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## Animal-Assisted Interventions for Children With Autism Spectrum Disorders: A Survey of French Facilities

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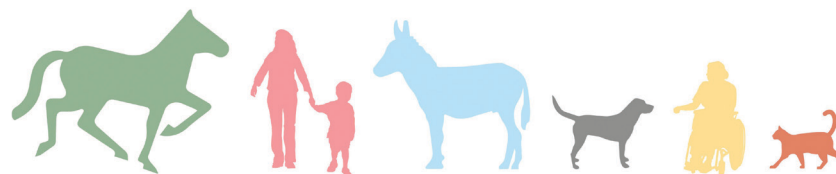
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### Cover Page Footnote

We thank all facilities for their participation. We are grateful to Jean Louis Agard, Boris Albrecht, and Marie Claude Lebret for their relevant advice about the large-scale survey design, and especially to Hervé Lefebvre all along in the project. We thank Dr. Ann Cloarec for her comments on the English written version.



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## Animal-Assisted Interventions for Children With Autism Spectrum Disorders: A Survey of French Facilities

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**Keywords:** animal-assisted intervention, autism spectrum disorders, children, facility, survey

**Abstract** Our survey of animal-assisted interventions (AAI) offered by French intervention facilities aimed to examine and describe the range of AAI for autism spectrum disorder (ASD) children. We invited 2,302 facilities to reply to an online questionnaire. The responses to our survey ( $n = 386$ ) revealed that animals were used extensively as a complementary intervention. Most AAI sessions were in groups. Various animal species (especially horses and dogs) and facility staff members as well as external collaborators were involved. Numerous benefits (e.g., enhanced well-being, self-esteem, and socialization) were reported. Facilities face difficulties in connection with AAI including finances, staffing, and scheduling constraints. However, these problems do not affect staffs' motivation. This is the first large-scale survey giving a qualitative and quantitative picture of AAI practices in an entire country.

### Introduction

Autism spectrum disorder (ASD) is a common neurodevelopmental disorder characterized by pervasive difficulties since early childhood concerning reciprocal social communication and restricted, repetitive interests and behaviors (APA, 2013). ASD is a worldwide societal concern; for example, the French government nominated it the “2012 Cause of National Importance.” Indeed, increasingly more people are concerned: recent surveys suggest an ASD rate of

around 1/160, prevalence increasing with time (e.g., Elsabbagh et al., 2012). Furthermore, establishing an accurate diagnosis of ASD as early as possible is crucial to allow early interventions adapted to each individual with ASD, thus increasing favorable outcome probabilities (Dawson, 2008). ASD requires early, continuous, global, and coordinated interventions involving interdisciplinary teams. A myriad of treatment options are available for individuals with ASD, with varying levels of effectiveness (Baghdadli et al., 2007; Volkmar et al., 2014). Educational

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interventions, including behavioral strategies and therapies, are the cornerstones of ASD management (Volkmar et al., 2014). Applied behavioral analysis is one of the most accepted interventions for ASD that has been proven to be effective (Virués-Ortega, 2010). Other treatments with empirical support, such as occupational therapy, sensory integration therapy, speech therapy, and pharmacotherapy, are also commonly used. In addition to these traditional treatments, families of children with ASD increasingly turn to complementary interventions to enhance outcomes. Animal-assisted interventions (AAI) that include various animals in the treatment process are one of the most widespread complementary interventions (Fine, 2015).

Research in recent years has focused on the benefits of AAI and service animals. According to O’Haire’s (2012) review, these ASD treatment practices can take a variety of forms and involve diverse species of animals (i.e., horses, dogs, rabbits, guinea pigs, llamas). AAI appears to help improve multiple areas of functioning known to be impaired in ASD children, namely socialization skills, communication, and behavior (e.g., Borgi, Loliva, et al., 2016; Gabriels et al., 2012; Martin & Farnum, 2002). An increase in positive social behavior and social interactions, and a decrease in social isolation and self-absorption have been reported, as well as improvement in communication and use of language and probable decrease of ASD severity (e.g., Gabriels et al., 2015; Grandgeorge et al., in revision; Martin & Farnum, 2002; Redefor & Goodman, 1989). For example, children with ASD offered AAI involving guinea pigs at school showed fewer negative peer interactions and less social withdrawal (O’Haire, McKenzie, Beck, & Slaughter, 2013). Both parents and teachers reported global improvements in social skills after two months with the animals (O’Haire, McKenzie, McCune, & Slaughter, 2014). Moreover, animals could act as social buffers for children with ASD as their skin conductance responses decreased during free play with peers more in the presence of animals than toys (O’Haire, McKenzie, Beck, & Slaughter, 2015). AAI may also be related to reduced stress and increased well-being: better mood,

