

MINISTRY OF EDUCATION, RESEARCH, YOUTH AND SPORTS
BABEȘ-BOLYAI UNIVERSITY
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PhD THESIS ABSTRACT

**ANIMAL ASSISTED THERAPY AND ACTIVITIES FOR IMPROVING
SOCIO-EMOTIONAL SKILLS AND ATTITUDES TOWARDS
ANIMALS IN CHILDREN**

SCIENTIFIC ADVISOR

CONF. UNIV. DR. ABIL. ALINA S. RUSU

PhD CANDIDATE

VICTOR CHITIC

CLUJ-NAPOCA

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Key words: AAT, animal assisted therapy, animal assisted education, human-animal interaction, communication, socialization, empathy, attitudes towards animals

CHAPTER 1. THEORETICAL BACKGROUND

1.1 Historical perspective of the human-animal bond

The multiple benefits of interacting with animals are well known since ancient times. Xenophon wrote in 350 B.C, in his treaty "On Horsemanship" : "A horse is a thing of beauty... none will tire of looking at him as long as he displays himself in his splendor." In the '80s, in Aschelon, Israel, a team of archaeologists discovered a 2450 year old cemetery for dogs, where around 1300 dogs were individually, ritually buried. The ancient Greeks kept healing dogs in their temples. These are just a few examples of the long and durable connection between animals and man, who apparently understood early on the therapeutical and educational value of this connection.

1.2. Animal Assisted Therapy

Animal Assisted Therapy appears to be the main term in the latest years in the scientific literature to define "a goal directed intervention in which an animal that meets specific criteria is an integral part of the treatment process" (Delta Society, 2005; Rusu, 2008).

Pet Partners (former Delta Society), the largest organization in the United States offering formative programs and certifications in this field, makes the distinction between "*animal assisted therapy (AAT)*" and "*animal assisted activities (AAA)*", the latter being defined as activities with animals with a predominantly recreational, educational and/or therapeutic and of quality of life improvement purpose, but without it having a clearly defined goal, without assessing in any way the results of the interaction with the animal and without the necessity of the presence of any health professionals (Delta Society, 2005).

1.2.2 Theoretical framework (theories regarding the field of Animal Assisted Therapy)

AAT – complementary therapy, interdisciplinary, multidisciplinary, pluridisciplinary process

It is important to note that AAT is not a form of psychotherapy such as psychodynamic therapy and cognitive-behavioral ones, but a type of complementary, supportive intervention (Chandler, 2005; Fine, 2000). The therapist, according to his/her training can find, in collaboration with the handler (owner or specialist handling the animal), several creative ways to incorporate the animal into the treatment process. TAA can be successfully incorporated not only in psychotherapeutic interventions, but also in other interventions such as physiotherapy, speech therapy etc. (Fine, 2000).

We consider that the methodological flexibility of animal-assisted interventions is one of the key issues that recommends investigating its use. Delta Society indicates in this respect three different approaches when it comes to incorporate animal-assisted interactions in a therapeutic program (Delta Society, 2005; Fine, 2006):

- *Interdisciplinary approach* - requires each of the specialists involved in the treatment process to use their skills according to the the profession they represent, whenever the therapeutic goals overlap. Basically, each specialist brings its own specific contribution to achieving a common goal.
- *Multidisciplinary approach* - In this approach, each of the specialists involved in the treatment process pursues its own goals through their own means. In this approach,

the objectives do not overlap, but concur so as to achieve the treatment plan set by the therapeutic team.

- *Transdisciplinary approach* - requires a model that focuses on the patient, who decides upon the therapeutic method to be used in treatment. This model assumes that team members work together and that everyone's expertise is used to train other team members. Team roles and responsibilities are divided. This model is often used in educational contexts.

1.2.3 Animals in psychotherapy

The field of animal assisted therapy is now at the stage where it is still suffering from the lack of a widely accepted and empirically supported unified theoretical framework, to explain how and why interactions between humans and animals have a therapeutic potential (Chandler, 2005 cited Rusu, 2008). We believe that the benefits of animal assisted interventions observed over time are undeniable. Evidence that animal assisted therapy works in a psychotherapeutic context have started gathering slowly but surely, first by semi-literary and pseudo-scientific reports of some non-specialist animal lovers and more recently through well documented empirical studies of yet few professionals interested in this field (Chandler, 2005; Fine, 2000), the literature pointing out that the mechanisms by which animal-assisted interventions will improve the efficiency and effectiveness of therapeutic act are still not very clear. A variety of possible mechanisms have been proposed in the scientific literature and most seem to focus on the intrinsic qualities of the animal (Serpell, 2003).

1.2.4 Animals used in AAT

The most widely used animals in animal assisted therapy are dogs and horses (Fine, 2000), the dogs because they can be easily trained, transported and because of their pack instinct that makes them want to interact with humans, and horses because, besides any psychological benefits that the patient may have, there is a wide range of physical benefits, and they can successfully and less stressfully replace some physiotherapy exercises necessary in certain pathologies or recovery from certain injuries (Chandler, 2005). In the United States, Canada, Australia and Western Europe, the most extensive educational programs for specialists, intervention methods and criteria for the selection and training of animals were developed for dogs and horses (Chandler, 2005; Fine, 2000). Dolphins, cats, farm animals, turtles are also used. Characteristics of the species, of the individual, patient compatibility with a specific animal, therapeutic reasoning of interaction with that animal in particular and aspects of animal welfare, and not least patient safety are all things to be considered in regards to all animals used (Fine, 2000).

1.2.5 Ethical considerations regarding animal assisted interventions

When we talk about the moral aspects of animal assisted interactions, it is recommended to take into account the fact that the professional or the person offering this service or administer this type of intervention is equally responsible for the welfare and interest of the patient and the animal with which it works and is responsible for. In connection with ethical issues related to clients, things are quite simple in the sense that these issues are already known and applied in medicine and psychology, and the AAT practitioner should not leave these ethical guidelines (Delta Society, 2005).

Broader discussion began to be increasingly focused towards animal welfare, a concept much newer and more controversial than human wellbeing. Most practitioners AAT opt for the use of the expression "to work with" an animal at the expense of the terms "utilize" or "use" animals (Delta Society, 2005).

Currently, most AAT programs try to connect animal interests to those of humans, by placing abandoned animals from shelters with elderly people, thus bringing a quicker benefit to a certain category of animals.

1.2.6. „Dogs for People” and „Children Learn to Protect Animals” programs

The studies summarized in this thesis were conducted with the support of Vier Pfoten Foundation (<http://www.vier-pfoten.ro/>) and the "Dogs for People" program, which falls into the category of AAT programs described above, i.e. programs that connect people's interests with those of animals, towards improving the quality of human and animal life.

FOUR PAWS (VIER PFOTEN) is an animal welfare foundation founded in 1988 in Austria by a few animal lovers. The stated mission of the foundation is "*a world without cruelty towards animals.*" In 2000, Vier Pfoten opened an office in Romania, and today has offices in nine European countries, the USA, Australia, South Africa and a special office to lobby the European Commission. Amid major social problems posed by stray dogs in 2004, Vier Pfoten launches the "Dogs for People" project, intended to improve the mentality of people in Romania towards these dogs, showing that they can be useful to society if one invests time, energy and love in them. The program involves selecting mixed breed dogs from the streets or from shelters and training them to become therapy dogs. This is the first animal assisted therapy program with stray dogs in the world and the first AAT program in Romania. Currently, the field began to grow nationally, with other similar programs at university level, NGOs, mainstream schools, special schools, hospitals etc. "Dogs for People" program still remains the only program TAA using exclusively mixed breed dogs, specially trained for this type of human-animal interaction.

"*Children learn to protect animals*" is an animal-oriented humane education program, conducted by Veronica Tulpan (Vier Pfoten), aiming to educate the children in the attitudes of respect and empathy for life in all its forms. Such programs are successfully implemented for many years in the US, Western Europe, Canada and Israel. The program targets 3rd and 4th grade children and has been successfully implemented across the country in collaboration with the Romanian Ministry of Education and school inspectorates, as an optional subject. The course consists of a manual by Veronica Tulpan, Sorina Cuzum and Gina Velcu, called "Close to the animals". The description of the manual can be found here: <http://www.vier-pfoten.ro/proiecte/copiii-invata-sa-protejeze-animalele/>

CHAPTER 2.

GOALS, OBJECTIVES AND THE RESEARCH PROCESS

This research aims to improve the practice of animal assisted therapy and activities in Romania (in particular) and at an international level (in general). For this, a deep understanding of factors that contribute to multiple benefits observed in the context of human-animal interaction is needed. We believe that this understanding can only be achieved through empirical research that reveals underlying mechanisms of change and differentiates the effective practices from the ineffective ones.

The first objective of the doctoral research was to investigate the research field of human-animal interactions in a therapeutic context (improving communication skills and socialization) by conducting a *meta-analysis type study*. Although meta-analyses of the research in the field of animal assisted therapy have been previously carried out (Nimer & Lundahl, 2007), this is the first meta-analysis that focuses exclusively on research aimed at improving communication and socialization skills. We looked at the factors identified in the scientific literature as important in the context of animal assisted therapy and the investigated variables with possible impact on social and communication skills.

The second objective was the direct investigation (in practice) of the effect that animal assisted therapy can have on development of socialization and communication skills of a child with mental retardation and ADHD (case study, conducted over 35 sessions, one hour weekly over a one year period). For this, we employed in an innovative and interdisciplinary manner methods from ethology (scientific study of animal behavior) and sociometry, in order to extract behavioral data by analyzing video images of five sessions, selected at five different moments from the entire range of the AAT program. The sessions selected for analysis occurred at approximately equal time intervals to cover the period of one year. The methodological originality of this study consisted in the use of "*focal animal sampling*" to obtain quantitative data and the combination of sequential analysis and network analysis for analyzing behavioral observations of the child participating in the study. This interdisciplinary methodological approach (ethology and sociometry) stemmed from the need of rigorous extraction of quantitative data in a practice where the evaluation of the therapeutic process is often accomplished with less objective tools.

The third objective was to assess the effects of a humane education program (the first program of its kind at national level, *Children Learn to Protect Animals*, Vier Pfofen Foundation, Bucharest, Romania) on attitudes towards animals, empathy towards animals and empathy towards people in 4th graders (mean age = 10.51 years, SD = 0.50). Being the first such program in the country, we believe that a better understanding of the *mechanisms of change* involved in such an act of education and the impact it can have on children can contribute to developing appropriate strategies and teaching materials, tailored to a specific audience, to serve in an optimum manner the proposed educational purpose.

The fourth objective was that, starting from the limits identified in study 3, to assess the effects of the same humane education program (*Children Learn to Protect Animals*, Vier Pfofen Foundation, Bucharest, Romania), implemented in a controlled manner regarding the randomisation of participants in experimental and control groups (Romanian 4th graders from an elementary school in Bucharest, mean age = 9.49 years, SD = 0.50) focusing on a single variable: the favorable attitudes towards animals. Attitudes towards animals is a variable identified in the meta-analytic study (study 1) as a significant predictor of responsible behavior towards pets.

CHAPTER 3.
ANIMAL ASSISTED THERAPY AND ACTIVITIES IN IMPROVING
COMMUNICATION AND SOCIAL SKILLS

3.1. STUDY 1

THE ROLE OF ANIMAL ASSISTED THERAPY IN IMPROVING
COMMUNICATION AND SOCIAL SKILLS: A META-ANALYSIS

3.1.1 Introduction

Among the benefits of interacting with animals, those regarding socialization and communication occupy an important place after psycho-physiological benefits. Reports on the benefits within the area of communication and socialization abound, but very few are supported by empirical data. Therefore, many researchers have focused on objective measurements of biomarkers to investigate whether there are benefits of interacting with animals. Nimer & Lundahl (2007) report in their meta-analysis conducted on 49 studies that the largest effect size of animal assisted interventions was found in alleviating the effects of autistic spectrum disorders ($d = 0.7$), in which the main problems are related to social and communication skills.

It seems that there is no consensus in the scientific literature when it comes to defining social skills. There have been many attempts to define and conceptualize social skills. By integrating key concepts of a few definitions of the the social skills, Merrell & Gimpel (1998) provide a comprehensive definition suggesting that "*social skills are learned, composed of specific behaviors, include initiations and responses, maximize social reinforcement, are interactive and situation-specific and can be specified as targets for intervention.*" This definition conceptualizes social skills as adaptive behaviors, while failure to use current social abilities is seen as a deficit in social skills.

Gresham (1986) identifies three types of defining aspects of social behavior:

(1) **Peer acceptance** - Children are encouraged to have a prosocial behavior in order to be considered popular or accepted by peers. These definitions, very popular in the 70s and 80s, are based on sociometric assessments of peers acceptance (Elliott & Gresham, 1987; Rose-Krasne, 1997). This kind of definition also contains a somewhat predictive value. There is research linking rejection by peers with negative outcomes (delinquency; Rose-Krasne, 1997).

(2) **Specific behaviors** – this type of definitions attempt to explain social skills using behavioral terms. Thus, social skills are considered to be behaviors specific to situations that are likely to be enforced and less likely to be punished (Elliott & Gresham, 1987). Behavioral definitions seem to have an advantage over those of peer acceptance because antecedents, behaviors and specific consequences can be identified and addressed by treatment (Elliott & Gresham, 1987).

(3) **Social validity** - in this approach, social skills are defined as specific behaviors with predictive role in social outcomes important for children in specific situations (Elliott & Gresham, 1984), such as acceptance by others, school adaptation and psychological adaptation. Walter, Colvin and Ramsey (1995) add that social skills are behaviors that help children cope and adapt to increasingly demanding social environments.

Gresham (1987) includes the construct of "social skills", along with "adaptive behavior" in the in supra-construct of "social competence", and communication skills are part of the social skills construct (Fig. 1).

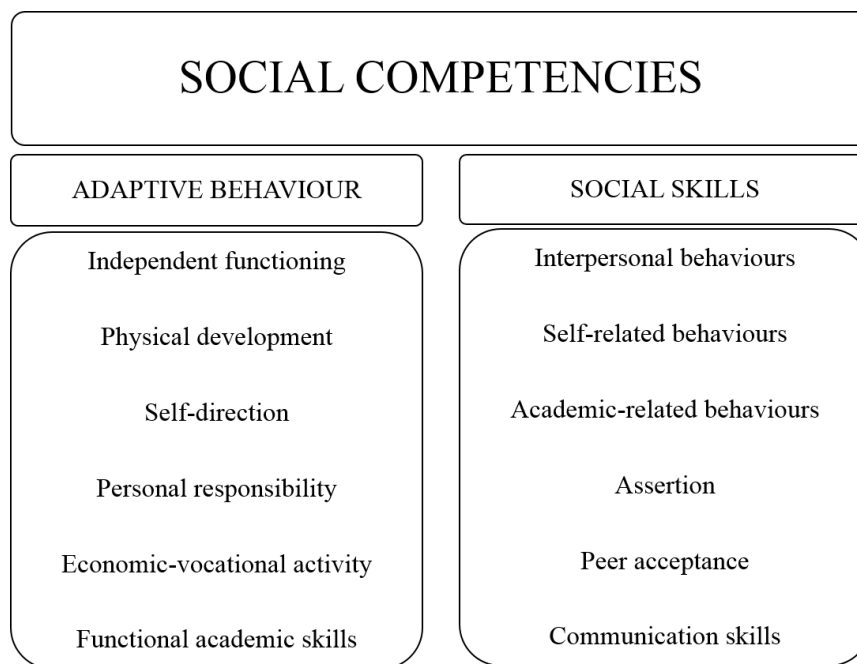


Figure 1. Social competence model (after Gresham, 1987).

3.1.2 Objectives

This meta-analysis has the following two objectives:

1. Analysis of the effect size (calculated based on Cohen's *d*) of the selected articles to investigate the effectiveness of AAT (animal assisted therapy) type interventions in improving social and communication skills.
2. Investigating the effect that moderating variables have on the results of AAT.

