields (e.g., educators, nurses, veterinarians, social workers) and non-experts (e.g., handlers, clients) in the design of each methodological step can be useful in future studies. Such an approach can advance research in the field of AAAs by: (a) exploring AAAs in a more global context (Borrego et al., 2014), (b) further exploring how to adapt or to develop reliable tools and valid methods, (c) drawing strategies to combine multiple and well-validated measures including physiological measures, various questionnaires and observations (Rodriguez et al., 2018), (d) expanding the current knowledge about dog-handler teams (Kuzara et al., 2019), and (e) expanding the current knowledge about dogs' (Clark et al., 2019) and handlers' health and well-being (Tardif-Williams et al., 2019)

## **Scoping Review of Studies on Dog-Handlers Engaging in AAA**

### **Search Terms and Strategy Applied**

The methodological framework guiding this scoping review was suggested by Arksey and O'Malley (2005). The review process included five stages: (a) identification of the research question, (b) identification of relevant studies, (c) selection of studies based on specific exclusion and inclusion criteria, (d) charting of the data based on the theme proposed in this review, and finally (e) summary, comparison and organization of the results.

The following search terms were applied: animal-, canine- and dog-assisted activity; animal-, canine- and dog-assisted intervention; handler; animal-, canine- and dog-handler team. These keywords were combined with the terms: children, teenagers, child, adolescents, young people, students, youth, school, hospital, classroom, university. The search combined the above keywords to generate a comprehensive list of relevant research studies.

This analysis focused only on peer-reviewed studies with full text in English from January 1<sup>st</sup> 2004 to July 1<sup>st</sup> 2019, and these studies were identified by searching the electronic databases SuperSearch, Academic Search Complete, PsychoInfo, Taylor and Francis Online, Directory of Open Access Journals, ScienceDirect, Medline, Education Source and CINAHL. Additional studies were identified by searching the reference list of recent systematic reviews relevant to AAAs with children, youth and young adults.

### **Inclusion and Exclusion Criteria**

Next, the following criteria were applied to determine study inclusion: (a) studies on canine-assisted activity published in peer-reviewed journals and with full-texts in English, (b) studies published within the last 15 years (from January 2004 to July 2019), (c) studies involving live dogs and without comparison with other animals, (d) studies involving children, youth or young adults and a AAA team, (e) studies involving more than one session of AAA, and (f) studies where it was possible to identify who was the professional responsible for the dog. Note that studies involving the analysis of single sessions were excluded from this study.

Both quantitative and qualitative studies were included if they met the inclusion and exclusion criteria. Also, studies defined by the authors as involving animal-dog- or canine-assisted therapy (and not AAA) and those involving both AAT and AAA were excluded from this scoping review. Studies defined by the authors as involving AAT were excluded for two reasons. Firstly, AAT programs usually involve the presence of a healthcare professional and not all programs involve a volunteer handler. Second, the dynamic between handlers and clients as well as handlers' roles may be different in more structured sessions which is the case in AAT. As the first goal of this scoping review was to explore variables related to the triad (dog-handler-client) this paper focuses only on AAA studies.

### Results of the Search and Data Extracted from Studies

The search process was primarily carried out by the first author, and a secondary search was conducted by the second author to ensure that all the relevant studies were included. The process is described in the Figure 1.

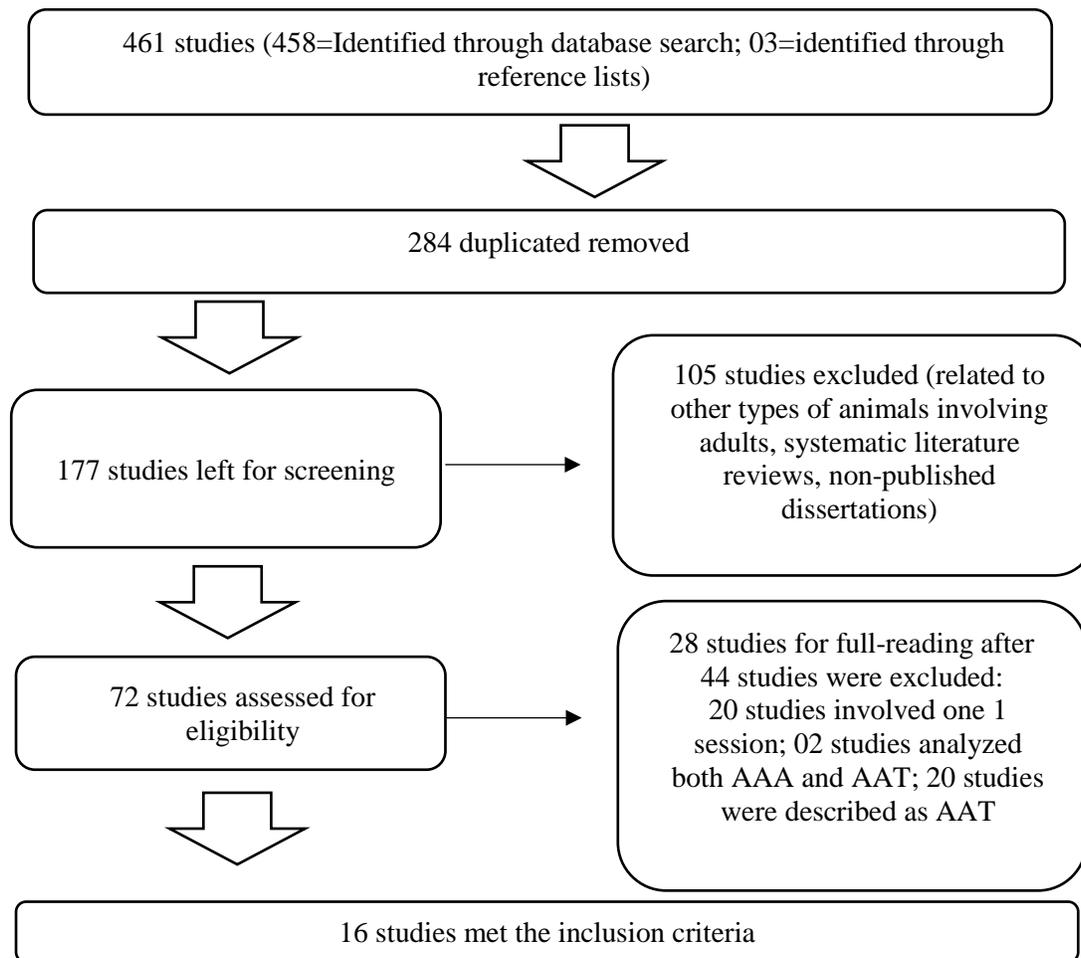


Figure 1. Scoping Review Search Process

For each study reviewed, information related to the geographic locations and local settings wherein the data was collected, the journal and year in which each study was published, the first author, the study protocol, and an overview of aspects assessed and tools used were extracted (see Tables 1 and 3). In addition, information about the dogs, the handlers, the dog-handler teams and the client participants were extracted (see Tables 2 and 3). Table 1 lists the 16 studies reviewed in terms of first author, year of publication, journal in which they were published, geographic locations and local settings in which the data was collected. Table 2 highlights the total number of studies in which different types of data about handlers, dogs and the dog-handler teams were identified. Table 3 shows an overview of the studies analyzed in this scoping review in terms of aspects assessed, study protocols, tools used, and further details about the children, youth and young adults.