enhanced motivation, and energy (O’Haire, 2012; Steiner & Kertesz, 2015). Despite the limitations of most studies (e.g., small samples or other methodological weaknesses), their promising outcomes provide preliminary support for the use of AAI for some individuals with ASD. Benefits are not limited just to AAI as social improvements have been observed after the arrival of a pet in the home, especially when the children with ASD are at least 5 years old and the bond between the child and pet is strong (Carlisle, 2014; Grandgeorge et al., 2012).

As Schuurmans, Enders-Slegers, Verheggen, and Schols (2016) stated, “in keeping with the rising popularity of AAI, however, concerns about professionalism, hygiene, zoonoses, safety, and animal welfare have been raised.” But the scientific literature does not always reflect professional AAI practices (Michalson, 2014). That is why large surveys concerning defined populations and in specific countries become informative, for example surveys concerning AAI in nursing homes in the Netherlands (Schuurmans et al., 2016), AAI for children with ASD in Australian schools (Smith & Dale, 2016), or AAI for elderly people in French retirement homes (Vuilleminot & Cesaire, 2000). Nevertheless, to date and to our knowledge, no large survey of AAI practices in intervention facilities for ASD children has been published. Addressing this gap, we made such a survey in French intervention facilities, focusing especially on both quantitative and qualitative data to evaluate more precisely how many French intervention facilities offer AAI to children with ASD, the types of intervention they offer (e.g., animals, type of children, context), and their aims.

## Methods

### *Survey Procedure*

First, a detailed inventory of child and adolescent intervention facilities was obtained through an online search, metropolitan French public agencies, and handicap associations. As few facilities are specifically dedicated to ASD, we included some facilities that receive children with various disabilities

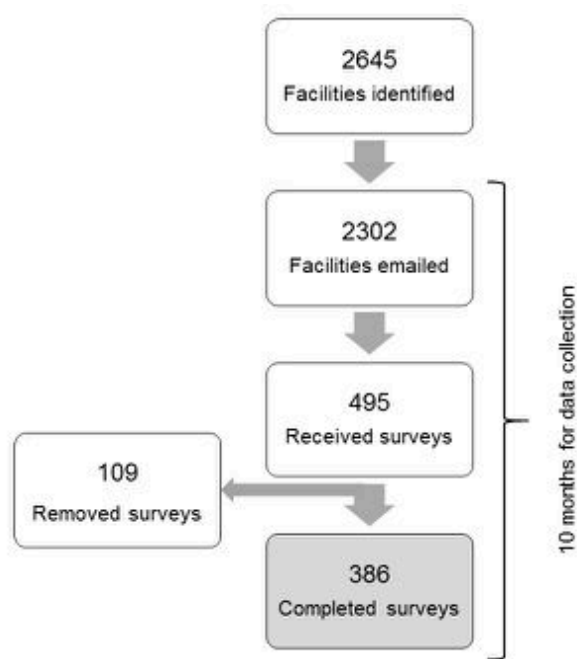


Figure 1. Flowchart of the survey.

including ASD. Nevertheless, we specified clearly in the survey that only children with ASD were to be considered.

Figure 1 presents the large-scale survey procedure. Two thousand three hundred and two (2,302) of the 2,645 facilities inventoried had an email address. After the first mailing, a reminder email was sent three times to increase response rate. The survey responses were collected from January 2013 to the end of October 2013. Three hundred and eighty-six (386) of the 495 surveys received were complete and useable, that is, there was a final response rate of 16.8%. One hundred and nine (109) of the surveys received were discarded because the facilities did not receive children with ASD, or their responses were incomplete or incoherent.