3.1.3. Methods

Selecting the articles

Articles analyzed were selected from the databases PubMed, EBSCO PsychInfo through the use of keywords. Keywords used to identify articles were: *animal assisted therapy, animal assisted intervention, pet facilitated intervention, pet therapy, pet psychoterapy, animal psychotherapy, animal assisted psychotherapy, dog assisted intervention, dog assisted therapy, animal assisted training, dog assisted training, animals+social, pet+social, animals+communication, pet+communication, AAT, AAT+social, AAT+communication.*

The next methodological step was the introduction of criteria for selecting articles found by the use of keywords. The selection criteria were consistent with the objectives of the investigation and based on the criteria mentioned in the literature (Borenstein & Rothstein, 1999):

1. The selected articles to cover only the AAT domain (articles that relate to animal assisted activities, benefits brought by interacting with pet or service animals or plush or robotic surrogates will be excluded).
2. Articles provide information about improving social and communication skills through AAT.
3. Articles should be in English, with full text access.
4. The authors provide sufficient data to enable the calculation of effect size.
5. Use of a control group.

Studies with experimental and control groups with smaller sample sizes were not excluded from the analysis as long as the authors have provided sufficient data to calculate effect sizes (mean, standard deviation, size of groups, statistics of evaluations used etc.). A total of four articles were found meeting the criteria for selection, and were included in the analysis, (Fig. 2).

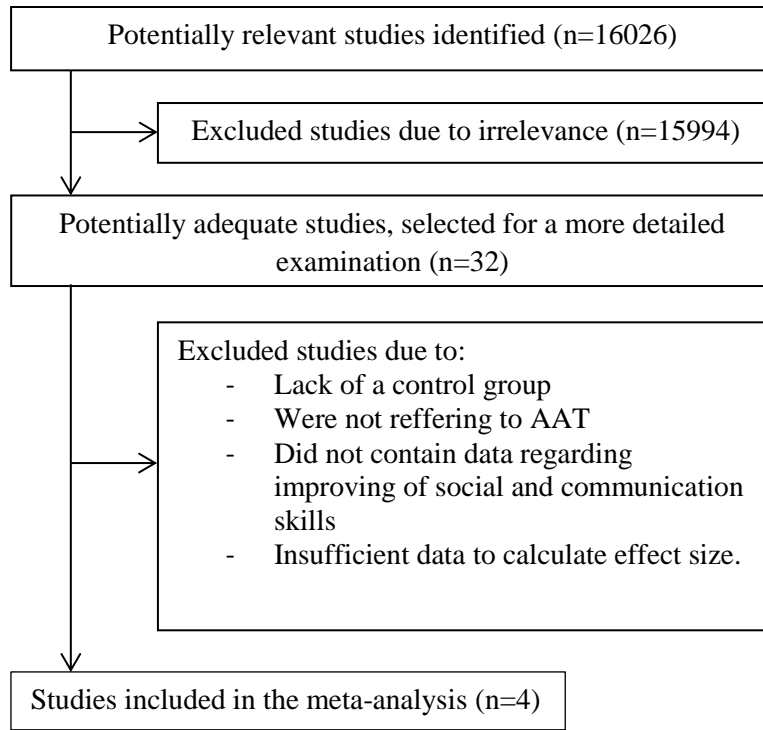


Figure 2. QUOROM diagram of searching and selecting studies for meta-analysis.

Coding the articles included in the meta-analysis

Articles were coded for effect size and moderating variables using Comprehensive Meta-Analysis software (Borenstein & Rothstein, 1999). The 13 coded variables were subsequently subjected to moderation analysis to determine the extent to which these moderate the effect of AAT. They have been grouped in classes of variables as follows: three were variations in characteristics of subjects, three were variations in the animals used, five were variations in the administration of the intervention and two were variations in the characteristics of the study (Table 1).

(1) Subject characteristic category:

The first coded variable was participants' age. Based on typical patterns of development (Broderick & Blewitt 2003), *age* of subjects in the identified studies was distributed in four groups: children (0-12), teens (13-17), adults (18-64), elderly (> 65). Where one of the experimental groups contained subjects from two age categories, the average age of the group was considered. A second coded variable was cognitive integrity. We coded clinical trials investigating healthy subjects or whose diagnosis did not include cognitive impairment and studies investigating subjects with varying degrees of cognitive impairment (dementia, mental retardation, etc.). Barak (2001) does not specify whether or not cognitive impairment was present in the investigated subjects, however, the fact that one of the exclusion criterion was cognitive impairment, serious diagnosis of chronic schizophrenia (where cognitive impairment is commonly occurring) and age of the patients (an average of 79 years) makes us think that at least a small degree of cognitive impairment was present in all subjects, thus

making us code the article as referring to subjects with cognitive impairment. A third variable we investigated was the number of subjects in each study (Table 1).

(2) *Animal characteristic category:*

Regarding the *characteristics of the animal*, the *type of animal used* was the first coded variable. Of the four studies, two studies used dogs, one has used a combination of dogs and cats (in unspecified proportion) and only one study used a different animal (dolphin). Another variable of interest was the *certification of the animal*. Increasingly more organizations offering training and certification in the field of AAT include clear selection criteria and standards for animals used. For example therapy dogs are tested for temperament, behavior in certain situations considered to simulate real situations that may be encountered in therapy and training level. If the animal has at least been subjected to a temperament test, it was coded as "certified". Finally, we wanted to investigate whether the number of animals used moderate the effect of AAT (Table 1).

(3) *Intervention related variables category:*

Regarding *variables related to the intervention*, the first coded variable was *session frequency* (daily or weekly). The second variable is the *location* where the intervention took place: hospital, school or AAT specialized institution (in our case, only one study in which the intervention was held at the Nuremberg Zoo which had a regular dolphin assisted therapy program). The third coded variable was the *intervention administration manner* (individual, group or mixed). The next two variables were the *total number of sessions* for each group and *duration of sessions* in minutes (Table 1).

(4) *Study characteristic category:*

The two variables referring to *characteristics of the study* were *type of measurement* (objective and subjective) and the *effect of treatment* over time. We considered that the authors measured medium term effects if the AAT effect was evaluated between 5 and 15 weeks after the intervention and long term effects if it was at a time over 15 weeks (Table 1).

Table 1. Variable classes coded in the meta-analysis

		Categorical moderating variables		Moderating variables measured on a continuous scale		
		Moderating variables	Number of studies	Moderating variable	Study	Values
Var. related to subjects	Age	children	1	Number of subjects	Barak et.al. 2001	20
		adolescents	1		Banks & Banks 2002	45
		elderly	2		Breitenbach et. al. 2009	94
	Cognitive integrity	yes	2		Prothmann et. al. 2006	100
		no	2			
Var. related to animals	Animal used	dogs	2	Number of animals used	Barak et.al. 2001	
		dolphins	1		Banks & Banks 2002	1
		Dogs and cats (unspecified proportion)	1		Breitenbach et. al. 2009	1

	Animal certification	yes	3		Prothmann et. al. 2006	4
		no	1			
Var. related to the intervention	Frequency of the sessions	weekly	3	Number of sessions	Barak et.al. 2001	48
		daily	1			
	Location of the sessions	hospital (or nursing home)	3		Breitenbach et. al. 2009	5
		specialized AAT institution	1			
Administration	mixed	1	Duration of the sessions (in minutes)	Barak et.al. 2001	180	
	individual	3				
Var. related to the study	Type of measurement	objective	1		Breitenbach et. al. 2009	30
		subjective	3			
	Effect of treatment over time	long	2		Prothmann et. al. 2006	30
		medium	2			

3.1.4. Results

Quantitative analysis of the studies included in the meta-analysis

The quantitative analysis of the effectiveness of AAT interventions in the selected studies was based on the calculation of effect size (d , Cohen). A total of 3 studies allowed calculation of effect size based on means and standard deviation, using Cohen's formula (d) (Cohen 1988 p44). For the calculation of d , an online calculator was used, found at <http://web.uccs.edu/lbecker/Psy590/escalc3.htm>. For the one study that did not provide data about means and standard deviations (Banks & Banks 2002), the *eta squared* effect size indicator obtained by analysis of covariance was converted to Cohen's d . The table below shows the results of the quantitative analysis of the AAT studies (Table 2).

Table 2. Values of the effect size for the AAT intervention in the experimental group (compared to the control group) of the studies included in the meta-analysis

No	Main author	Year	No. of groups	N	Assessment tool	Measured dimensions	Effect size (d)	95% CI
1	Barak et.al.	2001	2	20	Social Adaptative Functionng Evaluation (SAFE)	Social Adaptative Functionng	3,11	1,6 - 4,3
2	Banks & Banks	2002	3	45	UCLA Loneliness Scale (version 3)	Feelings of loneliness	1,01	0,35 - 1,63
3	Breitenbach et. al.	2009	3	94	Questionnaire designed by the authors (Cronbach's alpha =0.71-0.9)	Communication abilities and socio-emotional behaviour	0,42	0,02 - 0,8
4	Prothmann et. al.	2006	2	100	Basler Befindlichkeits-Skala	Social extraversion	0,6	0,2 - 0,98

In order to assess whether animal assisted therapy produced any effect on the dependent variable (DV), the next step was to calculate a global effect size of all studies (D), variation of D (VARD) and confidence interval CI, to see if the results are statistically significant. Thus, the effect size across all studies is **D = 0.79**. The effect size is considered of trivial value if the score is between 0 and 0.20, low between 0.20 and 0.50 if, medium between 0.5 and 0.8 and great if more than 0.8. Therefore the effect size of AAT on the investigated dependent variable (social and communication skills) is a high one.

The variance of **D (VARD)** is 0.48 and confidence interval for alpha 0.05 (95% CI) is 0.12 - 1.46. Given that the confidence interval does not include a 0 value, we can say that the result is statistically significant. Homogeneity was tested using the Q test. A significant value of Q indicates that there are variations in the distribution of effect sizes and therefore requires assuming a heterogeneous model (Q = 16.49, p = 0.001).

The next step in the quantitative analysis of the data was to conduct a *moderation analysis* to investigate the role that the coded variables have in moderating the effect of AAT on the dependent variable (Table 3). The presence of statistical differences between the coded variables was examined using the Qb test (Qbetween - Johnson, 1993). A significant value of Qb indicates a significant moderation relationship.

Table 3. The results of the analysis conducted on the categorial variables in the studies included in the meta-analysis

Moderating variable	Number of studies	Mean effect size	Confidence interval (95%)	Qb	
Age	children	1	0,42	(-2,334; 3,174)	1,045 p=0,593
	adolescents	1	0,6	(-2,154; 3,354)	
	elderly	2	1,98	(-0,072; 4,032)	
Cognitive integrity	yes	2	0,797	(-0,476; 2,071)	0,543 p=0,461
	no	2	1,5	(0,132; 2,869)	
Animal used	dogs	2	0,729	(0,356; 1,103)	14,336 p=0,001
	dolphins	1	0,42	(-0,031; 0,871)	
Animal certification	Dogs and cats (unspecified proportion)	1	3,11	(1,792; 4,428)	13,324 p=0,000
	Yes	3	0,602	(0,318; 0,887)	
Frequency of the sessions	No	1	3,11	(1,794; 4,426)	0,944 p=0,331
	Weekly	3	1,37	(0,353; 2,388)	
Location of the sessions	Daily	1	0,42	(-1,205; 2,045)	0,944 p=0,331
	hospital (or nursing home)	3	1,37	(0,353; 2,388)	
Administration	specialized AAT institution	1	0,42	(-1,205; 2,045)	13,324 p=0,000
	Mixed	1	3,11	(1,794; 4,426)	
Effect of	Individual	3	0,602	(0,318; 0,887)	0,543
	Long	2	1,5	(0,132; 2,869)	

treatment over time	Medium	2	0,797	(-0,476; 2,071)	p=0,461
Type of measurement	Objective	1	3,11	(1,794; 4,426)	13,324
	Subjective	3	0,602	(0,318; 0,887)	p=0,000

The next step was to perform a linear regression to test the moderating variables measured on a continuous scale (Table 4).

Table 4. The results of the analysis of the continuous variables investigated in the studies included in the meta-analysis

Moderating variable	Regression coefficient B	Significance
No. of subjects	-0,017	0,0009
No. of animals used	0,005	0,285
No. of sessions	0,059	0,0009
Duration of the sessions (in minutes)	0,0168	0,0009

The moderation analysis showed that the variables that can play a role in moderating the effect of the AAT intervention on improving socialization and communication skills are: the type of animal used, certification of the animal, the administration of the AAT intervention, type of measurement, the number of subjects, the number of sessions and duration of sessions (Table 4).

Finally, to determine the influence of unpublished articles on this analysis, the "fail-safe N" or "file drawer" analysis was performed (Rosenthal, 1979). This statistic conducted by Rosenthal and later adapted by Orwin for the standardized mean of effect size, estimates the number of unpublished articles with significant results (that would not find the investigated effect) required to bring the cumulative effect of articles found in the meta-analysis below the minimum accepted value (in this case 0.1) (Rosenthal, 1979; Orwin 1983; Lipsey and Wilson 2001). For the criterion value of 0.1, the number of unpublished articles finding zero effects should be 27.

3.1.5 Conclusions and discussions

The objectives of the meta-analysis regarding the effects of animal assisted interventions were achieved, finding a large effect size of the investigated variable, and the moderation analysis performed on the coded variables revealed significant values, thus identifying several variables that may moderate the effect of animal assisted therapy in

improving social and communication skills. Since the meta-analysis highlights the important role of *the type of animal used*, we recommend that greater attention should be paid in future studies to the inclusion of more data about the characteristics of the animal. Among the studies we analyzed, only one offers this type of data referring to the dog breeds used. Thus, Banks & Banks (2002) report using three German shepherd dogs and a terrier (not specifying what type of terrier, despite the fact that differences in size can be very large between different types of terriers). Size of the dog, especially if the investigated sample is composed of children, may influence the decision of the child to interact with the animal, or can speed up or slow down building a relationship with the animal. A large size dog can be associated with anxiety in initiating interactions by children, for example.

Two of the three studies that used dogs report that the animals have been certified for AAT or at least assessed and found suitable in terms of temperament. More data such as the type of evaluation that animal has undergone or who has provided certification and according to what criteria, are not given in these studies. Breitenbach et al. (2009) report that the dolphin used in their study was trained. The temperament of the animal is another significant detail unreported in the studies reviewed in the meta-analysis, although data in the literature indicate that a particularly active dog, for example, may enhance the hyperactivity symptoms in a child diagnosed with attention deficit disorder, but may have a behavioral activating effect for people diagnosed with depression.

Breitenbach et al. (2009), which is by far the most rigorous and well conducted study included in the meta-analysis, investigates one of the non-specific effects of the intervention, which is the influence on the aquatic environment on the dependent variable (the study where they used dolphins). Even without finding a significant effect, the fact that the authors have thought about controlling the environment variable as a moderator, is a novelty in the field, in terms of scientific rigor. The authors tried to increase the construct validity of the research by taking into account also the non-specific effects, following an analysis conducted also on the effects of AAT with dolphins by Marino and Lilienfeld by (2007). The authors discuss threats to construct validity and internal validity of the 5 studies analyzed.

We would like to point out that one of the important non-specific effects in the area of AAT that has not been taken into account in any of the four articles selected for this analysis is the *novelty effect*. Initial progress may be also be affected by the fact that the animal represents a novelty and can generate enthusiasm capable of producing positive effects apparently associated with the intervention (eg when investigating the effects of AAT on depression). Thus, if only the short or medium term effects of AAT are measured, there is a rather large possibility of influence from a novelty effect, if this non-specific effect of the AAT intervention is not taken into account and no measures of its control are taken.

It is important to note that only one study of those analyzed (Prothmann et al., 2006) took into account the probability of other existing factors that may influence the dependent variable when measuring long-term effects of the AAT. Also, we consider that attention should be paid in the future in terms of design of studies and their scientific rigor. Perhaps inclusion in the research design of objective measurements of the variables (quantitative and qualitative) will be helpful in obtaining accurate results with less chance of being flawed.

The results of the meta-analysis support the necessity to continue studying the AAT domain. Although there are already many studies investigating the global effects of AAT, more research highlighting the specific effects of animal-assisted interventions is needed.

3.2. STUDY 2

IMPLEMENTING ETHOLOGICAL AND SOCIOMETRICAL METHODS IN ANALYZING THE EFFECTS OF ANIMAL ASSISTED THERAPY

3.2.1 Introduction

Whenever the subject of Animal Assisted Therapy is approached in books, scientific or less scientific articles, a brief definition is always followed by a list of physical, cognitive, emotional and social potential benefits. Improving communication skills is always on this list. Although the amount of systematic research in this area has increased in recent years, the drawback of a lot of research in the attempt to bring forth evidence of the effectiveness of this type of complementary therapy is often lack of objective measurement instruments of the therapeutic progress, both in terms of recording behaviour and analysis of the result of human-animal interaction (HAI).