First, information about dogs included the dog's age, sex, breed, name, type of certification, mention to preventative measures used during AAA to ensure the dog's welfare, the use of a leash during AAA interventions, and measures related to the dog's stress levels during AAA interventions. Second, information about the handlers included the handler's age, gender, years of experience, role during activities, clients' responses toward the handler, and handlers' responses to AAAs. Third, information about AAA teams included the configuration of teams (e.g., dog-handler teams, teacher-dog team, and presence of other professionals working with dog-handler teams), the relationship between dogs and handlers (dog ownership and assessment of dog-handler interactions), comparison between different dog-handler teams and criteria used to match children or youth and AAA teams. Fourth, information about participants included the participants' age, gender and specified any special diagnosis if noted.

### **Settings and Description of Studies Reviewed**

The majority of the 13 studies in schools assessed the effects of interventions on students' reading skills and/or students' attitudes toward learning (see Table 3). However, these programs also focused on students' emotional or socio-emotional outcomes, in addition to investigating the influence of dogs on reading abilities among students (their beliefs about themselves, peers and dogs). As detailed in Table 3, one program assessed the effect of a dog on teachers' perceptions of students after an AAA program. Additionally, students' and teachers' perceptions of children's behavior were captured through the use of questionnaires in one study. In another AAA study, dog owners' and educators' views of children's improvement were collected. Only one study involved university students and focused on dog-handler dyads by comparing handlers' interactions with their dogs in the presence of students and dog-handlers' interactions styles just before interventions (see Table 3).

Table 1  
 List of Animal-Assisted Studies Among Children, Youth and Young Adults Reviewed

First Author, Year of Publication	Setting	Journal of Publication	Geographic location of data collection
Correale et al., 2017	School	Veterinary Sciences	Rome, Italy
McCullough et al., 2018	Hospital	Animal Applied Behaviour Science	5 locations in the USA (Nashville – Tennessee, Portland – Oregon, Sacramento, California, Tampa – Florida, Worcester, Massachusetts)
Caprilli et al., 2006	Hospital	Child Youth Care Forum	Firenze, Italy
Levinson et al., 2017	School	Society and Animals	Northwest Pennsylvania, USA
le Roux et al., 2014	School	Child Youth Care Forum	Western Cape – South Africa
Linder et al., 2018	School	Early Childhood Education Journal	Central Massachusetts, USA
Bassette et al., 2016	School	RMLE Online: Research in Middle Level Education Online	USA
Tissen et al., 2007	School	Anthrozoös	Vienna, Austria (3 schools)

*Cont. Table 1*

Moore et al., 2013	3 Schools	Anthrozoös	A large district in the Southwestern United States
Bassette et al., 2013	School	Child Youth Care Forum	USA
Beetz 2013	School	Frontiers in Psychology	German
Anderson et al., 2006	School	Anthrozoös	North Dakota - USA
Kirnan et al, 2016	School	Early Childhood Education Journal	Central New Jersey - USA
Connell et al., 2019	School	Anthrozoös	Victoria - Australia
Kuzara et al., 2019	University	Animals	Washington - USA
Schuck et al., 2018	School	Human-Animal Interaction Bulletin	California – USA

Regarding the two studies involving AAAs that were implemented in hospitals, one study focused on dogs' behavioral and psychological responses during AAA interventions among oncologic patients. This study did not focus on handlers' perceptions but collected and effectively incorporated handlers' observations to the analysis in terms of child or dog behaviors, or environmental variables (e.g., noises, child's mood, dog's unusual behavior) that could influence the dog's stress level. The second study included patients with different diagnoses and captured children's perceptions and engagement in activities with the dog. In addition, this study explored parents' and staffs' opinions about the presence of dogs in the hospital, as well as the infection rate in the presence of the dogs (see Table 3)

**Configuration of AAA Teams**

The configuration of AAA teams varied in terms of the type and number of professionals involved. In seven studies, AAA teams were constituted only by volunteer and certified dog-handler teams, while in six other studies the dog-handler team carried out the activities with the collaboration of other professionals either from schools or from a hospital. In the remaining three papers, a teacher with a past relationship with the participants implemented the AAA program with the dog (see Table 2).

## **Characteristics of Children and Youth**

As detailed in Table 3, most of the 16 studies reviewed involved exclusively children (aged between 3 and 12 years), with two of the 16 studies involving both children and youth (aged between 3 and 17 years), and another study involving only university students with an average age of 19 years and 2 months. In nine studies the sample included a majority or only participants without a specific diagnosis or learning impairments. Seven studies included only participants with emotional or behavioral disorders, learning impairments, or other medical conditions. A total of 12 of the 16 studies clearly mentioned the participant's gender, and in this case one study included only boys and the remaining 11 studies included both boys and girls (see Table 3). In the remaining four studies, although the information about gender was not directly mentioned, the descriptions of the samples suggest the inclusion of boys and girls. Some studies also described variation in terms of participant's ethnic origin, income and first language, but with participants being mainly North-American or European and speaking English as a first language.

## **Information Provided About Dogs**

As summarized in Table 2, when examining the characteristics of the dogs involved in AAAs we noted that 12 out of the 16 studies included only certified dogs and three studies included only non-certified dogs. Also, one study incorporated puppies in-training in the final three sessions of a 12-weeks program. However, even non-certified dogs were informally prepared to work within an AAA setting, and all studies described some degree of information about the measures taken to ensure dog welfare, such as ongoing observations by the handler, pauses between sessions, and the possibility of removing the dog from the room when the dog displayed signs of stress.

Concerning the use of a dog leash, as described in Table 2, in most studies it is unclear whether a leash was or was not used, but it was noted that in four studies the dogs were leashed, and in two studies the dogs were unleashed. Only eight of the 16 studies reported the dog's age, which ranged from age 3 to 12 years. The dog's breed was mentioned in 12 studies. Although Labrador and Golden retriever were the most popular breeds, dogs varied in size and breed and included English Setters, Pinschers, Poodles, King Charles Cavaliers and mixed-breed dogs. One study was not specific but mentioned the inclusion of dogs from more than one breed (different sizes and colors). Seven studies directly mentioned the inclusion of more than one dog breed. Five studies reported that they included only one dog breed (3 studies included Labradors; 1 study included one Poodle; 1 study included Norwegian Lundehunds). The dog's sex was clearly mentioned in eight of the 16 studies and could be assumed in two studies by looking at the dog's name. In the remaining five studies, the dog's sex was not given. We noted a prevalence of females in four of the 10 papers where dogs' sex was given, while male dogs were predominant or exclusively present in six studies (see Table 2). In terms of behavioral or physiological measures related to the dog's well-being, one study assessed canine stress levels (see Table 3).