### Survey Design

We developed our large-scale survey after an in-depth review of the literature relating to ASD, animal-assisted interventions, and methodology (e.g., Bjerke, Odegardstuen, & Kaltenborn, 1998; Paul & Serpell, 1993; Serpell, 1983, 1991, 1996). This review

enabled us to compile a list of important topics and to create items for a self-report questionnaire. After a section requesting description of the facility, the survey requested information concerning animal-assisted intervention (AAI) characteristics and the three categories of partners involved in AAI, that is, the child with ASD or client, the animal(s), and the professional(s) (Table 1). The survey mainly contained multiple-choice questions, but some open-ended questions required details. The survey was provided online because of the large number and dispersion of eligible facilities identified. The data were collected anonymously to encourage frank and honest disclosure.

### Survey Analysis

All results were anonymized and analyzed using descriptive statistical tests computed by SPSS Statistics (IBM SPSS Statistics, IBM Corporation, Chicago, IL) following Schuurmans et al. (2016).

### Ethical Notes

The present research was considered a noninvasive low-risk study and did not involve pharmacological interventions. Informed consent was obtained at the beginning of the online survey from all participating institutions included in this study. According to the French legislation and ethics committee, all data were coded to ensure confidentiality and identifiers in direct quotes were removed to protect identity.

## Results

### Characteristics of the Facilities Using AAI for ASD Children

**AAI in French Facilities.** Most of the facilities (60.1%) that replied to our questionnaire reported that they used animal interventions for ASD children, that is, 232 facilities. Most of these facilities gave information concerning when they started these interventions (65.1%). Although some of the first experiences with AAI date back several decades (1960 was the earliest reported date), AAI have increased,

**Table 1** The five categories of questions asked in the survey.

Topics	Questions	Response Type	Possible Responses	Aim
<i>Facility description</i>	ASD facility type	Multi-choice	Day facility / Week facility / Intervention at home / Other	To characterize the facility
	AAI for ASD children	Multi-choice	Yes / No	To determine the proportion of facilities using AAI for ASD children
	Date AAI started	Open-ended		To assess development of AAI and the facility's perspective regarding AAI
<i>ASD Children</i>	AAI offer	Multi-choice	For all ASD children / For only some ASD children	To identify ASD children involved in AAI
	If selection, criteria used	Multi-choice	Too many children in relation to numbers of animals / Organizational difficulties / Selection of children for which AAI was appropriated / Other	
	Age	Open-ended		To assess situations when ASD children interact with animals
	Individual or collective intervention	Multi-choice	Individual intervention Collective intervention; specify group size	
	AAI frequency	Multi-choice	Daily / Twice a week / Once a week / Once a month / Adapted for each child / Other	
<i>Animals</i>	Species involved	Multi-choice	Horse / Donkey / Dog / Cat / Rabbit / Rodent / Bird / Fish / Other	To assess the animal choice most relevant for children with ASD
	Supplementary questions according the species involved (e.g. number, breed and age of animals, origin, education, frequency) - not detailed in this manuscript			To evaluate the animal welfare
<i>Professionals</i>	Link with facility	Multi-choice	Facility staff / External collaborator	To identify AAI professionals
	Number of professionals	Open-ended		To assess their skills to carry out an activity with animals and ASD children
	Occupation	Open-ended		
	AAI specific training	Multi-choice	Yes (specify AAI training) / No	
<i>Animal-assisted interventions</i>	AAI content	Open-ended		To analyze the integration of AAI in ASD children's projects
	AAI objectives	Multi-choice	Socialization / Wellbeing / Self-esteem / Bodywork / Other	
	AAI evaluation methods	Open-ended		To identify difficulties encountered by facilities
	Difficulties linked to AAI	Multi-choice	Lack of time / Budget constraints / Safety of ASD children / Staff opposition / Family opposition / Lack of enthusiasm from ASD children / Doubtful benefits / Animal care / Other	
	AAI future development	Multi-choice	Stop / Expansion / Other	
		Key points	Open-ended	

especially since 2000 (Figure 2). This trend should continue as approximately half of the facilities want to maintain their current AAI (45.6%), a similar proportion want to extend AAI to other children (44.8%), and a minority want to develop their current AAI (9.6%, e.g., by increasing frequency and/or improving the content). Conversely, the four facilities (3.2%) that would stop AAI explained their choice by financial constraints, difficulties concerning animal care, lack of enthusiasm shown by ASD children, and doubts about benefits for these children.