The present research aims to offer an objective analysis of verbal and non-verbal communication in the context of AAT, using ethological and sociometrical methods. The same method can later be used also for the analysis of behaviors other than the ones related to communication, in the context of therapeutic HAI.

Both the behavioral therapy school and the systemic one consider the direct observation by a trained observer as the most reliable form of data collection (Jacob 1976). As in the aforementioned therapies, the data obtained through direct observation in AAT can be analyzed in various ways: they can be used to diagnose and analyze behavioral deficits (or excesses) within the interaction or they can be used as a control instrument in pre or post-intervention evaluations. Several authors among which Limond, Bradshaw and Cormack (1997), preferred the use of video recordings and ethograms to investigate the behavioral change as a result of interaction with dogs.

Dogs in animal assisted therapy

In their meta-analysis, Nimer and Lundahl (2007) define Animal Assisted Therapy as the „*deliberate inclusion of an animal in a treatment plan*” which „*is designed to accomplish predefined outcomes believed to be difficult to achieve otherwise or outcomes best addressed through exposure to an animal*”. In AAT, the therapy dog and his handler (often times his owner) work together with therapists and educators to help children reach an educational objective (for example to pronounce correctly a certain sound) or a therapeutic objective (increased positive interaction with others).

Research in the area of AAT suggest that interaction with dogs can encourage social interaction of children with special needs with colleagues and adults, because of the perceived non-critical nature of the dog. From the scientific literature we can conclude that interaction with dogs in the context of AAT is encouraged for one of the following reasons: (1) the dog offers a unique form of unconditioned social support for children with disabilities, dogs being perceived as “*special friends*” (Anderson and Olson 2006), (2) the dog’s spontaneous enthusiasm for social interaction can provide a stimulus for the child’s own social behavior (Prothmann et al. 2006) or (3) the dog can increase positive interactions initiated by the educator at the same time with the interaction with the dog (Limond et al. 1997; Walters, Esteves and Stokes 2008)

Verbal and non-verbal communication disorders

Of all childhood onset neurodevelopmental disorders, verbal communication disorders are probably the most common (Band et al., 2002). Preventing the cumulative negative consequences of these disorders is of great importance in achieving optimum functionality (autonomous organization, social functioning, etc.). A study by McCabe (2005) shows that children with high deficits of spoken language developed more behavioral problems and fewer social skills than those in the control group.

For children with speech impairments, for example, the dog can prove extremely useful because it communicates with the child at the same level: non-verbal, which, combined with the the perceived non-critical nature of the dog may have special therapeutic value (Agnetta, Hare & Tomasello, 2000). In addition, due to the co-evolution with the human species, dogs seem to have developed a high capacity to understand gestures and facial expressions, which exceeds even that of our closest genetic relatives, anthropoid primates (Miklósi et al., 1998; Agnetta, Hare & Tomasello, 2000; Soproni et al., 2001). All of these can be reasons for the increasingly wider use of AAT with dogs.

3.2.2 Objectives and research hypothesis

Objectives

The main objective of the present study is to investigate the effects that animal assisted therapy (dogs) can have on improving communication skills in children with mental retardation (case study).

A second objective is to propose implementation of a combination of interdisciplinary methods as objective tools for assessing the effects of animal assisted therapy at behavioral level: data collection using the method of *focal animal sampling* and *sequential analysis* combined with *social network analysis*. *Focal animal sampling* and *sequential analysis* are methods specific to ethology (scientific study of animal behavior) and *social network analysis* method is specific to the domain of sociometry.

Hypothesis

1. The AAT intervention will increase the level of verbal and non-verbal communication.
2. The AAT intervention will increase the diversity and frequency of associations between behavioral elements during the course of the program (interaction with the dog will be associated with the occurrence of new behavioral sequences relevant for verbal and non-verbal communication, as well as with connections between these behavioral sequences).

3.2.3 Research methodology

Methods

Focal animal sampling is an observation technique used in ethology to observe behaviors of an animal, or a group of animals, through a limited period of time. The main advantage is that it allows observation of all behaviors occurring in a given period, even the ones that do not seem important or are less obvious at a first observation (Alcock, 1997).

Sequential analysis is a method that allows examination of the sequential relationship between each pair of behaviors and its visualisation in the form of patterns (Bakeman & Gottman, 1997). Each behavioral element is noted when it occurs during the observation period, along with the previous and next element.

Social network analysis (SNA) is a method of sociometric analysis of social structures and communication networks (Otte and Rousseau, 2002). Network analysis is traditionally used to analyze group dynamics in human or non-human groups of individuals. In this study,

individuals were substituted with specific behaviors and we analyzed the relationship between these behaviors according to the method described by Bența (2005).

Participants

The analyzed subject is Ionuț, a 5 year old child at the date of the video recordings, diagnosed with medium mental retardation ADHD. Ionut is an orphan and is a resident of the residential center for children with special needs where the recorded therapy sessions were conducted (Bucharest, Romania). At the beginning of the intervention his verbal communication consisted only in isolated sounds. Ionut is very sociable and communicative, generally compliant and has a slight reluctance to interact with dogs, if he happens to encounter them on the street.

Therapy dogs

This research was conducted in the animal assisted therapy project "Dogs for People", supported by the Vier Pfofen animal welfare foundation, Bucharest, Romania. The "Dogs for People" project started in 2004 as the first animal assisted therapy project in Romania. One of the project's objectives was to produce changes in public opinion on the issue of stray dogs. Thus, common breed dogs were selected from the street or in shelters and then trained by the foundation staff, under the supervision of a professional trainer, to do animal assisted therapy and activities. On the entire two year (2008-2009) duration of therapy with Ionuț, we worked successively with three dogs in weekly sessions, lasting one hour/session, with a total number of 35 meetings. The therapeutic foundation of this decision was to provide different stimuli and increase adaptability to different stimuli. The three dogs are different in temperament, as recommended in the AAT guidelines of the Delta Society Organisation (2005), to avoid preferences and attachment to one therapy dog and prevent dysfunctional emotions associated with the probability of a certain dog missing certain sessions or its loss due to accident. During the observed period included in the research we worked with two of the three dogs. The therapy dogs, a male and a female were mixed breed, medium size, adults, chosen following an elaborate selection process, behaviorally tested according to the criteria promoted by the Delta Society (2005; petpartners.org), the most famous organization in the world in evaluating AAT teams, and trained to perform animal assisted therapy. Dogs have met the medical criteria for health and prevention of zoonotic risks (were periodically treated against internal and external parasites, were living in optimal hygiene conditions, having regular checkups at the veterinarian).

The handlers involved in AAT

The handlers are the people who trained the dogs in the *Dogs for people* program, and who worked with them and Ionuț during therapy. Of the two handlers who worked with Ionuț, one is a qualified psychotherapist, the other was a certified canine instructor. Both handlers were men.

Location of the AAT sessions

Therapy sessions were conducted in a residential center for children with special needs in Bucharest, where Ionuț lived, in a carpeted room about 60 m², equipped with only a few pieces of furniture (2 tables, 2 closets, 4 chairs). Given the symptoms of ADHD and in particular the difficulty of maintaining attention, potentially disruptive stimuli were removed as much as possible from the room, leaving only what was absolutely necessary or could not be removed.

Equipment used

Therapy sessions were recorded using a compact Sony Handycam camera, which, however, did not always have a fixed position. The images were encoded using the *software JWatcher* (<http://www.jwatcher.ucla.edu/>). JWatcher allows the analysis of previously coded behavioral events, being capable of sequential analysis functions. Each element can be behavioral scored once and analyzed as many times as needed.

The social network analysis (in this case, social agents were substituted with sequences of behavior encoded and recorded in JWatcher) was performed using the software Agna 2.1 (Applied Graph Network Analysis), developed by a sociologist, collaborator of the research team, (Bența, 2003). Agna 2.1 is a desktop application that allows creating, editing and analyzing social networks comprised of different sequences (types of succession, the organization / entropy of each sequence chain etc.).

The AAT intervention

Sessions were held weekly for two years (2008/2009), each session lasting one hour (total = 35 sessions). The 5 sessions selected for this analysis cover the period May 2008-May 2009. In addition to the child and the handler (the person who actually worked with the dog and child), there was a psychotherapist present from the Vier Pfoten Foundation (study author) and a psychologist from the residential center where Ionuț lives.

Sessions consisted of games with the dog and adjacent tasks designed to achieve objectives established for Ionuț, together with the residential center psychologist.

Categories of coded behaviours

Of all the observed behaviours, those coded were those that appeared most often and are considered to be socially meaningful behaviours, based on literature review and the previously completed meta-analysis (Study 1). The behaviors were categorized in the table below (Table 1).

Table 1. Behavioral elements coded in the AAT program with Ionuț (the behavioral repertoire only refers to human behavior, not canine behavior as well).

	dog	handler
NON VERBAL	offers water or food to the dog (throws food on the ground or place it where directed)	points towards an object/demands something
	non-verbal command	points towards the dog (or body parts)
	throws ball or dog toy (tug-of-war)	points towards self (or body parts)
WITH PHYSICAL CONTACT	pets dog	
	feeds from hand	physical contact (hugs, touches parts of the handler's body, takes his hand, etc)
	other physical contact (hugs, touches parts of the dog's body, prompted or not)	

VERBAL	Single sound
	Monosyllabic word
	Disyllabic word
	More than two syllables
	Word association
	Sentences

For the observed non-verbal behaviours we also coded the direction of the behaviour (the dog or the handler). For verbalizations, this was not possible because there often verbalizations without clear direction (orientation to receiver) and some were just exclamations. In agreement with the psychologist from the residential center, regarding verbal behaviours, we coded verbalization quantity and structural complexity, not its quality (accuracy in pronunciation).

3.2.4. Results

After coding the behaviors (Table 1) we used the software Agna 2.1 to generate a chain of behavioral sequences/AAT session, a transition matrix containing the relative frequencies for each behavior and a kinetic diagram for each of the 5 sessions (s1-s5). Subsequently we determined the sociometric status of each sequence in the network by using Agna software that enables automatic calculation of this sociometric value.

Analyzing the coded behaviors, both verbal and non-verbal, we see a downward trend from the second to the fifth session (Fig. 1). As expected, considering the ADHD diagnosis and the multitude of new stimuli, the first session had the lowest number of coded behaviors. Thus, in the first session there were 108 verbal behaviors and 45 non-verbal. In the second session there were 481 verbal behaviors (an increase of 345.3%) and 240 non-verbal (an increase of 433.3%). The number of verbal and non-verbal behaviors fell from the second to the fifth session, reaching 191 verbal and 67 non-verbal (a percentage decrease of 60.3% for the verbal, and 72% for the non-verbal compared to the second session).

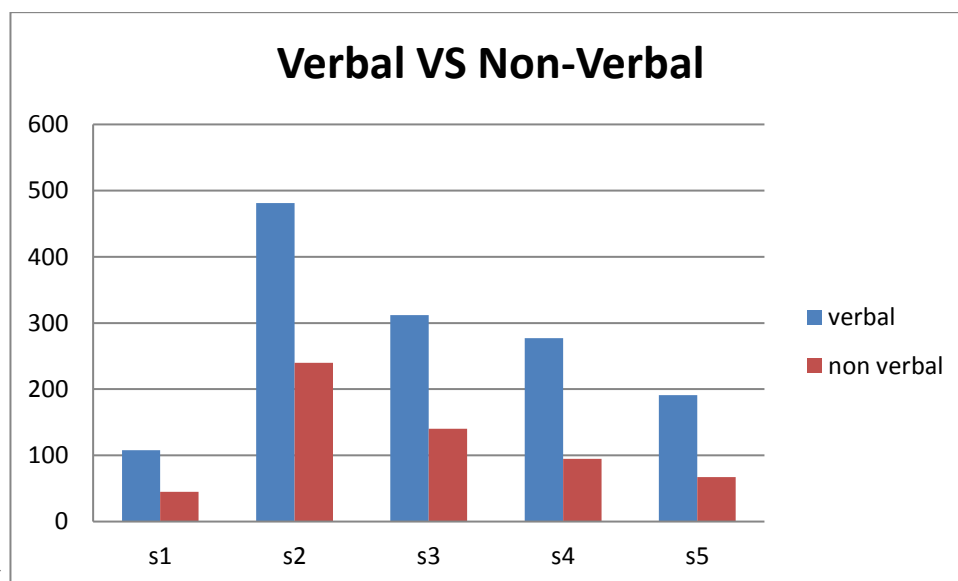


Figure 1. Verbal and non-verbal behaviours (codate according to Table 1) observed during the five selected sessions (s1-s5) in the AAT program.

Regarding verbalizations, we can see how speech diversifies towards the fifth session (Fig. 2). So if in the first session we only observed one verbal behavior (most basal, namely a singular sound), in the fifth session we observed all six levels of coded verbal complexity (Fig. 2).

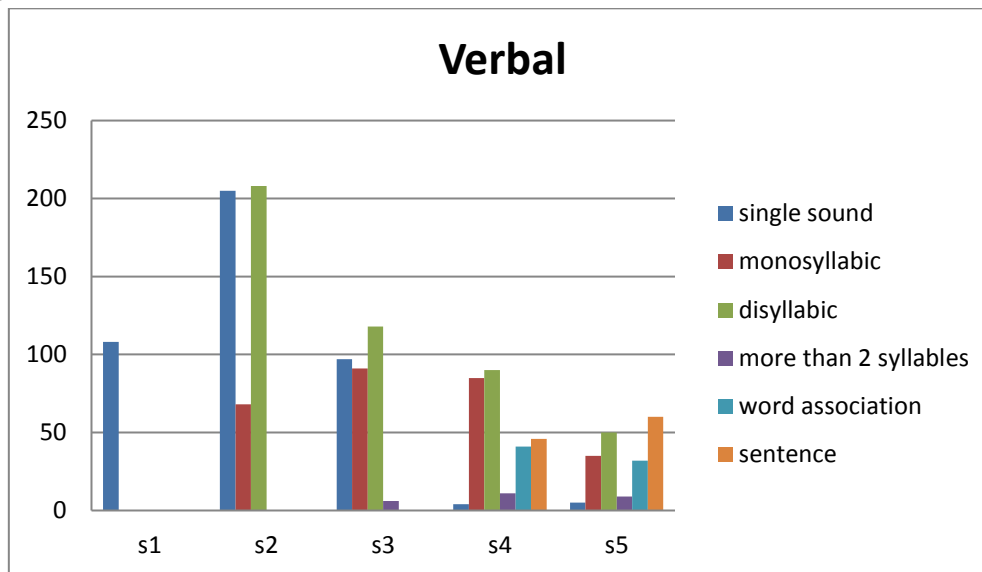


Figure 2. Verbal behaviours (coded according to Table 1) observed de tip verbal codate conform Tabelului 1 observed during the five selected sessions (s1-s5) in the AAT program.

The decreasing trend of both categories can be explained by the fact that as speech diversifies and refines, the child's need to communicate through gestures decreases. Evolution of the emergence of sentences in the child's verbal repertoire appears to be inversely proportional to the decrease in frequency of gestures (Fig. 3). The same algorithm can be observed in the non-verbal language, directed both towards dog and handler. The frequency of non-verbal communication is reducing from the first to the last session, while at the same time, behavioral diversity increases.