Table 2  
 Overview of Types of Information on Handlers, Dogs and Dog-Handler Teams Extracted From the 16 Studies

Handlers	Dogs	Dog-handler teams
<u>Age</u> : 2 studies <sup>2, 15</sup>	<u>Age</u> : 8 studies <sup>2, 3, 7, 9, 11, 12, 13, 15</sup>	<u>Configuration of teams</u> :
<u>Gender</u> : 6 studies <sup>1, 2, 5, 7, 8, 15</sup>	<u>Sex directly mentioned</u> : 8 studies <sup>2, 3, 5, 7, 8, 9, 11, 15</sup> ;	Only dog and volunteer handler: 7 studies <sup>2, 4, 5, 6, 8, 15, 16</sup>
<u>Years of experience</u> : 3 studies <sup>2, 14, 15</sup>	supposed by the name: 2 studies <sup>1, 10</sup>	Only dog and teacher: 3 studies <sup>7, 9, 11</sup> ; Dog-handler teams with other professionals: 6 studies <sup>1, 3, 10, 12, 13, 14</sup>
<u>Overview of handlers' role during activities</u> : all studies	<u>Breed</u> : 12 studies <sup>1, 2, 3, 5, 7, 8, 9, 10, 11, 12, 14, 15</sup>	<u>Dog-ownership clearly reported</u> : 8 studies <sup>5, 7, 9, 10, 11, 12, 13, 15</sup>
<u>Handlers' responses toward the dog</u> : 1 study <sup>15</sup>	<u>Name</u> : 8 studies <sup>2, 3, 7, 9, 11, 12, 13, 14</sup>	<u>Analysis of dog-handler interactions</u> : 1 study <sup>15</sup>
<u>Handlers' perceptions and recommendations</u> : 1 study <sup>13</sup>	<u>Certified dogs</u> : 12 studies <sup>1, 2, 3, 4, 5, 6, 8, 9, 10, 13, 14, 15</sup>	<u>Rationale behind the process of matching children and AAA teams</u> : vague reference in 2 studies <sup>2, 3</sup>
<u>Participants perceptions and/or reactions towards the handler</u> : no study	<u>Non-certified</u> : 3 studies <sup>7, 11, 12</sup>	<u>Participants responses to different dog-handler teams</u> : no study
	<u>Certified dogs in most sessions</u> : 1 study (puppies in-training were incorporated in the final 3 sessions) <sup>16</sup>	AAA Teams' health and/or well-being: no study
	<u>Use of leash</u> : Yes: 4 studies <sup>2, 3, 4, 15</sup>	
	No: 2 studies <sup>11, 12</sup> ; Unclear: 10 studies <sup>1, 5, 6, 7, 8, 9, 10, 13, 14, 16</sup>	
	<u>Behavioral or Physiological measures related to the dog</u> : 1 study <sup>2</sup>	
	<u>Mention to measures related to dog welfare</u> : all studies (in different levels)	

<sup>1</sup> Correale et al., 2017; <sup>2</sup> McCullough et al., 2018; <sup>3</sup> Caprilli et al., 2006; <sup>4</sup> Levinson et al., 2017; <sup>5</sup> le Roux et al., 2014; <sup>6</sup> Linder et al., 2018; <sup>7</sup> Bassette et al., 2016; <sup>8</sup> Tissen et al., 2007; <sup>9</sup> Moore et al., 2013; <sup>10</sup> Bassette et al., 2013; <sup>11</sup> Beetz, 2013; <sup>12</sup> Anderson et al., 2006; <sup>13</sup> Kirnan et al., 2016; <sup>14</sup> Connell et al., 2019; <sup>15</sup> Kuzara et al., 2019; <sup>16</sup> Schuck et al., 2018

### **Information about Handler, Dog-Handler Relationship and Factors Related to Decisions when Matching Dog-Handler Teams and Clients**

When examining the demographic characteristics of the handlers involved in AAA, it was noted that most handlers identified as female; however, it should be pointed out that only six (of the 16) studies clearly reported the handlers' gender (see Table 2). In the remaining papers, this data was unclear or was not included. Curiously, the handler's age was reported only in two papers and in both studies, a predominance of women aged 40 years and over was observed. As observed in Table 3, in one of these studies (Kuzara et al., 2019) the main measures taken were related to the dog-handler relationship, which reflected a more detailed description of the handlers in terms of: age ( $M_{\text{age}} = 42.3$  years,  $Ag_{\text{range}} 18-70$ ,  $SD = 18.5$ ), gender (majority of female handlers) and years of experience (average of 2.79 years). In this paper, handler's responses to AAAs were assessed in terms of differences in their interaction style toward the dog before and during sessions. In another study, handlers' perceptions about the AAA program, as well as their recommendations for future programs were collected through interviews (Kirnan et al., 2016). Only three papers directly mentioned handlers' years of previous experiences with AAAs (see Table 2). The average years of experience for handlers was 2.79 years in one study, while in two studies handlers' years of experience was similar and ranged from around six months to ten years. Also, one study noted that handlers had extensive (number of years was not provided) experience either in healthcare or in school settings (Schuck et al., 2018). In eight of the 16 studies, handlers were clearly described as dog owners, while in the remaining eight studies this information was unclear. However, the dog-handlers involved in these eight studies were certified, which suggests the dog-handler teams had at least six months of experience working together. In two studies, dog-handler teams and participants were paired based on the availability of the participants' and the AAA team, without mention to possible reasons based on dog-handler and clients characteristics. In most studies, however, a rationale for matching participants and dog-handler teams was not provided (see Table 2).

Table 3

*Overview of studies reviewed in terms of aspects assessed, study protocols, tools used, children, youth and young people participants.*

<b>Study</b>	<b>Overview of aspects assessed</b>	<b>Overview of study protocol</b>	<b>Tools used</b>	<b>Overview of Population (children, youth or young adults)</b>
Correale et al., 2017	Teachers' perceptions of students' difficulties (e.g. social, emotional and cognitive aspects) after a AAA program	5 biweekly encounters; within-group comparisons	Pre-assessment questionnaires for participants; observations; standard questionnaires filled by teachers	N=21 (12 males, 9 females; Age <sub>range</sub> = 9-10 years) three participants with specific behavioral, emotional or socio-cognitive diagnosis (or borderline symptoms).
McCullough et al., 2018	The effect of AAAs on dogs' behavioral and psychological responses during AAAs	Weekly AAA visits to patients and parents during four months; within-group comparisons.	Demographic forms; canine behavioral assessment; research questionnaire; handler and study coordinator self-reports; behavioral analysis; dogs' cortisol levels analysis	26 therapy dog-handler teams paired with 60 oncologic participants. (Age <sub>range</sub> = 3-17 years)
Caprilli et al., 2006	Children's perceptions and engagement in AAAs; parents' and staffs' opinions about the presence of dogs in the hospital; the infection rate in the presence of the dogs.	~13 children per encounter; 20 weeks, at least 5 minutes of interaction per child; within-group comparisons.	Participants' drawings; behavioral and self-assessment manikin (a non-verbal technic) questionnaires for parents and staff; analysis of hospital infection rates.	N=138 (Age <sub>range</sub> = 3-11 years; M <sub>age</sub> = 3.5 years); hospitalized children.