**Care and Management.** Most of the facilities using AAI for ASD children were day or week care facilities (84.1%; children attended on a daily basis or lived there during the week), although a few interventions occurred at home (15.9%). Some answers included no information about the ASD children's situations (11.2%).

### Characteristics of ASD Children Involved in AAI

**Selection of ASD Children Involved in AAI.** Three-quarters of the facilities offering AAI

for ASD children specified how they chose the children involved in AAI (78%). Only few of them offered AAI to all ASD children without selection (7.7%). Most of the facilities based their selection first on each ASD child's personalized educational program, especially taking their skills, their degree of autonomy, and their preferences into account (86.2%). The other facilities mentioned organizational difficulties (e.g., too many ASD children, budget constraints, staff shortage, staff management, ASD children's schedules) that forced them to limit the number of ASD children selected. Obviously animal allergies as well as animal phobia were considered before selecting the ASD children. Indeed, animal phobia could induce professionals to make opposite decisions as some facilities excluded ASD children with animal phobia while other facilities selected these ASD children especially with the aim of overcoming it.

**Age of ASD Children.** Approximately half of the facilities using AAI for ASD children gave information concerning their ages, which ranged from 4 to 21 years old (60.3%). Unfortunately, many responses were not precise and it was not possible to assess the age distribution of the children.

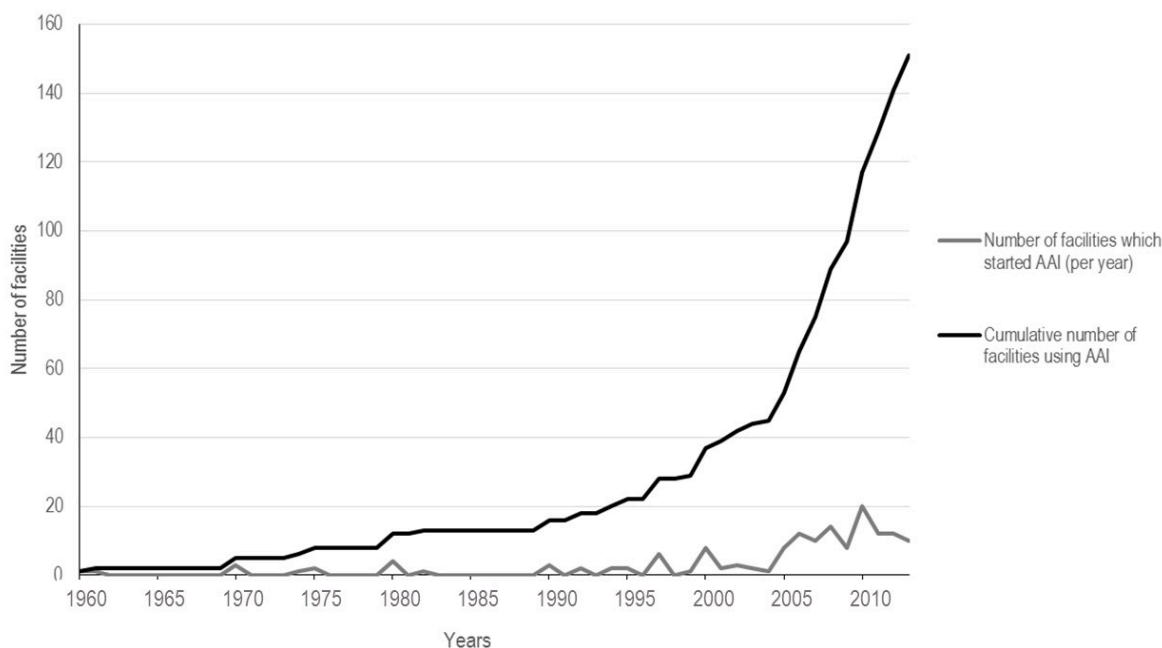


Figure 2. Development of AAI in facilities for ASD children between 1960 and 2013.