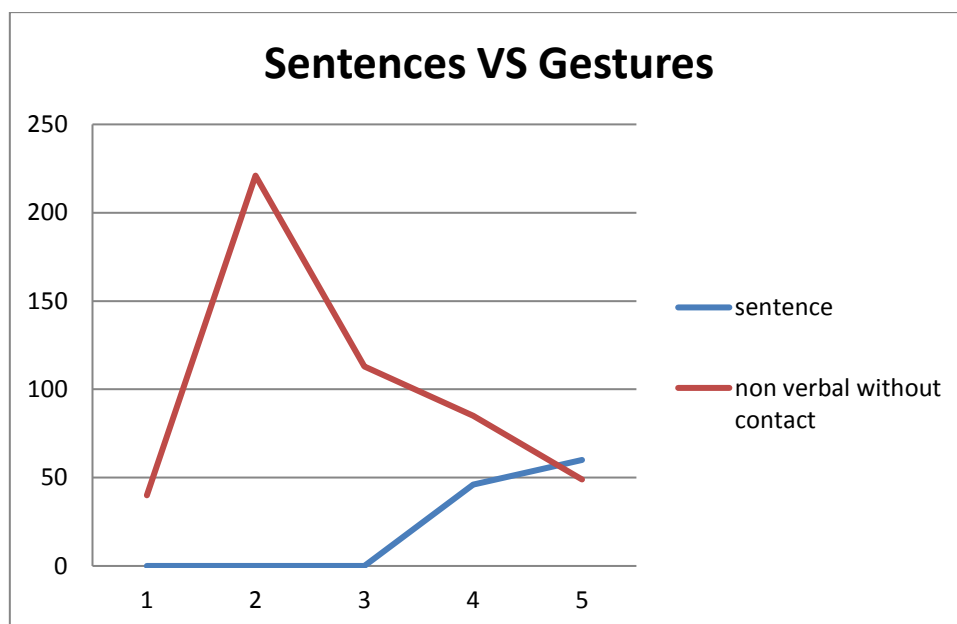


Figure 3. Graphical representation of the dynamics of sentences as verbal behaviors and non-verbal behaviors without contact (sessions 1-5 of the AAT program).

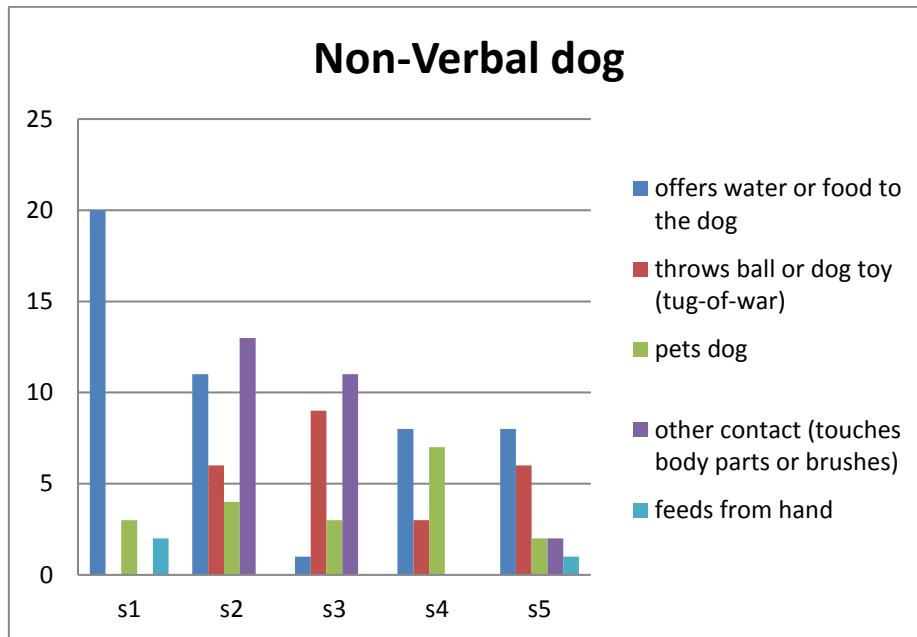


Figure 4. Types of behaviors displayed towards the therapy dog during the five selected sessions (s1-s5) in the AAT program.

At the same time, we can see that while the complexity of speech increases, the overall quantity of verbalisations decreases, indicating more efficient verbal communication.

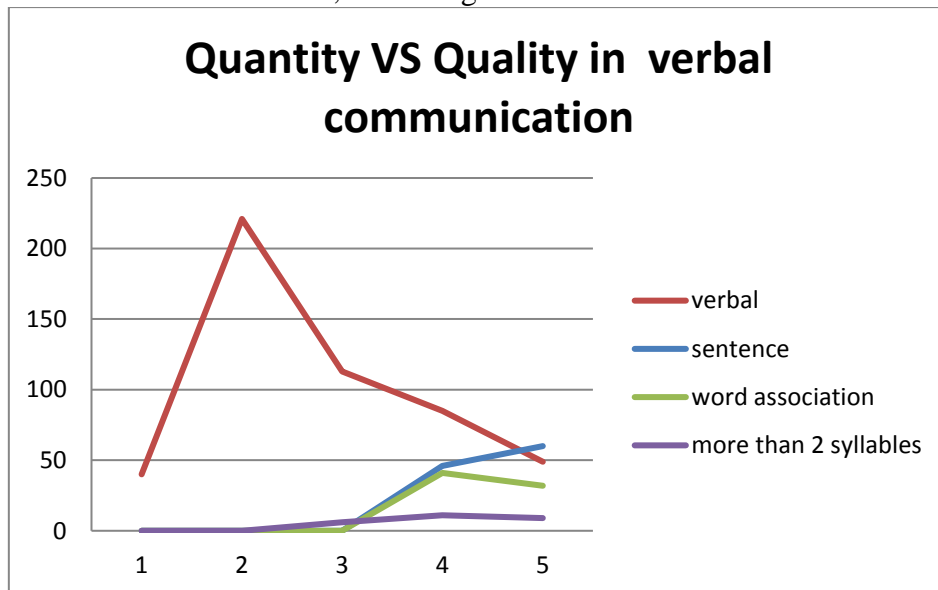


Figure 5. Graphical representation of the types of verbal behaviors during the five selected sessions (s1-s5) in the AAT program.

Analyzing the transition matrices for each session separately, allowed us to perform an analysis of the significance thresholds of the emergence of associations of behavioral sequences (Table 2). According to the literature, the significance threshold was set at 0.05. Thus, the session with the fewest significant association of behavioral sequences was the first session (s1) with two significant associations both between nonverbal behaviors oriented towards the dog, and verbal behaviors. The session with the most significant associations of behavioral sequences was the fourth meeting (s4) with 24 significant associations, 7 of which between nonverbal behaviors towards the handler and verbal behaviors, five between

nonverbal behaviors towards the dog and 7 between nonverbal behaviors towards the handler. The behaviors with most occurring significant associations during the five sessions were nonverbal behaviors towards the handler and verbal behaviors (18) and nonverbal behaviors towards the dog and verbal behaviors (15).

Table 2. Significant ($p < 0.05$) sequence associations during the five selected sessions (s1-s5) in the AAT program. (c - non-verbal behavior towards the dog, h - non-verbal behavior towards the handler, v – verbal behavior).

	Session 1	Session 2	Session 3	Session 4	Session 5	total
c/v	2	6	3		4	15
h/v		5	4	7	2	18
c/h		1	2		1	4
v/v		1	2	5	1	9
c/c		1		5		6
h/h		3		7		10
total	2	17	11	24	8	

Sociometric analysis of the transition matrices using Agna 2.1 allowed us to determine the sociometric status of each node in the network (behavioral sequence in our case; Table 3). The sociometric status of a network node is the sum of interactions that it emits or receives in relation to the total number of nodes in the network (Bența, 2005).

Table 3. The sociometric status of the behavioral sequences coded during the five selected sessions in the AAT program.

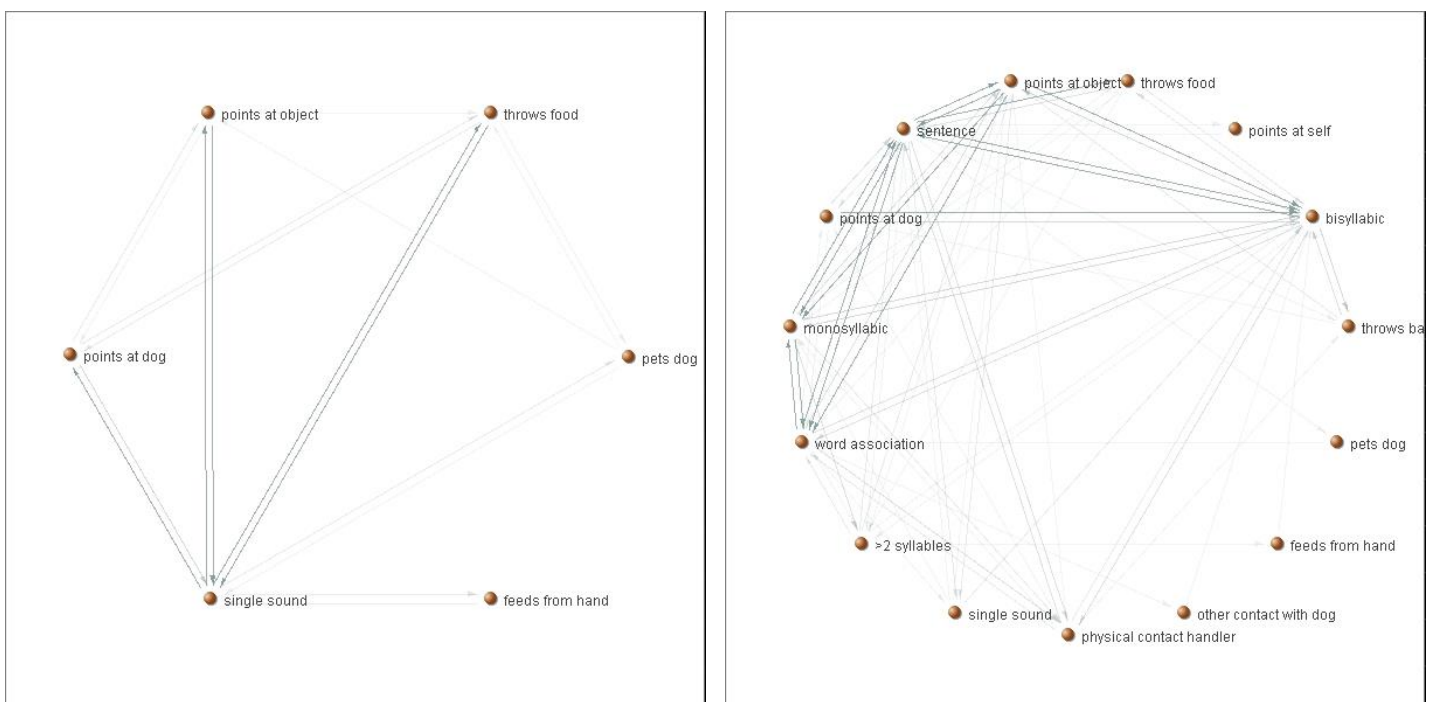
Sequence	eode	Session 1	Session 2	Session 3	Session 4	Session 5
<i>Throws food</i>	a	4,8	0,181	0,181	0,25	1,142
<i>Points towards self</i>	e	0	0,545	0,545	0,333	0,142
<i>Disyllabic</i>	e	0	15,818	15,818	8,833	4,857
<i>Throws ball</i>	f	0	1,636	1,636	0,333	0,857
<i>Pets dog</i>	g	1,2	0,545	0,545	0,333	0,142
<i>Feeds from hand</i>	h	0,8	0	0	0	0,142
<i>Other contact with dog</i>	j	0	2	2	0	0,142
<i>Physical contact with handler</i>	n	0	2,181	2,181	0,5	1,57
<i>sunet</i>	q	10	11,909	11,909	0,66	0,714
<i>>2 syllables</i>	r	0	0,727	0,727	1,5	1,142
<i>Word association</i>	t	0	0	0	4,333	3,785
<i>Monosyllabic</i>	w	0	12,818	12,818	9,33	3,714
<i>Points towards dog</i>	x	3,2	2,909	2,909	0,66	1,285
<i>sentence</i>	y	0	0	0	5,583	5,785
<i>Points towards object</i>	z	4,4	13,636	13,636	1,5	3,428
Secventa	cod	Session 1	Session 2	Session 3	Session 4	Session 5
<i>Throws food</i>	<u>a</u>	<u>4,8</u>	<u>2,0</u>	<u>0,181</u>	<u>0,25</u>	<u>1,142</u>
<i>Points towards self</i>	<u>c</u>	<u>0</u>	<u>3,636</u>	<u>0,545</u>	<u>0,333</u>	<u>0,142</u>

<i>Disyllabic</i>	<u>e</u>	<u>0</u>	<u>28,363</u>	<u>15,818</u>	<u>8,833</u>	<u>4,857</u>
<i>Throws ball</i>	<u>f</u>	<u>0</u>	<u>1,090</u>	<u>1,636</u>	<u>0,333</u>	<u>0,857</u>
<i>Pets dog</i>	<u>g</u>	<u>1,2</u>	<u>0,727</u>	<u>0,545</u>	<u>0,333</u>	<u>0,142</u>
<i>Feeds from hand</i>	<u>h</u>	<u>0,8</u>	<u>2,363</u>	<u>0</u>	<u>0</u>	<u>0,142</u>
<i>Other contact with dog</i>	<u>i</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>0,142</u>
<i>Physical contact with handler</i>	<u>n</u>	<u>0</u>	<u>0,363</u>	<u>2,181</u>	<u>0,5</u>	<u>1,57</u>
<i>sunet</i>	<u>q</u>	<u>10</u>	<u>25,272</u>	<u>11,909</u>	<u>0,66</u>	<u>0,714</u>
<i>>2 syllables</i>	<u>r</u>	<u>0</u>	<u>0</u>	<u>0,727</u>	<u>1,5</u>	<u>1,142</u>
<i>Word association</i>	<u>t</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>4,333</u>	<u>3,785</u>
<i>Monosyllabic</i>	<u>w</u>	<u>0</u>	<u>10,0</u>	<u>12,818</u>	<u>9,33</u>	<u>3,714</u>
<i>Points towards dog</i>	<u>x</u>	<u>3,2</u>	<u>6,818</u>	<u>2,909</u>	<u>0,66</u>	<u>1,285</u>
<i>sentence</i>	<u>y</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>5,583</u>	<u>5,785</u>
<i>Points towards object</i>	<u>z</u>	<u>4,4</u>	<u>22,454</u>	<u>13,636</u>	<u>1,5</u>	<u>3,428</u>

In Table 3, one can observe how the sequence "sound", representing the most basic verbal behavior, changes its sociometric status from 25.2 in the second session, to 0.7 in the last session. Verbal communication in its most complex form (the sentence) becomes in the last session the sequence with the highest sociometric status (5.7). The sequence "points towards object" representing the most basal nonverbal behavior changes its sociometric status from 22.4 in the first session, to 3.4 in the last session.

By analyzing the kinetic diagrams (graphic representations of connections between behavioral sequences, Fig. 6) and centrality indicators for each session, we can observe new behavioral sequences occurring from one session to another. The diversity of connections between the nodes increases. Also, each node sends and receives information from different nodes sometimes from the previous session. Vocalization is associated with dog-oriented sequences such as "pointing towards dog."

Figure 6. Comparison between the kinetic diagrams (connections and diversity of the behavioral sequences) of the first session (left) and the fifth session (right).



3.2.5 Limitations of the research

The main limitation of the research is the fact that there was no control condition or no establishment of a basic level of communication effectiveness before the start of sessions. This research (case study) assumed as a base level the level recorded at the first session by the methods proposed. Another limitation that makes it impossible to generalize the results is the lack of control over the maturation effect, a limitation biasing many studies on development. Given that the subject in question suffered from a developmental delay, his development curve is atypical and does not follow the expected developmental curve of a child with typical development.

3.2.6. Conclusions and discussions

Using an interdisciplinary combination of ethological and sociometrical methods enabled us to objectively analyze a multitude of interactions of which, normally, it is difficult to extract quantitative data and interpretations on the effectiveness of animal-assisted interventions. The obtained data supports the formulated hypothesis as follows:

Hypothesis 1. The AAT intervention will increase the level of verbal and non-verbal communication (case study): The data we obtained allow us to note that during the five sessions selected from the 35 sessions of the AAT program, the complexity of verbal communication increases. Analysis of the sociometric status of nodes in the network shows how verbal communication in its most complex form (the sentence) becomes in the last session the sequence with the highest sociometric status. Non-verbal communication directed both towards the dog and the handler, also diversifies, towards the last meeting. The behavior pairs significantly associated that occur most often show the association between dog and speech and between handler and speech.

Hypothesis 2. The AAT intervention can increase behavioral diversity: Analysis of transition matrices and kinetic diagrams indicate an increase in the number of new behavioral sequences relevant to verbal and non-verbal communication. The number of nodes in the network grow from 6 in the first session to 15 in the last session. The relationship between behaviors becomes increasingly more complex as we approach the last session. The model of analysis of human-animal interaction in the context of animal assisted therapy that we propose is very effective in a research context, but complicated and laborious procedures makes it difficult to use in evaluating interaction or therapy progress in every day practice. Given the interdisciplinary nature of animal assisted therapy we propose also an interdisciplinary model as an evaluation method of this complementary form of therapy, using these ethological and sociometrical methods. This would be a simplified form (maybe an online application), that would allow specialists in the field of AAT to provide feedback.