Levinson et al., 2017	Comparison between: a AAA program and a reading program with peers on students' reading skills and their attitudes toward learning	5 weekly encounters; post-test control group design with repeated measures; within-group and control-group comparisons	Curriculum-based measurement procedures; standard reading attitude survey filled by children	N=45 (31 girls, 17 boys); second, third, fourth and fifth grader students
le Roux et al., 2014	The effects of three conditions (a dog group, an adult group, a Teddy bear group) on students' reading skills	10-weeks reading program; within and between group comparisons (with control group)	Demographic forms; standardized reading test	N = 102; range age 7-13 years; average age 8.2 year; <i>SD</i> = .92), poor readers students from low-income families; both boys and girls were included
Linder et al., 2018	The effect of a therapy dog, and a standard class on students' reading skills and academic reading attitude.	A 6-weeks program; within and between group comparisons	Standard curriculum measurement; a reading attitude scale; self-reported scale	N=28 (distributed into two homogeneous groups); participants with average second grade literacy skills
Bassette et al., 2016	Impact of an alternative treatment design, and a classroom design with a dog in students' reading skills and motivations levels.	3-months program; within and between group comparisons (dog was present in the school every day)	Pre-test assessment; curriculum-based measures of oral reading fluency and comprehension measures; assessment post-intervention	N= 4 (male students with emotional behavioral disabilities); age 10-13 years

Tissen et al., 2007	The effect of three experimental conditions with and without a dog on students' social behavior, empathy, and aggression	A 10-weeks program; within and between group comparisons	Standard and adapted questionnaires (filled by students and teachers); post-assessment	230 children (47.4% Male, 52.6% Female); 9 teachers
Moore et al., 2013	Assessment of implicit theories of reading ability, reading self-efficacy, and views of dogs.	16-weeks program (4 days/week); comparison across time within-conditions	Five surveys related to the measures taken; lesson plans developed by the authors	N=71 third-graders students (39 girls, 32 boys)
Bassette et al., 2013	The effects of a reading program on students' academic engagement	4-weeks program; multiple probe across student single-subject design	Pre and post interviews with students and teachers; systematic direct observational measures	N=3; elementary aged children (two 11-year-old male; one 7-year-old female) with emotional and behavioral disabilities
Beetz, 2013	The effects of the presence of a dog-teacher team on students' socio-emotional abilities, emotion regulation, and positive attitude toward school.	1-year AAA program; weekly encounters, comparison with a control group	Standard questionnaires (filled for children and teachers – with questions about the children)	N=25; third-graders students (male n = 12, female n = 13; $M = 8.5$ years, $SD = 0.51$ )
Anderson et al., 2006	Students' reading skills and/or students' attitudes toward learning / students' emotional or socio-emotional outcomes	8-weeks program; daily encounters; within group comparisons	Daily observations by the teacher; individual interviews with parents and children post-intervention interviews; recordings on problem solving sheets, and recordings	N=6; children with severe emotional disorders (aged from 6 to 11 years); low income school

Kirnan et al, 2016	The effect of AAA on students' reading skills and attitudes toward learning	Weekly encounters; 1 year (comparison with a control group)	on ABC analysis forms Standardized reading test scores; interviews with educators and dog owners (including questions about their perceptions, recommendations)	N=169, students from kindergarten, 1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , and 4 <sup>th</sup> grades regardless of their reading abilities
Connell et al., 2019	The effects of three different dog-assisted reading programs on the reading ability of primary school-aged children.	Pre-test week followed by 7-week AAA encounters, followed by post-assessment; 3 experimental conditions	Standard scales related to reading abilities	N=63 students; 36 57.1% females, 42.9% males ( $A_{g\ range}$ 6.33- 8.73 years, $M = 7.43$ years)
Kuzara et al., 2019	Handlers' interactions with their dogs before and after AAAs	Weekly encounters offered to students; average of 4 encounters for each dog-handler team	Behavioral analysis of recordings of AAAs	N=212; undergraduate students primarily female, $M_{age} = 19.2$ years
Schuck et al., 2018	Psychosocial intervention aimed to promote acquisition of adaptive skills	12-weeks program; pre, post and follow-up measures; weekly AAA sessions with children, weekly behavioral parent training sessions; within and between group-comparisons	Standard scales filled by parents at different moments	N=88; children with Attention-Deficit/Hyperactivity Disorder; aged 7-9 years

## Discussion

This scoping review aimed to identify if and how different characteristics of dogs, handlers and dog-handler teams were described and integrated into the analysis in past studies. The scoping review included many AAA studies carried out in schools with children living in different parts of the USA. Studies of AAAs taking place in hospital or university contexts, as well as studies involving children and youth from Italy, Western Cape in South Africa, Germany, and Australia also were identified. The main finding of this scoping review was that the majority of the studies primarily highlighted features directly related to the dog-client interactions when measuring the impact of AAAs. Another relevant finding of this scoping review was a gap in previous studies in terms of the description of handlers (e.g., age, gender, years of experience) and dog-handler teams (e.g., relationship, years of experience). In this way, the majority of previous studies have not explicitly considered the dog-handler-client triadic relationship and have tended to focus exclusively on dyadic interactions (e.g., dog-client interaction, dog-handler interaction).

In some of the studies reviewed, the relevance of other variables to the outcomes (e.g., presence of parents, participants' characteristics, a previous child-teacher bond) was discussed; however, these key variables were rarely integrated into the tools used to measure the outcomes. For example, Anderson and Olson (2006) used a range of tools (e.g., questionnaires, observations) to capture the perceptions of teachers, parents and children. However, the types of questions addressed were mostly related to the dog *per se*. Similarly, in their research Caprilli and Messeri (2006) used multiple tools for parents, staff, and children, but their specific queries focused mostly on aspects of the dog-child interaction or the types of activities carried out. In another study, the author clearly noted her intention to measure "effects based not only on the presence of the dog, but rather on" both the dog and the handler "as a team" (Beetz, 2013, p. 3), thus revealing a dynamic and triadic view of AAAs. The researcher aimed to compare the effects of teachers' personality traits in children's reactions to different teachers (from the experimental and control group). However, as one teacher did not fill the questionnaire, this data could not be analyzed.

In many of the studies reviewed in this paper it is unclear if and how different aspects of dogs, handlers, teachers or other professionals (e.g., personality traits and gender) might influence outcomes in the context of AAAs with children, youth and young adults. Further, only a few studies highlighted dogs' responses and effectively incorporated handlers' perceptions when analyzing the data (McCullough et al., 2018) or focused on the characteristics of dog-handler interactions (Kuzara et al., 2019). Furthermore, only one study explored teachers' perceptions of children after participation in an AAA program and it was observed that the presence of a dog in the classroom fostered teacher awareness of the students' emotional and educational difficulties (Correale, Crescimbene, Borge, & Cirulli, 2017). These findings reinforce the need for exploring how the perceptions of professionals (e.g., handler, teachers, parents, nurses) are influenced by dog-client interactions.

Although participants' emotional and behavioral reactions towards handlers were not directly assessed in any of the studies reviewed, some of the studies acknowledged the influence of both dogs and handlers to the success of AAAs (Bassette & Doughty, 2013), or emphasized that other professionals present into the room (e.g., teachers) may equally influence the setting and promote positive outcomes in the sense of fostering positive emotions, empathy toward peers and adults, and behavioral control in social interactions (Anderson & Olson, 2006). In another studied Kuzara et al. (2019) also stressed the need for future investigations of handlers' responses to different participants and participants' reactions to dog-handlers with different interaction styles.

More studies involving aspects not directly related to dog-client interaction and involving handlers, teachers, parents and other professionals involved in AAAs are important for different reasons. First, although examining dyadic interactions is crucial, this is far from encompassing all the interactional variables involved in AAAs. In this way, expanding the focus of dog-participant interactions to include the dog-handler-participant triad might clarify the dynamic interactions among all participants. Second, further detailing the features of all participants involved in these activities might open up the possibility to explore what expectations each participant brings to the room (e.g., handler's expectations towards the dog, children's expectations toward dog-handler teams), and what emerges from dog-handler-client interactions. This clarification may elucidate critical aspects that need to be considered when exploring the mutual and ongoing adjustments that are required to ensure the successful outcomes of AAA programs for children and young people from different cultures. Further, the definition of successful outcomes should consider not only the specific goals of different AAA programs (e.g., to increase students' motivation for learning, to promote children's emotional and social well-being), but also the well-being of all those engaged in AAAs. Also, the mechanisms through which all these interactions are interconnected within AAA interventions are still unclear and understudied. Instead of involving primarily linear and causal dog-client relations, in our understanding, these interactions involve multidimensional and dynamic dog-handler-client relations.

The presence of different professionals within AAA teams is another key feature identified in this scoping review. The configuration of AAA teams, as well as the interactional dynamics when a handler works with other professionals requires careful analysis and should be integrated into the assessments of AAA programs. In this way, future studies could investigate how these differences in the configuration of AAA teams (e.g., dog-handler team, teacher-dog team, teacher-dog-handler team) might contribute to successful outcomes for children and young people. By giving a voice to these professionals, in the sense of including their perceptions both into the analysis and the interpretation of the findings, researchers can investigate if and how the variations in the AAA teams are connected to the dynamic and relational features that emerge from dog-handler-client interactions.

Further, emotions may also mediate children's interactions with peers and adults (Obeldobel & Kerns, 2019). However, emotional aspects of the relationship between young

clients and handlers (or other professionals) involved in AAAs have been largely overlooked in past studies. Obeldobel and Kerns (2019) suggest that in educational contexts there is a positive correlation between security of attachment in the parent-child relationship, higher school achievement and positive emotions such as greater openness to life and satisfaction with life. Replicating this type of study in the AAA field may clarify if and how parent-client attachment or clients' emotions toward the handler can mediate the quality of interactions in which the dog is involved (e.g., reading a book, performing a task).

Nicolescu (2005) uses the concept of a trans-subjective dimension to describe the inherent and non-hierarchical interconnection between multiple and coexisting levels of the transdisciplinary reality. From this perspective, each level is always incomplete when not interconnected to one another, which makes them equally relevant to understand a given phenomenon. Adopting a complex and non-linear appreciation of interactions within the context of AAAs requires an appreciation of the multiple and non-hierarchical levels of realities that are produced within these sessions. These diverse multidimensional realities are generated from encounters between handler, dog, client, and other professionals and cannot be isolated from the contexts from which they emerge.

Regarding how and if the particularities of different children and different dog-handler teams were matched, the criteria (when reported) were focused on the team's availability and participant's schedule. According to Nissani (1995) one essential component of transdisciplinary research is the degree of integration among the expert, non-expert and community member participants. This process requires working toward intense levels of collaboration from the initial to the final phases of the research process. As suggested by Austin, Park and Coble (2008) the process of integration among different stakeholders involves addressing the power relations that permeate these interactions. Exploring such aspects of AAAs can elucidate how the interactions and the outcomes are shaped by the power of individuals and their place in the world (e.g., volunteers, experts from a particular field). Congruent with transdisciplinary perspectives, there is a need for a higher level of participation of dog-handler teams and clients in the design of these interventions and interpretation of the findings. This may involve giving more emphasis to the participants' attributes when matching teams and clients and giving voice to the preferences of dog-handler teams and children and youth when matching dog-handler teams and participants.

The studies reviewed all described the role of handlers in terms of what activities were carried out during the AAA interventions (e.g., reading a book, introducing the dog) and the handler's commitment to the dog's welfare. It is interesting to note however that none of the studies assessed participants' responses to the handlers. Considering that all studies involved AAA programs with at least four sessions, it is likely that a bond developed not only between the participants and dogs but between the participants and handlers as well, even if the handlers were oriented to take on a passive role. In this regard, it is still unclear whether it is more beneficial to the success of the AAA for the client if the handler takes on an active or a passive role. This response might depend on the clients and the goals of the AAA session, and this is

a possible venue to be further explored. Also, measures related to the teams' physical and mental health or emotional well-being were not identified in the studies reviewed.

In the description of handlers, most studies emphasized the handler's role of safeguarding the dog's well-being and promoting adequate client-dog interactions without a further analysis of the handler-client relationship. While this is undeniably an important focus, a description exclusively focused on the handler's ability to advocate for dogs and preventing behavioral problems is incomplete. This type of description gives minor emphasis to the handler-client bond and highlights the presence of handlers as professionals who will protect the dog and control the dog's behaviors (including unpredictable and undesirable behaviors) when necessary. Unfortunately, these descriptions overlook handler's unique connection to clients and other professionals during AAAs. In this type of description, a false dichotomy is created between handlers as tools (with their role being mostly one that is connected to the "control" of their dog's behaviors and welfare) and handlers as agentic agents contributing meaningfully to the unfolding process of AAAs. Future research could examine whether the type of bond shared between the handler and his or her dog reflects on the type of bond that a client will share with the dog, handler and/or dog-handler team.