A post intervention observation, that was not directly investigated in this research, is that as speech developed, the ADHD symptoms that child was diagnosed with at the beginning of the intervention, were significantly reduced. We know from the literature that speech development is closely linked to emotional regulation (Fox, 1994; Fujiki, Brinton, & Clarke, 2002). A significant association was identified between language disorders, attention deficit disorders and autism spectrum disorders (Beitchman et al., 2001; Bruce, Thurnlund, & Nettelbladt, 2006; Cohen et al., 2000). However, this research revealed a decrease in non-verbal behaviors in relation to the increasing verbal behaviors. Many of the problem behaviors in ADHD are nonverbal, related to the hyperactive aspect of the disorder, and the

previously exposed theoretical background supports the data revealed by this research in regards to lowering the hyperactive, non-verbal, motor symptoms.

In conclusion, the combination of innovative interdisciplinary methods of collecting and analyzing data (focal animal sampling, sequential analysis and social network analysis) allowed us to study the behavioral effects of animal assisted interventions on communication skills (verbal and non-verbal) in a child with special needs. A deeper analysis of recorded video material will allow us to identify the level of spontaneity and types of triggers of behaviors observed in each session of the animal assisted therapy program.

3.3. STUDY 3

INVESTIGATION OF THE EFFECTS OF AN ANIMAL-ORIENTED HUMANE EDUCATION PROGRAM ON ATTITUDES TOWARDS ANIMALS, EMPATHY TOWARDS ANIMALS AND PEOPLE, IN CHILDREN AGED 10 TO 11

3.3.1. Introduction

Animals play an important role in the cultural, political and social arena, of modern societies (Taylor & Signal, 2005). They have been part of human social and psychological landscape ever since the dawn of our species, all human societies coexisting with animals; animal-human interactions range from parasitism to predation and partnership (Ingold, 1994 cited in Knight & Herzog, 2009). The presence of animals can increase psychological well-being (Beck & Katcher, 2003), bringing benefits like company, comfort and support, improving self-esteem and educational benefits such as early experiencing of life events (eg, birth and death) and learning how to take care of someone else (by feeding and cleaning the animal) (Podberscek, 2006).

Many philosophers have theorized that the humane treatment of animals is an indicator of a general moral propensity and ethical conduct (Westbury & Neumann, 2008). Starting from this idea, **humane education programs** – HEP, have been proposed as an effective mechanism by which a lack of empathy towards people can be remedied by teaching proper attitudes towards animals (Thompson & Gullone 2003). For the first time in Romania, such a program has been proposed by animal welfare organization Vier Pfoten (Four Paws) ("*Children learn to protect animals*"), being implemented in Bucharest, Brasov, Sibiu and Cluj (Romania).

Având în vedere rezultatele echivoce existente în literatura de specialitate, studiul de față își propune investigarea efectelor pe care PEU introdus de fundația Vier Pfoten și deținerea unui animal de companie le au asupra atitudinilor față de animale, empatiei față de animale și empatiei față de oameni în cazul elevilor de clasa a IV-a. De asemenea, studiul de față urmărește identificarea posibilelor asocieri dintre variabilele menționate și punerea în evidență a potențialului impact pe care îl are genul asupra acestor variabile.

Given the equivocal results found in the scientific literature, the present study aims to investigate the effects of the HEP introduced by the Vier Pfoten foundation and pet ownership on attitudes towards animals, empathy towards animals and empathy towards people in 4th graders. Also, this study aims to identify possible associations between the afore-mentioned variables, and to highlight the potential impact that gender has on these variables.

3.3.2. Objectives and hypotheses of the research

Research objectives

The first objective of the present study is to assess the effects of the program "Children learn to protect animals" (Vier Pfoten foundation) on attitudes towards animals, empathy towards animals and empathy towards people in 4th graders (mean age = 10.51 years, SD = 0.50).

The second objective aims at exploring relationships between the mentioned variables, namely the possible association between attitudes towards animals, empathy towards people and animals.

The third objective aims at assessing the impact of pet ownership and gender on attitudes towards animals, empathy towards people and animals.

Research hypotheses

1. Compared to pretest (before the implementation of the humane education program "*Children learn to protect animals*"), at post-test, we expect to observe an increase in the experimental at level of favorable attitudes towards animals, as measured by *Pet Attitude-Scale Modified* (Munsell et al., 2004; PAS-M), and at level of the empathy towards animals, as measured by the *Animal Empathy Scale* (Paul, 2000a; AES).

2. If the hypothesis of transfer/generalization is sustained, at post-test, we expect to record in the experimental group an increase in empathy towards people, measured by Bryant's Index of Empathy for Children and Adolescents (Bryant, 1982) - BIECA.

3. There will be a significant positive correlation between the level of favorable attitudes towards animals, as measured by the PAS-M, and empathy to animals, measured by AES.

4. There will be a significant positive correlation between the level of favorable attitudes towards animals, as measured by the PAS-M, and the empathy towards people, measured by BIECA.

5. There will be a significant positive correlation between level of empathy towards animals and empathy towards people, measured by AES, respectively BIECA.

6. There will be significant differences in the variables measured regarding pet ownership in that fourth graders owning a pet will have more favorable attitudes towards animals, as measured by PAS-M, higher levels of empathy towards animals, measured by AES, and an increased level of empathy towards people, measured by BIECA compared with fourth graders who do not own a pet.

7. There will be significant differences in the variables measured by gender, in the sense that girls will have higher levels of favorable attitudes towards animals, as measured by the PAS-M, higher levels of empathy towards animals, as measured by AES, and empathy towards people (measured by PAS-M, AES and BIECA) compared to boys.

3.3.3. Research methodology

Research design

For hypotheses 1 and 2 we used a quasi-experimental design. The quasi-independent variable was the implementation of the humane education program. We had two groups: one in which the humane education program was not implemented (control group) and a group where this program was implemented (experimental group). The dependent variables were represented by:

- level of favorable attitudes towards animals (measured by the PAS-M standard scale);
- level of empathy towards animals (measured by the AES standard scale);
- level of empathy towards people (measured by the BIECA standard scale).

These variables were evaluated both before the start of the humane education program (pretest) and after completing this program (posttest).

For hypotheses 3, 4 and 5 used a correlational design.

For hypotheses 6 and 7 were used a quasi-experimental design. For hypothesis 6, the quasi-independent variable was pet ownership, and participants were divided into two groups: those who own pets and those who do not own pets. This division has been conducted both at pre-test and at post-test. For hypothesis 7 the quasi-independent variable was represented by gender (male and female). For both hypotheses, the dependent variables were the three referred to in hypotheses 1 and 2.

Participants

In this research, we included 45 fourth grade students, 32 from a school in Cluj-Napoca, Cluj County, Romania, based on an agreement to participate in the VIER PFOTEN project "*Children learn to protect animals*" (experimental group) and 13 from a school in the town of Turda, Cluj County, where this program was not implemented (control group). The mean age for each group and frequencies of participants gender are reported in Table 1 and Table 2.

Table 1. Mean age of fourth grade students participating in the study

Group	Control group	Experimental group	Total sample
M	10.53	10.50	10.51
AS	0.51	0.50	0.50
N	13	32	45

Table 2. Gender of fourth grade students participating in the study

Gender	Group				Total	
	Control group		Experimental group		N	Percentage
	N	Percentage	N	Percentage	N	Percentage
male	5	38.5	15	46.9	20	44.4
female	8	61.5	17	53.1	25	55.6
Total	13	100	32	100	45	100

Intervention

The intervention consisted of the implementation of the Vier Pfoten program "*Children learn to protect animals*" by two teachers from the school in Cluj-Napoca after an initial training conducted by representatives Vier Pfoten Foundation (with the participation of the author). The general objectives of this program include (Tulpan, 2010):

- Educating exploration of the environment and understanding its mechanisms;
- Educating positive attitudes towards animals;
- Educating and developing of pets and stray animals protection and care skills;
- Practicing documentation techniques;
- Strengthening communication skills and teamwork;
- Educating feelings of attachment, care, compassion, responsibility towards animals.

Research tools

(1) Pet Attitude Scale- Modified (PAS-M):

PAS-M (Munsell et al., 2004) is the modified version of the Pet Attitude Scale (PAS Templer et al., 1981). PAS-M measures the level of favorable attitudes towards animals by statements that can be answered on a Likert scale from 1 (strongly disagree) to 7 (strongly agree). Items 4, 6, 9, 12, 13, 15 and 17 have inversed rating. The minimum score is 18 and the maximum 126. A higher score reflects more favorable attitudes towards animals. Cronbach alpha coefficient reported in the study by Munsell et al. (2004) was .92 for PAS and PAS-M.

(2). Animal Empathy Scale (AES)

AES is a questionnaire designed by Paul (2000), based on *Questionnaire Measure of Emotional Empathy* (QMME, Mehrabian & Epstein, 1972). AES is comprised of 22 items, of

which 11 refer to empathetic feelings (for example: "*It saddens me to see a single animal in a cage*") and 11 unemphatic feelings ("*I hate dogs barking and howling when left alone*"). The higher the total score it is considered that the level of empathy towards animals is higher. In the present study sample, internal consistency (assessed by Cronbach alpha) of the AES was .68 at pretest and .85 at post-test.

(3). *Bryant's Index of Empathy for Children and Adolescents (BIECA)*

BIECA was adapted from the adult version of the *Questionnaire Measure of Emotional Empathy* (QMEE; Mehrabian & Epstein, 1972) for use with pediatric patients. BIECA is a self-reported measure of empathy which contains 22 items. The minimum score is 22, the maximum score is 110. The higher the score is, the more it is considered that the level of empathy is higher. In the present study sample, internal consistency of BIECA assessed by Cronbach alpha was at pretest .67 and .75 at posttest. By eliminating the items 11 and 16 we obtained a Cronbach's alpha coefficient of .65 at pretest, respectively .73 at posttest.

Procedure

Implementation of the program *Children learn to protect animals* for the experimental group was carried out by two teachers in two 4th grade classes at a school in the city of Cluj-Napoca based on informed consent and after a training previously conducted by the Vier Pfoten Foundation. Questionnaires were applied in groups before the start (pretest) and after the program "*Children learn to protect animals*" (posttest). Both at pretest and posttest identification data and information about pet ownership were obtained (where participants owned pets). The research was conducted in the period April through June 2010.

3.3.4. Research results

3.3.4.1. Presentation and data analysis

Effects of the humane education program on attitudes towards animals, empathy towards animals and empathy towards people

To create the database, participants' answers to questionnaires were coded and entered into SPSS (version 11.5). In a first stage, we performed descriptive statistics for the control and experimental group, on overall scores for attitudes towards animals, empathy towards animals and empathy towards people, both at pretest and posttest. Table 3 indicates the mean and standard deviation for each of those variables. Also, the significance threshold has been set at $p=.05$.

Table 3. Means and standard deviations for the total scores PAS-M, AES și BIECA at pretest and posttest, by groups (control and experimental).

Variable	Control group				Experimental group			
	M	AS	N valid	N missing	M	AS	N valid	N missing
Total score PAS-M pretest	95.76	8.56	13	0	101.59	12.99	32	0
Total score PAS-M posttest	92.53	10.82	13	0	95.53	17.83	32	0
Total score AES pretest	77.30	9.85	13	0	83.86	9.75	30	2
Total score AES posttest	77.23	10.87	13	0	84.66	11.93	30	2

Total score BIECA pretest	62.50	6.72	12	1	63.77	10.17	31	1
Total score BIECA posttest	63.25	11.88	12	1	64.40	10.95	30	2

To check whether there are any differences between the control group and the experimental group regarding attitudes towards animals, empathy towards animals and empathy towards people at pretest, were conducted independent samples t tests for the mentioned variables at pretest (see Annex 6, part B). The results are shown in Table 4.

Table 4. T-test for the two groups for PAS-M, AES and BIECA scores measured at pretest (before the start of the program).

Variable	Group				T-test for the equality of means		
	Control group		Experimental group		t	Degrees of freedom	Significance (2 tailed)
	M	AS	M	AS			
Total score PAS-M pretest	94.58	7.75	101.86	12.89	-1.81	39	0.07
Total score AES pretest	76.16	9.35	84.03	9.88	-2.35	39	0.02
Total score BIECA pretest	62.50	6.72	63.24	10.16	-2.32	39	0.81

As can be seen from Table 4, there were no significant differences in the PAS-M scores at pretest for the control and the experimental groups $t(39) = -1.81$; $p = .07$. Also, there were no significant differences at pretest regarding BIECA scores for the control and the experimental group $t(39) = -2.35$, $p = .81$. But there were significant differences in the scores in the AES scores at pretest for the control group and the experimental, $t(39) = -2.35$, $p = .02$, $\eta^2 = 0.12$ (moderate effect). The experimental group had a higher level of empathy towards animals compared to the control group.

In the next step, we conducted six repeated measures ANOVA on each group, in order to compare the results obtained at pretest with the post-test for the three variables. The results were as follows:

- *Attitudes towards animals*: there was no significant effect for time in the control group, Wilk's Lambda = .86, $F(1,12) = 1.91$, $p = .19$, multivariate partial $\eta^2 = .13$. There was however a significant effect for the time in the experimental group, Wilk's Lambda = .74, $F(1,31) = 10.45$, $p = .003$, multivariate partial $\eta^2 = .25$ (great effect). The experimental group had lower scores on scales measuring attitudes towards animals at posttest than pretest.

- *Empathy towards animals*: there was no significant effect for time in the control group, Wilk's Lambda = 1.00, $F(1,13) = .003$, $p = .96$, multivariate partial $\eta^2 = .00$. There was no significant effect for the experimental group either, Wilk's Lambda = .97, $F(1,27) = .66$, $p = .42$, multivariate partial $\eta^2 = .02$.

- *Empathy towards people*: there was no significant effect for time in the control group, Wilk's Lambda = .95, $F(1,10) = .44$, $p = .52$, multivariate partial $\eta^2 = .04$. Also,

there was no significant effect for the experimental group, Wilk's Lambda = .99, $F(1,13) = 0.04$, $P = .82$, multivariate partial eta squared = .002.

To check if there are any significant pretest-posttest differences between the groups included in the research were introduced corresponding data for each variable in three mixed design 2x2 ANOVA with the group (control group / experimental group) as inter-participants factor and time (pretest / posttest) as intra-participants factor. The results are shown below:

- *Attitudes towards animals*: ANOVA revealed a significant main effect for time: Wilk's Lambda = .84, $F(1,43) = 7.91$, $p = .007$, multivariate partial eta squared = .15 (moderate effect). There was no significant effect for group, $F(1, 43) = 1.01$, $p = .31$, partial eta squared = .02, and no significant effect for group-time interaction, Wilk's Lambda = .98, $F(1,43) = 0.73$, $p = .39$, multivariate partial eta squared = .01. Participants in both groups had lower scores on attitudes towards animals in the second part of the experiment.

- *Empathy towards animals*: ANOVA revealed no significant main effect for time, Wilk's Lambda = .99, $F(1,39) = 0.22$, $p = .63$, multivariate partial eta squared = .006 nor for time-group interaction, Wilk's Lambda = .99, $F(1,39) = 0.29$, $p = .59$, multivariate partial eta squared = .007. Instead, it revealed a significant effect for group, $F(1,39) = 3.93$, $p = .05$, partial eta squared = .09. Participants in the experimental group had a greater empathy towards animals.

- *Empathy towards people*: ANOVA revealed no significant effect for time, Wilk's Lambda = .99, $F(1,38) = 0.10$, $p = .74$, multivariate partial eta squared = .003, nor for time-group interaction, Wilk's Lambda = .99, $F(1,38) = 0.32$, $p = .57$, multivariate partial eta squared = .009. Also, no significant effect for group was found, $F(1,38) = 0.61$, $p = .43$, partial eta squared = .01

Relationship between attitudes towards animals, empathy towards animals and empathy towards people

In a first stage, preliminary analyses were conducted on attitudes towards animals, empathy towards animals and empathy towards people based on total scores at pretest, posttest respectively. Means and standard deviations for these variables at pretest and posttest are shown in Table 5.

Table 5. Means and standard deviations for the total scores of PAS-M, AES and BIECA at pretest and posttest, by groups.

Time	Variable		
	Total score PAS-M	Total score AES	Total score BIECA
Pretest			
M	99.91	81.88	63.41
SD	12.88	10.13	9.28
N valid	45	43	43
N missing	0	2	2
Posttest			
M	94.66	82.41	64.07
SD	16.05	12.00	11.09
N valid	45	43	42
N missing	0	2	3

In a second stage, we explored the relationship between attitudes towards animals, empathy towards animals and empathy towards people, using Pearson correlations (results are shown in Table 6).

Table 6. The values for the correlation coefficient at pretest and posttest for attitudes towards animals, empathy towards animals and empathy towards people.

Correlated variables	Values for Pearson correlation coefficient	
	Pretest	Posttest
Total score PAS-M and total score AES	.61*	.59*
Total score PAS-M and total score BIECA	.52*	.37**
Total score AES and total score BIECA	.45*	.46*

Note: * significant correlation at $p < .01$.

** significant correlation at $p < .05$.

Significant correlations were obtained between the variables, as follows:

- *Attitudes towards animals and empathy towards animals:* significant correlations between the scores of PAS-M, and AES were obtained both pretest and post-test. A high positive correlation ($r = .61$, $n = 43$, $p < .001$) was recorded at pretest, and also at posttest ($r = .59$, $n = 43$, $p < .001$), with higher levels of favorable attitudes towards animals being associated with higher levels of empathy towards animals.
- *Attitudes towards animals and empathy towards people:* significant correlations between the scores of PAS-M, and BIECA were obtained for both pretest and post-test, although different magnitudes. Thus, a high positive correlation was recorded at pretest ($r = .52$, $n = 43$, $p < .001$) and a medium positive correlation at posttest ($r = .37$, $n = 42$, $p = .01$) with higher levels of favorable attitudes towards animals being associated with higher levels of empathy towards people.
- *Empathy empathy towards animals and empathy towards people:* significant correlations between the scores of AES and BIECA were obtained for both pretest and post-test. A medium positive correlation was recorded at pretest ($r = .45$, $n = 41$, $p = .003$), as well as at posttest ($r = .46$, $n = 43$, $p = .002$), with higher levels of empathy to animals being associated with higher levels of empathy towards people.

The influence of pet ownership on attitudes towards animals, empathy towards animals and empathy towards people

Pet ownership was coded as a dichotomous variable (1 = owns a pet, 2 = does not own a pet). At pretest, 23 of the respondents (51.1%) stated that they have no pets, while 22 of the respondents (48, 9%) said they own a pet. At posttest, 25 of the respondents (55.6%) stated that they have no pets, while 20 of the participants (44.4%) stated that they own a pet. We conducted t tests for independent samples to elucidate the influence that pet ownership has on attitudes towards animals, empathy towards people and empathy towards animals both at pretest and post-test.

Table 7. T-test for participants that own/do not own a pet for attitudes towards animals, empathy towards people and empathy towards animals measured at pretest.

Variable	T-test for equality of means				
	M	SD	t	Degrees of freedom	Significance (2 tailed)
Total score PAS-M pretest					
Does not own a pet	101.25	13.49	0.78	39	.43
Owns a pet	98.28	10.52			
Total score AES pretest					
Does not own a pet	84.90	9.19	1.99	39	.05
Owns a pet	78.71	10.54			
Total score BIECA pretest					
Does not own a pet	62.45	10.69	-0.38	39	.70
Owns a pet	63.57	7.78			

As shown in Table 8, during the pretest, there were no significant differences between participants who do not own pets and those who did own pets on attitudes towards animals, $t(39) = .78$, $p = .43$, regarding empathy towards people, $t(39) = -0.38$, $p = .70$. We found, however, a significant difference between participants who did not own pets and those who did, in terms of their level of empathy towards animals, $t(39) = 1.99$, $p = .05$, eta squared = .03 (small effect). At pretest, participants who did not own pets had a greater empathy towards animals.

Table 8. T-test for participants that own/do not own a pet for attitudes towards animals, empathy towards people and empathy towards animals measured at posttest.

Variable	T-test for equality of means				
	M	SD	t	Degrees of freedom	Significance (2 tailed)
Total score PAS-M posttest					
Does not own a pet	93.95	19.57	-1,35	38	.89
Owns a pet	94.66	12.79			
Total score AES posttest					
			0.90	38	.37

Does not own a pet	83.72	12.79			
Owns a pet	80.22	11.45			
Total score BIECA posttest					
Does not own a pet	62.68	11.54	-0.90	38	.37
Owns a pet	65.94	11.06			

Regarding the post-test, as shown in Table 8, there were no significant differences between those who did not own pets and those who did regarding attitudes towards animals, $t(38) = -1.35$, $p = .89$, empathy towards animals, $t(38) = 0.90$, $p = .37$, or empathy towards people, $t(38) = -0.90$, $p = .37$.

We then decided to analyze the total scores of PAS-M, ESA and BIECA in the control and experimental group by pet ownership.

Table 9. Scores of PAS-M, AES and BIECA by group and pet ownership, at pretest and post-test.

Variable	Control group			Experimental group		
	M	SD	N	M	SD	N
Total score PAS-M at pretest						
Does not own a pet	0	0	0	100.95	13.53	23
Owns a pet	95.76	8.56	13	103.22	12.10	9
Total score PAS-M at post-test						
Does not own a pet	0	0	0	95.78	17.05	23
Owns a pet	92.53	10.82	13	94.88	20.78	9
Total score AES at pretest						
Does not own a pet	0	0	0	84.70	9.28	20
Owns a pet	77.30	9.85	13	80.50	11.30	8
Total score AES at post-test						
Does not own a pet	0	0	0	85.50	10.65	20
Owns a pet	77.23	10.85	13	82.75	16.02	8
Total score BIECA at pretest						
Does not own a pet	0	0	0	64.15	10.83	20
Owns a pet	62.36	7.03	11			9
Total score BIECA at post-test						
Does not own a pet	0	0	0	65.00	10.88	20
Owns a pet	61.36	10.41	11	64.77	12.02	9

We then performed mixed-plot ANOVA analyses for each group, with ownership / non-ownership of an animal as inter-participants factor and measurements at pretest and posttest as an intra-participant factor.

- *Attitudes towards animals:* Could not perform comparisons between owners / non-owners in the control group because there were no participants who did not have animals. The time factor has not had a significant effect, Wilk's Lambda = .86, $F(1,12) = 1.91$, $p = .19$, multivariate partial eta squared = .13. For the experimental group the factor "pet ownership" did not have a significant effect, $F(1,30) = 0.14$, $p = .90$, partial eta squared = .00. Also, the time-group interaction was not significant, Wilk's Lambda = .98, $F(1,30) = 0.56$, $p = .45$, multivariate partial eta squared = .01. But the time factor had significant effect, Wilk's Lambda = .74, $F = 10.34$, $p = .003$, multivariate partial eta squared = .25 (great effect).

Thus, both the participants who owned pets and those who did not had a significantly lower level of favorable attitudes towards animals at pretest compared to post-test.

- *Empathy towards animals:* Could not perform comparisons between owners / non-holders in the control group because there were no participants who do not have animals. The time factor has not had a significant effect, Wilk's Lambda = 1.00, $F(1, 12) = 0.003$, $p = .95$, multivariate partial eta squared = .00. For the experimental group, the group factor had a significant effect, $F(1, 26) = 0.63$, $p = 0.43$, partial eta squared = .02. The time factor has not had a significant effect, Wilk's Lambda = .96, $F(1, 26) = 0.82$, $p = .37$, multivariate partial eta squared = .03. Also, the time-group interaction was not significant, Wilk's Lambda = .99, $F(1, 26) = 0.18$, $p = .66$, multivariate partial eta squared = .007.

- *Empathy towards the people:* Could not perform comparisons between owners / non-holders in the control group because there were no participants who do not have animals. The time factor has not had a significant effect, Wilk's Lambda = .95, $F(1, 10) = 0.44$, $p = .52$, multivariate partial eta squared = .04. For the experimental group, the group factor did not have a significant effect, $F(1, 27) = 0.14$, $p = .90$, partial eta squared = .001. The interaction between group and time had no significant effect, Wilk's Lambda = .99, $F = 0.06$, $p = .79$, multivariate partial eta squared = .003, and also no significant effect for the time factor, Wilk's Lambda = 1.00, $F = 0.01$, $p = .92$, multivariate partial eta squared.

The influence of gender on attitudes towards animals, empathy towards animals and empathy towards people

The sample in this study consisted of 20 boys (44.4%) and 25 girls (55.6%). To examine the influence that gender has on attitudes towards animals, empathy towards animals and empathy towards people, were carried out t tests for independent samples, both at pretest and at posttest.

At pretest we did not find significant differences between male or female participants regarding the studied variables. Thus, no significant differences were found in terms of attitudes towards animals, $t(34) = -0.92$, $p = .36$, empathy towards animals, $t(34) = -1.24$, $p = .22$, or empathy for people, $t(34) = -0.42$, $p = .67$.

Table 10. T-test for gender groups regarding attitudes towards animals, empathy towards people and empathy towards animals measured at pretest.

Variable	T-test for equality of means				
	M	SD	t	Degrees of freedom	Significance (2 tailed)
Total score PAS-M pretest					
Male	97.94	14.11	-0.92	34	.36
Female	101.68	10.12			
Total score AES pretest					
Male	79.41	10.62	-1.24	34	.22
Female	83.78	10.43			

Total score BIECA pretest					
Male	63.05	11.24	-0.42	34	.67
Female	64.42	7.81			

At posttest there was a significant difference between boys and girls in terms of attitudes towards animals, $t(34) = -0.85$, $p = .38$, nor in terms of empathy towards animals, $t(34) = -1.27$, $p = .21$. However, we found a significant difference between boys and girls regarding empathy for people, $t(34) = -2.38$, $p = .02$, $\eta^2 = .14$ (great effect). At post-test, the girls in this sample had a greater empathy for people than boys.

Table 11. T-test for gender groups regarding attitudes towards animals, empathy towards people and empathy towards animals measured at post-test.

Variable	T-test for equality of means				
	M	SD	t	Degrees of freedom	Significance (2 tailed)
Total score PAS-M post-test					
Male	91.35	20.50	-0.85	34	.38
Female	96.15	11.31			
Total score AES post-test					
Male	79.52	12.51	-1.27	34	.21
Female	84.78	12.19			
Total score BIECA post-test					
Male	58.94	9.34	-2.38	34	.02
Female	66.84	10.42			

3.3.4.2 Interpretation of the results

The effects of the humane education program on attitudes towards animals, empathy towards animals and empathy towards people

The present results have confirmed the first two hypotheses proposed. Thus, the first hypothesis predicted that, by comparison with the pretest period, at posttest will see increases in the experimental group regarding the level of favorable attitudes towards animals and the empathy towards animals. In the control group there were no significant differences between pretest and posttest on these variables. The level of favorable attitudes towards animals in the control group dropped at posttest, but not significantly. In the experimental group, the situation was a different one, because the participants had significantly lower scores on the scale measuring attitudes towards animals at posttest compared to the pretest (effect size was moderate), although the comparison with the control group performed with ANOVA revealed

no significant difference between the two groups. However, the mean of the experimental group at posttest continued to be a large one ($M = 95.53$, $SD = 17.83$); pretest-posttest difference might be due to a "normalization" effect of attitudes towards animals following the implementation of HEP. It should also be noted that PAS-M particularly assesses attitudes towards pets, while HEP was focused on animals in their ecological environment. It is possible that, following the implementation of the HEP, the anthropomorphisation of animals by children has decreased slightly compared to the pretest. As in the control group, in the experimental group where no pretest-posttest changes related to empathy towards animals. It should be noted that at pretest participants in the experimental group had higher levels of empathy towards animals compared to the control group, levels that grew at post-test but not significantly.

The result regarding attitudes toward animals is not consistent with the existing literature to date: there was no study identified where the implementation of a HEP would lower the level of favorable attitudes towards animals. Studies such as those made by Ascione (1992) or Montminny-O'Hare and Dana (2001) identified positive results of the HEP; a study where no significant effects have been identified of a HEP was conducted by Vockell and Hodal (1980, cited in Ascione, 1992), but in this case there was no pre-test evaluation.

Also, the second hypothesis was not confirmed. This hypothesis was based on the transfer/generalization theory, suggesting that during the posttest will also see increases in the experimental group regarding empathy towards people, measured by BIECA. Given that in this study we did not find a significant increase in PAS-M or AES, PAS-M decreasing significantly and AES increasing, but not significantly, the lack of differences between the BIECA measurements conducted at pretest and at posttest do not confirm the of hypothesis transfer/generalization, which was confirmed, for example, in the study by Ascione both in 1992 and in its follow-up (Ascione & Weber, 1996).

Differences between the changes recorded on the attitudes towards animals and the absence of significant changes in empathy towards animals or towards humans could be explained by the fact that both AES and BIECA originate in QMEE, assessing empathy as trait. Knafo et al. (2009) noted that empathy in children can be seen as relatively resistant trait that has a substantial degree of stability and consistency. Therefore, it is possible that the time between pre-test and post-test to have been too short in order to highlight any significant changes.

Relationship between attitudes towards animals, empathy towards animals and empathy towards people

The results confirmed the hypotheses 3, 4 and 5. Thus, in hypothesis 3 it was predicted that there will be a significant positive correlation between the level of favorable attitudes towards animals, measured by PAS-M and the empathy to animals, measured by AES. This hypothesis was confirmed by obtaining a high positive significant correlation ($r = .61$ at pretest, respectively $r = .59$ at posttest) between scores at PAS-M, respectively at AES; a positive significant correlation also identified Wagstaff (1990).

In hypothesis 4, it was predicted that there will be a positive significant correlation between the level of favorable attitudes towards animals, as measured by PAS-M and empathy towards people, measured by BIECA. This hypothesis was confirmed by obtaining a high positive significant correlation ($r = .52$) at pretest and a medium positive correlation ($r = .37$) at posttest between scores at PAS-M, respectively BIECA. The decrease of the correlation at posttest, can be explained by lowering the PAS-M scores. This result is similar to that obtained by Daly and Morton (2006), which identified a small but significant positive correlation ($r = 0.33$, $p < .01$) between attitudes towards animals and empathy towards people, measured by the same tools that were used in this study.

In hypothesis 5 it was predicted that there will be a significant positive correlation between the level of empathy towards animals and empathy towards people, measured by AES, respectively BIECA. This hypothesis has also been confirmed by obtaining a medium significant positive correlation of both the pre-test ($r = .45$) and the post-test ($r = .46$). These results are similar to those obtained by Paul (2000a); this author's study indicated a low correlation between empathy towards people and towards animals (Kendall tau = 0.26, $p < 0.05$).

The influence of pet ownership on attitudes towards animals, empathy towards people and empathy towards animals

The results obtained in this study haven't confirmed hypothesis 6. Thus, it was predicted that there will be significant differences in the specified variables by pet ownership, so fourth grade students who own pets will have more positive attitude towards animals, measured by PAS-M, higher levels of empathy towards animals, measured by AES and an increased level of empathy towards people, measured by BIECA, compared to fourth grade students that don't have pets. However, at pretest were no significant differences between participants who own animals and those who don't, in terms of attitudes towards animals and empathy towards people. It was found, however, a difference in terms of empathy towards animals, meaning that at pretest, participants who don't own animals had a greater empathy towards them (the effect being small). At post-test, there were no significant differences between participants who do not own pets and those with animals, for any of the measured variables. Also in the experimental group there were no significant differences by ownership / non-ownership of an animal when comparing pretest and post-test results. The lack of significant differences between groups based on owning a pet is similar to the results obtained by Daly and Morton (2003, cited in Daly & Morton, 2006), Taylor and Signal (2006) but not those obtained by Serpell and Paul (1993). However, the existence of higher empathy towards animals in people who do not have pets, do not replicate the results of the study conducted by Paul (2000a), according to which owning a pet is a significant predictor for greater empathy for animals.

The influence of gender on attitudes towards animals, empathy towards animals and empathy towards people

The results confirm only partially hypothesis 7. In it, it predicted that there will be significant differences in the measured variables, by gender, meaning that girls will have higher levels of favorable attitudes towards animals, measured by PAS-M, level of empathy towards animals, measured by AES and empathy towards people (measured by PAS-M, AES and BIECA) compared to boys.