Describing handlers beyond their primary role toward their dogs means recognizing the multiple dimensions of their interactions within AAA sessions. As suggested by Kuzara, et al. (2019) further investigating how differences in dog-handler interaction styles shape participants' responses may shed light on a key dimension of AAAs. Also, incorporating more details about the individual attributes of dog-handler teams, rather than generic descriptions of these teams, can lead to new comparisons and interconnections between studies involving professionals from different cultures and working in different settings.

Furthermore, other aspects of handlers' roles within interventions can be explored including characteristics of the handler group. For example, beyond their role as volunteers connected to their dogs, what attributes do handlers bring to the AAA context, and what is the impact of different types of dogs on handlers' interaction styles within the AAA context. Exploring the kinds of information that handlers receive about the children and young people with whom they are engaged in AAAs also can help to clarify the level of collaboration between handlers and other professionals. Moreover, it is important to investigate if the handlers are free to initiate interactions with the children and young people, and how they integrate different aspects of their role as handlers in AAAs. Ultimately, addressing questions about how power relations operate among all of the parties involved in the AAA context can help to explore possible differences when comparing AAA teams from different cultures and working in different institutions. Also, this type of analysis can inform the design of culturally-relevant and sensitive programs to promote the well-being of dog-handler-client triads.

Additionally, details about the characteristics of the dogs can illuminate not only dog-handler interactions but also triadic interactions involving handler-dog-client and other professionals. For instance, the use or the lack of leash plays a role in dog-handler communication and might expand or restrain the degree of spontaneity in dog-client

interactions. This variable also may have an impact on how handlers “control” their dogs, which will offer a particular model of how to interact with dogs to children and youth. As described in many of the studies reviewed, handlers teach children the best and safest way to interact with the dogs. Whether and how the leash is used to communicate with a dog may change the clients’ communication styles toward dogs, as well as the dogs’ responses to interactions. At the same time, the use of a leash can have an impact on the dogs’ well-being. Compared to dogs kept on a leash during interventions with psychiatric clients, unleashed dogs showed lower stress levels when cortisol and behavioral parameters were assessed before and after interventions (Glenk et al., 2013). Therefore, keeping dogs unleashed may be a preventative measure to ensure dogs’ well-being. This example illustrates the multiple effects of a variable within AAA contexts.

This scoping review suggests a plurality of methodological approaches characterizing studies about the impact of AAAs for children, youth and young people. It also indicates focus on different dimensions of dog-handler-client interactions such as dog-client relationship and dog-handler relationship. In transdisciplinary research, taking into consideration the experiences and perspectives of all those involved in a specific interaction is the way scientific rigor manifests (Nicolescu, 2002). To be sure, transdisciplinary research aims for careful and equal attention not only to “things, but also beings and their relations to other beings and things” (Nicolescu, 2002, p. 120). Leavy (2016) states that an essential component of transdisciplinary studies is the commitment to understanding how different expert, non-expert and community members involved in the research make sense of “the coded or statistically analyzed data” (p. 136). This process also involves exploring to what degree all the parties are involved in different stages of the research and how they “negotiate and share their interpretations” (p.136). Therefore, consistent with a transdisciplinary worldview, the plurality of methodological approaches emerging from dog-handler-client interactions are not inherently competing and dissonant views (Leavy, 2016). In fact, they constitute the complex web (Nicolescu, 2014) of dog-handler-client interactions. Incorporating the voices of handlers, dogs, children, youth, young adults and other professionals is more than a moral responsibility. A shift in the conceptualization of the dog-handler-client relationships can illuminate “asymmetrical power” (Moore, 2018, p. 483) relations and generate new research queries. This type of appreciation is vital to appreciate the nuanced and interconnected dimensions of dog-handler-client triads, which can in turn inform the design of successful AAAs for children, youth and young people.

One limitation of this paper may be that we excluded single interventions and limited our analysis to studies published in English. These criteria may have excluded investigations focused on dog-handler-client interactions. Future scoping reviews could also analyze the role of handlers in AAT programs, with a focus on elucidating the variables related to their interactions with the professionals involved in these specific types of interventions. Furthermore, we proposed a scoping review and a transdisciplinary analysis focused particularly on the ways dog-handler teams have been described and incorporated into previous

studies, and thus this review did not focus on different study designs and protocols. Future analysis should incorporate other variables equally important to understanding how dog-handler-client interactions are shaped. These variables may include (a) clients' characteristics (e.g., past contact with dogs, psychological diagnosis), (b) the differences in the requirements of organizations responsible for dog-handler certification and training, and (c) the particularities of different cultures and settings.

### Conclusions

A transdisciplinary perspective considers the direct and indirect effects of different features of dog-handler-client triads and gives equal weight to the voices of all parties involved. In this way, a transdisciplinary lens can help to clarify the specific factors contributing to the success of AAA interventions. Most of the studies reviewed highlighted variables related to dog-client dyads and were particularly focused on the unilateral effects of dogs on participants. Although this type of analysis brings relevant contributions to the study of AAAs, they also indicate a limitation in terms of what set of variables and dimensions have been valued. This review reveals a need for research exploring the therapeutic role of dog-handlers, dog welfare and the well-being of dog-handler teams. Adopting a transdisciplinary lens in research on AAAs can focus attention on the complex web of relationships involved within AAAs. This reflection can foster a deeper understanding of how interspecies relations are manifested in therapeutic contexts. In this way, understanding how complex and multiple dimensions of interactions emerge from dog-handler-client relationship in a variety of contexts is vital to advancing research on the effectiveness of AAAs for children, youth and young people.

### References

- Anderson, K. L., & Olson, M. R. (2006). The value of a dog in a classroom of children with Severe emotional disorders. *Anthrozoos*, *19*(1), 35–49. doi: 10.2752/089279306785593919
- Animal & Society (2019). Human animal studies: Animal assisted therapy programs Retrieved from <https://www.animalsandsociety.org/human-animal-studies/animal-assisted-therapy-programs/>
- Arksey, H., & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*, *8*(1), 19–32. <https://doi.org/10.1080/1364557032000119616>
- Austin, W., Park, C., & Coble, E. (2008). From Interdisciplinary to transdisciplinary research: A case study. *Qualitative Health Research*, *18*(4), 557-564. doi: 10.1177/1049732307308514
- Banks, J. B., McCoy, C., & Trzcinski, C. (2018). Examining the impact of a brief human-canine interaction on stress and attention. *Human-Animal Interaction Bulletin*, *6*(1), 1-13
- Bassette, L. A., & Taber-Doughty, T. (2013). The Effects of a dog reading visitation program on academic engagement behavior in three elementary students with emotional and behavioral disabilities: A single case design. *Child and Youth Care Forum*, *42*(3), 239-256. doi 10.1007/s10566-013-9197-y