During the pretest, there were not significant differences between boys and girls for any of the variables investigated. These results do not replicate those in the literature, which indicates that women generally have a greater level of both empathy towards people (for example, Mehrabian & Epstein, 1972; Eisenberg & Lennon, 1983; Mestre et al., 2009) and attitudes towards animals (Ascione, 1992; Matthews & Herzog, 1997; Paul, 2000a, Taylor & Signal, 2005; Daly & Morton, 2006). However, it was found a significant difference between boys and girls at posttest regarding empathy towards people: girls had a higher level of empathy towards people compared to boys.

3.3.5. Conclusions and implications

3.3.5.1. Major conclusions and practical applications

First, the study sought to evaluate the effects of the "*Children learn to protect animals*" (supported, developed and implemented by the Vier Pfoten foundation) on attitudes towards animals, empathy towards animals and empathy towards people at fourth graders (mean age = 10.51 years, SD = 0.50). Secondly, the study explored the possible associations of the three variables mentioned above. Thirdly, the study investigated the impact assessment on pet ownership and gender on attitudes towards animals, empathy towards people and empathy towards animals. All hypotheses of the study (except the last, on gender) have started from the assumption that human-animal interaction may be beneficial for socio-emotional development of children.

This study has highlighted a number of different results from those in the literature. Thus, the group of participants included in the "*Children learn to protect animals*" program proposed by Vier Pfoten had lower scores on the scale measuring attitudes towards animals at posttest than at pretest and compared to the control group who did not receive the intervention. This could be due to "normalization" children's attitudes towards animals on the one hand, which were very high at pretest.

One of the main objectives of the "*Children learn to protect animals*" program is to educate children about animals and instilling an attitude of respect towards animals based on shaping a correct image in line with the reality of the lives of animals. In this context, the apparent depreciation of favorable attitudes toward animals might actually indicate a "relativisation" of children position towards animals, by reducing the level of anthropomorphism, which indicates reaching the educational purpose the project. The general concept of anthropomorphism refers to the allocation of human mental states (thoughts, feelings, motivations, intentions) to the animate beings and inanimate and the specific concept refers to attributing mental states only to animals (Kennedy, 1992). The tendency to describe things in anthropomorphic terms is transcultural and obvious from the age of 5 years. It occurs in situations of uncertainty confronted with stimuli perceived as ambiguous. (Rusu, A. S., 2008). So, taking into account the age of the children included in the study (10 and 11 years) we notice that, because of the anthropomorphism trend, they are relatively close to the age of onset of this trend (5 years) and urban areas where children come from, can cause a more ambiguous or unclear image to children of animals. Some of the items PAS-M assesses anthropomorphism (eg: item 16. *I speak with my pet frequently or I would speak if I had any*). Also, lower scores on scale measuring attitudes toward animals might be due to specific decreases on a particular factor of PAS-M ("*Pets at Home*"), as a result of some activities related to the life of animals their ecological environment.

There weren't found changes in empathy towards animals and empathy towards people; these results do not support the theory of transfer/generalization. Another interesting result is the higher empathy towards animals in participants who did not have pets; however, although significant, the difference of levels of empathy towards animals of those with animals and those who did not own animals was small and no longer incurred at posttest. Also, no differences were found gender related on attitudes towards animals, empathy towards animals and empathy towards people at pretest and at posttest differences existed only on empathy towards people in favor of girls.

A number of results were similar to those in the literature. Thus, it supported the idea of significant positive associations between attitudes towards animals, empathy towards animals and empathy towards people, although with different magnitudes. The highest correlations were seen between the level of favorable attitudes towards animals and the empathy towards animals. The mean correlation between empathy towards animals and towards people

supports the hypothesis proposed by Paul (2000a) that the two constructs are related but have different determinants. Also, the fact that girls had higher empathy towards people at posttest compared to boys replicate earlier findings of numerous studies which claim that empathy level is higher for women (Lennon & Eisenberg, 2003).

3.3.5.2. Limitations of the research and new directions for development

It should be noted that this study has several limitations: first, we used quasi-experimental designs that make it difficult to determine cause and effect relationships between variables. In the case of the "Children learn to protect animals" program there was no random assignment of classes in the control group or the experimental one. Participants were from two schools in different towns (inclusion of these schools in our study was made based on informed consent between schools management and FOUR PAWS).

Secondly, participants in the control group were significantly different from those in the experimental group in terms of pets owned. All participants in the control group owned pets at pretest, while a much smaller number of participants in the experimental group were pet owners.

Thirdly, the study was carried out with a small sample of participants, of which almost half have been eliminated (43%), because of more than half of the data missing in at least one questionnaire, either at pretest or at posttest. This calls into question the possibility of generalizing the results obtained in this study.

Fourthly, other than the two pretest-posttest evaluations, there was no monitoring of how the program was implemented during its deployment; integrity of the intervention was assessed only based on the information provided by the teachers at the end of the program.

This study attempted to provide some answers concerning the effectiveness of the program proposed in premiere by FOUR PAWS in Romania. In the US, HEP are seen not as an area of unfulfilled promises, but as an area of untapped potential (Unti & DeRosa, 2003). The same can be said about the situation of HEP in Romania. Although in the case of this sample not all expected outcomes were achieved, further replications are necessary to elucidate which elements are most effective in this program, which elements should be removed and which can be improved.

Future studies should investigate the effectiveness of the program proposed by Vier Pfoten on different samples with a larger number of participants and experimental designs that include randomized groups. It is important to identify activities that prove most useful to program objectives, in order to focus the program on these activities. This can be only be properly achieved with empirical evidence, based on diverse assessments. As Ascione and Weber (1992) noted, it is recommended to pay attention to the quality of instruction, adequacy of educational materials and nature of the assessment tools. In addition to the assessments on attitudinal levels, behavioral assessments are needed, both regarding behavior towards people and towards animals.

Transfer/generalization theory requires further investigation, as well as differences between empathy towards people and towards animals. It would also be appropriate to investigate other variables that might have an impact on the three main variables of the study, for example, the type of animal owned and quality of the child's relationship with it (Ascione, 1992), ie attachment to animal (Daly & Morton, 2006). For example, the study by Daly and Morton (2006) found that children who preferred and/or owned both a dog and a cat had higher levels of empathy than those who preferred/owned only one pet. Animal bio-behavioral similarity with humans is a less explored factor, with a possible impact on attitudes towards animals (Batt, 2009) and empathy towards them, according to the PAM model (Preston & de Waal, 2002). Also other variable that could be investigated is parents

attitudes towards animals, given that, besides the ideological influence from society, values are often transmitted from generation to generation (Fidler, Coleman, & Roberts, 2000).

As McPhedran (2009) noted, there is no evidence to support that empathy deficits are solely responsible for the development and proliferation of behavioral problems such as animal abuse and violence towards humans. Lack of empathy is only one of a network of interconnected developmental factors which can combine to lead to problematic behaviors. Implementation of HEP in populations with empathy deficits is needed to elucidate the HEP efficiency in addressing these deficits (McPhedran, 2009; Dadds, Whiting & Hawes, 2006).

Prin urmare, este esențială investigarea în continuare a interacțiunii om-animal și a aspectelor relaționate cu aceasta, atât din perspectiva deținerii animalelor de companie cât și din cea a intervențiilor asistate de animale (inclusiv PEU). Astfel s-ar putea obține informații relevante pentru programele de prevenție primară și de intervenție în cazul agresivității/abuzului față de animale, în vederea prevenției abandonului animalelor de companie, a deținerii responsabile a lor, a promovării atitudinilor și comportamentelor pozitive față de animale, a empatiei față de animale și a empatiei față de oameni, în direcția unor interacțiuni sănătoase om-animal.

Therefore, further investigation into the human-animal interaction and related aspects, both in terms of pet ownership and animal assisted interventions (including HEP). Thus, relevant information could be obtained for primary prevention and intervention programs for animal aggression/abuse, in order to prevent abandonment of pets, promote responsible ownership and positive attitudes and behaviors towards animals, empathy towards animals and empathy towards people, for healthy human-animal interactions.

3.4. STUDY 4

INVESTIGATION OF THE EFFECTS OF AN ANIMAL-ORIENTED HUMANE EDUCATION PROGRAM ON ATTITUDES TOWARDS ANIMALS IN CHILDREN AGED 9 AND 10 YEARS

3.4.1 Introduction

The importance of animals in our lives is undeniable. Human societies since ancient times until today have evolved in constant relationship with animals, the relationship ranging from predation to parasitism and partnership (Ingold, 1994 cited in Knight & Herzog, 2009). The presence of animals can increase the psychological wellbeing (Beck & Katcher, 2003), bringing benefits like company, comfort and support, improving self-esteem and educational benefits such as early experiencing of some life events (e.g. birth and death) and learning to take care of someone else (by feeding and cleaning the animal) (Podberscek, 2006).

Many philosophers have theorized that the humane treatment of animals is an indicator of a general moral propensity and ethical conduct (Westbury & Neumann, 2008). Starting from this idea, **humane education programs** (*humane education programs*, HEP) have been proposed as an effective mechanism by which a lack of empathy directed towards people can be remedied by learning appropriate attitudes towards animals (Thompson & Gullone 2003). Premiere for Romania, such a program was proposed by Vier Pfofen foundation ("*Children learn to protect animals*"), being implemented in schools across the country.

Attitudes towards animals have in recent years become a topic increasingly important in society, both in the field of conservation and animal welfare as well as drivers of favoring pro-social and empathetic attitudes and behaviors. Attitudes towards animals can be very varied, there are many factors that can influence and determine these attitudes

Given the equivocal results existing in literature and a preliminary study on the national implementation in premiere of the "*Children learn to protect animals*" program (Study 3 of this thesis, in which they evaluated the HEP effects on attitudes towards animals, empathy towards animals and empathy towards people, identifying a number of limitations), the present study aims to investigate in depth the specific effects which HEP, introduced by the Vier Pfofen foundation, has on a single variable with potential impact on the optimization of human-animal interaction, namely *attitudes towards animals* in third graders. Also, the present study aims to highlight the potential impact that has gender (female, male) on attitudes towards animals, given the preliminary investigations on the significant relationship between the gender of the population of adult pet owners in Romania and attitudes to their sterilization (Cocia & Rusu, 2010).

3.4.2 Research objectives and hypotheses

Research objectives

The main objective of the present study is to assess the effects of the program "*Children learn to protect animals*" on attitudes towards animals, for students of third grade (mean age = 9.49 years, SD = 0.50), achieving a randomized distribution of the participants in the experimental and control groups. The second objective seeks to assess the impact that has gender (female, male) on attitudes towards animals.

Research hypotheses

1. In comparison with the pretest period, in the posttest period we will see rises in the experimental group in terms of favorability attitudes towards animals, measured by Pet Attitude Scale-Modified (Munsell et al., 2004; PAS-M).

2. There will be significant differences regarding the gender variable, meaning that girls will have higher levels of favorability attitudes towards animals, as measured by the PAS-M compared to boys.

3.4.3 Research methodology

The research design

For both hypotheses there was used an experimental design. The independent variable was the implementation HEP "Children learn to protect animals" and there were two groups: the control group (in which HEP was not implemented) and the experimental group (in which HEP was implemented). The dependent variable was the favorability of attitudes towards animals (measured by PAS-M, Munsell et al., 2004; Romanian version is offered in Rusu, 2008). This variable is assessed both before the start of HEP (pre-test) and after the end of the program (post-test). In the hypothesis 2, the independent variable was represented by gender (male and female). In both hypotheses, the dependent variable was the level of favorability of attitudes towards animals (measured by PAS-M).

Participants

In this research were included 43 students of the third grade at a school in Bucharest, Romania (two classes), which participated in the project supported by Vier Pfofen Foundation "Children learn to protect animals", based on informed consent. It was decided to remove 8 participants from the study (5 from the experimental group and 3 from the control group), based on the lack of answers to the questionnaire, either at pretest, post-test or the absence of the subjects at post-test. The final sample was represented by 35 students of third grade (16 in the experimental group and 19 in the control group). The average age for each group and gender appropriate frequencies of the participants are reported in Table 1 and respectively 2:

Table 1. Mean age of third graders participants in the HEP study.

Group	Control group	Experimental group	Total sample
M	9.48	9.51	9.49
SD	0.24	0.20	0.50
N	19	16	35

Table 2. The gender of the third graders participants in the HEP study.

Gender	Group				Total	
	Control group		Experimental group		N	Percent
	N	Percent	N	Percent		
Male	7	36.8	11	69.8	18	51.4
Female	12	63.2	5	31.3	17	48.6
Total	19	100	16	100	35	100

The distribution of participants in the experimental and control groups

The distribution of the participants in the two groups took place after initial testing (pre-test). After ordering all the 43 children in ascending order of score from pretest, the distribution in the control group or target group was made using a block design, so that the subjects were distributed in a balanced way in terms of the investigated variable (favorability attitudes towards animals).

The intervention

The intervention consisted of implementation of three lessons from the manual "*Close to the animals*" representing the support course of the program "*Children learn to protect animals*" run by Vier Pfofen Foundation, by the author of the textbook, Veronica Tulpan. The three lessons chosen from the manual "*Close to the animals*" were: Animals feel, Pets and The change of the animal behaviors. The pace of implementation of the themes was one a week (one activity of one hour per theme/week) for three weeks. Themes involve a number of discussions, role play, practical activities and group activities, the textbook including numerous photos and drawings. The themes chosen were those that addressed the topic specifically investigated namely attitudes towards animals. The detailed contents of the themes from the manual can be accessed here: <http://www.vier-pfoten.ro/proiecte/copiii-invata-sa-protejeze-animalele/caietul-de-studiu-aproape-de-animale/>

Research tools

Pet Attitude Scale- Modified (PAS-M)

PAS-M (Munsell et al., 2004) is the modified version of the Pet Attitude Scale (PAS Templer et al., 1981). PAS-M measures the level of favorable attitudes towards animals by statements that can be answered on a Likert scale from 1 (strongly disagree) to 7 (strongly agree). Items 4, 6, 9, 12, 13, 15 and 17 have inversed rating. The minimum score is 18 and the maximum 126. A higher score reflects more favorable attitudes towards animals. Cronbach alpha coefficient reported in the study by Munsell et al. (2004) was .92 for PAS and PAS-M.

Procedure

Implementation of the program for the experimental group was conducted by textbook author of "*Close to the animals*" Veronica Tulpan, along with the author of the study (VC), in two third classes at a school in Bucharest, Romania. Questionnaires were applied in groups before the start (pre-test) and after the program "*Children learn to protect animals*" (post-test). For both groups, the application of PAS-M to pretest was conducted 7 days before the first lesson implementation and application of the posttest was conducted 7 days after the implementation of the third lesson. The study was conducted during April-May 2014.

3.4.4 Research results

The effects of the Humane Education Program on attitudes towards animals

For creating the database, participants' answers to questionnaires were coded and entered into SPSS (version 11.5). As the first step was carried out the descriptive statistics for the control

group, respectively experimental, on the overall scores for attitudes towards animals of both the pre-test period and the post-test period. Table 3 indicates the mean and standard deviation values for each of the variables listed.

Table 3. Means and standard deviation values for the total scores PAS-M at pretest and post-test periods, according to groups.

Variable	Control group				Experimental group			
	M	SD	N valid	N missing	M	SD	N valid	N missing
Total score PAS-M pretest	107.10	8.67	19	0	104.87	9.89	16	0
Total score PAS-M posttest	104.52	9.66	19	0	110.06	6.53	16	0

To check whether there are differences between the control group and the experimental one on their level of attitudes towards animals during the pretest, we conducted t tests for independent samples for the variables listed. The results are shown in Table 4.

Table 4. The T test for the two groups at PAS-M scores measured during the pretest (before the implementation of the HEP program).

Variable	Group				The t test for the mean equality		
	Control group		Experimental group		t	Degrees of freedom	Significance (2 tailed)
	M	SD	M	SD			
Total score PAS-M pretest	94.58	7.75	101.86	12.89	-1.81	39	0.07

As can be seen from Table 4, there were no significant differences in the PAS-M scores during the pre-test between the control group and the experimental one, $t(39) = -1.81$; $p = .07$.

We then performed an analysis of repeated measures ANOVA for each group for comparison of results obtained during the pretest, respectively posttest for the investigated variable: *attitudes towards animals*. There was no significant effect for time in the control group, Wilk's Lambda = .92, $F(1,18) = 1.54$, $p = .23$, multivariate partial eta squared = .07. It also was not identified any significant effect for time for the experimental group, Wilk's Lambda = .86, $F(1,15) = 2.71$, $p = .11$, multivariate partial eta squared = .13.

To check if there are significant differences pretest-posttest between the groups included in the study, we performed an analysis of 2x2 ANOVA mixed design, with the group (control group/experimental group) as a factor inter-participants and time (pretest period/posttest period) as a factor intra-participants. ANOVA test indicated no significant main effect for

time: Wilk's Lambda = .99, $F(1,34) = 0.18$, $p = 0.66$, multivariate partial eta squared = .006. There was no significant effect for group, $F(1, 34) = 3.93$, $p = .05$, partial eta squared = .10. Instead there was a significant effect for group-time interaction, Wilk's Lambda = .88, $F(1,34) = 4.45$, $p = .04$, multivariate partial eta squared = .11 (Figure 1). Attitudes towards animals were significantly different between the control group and the experimental group at pretest and posttest.

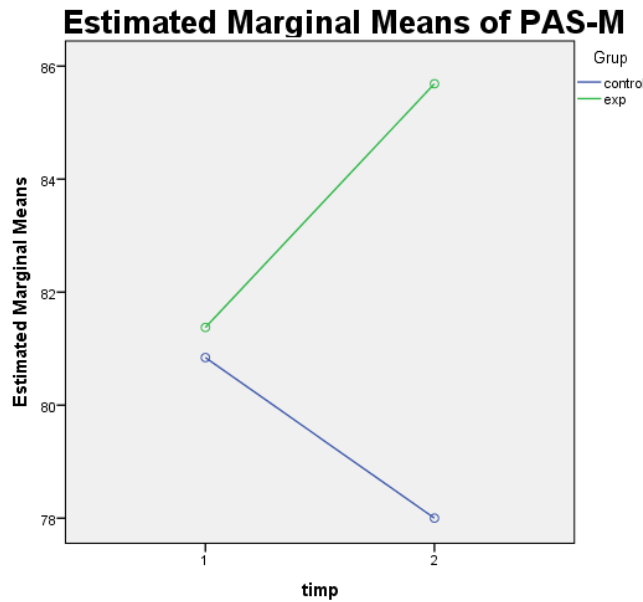


Figure 1: The interaction between group and time in terms of favorability attitudes towards animals measured by PAS-M.

Group-time interaction was, then, investigated by a post-hoc analysis of simple effects. The group had a significant influence on attitudes towards animals at posttest $F(1,33) = 6.18$, $p = .01$, but not at pretest $F(1,33) = 0.05$, $p = .80$. The analysis of paired factors revealed that the experimental group had attitudes towards animals significantly higher at posttest ($M = 85.68$, $SE = 2.27$., $F(1,33) = 6.18$, $p = .01$) than at pretest ($M = 81.37$, $SE = 1.61$).

The influence of gender on attitudes towards animals

The sample consisted of 18 boys (51.4%) and 17 girls (48.6%). To examine the influence of gender (male, female) on attitudes towards animals, were made t tests for independent samples for the period of pretest or the post-test (Table 5 and 6). During the pretest, significant differences were found between male participants, respectively female participants regarding the studied variable, in the direction that girls had significantly higher scores in terms of attitudes towards animals than boys, $t(33) = -2.07$, $p = .04$.

Table 5. t test groups formed by gender regarding attitudes towards animals, measured during the pretest (before the implementation of the HEP program).

Variable	t test for equality of means		
	t	Degrees of freedom	Significance (2 tailed)
M SD			

Total score					
PAS-M pretest					
Male	103.26	9.63	-2.07	33	.04
Female	109.43	7.58			

Regarding the post-test period, we found no significant difference between boys and girls in terms of attitudes towards animals, $t(33) = 0.53$, $p = .59$.

Table 6. T test groups formed by gender regarding attitudes towards animals, measured during the post-test (after the implementation of the HEP program).

Variable	t test for equality of means				
			t	Degrees of freedom	Significance (2 tailed)
	M	SD			
Total score					
PAS-M posttest					
Male	107.78	9.44	0.53	33	.59
Female	106.18	8			

3.4.5. Interpretation of the results

Effects of the humane education program on attitudes towards animals

The present results partially confirmed the two hypotheses. Thus, the first hypothesis predicted that, by comparison with the period of pretest (before the implementation of the HEP program *Children learn to protect animals*), at post-test there will be an increase in the experimental group in terms of favorability attitudes towards animals. In the control group, there were no significant differences between pretest and post-test on these variables. Favorability of attitudes towards animals in the control group dropped to post-test, but not statistically significant. In the experimental group there was a different situation, observing that participants had significantly more favorable attitudes towards animals at post-test compared to the pretest. The result regarding attitudes towards animals is consistent with the existing literature to date. Thus, studies such as those conducted by Ascione (1992) or O'Hare and Montminny-Dana (2001) identified positive results in terms of HEP regarding favorable attitudes towards animals.

Influence of gender on attitudes towards animals

The results obtained have only partially confirmed the second hypothesis. It was predicted that there will be significant differences in the variables measured by gender, meaning that girls will have higher levels of favorable attitudes towards animals, as measured by the PAS-M, compared to boys. During the pretest were significant differences between boys and girls for the investigated variable. These results replicate those from the literature, which shows generally for females a higher level in terms of attitudes towards animals

(Ascione, 1992; Matthews & Herzog, 1997; Paul, 2000a, Taylor & Signal, 2005; Daly & Morton, 2006). But at post-test (after the implementation of the HEP program), there were no significant differences between girls and boys in terms of attitudes towards animals. In boys, attitudes towards animals increased from pretest to post-test, whereas in girls, the level of attitudes slightly decreased, but not significantly, indicating a normalizing effect of the investigated variable.

3.4.6 Conclusions and implications

Major conclusions and practical applications

The aim of this study was twofold: first, the study sought to evaluate the effects of the "*Children learn to protect animals*" program (supported by the Vier Pfoten foundation) on favorable attitudes to animals for third graders from a state primary school in Bucharest, Romania. Secondly, the study investigated the assessment of the impact of gender (female, male) on attitudes towards animals. The first hypothesis of the study started on the assumption that human-animal interaction may be beneficial for socio-emotional development of children.

This study has highlighted a number of results in agreement with the literature. Thus, the group of participants included in the humane education program "*Children learn to protect animals*" proposed by Vier Pfoten had more favorable attitudes towards animals at posttest than at pretest. One possible explanation for lower scores recorded at posttest in the control group may be due to the fact that after the randomization procedure, children from the same class were distributed in the experimental group that received HEP intervention, while others were distributed in the control group. Although it was explained to the children that the test that they gave did not assess a performance on which to benefit or not from HEP, it is possible that those in the control group have been disappointed or felt they have been treated unfair and thus to lose interest in answering questions in the posttest phase. Also, there were differences of gender on attitudes towards animals at pretest period in the experimental group. Thus girls had higher levels of attitudes towards animals than boys. At post-test these differences were no longer significant indicating a leveling of gender differences regarding attitudes towards animals, following the implementation of a HEP. In this context, as in the previous study, the apparent depreciation of favorable attitudes to animals in girls and their appreciation in boys could actually indicate a "relativisation" of children about animals, the normalization of the degree of antropomorphism, actually indicating the achievement of the educational purpose of the project.

Limitations of the research and new research directions

Humane education programs are still low in number in Romania. This study attempted to provide some answers concerning the effectiveness of the proposed program in premiere by Vier Pfoten foundation in Romania. In the US, HEP are considered not as an area of unfulfilled promises, but as an area of unexplored potential (Unti & DeRosa, 2003). The same can be said about the situation of HEP in Romania. Although in the case of this sample yielded the expected results, further replications are needed to elucidate which are the most effective elements in this program, which elements should be removed and which can be improved.

It should be noted that this study has several limitations: first, the study was conducted with a low sample of participants (43) of which were eliminated eight (18.6%) as

they had more than half of the missing data to at least one questionnaire, either at pre-test, or post-test. This calls into question the possibility of generalizing the results obtained in this study. Secondly, the internal consistency test-retest of the assessment tool PAS-M expressed by Cronbach Alpha coefficient assessed on the research group, was modest (.68 at pretest to .65 at posttest). A possible explanation may be reduced comprehensibility of the items given the age of the participants. This may indicate a need for clearer scale to measure attitudes towards animals at this age and adapted for the Romanian population. Also, it is possible that a visual-analogue scale to be more effective for this age, than a Lickert scale type.

Future studies should investigate the efficiency of the HEP program proposed by Vier Pfofen on different samples with a larger number of participants, with experimental designs that include randomized classes. It is important to identify the activities that prove most useful to program objectives, in order to focus the program on these activities. This can be done properly only on the basis of empirical evidence, based on varied assessments. As remarked by Ascione and Weber (1992), it should be paid attention to the quality of the instruction, to the adequacy of the educational materials and to the nature of the assessment tools. In addition to the attitudinal level assessments are needed also behavioral assessments, as well as regarding the behaviors towards people and towards animals.

It would also be appropriate to investigate other variables that might have an impact on attitudes towards animals in children, for example, owning a pet, type of animal owned or attitudes of parents towards animals, given that, besides ideological influence from society, values are often transmitted from generation to generation (Fidler, Coleman, & Roberts, 2000). Therefore, it is essential to further investigate the human-animal interaction and the related aspects of it, both in terms of ownership of the pet and interventions assisted by the animal (including HEP). This way, it could be obtained relevant information for primary prevention programs and intervention in case of aggression, to promote positive attitudes towards animals, empathy towards animals and empathy towards people.

CHAPTER 4. CONCLUSIONS AND DISCUSSION

This doctoral research aimed primarily at promoting animal therapy and assisted activities providing scientific support through empirical research to this field which, as outlined in the theoretical foundation part, is still at the periphery of scientifically validated research, being encumbered by the absence of unified theoretical framework and the still small number of rigorous research in the field.

Although the last decade has registered a growing interest to researchers in the field of human-animal interaction, especially in terms of inter- and transdisciplinary approaches, despite the positive results in the fields of therapy and animal-assisted activities and animal-assisted education and in the simple interaction with pets, some of the mechanisms underlying the change still elude researchers, in part because research in this field of human-animal interaction is still in its infancy, but also because there is still no consensus among researchers on certain constructs, tools and mechanisms involved in the study of human-animal interaction.

The addressed subject was found to be in small extent covered in the specialty literature, which is why, I turned to theoretical principles, methodological knowledge and empirical data from ethology, sociology, social psychology and evolutionary, which have allowed an interdisciplinary approach of the investigated constructs. This approach, making use of theoretical and methodological principles from related disciplines of psychology, has the overall objective of discovering new information and strategies to contribute to knowledge in the field of interaction between humans and animals to improve the quality of life of humans and animals through interactions harmonious and mutually beneficial.

The research of this thesis was based on several central questions: (1) What is the status of this field at the start of the research? (Study 1); (2) How effective is animal assisted therapy in improving social and communication skills? How can we quantify as objectively as possible the progress in such a very complex intervention? (Study 2); What are the effects of an animal-oriented humane education program, regarding attitudes towards animals, animal empathy and empathy towards people? (Studies 3 and 4).

The first study consisted of a meta-analysis of the literature to investigate the status of the field at the start of the research. Despite the fact that there were completed meta-analysis to investigate a cumulative effect of animal assisted therapy, this research focuses on the specific effects of animal assisted therapy, namely the impact on improving communication skills and socialization as these are some of the most cited benefits of animal assisted therapy in the literature. Only four articles met the criteria for inclusion in the meta-analysis, which reflects the still relatively small number of quality research on some specific effects of the AAT. Meta-analysis revealed a large effect of the investigated variable (0.79) indicating that animal assisted therapy really can benefit in improving social and communication abilities. Moderation analysis has identified several variables that may moderate the effect of AAT in improving social and communication skills. Since this meta-analysis highlights the important role of the type of animal used, perhaps more attention should be paid in future studies to include more data about animal characteristics (type of animal used, certification, race, class etc). Other important moderating variables identified were the administration of TAA (Mixed or individual), type of measurement (objective or subjective), the number of subjects, the number of meetings and duration of the meetings. The results of the meta-analysis support the need to continue studying the AAT domain. Although there are already many studies investigating the global effects of AAT, there is still the need of more research highlighting specific effects.

The second study proposed an objective analysis of verbal and non-verbal communication in the context of the AAT, using an interdisciplinary combination of ethologic and sociometric methods. Research into AAT suggests that the interaction with dogs can encourage social interaction of children with special needs with peers and adults because of the non-critical perceived nature of the dog. Thus, there were analyzed 5 video recordings of the therapy sessions with a boy of 5 years diagnosed with ADHD and medium mental retardation, included in the animal assisted therapy program "Dogs for People" of the Vier Pfoeten Foundation. The chosen sessions for analysis took place at relatively equal time intervals covering a period of one year (sessions taking place weekly). For analysis there were coded certain behaviors related to socialization and communication sphere. Data were collected by a method used in ethology to study animal behavior, called "*focal animal sampling*" and analyzed by "*sequential analysis*" and "*social network analysis*", as sociometric techniques. The research hypotheses were confirmed, observing from the analysis of the data, that the intervention of AAT has the potential to increase the level of verbal and non-verbal and diversity of behavior (there was an increase in the number of new behavioral sequences relevant to verbal and non-verbal communication). A result that manages to make a strong argument for investigating using AAT as adjunctive therapy to address deficiencies of speech, is the fact that in the second study, vocalization is associated with dog-oriented sequences such as "*point to the dog*".

The third study aims the evaluation of the effects of the humane education program "*Children learn to protect animals*" on attitudes towards animals, empathy towards animals and empathy towards people, of 4th graders, investigation of the relationship between these variables and investigation of the impact of ownership of a pet and gender over attitudes towards animals, empathy towards people and empathy towards animals. This research has revealed some surprising results. Thus, in the third study, the group of participants included in the humane education program, had scores lower on the scale measuring attitudes towards animals at posttest than at pretest and through comparison to the control group where the intervention was not realized. Although initial attempt is to draw the paradoxical conclusion that their attitudes towards animals were down after the intervention, this might be due to "normalization" children's attitudes towards animals, which at pretest were very high (by lowering the level of antropomorphism of animals and the awareness of their real needs). One of the main objectives of the program "*Children learn to protect animals*" (implemented first in Romania and rated in premiere in this study) is to educate children about animals and instilling an attitude of respect towards animals based on shaping a correct image, in line with the reality of the lives of animals. In this context, the apparent depreciation of favorable attitudes toward animals, might actually indicate a "relativity" of children on animals, a reduction of the level of antropomorphism, underscoring the achievement of the educational purpose of the project. Another interesting result is that there were not found changes in empathy towards animals and empathy towards people; these results do not support the theory of transfer/generalization.

Following the results of the third study regarding the depreciation of the attitudes towards animals following the implementation of the humane education program "*Children learn to protect animals*", I led a fourth study, which evaluated solely the "*attitudes towards animals*", but this time on a group of third graders in Bucharest, showing a random distribution of participants in the experimental and control groups (compared to third study, which showed a convenience sampling). The research highlighted this time an increase in children's attitudes towards animals in the experimental group following the implementation of the humane education program. There were also highlighted gender differences regarding attitudes towards animals in the sense that at the pretest girls had higher values than boys of attitudes towards animals.

At post-test, these attitudes were normalized with mild depreciation at girls and mild appreciation at boys. This may be an indication of the effectiveness of such humane education program for the normalization of children's attitudes towards animals.

A significant difference in this study compared to the previous one, was the introduction of a randomization procedure and implementation of an experimental design, compared to the previous study, built on a quasi-experimental design. We have no data to support the hypothesis that there is a link between experimental design and that in this study unlike the previous one, showed a rise in attitudes towards animals following the implementation of the humane education program, but it certainly is an issue worth investigating in further studies. Given the plight of stray animals in Romania, we consider essential to continue implementing early (kindergarten, primary) humane education programs towards developing favorable attitudes and the education of children (future owners of pets) on responsible ownership of pets and healthy human-animal interactions.

The results of the four studies presented in this paper support the need for further exploring animal-assisted interventions. As these interventions are diversifying and evolving (methodological and theoretical), we believe it is time for human-animal interaction research to change from general to research the specific effects of the different kinds of interventions. We believe that the key for decoding mechanisms that facilitate change in the relationship between humans and animals is to investigate the specific effects and encourage an interdisciplinary approach in researching these mechanisms.

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