- Bassette, L. A., & Doughty, T. (2016). Analysis of an animal-assisted reading intervention for young adolescents with emotional/behavioral disabilities. *RMLE Online: Research in Middle Level Education*, 39(3), 1-20. doi: 10.1080/19404476.2016.1138728
- Beetz, A. (2013). Socio-emotional correlates of a schooldog-teacher-team in the classroom. *Frontiers in Psychology*, 4, 886. doi: 10.3389/fpsyg.2013.00886
- Binfet, J., & Passmore, H. (2016). Hounds and homesickness: The effects of an Animal-assisted therapeutic Intervention for first-year university students. *Anthrozoös*, 29(3), 441–454. doi: 10.1080/08927936.2016.1181364
- Brelsford, V. L. Meints, K., Gee, N. R., & Pfeffer, K. (2017). Animal-assisted interventions in the classroom - A systematic review. *International Journal of Environmental Research and Public Health*, 14(7), 669. doi:10.3390/ijerph14070669
- Borrego, J. L. C., Franco, L. R., Mediavilla, Piñero, M. A. P., Roldán, A. T., & Picabia, A. B. (2014). Animal-assisted interventions: review of current status and future challenges. *International Journal of Psychology and Psychological Therapy*, 14(1), 85-101.
- Caprilli, S., & Messeri, A. (2006). Animal-assisted activity at A. Meyer children's hospital: A pilot study. *Evidence-Based Complementary and Alternative Medicine*, 3(3), 379-383. doi: 10.1093/ecam/nel029
- Charry-Sanchez, J.D., Pradilla, I., & Talero-Gutierrez, C. (2018). Effectiveness of animal assisted therapy in the pediatric population: systematic review and meta-analysis of controlled studies. *Journal of Developmental & Behavioral Pediatrics*, 39(7), 580-59. doi: 10.1097/DBP.0000000000000594
- Choi, B. C. K., & Pak, A. W. P. (2006). Multidisciplinarity, interdisciplinarity and transdisciplinarity in health research, services, education and policy: Definitions, objectives, and evidence of effectiveness. *Clinical and Investigative Medicine*, 29(6), 351–364.
- Clark, S. D., Smidt, J. M., & Bauer, B. A. (2019). Welfare considerations: salivary cortisol concentrations on frequency of therapy dog visits in an outpatient hospital setting: A pilot study. *Journal of Veterinary Behavior*, 30, 88–91, doi: 10.1016/j.jveb.2018.12.002 91
- Connell, C. G., Tepper, D. L., Landry, O., & Bennett, P. C. (2019). Dogs in schools: The impact of specific human–dog interactions on reading ability in children aged 6 to 8 years. *Anthrozoös*, 32(3), 347–360. doi: 10.1080/08927936.2019.1598654
- Correale, C., Crescimbene, L., Borgi, M., & Cirulli, F. (2017). Development of a dog-assisted activity program in an elementary classroom. *Veterinary Sciences Science*. 4(4), 62. doi: 10.3390/vetsci4040062

- Diverio, S., Menchetti, L., Riggio, G., Azzari, C., Iaboni, M., Zasso, R., ... Santoro, M. M. (2017). Dogs' coping styles and dog-handler relationships influence avalanche search team performance. *Applied Animal Behaviour Science*, *191*(Complete), 67–77, doi: 10.1016/j.applanim.2017.02.005
- Fine, A.H. (2010). Incorporating animal assisted-therapy into therapy: Guidelines and suggestions for therapists. In Fine, A.H. (Ed.) *The handbook of complementary therapies* (pp. 169-191). New York, NY: Haworth Press. doi: 10.1016/B978-0-12-381453-1.10010-8
- Friesen, L. (2010). Exploring Animal-assisted programs with children in school and therapeutic contexts. *Early Childhood Education Journal*, *37*(4), 261–267. doi: 10.1007/s10643-009-0349-5
- Giri, A. K. (2002). The calling of a creative Transdisciplinarity. *Futures*, *34*(1), 103-115, doi.org/10.1016/S0016-3287(01)00038-6
- Glenk, L.M., Kothgassner, O.D., Stetina, B.U., Palme, R., Kepplinger, B., & Baran, H. (2013). Assessing therapy dogs' welfare in animal-assisted interventions. *Journal of Veterinary Behavior*, *8*(4), 27-46. doi: 10.1016/j.jveb.2013.04.012
- Gundersen, E.L., & Johannessen, B. (2018). What motivates arrangements of dog visits in nursing homes? Experiences by dog handlers and nurses. *Complementary Therapies in Clinical Practice*, *31*(1), 104-110. doi.org/10.1016/j.ctcp.2018.02.007.
- Ichitani, T., & Cunha, M. C. (2016). Animal-assisted activity and pain sensation in hospitalized children and adolescents. *Revista Dor*, *17*(4), 270-273. doi: 10.5935/1806-0013.20160087
- International Society for Animal Assisted Therapy (2019). Accreditation Full Programs. Retrieved from: <https://www.aat-isaat.org/accreditation/accreditation-full-program>
- Kirnan, J., Siminerio, S., & Wong, Z. (2016). The impact of a therapy dog program on children's reading skills and attitudes toward reading. *Early Childhood Education Journal*, *44*(6), 637–651. doi: 10.1007/s10643-015-0747-9
- Kuzara, S., Pendry, P., & Gee, N. R. (2019). Exploring the handler-dog connection within a university-based animal-assisted activity. *Animals*, *9*(7), 402-454. doi: 10.3390/ani9070402
- Leavy, P. (2016). Essentials of transdisciplinary research: using problem-centered methodologies. [Kindle DX version]. Retrieved from <http://books.amazon.com>
- le Roux, M., Swartz, L., & Swart, E. (2014). The effect of an animal-assisted reading program on the reading rate, accuracy and comprehension of grade 3 students: A randomized control study. *Child & Youth Care Forum*, *43*(6), 655–673. doi: 10.1007/s10566-014-9262-1
- Levinson, E. M., Vogt, M., Barker, W. F., Jalongo, M. R., & Van Zandt, P. (2017). Effects of reading with adult tutor/therapy dog teams on elementary students' reading

- achievement and Attitudes. *Society & Animals*, 25(1), 38–56. doi: 10.1163/15685306-12341427
- Linder, D. E., Mueller, M. K., Gibbs, D. M., Alper, J. A., & Freeman, L. M. (2018). Effects of an animal-assisted intervention on reading skills and attitudes in second grade students. *Early Childhood Education Journal*, 46(3), 323-329. doi: 10.1007/s10643-017-0862-x
- Lundqvist, M., Carlsson, P., Sjö Dahl, R., Theodorsson, E., & Levin, L.Å. (2017). Patient benefit of dog-assisted interventions in health care: a systematic review. *BMC Complementary & Alternative Medicine*, 17(1), 1–12. doi: 10.1186/s12906-017-1844-7
- Marinelli, L., Mongillo, P., Salvadoretti, M., Normando, S., & Bono, G. (2009). Welfare assessment of dogs involved in animal assisted activities. *Journal of Veterinary Behavior: Clinical Applications and Research*, 4(2), 84–85. doi: 10.1016/j.jveb.2008.09.022
- McCullough, A., Jenkins, M. A., Ruehrdanz, A., Gilmer, M. J., Olson, J., Pawar, A., ... O’Haire, M. (2018). Physiological and behavioral effects of animal-assisted interventions on therapy dogs in pediatric oncology settings. *Applied Animal Behaviour Science*, 200, 86–95. doi: 10.1016/j.applanim.2017.11.014
- Mitchell, R. C., & Moore, S. A. (2018). Transdisciplinary Child and Youth Studies: Critical praxis, global perspectives. *World Futures: The Journal of General Evolution*, 74(7-8), 450–470, doi: 10.1080/02604027.2018.1485435
- Montuori, A. (2013). The complexity of transdisciplinary literature reviews. (FEATURE ARTICLE). *Complicity: An International Journal of Complexity in Education*, 10(1-2), 45–55. <https://doi.org/10.29173/cmplct20399>
- Moore, E. G. J., Hlava, T., Garcia, S. L., & Brem, S. (2013). Ever try teaching a dog to read? Implicit theories of reading ability. *Anthrozoos*, 26(3), 381-393. doi: doi.org/10.2752/175303713X13697429463637
- Moore, S. A. (2018). Radical listening: Transdisciplinary, restorative justice and change. *World Futures: The Journal of New Paradigm Research*, 74(7–8), 471–489, doi: 10.1080/02604027.2018.1485436
- Moore, S. A., & Duffin, K. (2020). On rout/route: Engaging nature as therapeutic partner through land praxis in residential child care contexts. *Scottish Journal of Residential Child Care*, 19(1), 1-20
- Nammalwar, R. B., & Rangeeth, P. (2018). A bite out of anxiety: Evaluation of animal assisted activity on anxiety in children attending a pediatric dental outpatient unit. *Journal of Indian Society of Pedodontics and Preventive Dentistry*, 36(2), 181-184. doi: 10.4103/JISPPD.JISPPD\_54\_18
- Ng, Z. Y., Pierce, B. J., Otto, C. M., Buechner-Maxwell, V. A., Siracusa, C., & Werre, S. R. (2014). The effect of dog–human interaction on cortisol and behavior in

- registered animal-assisted activity dogs, *Applied Animal Behaviour Science*, 159(10), 69–81. doi: 10.1016/j.applanim.2014.07.009
- Nicolescu, B. (2002). *Manifesto of Transdisciplinarity*. (K. Voss, Trans.). New York: State University of New York Press
- Nicolescu, B. (2005). Towards transdisciplinary education. *The Journal for Transdisciplinary Research in Southern Africa*, 1(1). doi: 10.4102/td.v1i1.300
- Nicolescu, B. (2014). Methodology of transdisciplinarity. *World Futures*, 70(3-4), 186-199. doi:10.1080/02604027.2014.934631
- Nissani, M. (1995). Fruits, Salads, and Smoothies: A Working Definition of Interdisciplinarity. *Journal of Educational Thought*, 29(2), 121-128
- Obeldobel, C. A. & Kerns, K. A. (2019). Attachment security is associated with the experience of specific positive emotions in middle childhood, *Attachment & Human Development*. doi: 10.1080/14616734.2019.1604775
- O’Haire, M. E., McKenzie, S. J., McCune, S., & Slaughter, V. (2013). Effects of animal-assisted activities with guinea pigs in the primary school classroom. *Anthrozoos*, 26(3), 445-458. doi: 10.2752/175303713X13697429463835
- Pendry, P., Carr, A. M., Roeter, S. M., & Vandagriff, J. L. (2016). Experimental trial demonstrates effects of animal-assisted stress prevention program on college students’ positive and negative emotion. *Human-Animal Interaction Bulletin*, 6(1), 81-97
- Pet Partners (2017). Program Requirements. Retrieved from: <https://petpartners.org/volunteer/become-a-handler/program-requirements/>
- Purser, P. E., Park, C., & Montuori, A. (1995). Limits to Anthropocentrism: Toward an ecocentric organization paradigm? *Academy of Management. The Academy of Management Review*, 20(4), 1053-1089. doi: doi.org/10.2307/258965
- Rodriguez, K. E., Noémie A. Guérin, N. A., Gabriels, R.L., Serpell, L.A., Schreiner, P. J., & O’Haire, M. E. (2018). The state of assessment in human-animal interaction research. *Human-Animal Interaction Bulletin*, 6, 63-81.
- Rousseau, C. X., Draper, Z. A., Binfet, J. T., Tardif-Williams, C. Y., & Green, F. L. L. (2019). *Exploring handlers’ well-being in an on-campus canine-assisted intervention*. Paper presented at the 19 International Society of Anthrozoology, Wyndham Garden Lake Buena Vista, Orlando, Florida. Retrieved from <http://www.isaz.net/isaz/wp-content/uploads/2019/08/2019-ISAZ-Proceedings.pdf>
- Schuck, S. E. B., Emmerson, N. A., Abdullah, M. M., Fine, A. H., Stehli, A., & Lakes, K. D. (2018). A Randomized controlled trial of traditional psychosocial and canine-assisted interventions for children with ADHD. *Human-Animal Interaction Bulletin*, 6(1), 64-80

- Silas, H. J., Binfet, J.-T., & Ford, A. T. (2019). Therapeutic for all? Observational assessments of therapy canine stress in an on-campus stress-reduction program. *Journal of Veterinary Behavior*, 32(4), 6–13. doi: 10.1016/j.jveb.2019.03.009
- Tardif-Williams, C. Y., Binfet, J. T., Rousseau, C. X., & Green, F. L. L. (2019). *Volunteering in a Canine-Assisted Program with University Students: Understanding the Experiences of Handlers and their Canine Partners. Paper presented at the 19 International Society of Anthrozoology*, Wyndham Garden Lake Buena Vista, Orlando, Florida. Retrieved from <http://www.isaz.net/isaz/wp-content/uploads/2019/08/2019-ISAZ-Proceedings.pdf>
- Tissen, I., Hergovich, A., & Spiel, C. (2007). School-based social training with and without dogs: Evaluation of their effectiveness, *Anthrozoos*, 20(4), 365. doi: 10.2752/089279307X245491
- Wanser, S. H., & Udell, M. A. (2019). Does attachment security to a human handler influence the behavior of dogs who engage in animal assisted activities? *Applied. Animal. Behavior Science*, 210(1), 88–94. doi: 10.1016/j.applanim.2018.09.005