### Individual Versus Collective Interventions for ASD Children.

About two-thirds of the facilities using AAI for ASD children (66.8%) only offered collective interventions and a few of them only offered individual interventions (10.1%). About a quarter of the facilities (23.1%) alternated these two kinds of interventions according to the children and their objectives. The sizes of groups in collective interventions ranged from 2 to 15 ASD children, with a statistical median of 4 ASD children in a group.

**AAI Frequency.** Most ASD children participated in weekly AAI sessions (68.3%), but frequencies varied greatly. While ASD children in some facilities had the opportunity to have AAI every day (8.1%) or twice a week (6.5%), other ASD children only had AAI every other week (4.3%), once every month (4.3%), or even less frequently (8.6%). To fulfill ASD children's needs, 10.2% of the facilities were able to change the AAI frequency.

### Animal Species Involved in AAI

A large variety of animal species were involved in AAI for ASD children, and some facilities used several species. The most common species were horses (79.7%) and dogs (25.9%), followed by rabbits (17.2%), farm animals (e.g., cow, goat, sheep, pig, poultry; 16.8%), and donkeys (12.5%); rodents (e.g.,

hamster; 8.6%), cats (5.2%), fish (5.2%), and birds (2.2%) were used less often (Figure 3). Three species were reported only once: camels, alpacas, and male deer (quoted as others). Around half of the facilities (59.5%) used only one species in AAI, while the other facilities used several in the same or different types of AAI (40.5%): two species (14.7%), three species (8.2%) and four or more species (17.7%).

### Professionals Involved in AAI

Half of the facilities offering AAI for ASD children (55.9%) reported that both AAI professionals belonging to their own staff and external collaborators were involved. In others (40%) only AAI professional staff members were involved. The involvement of only an external collaborator was less common (4.1%).

The facility staff AAI professionals involved were specialized: support teachers, social workers, psychomotor therapists, occupational therapists, physiotherapists, speech therapists, nurses, nursing assistants, psychologists, or psychiatrists. All these professionals knew the ASD children and their special needs and characteristics. Some of them had dual qualifications to manage both ASD children and animals during AAI. The external collaborators were solicited by the facilities. Some were self-employed and others worked in partner centers such as equestrian centers, educational farms, AAI associations, or animal shelters.

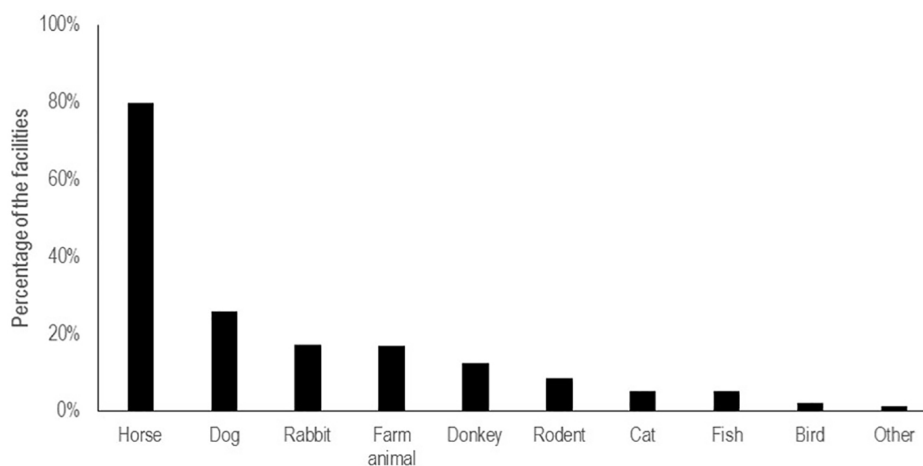


Figure 3. Animal species involved in AAI for ASD children.



### AAI Characteristics

**AAI Content.** AAI with horses usually took place in equestrian centers for riding therapy or riding sessions adapted for ASD children. Dogs usually belonged to the facilities or to an external collaborator who came to work at the facility; in both cases AAI was based on interactions between the dogs and ASD children. Cats usually belonged to the facilities, and their ASD children interacted freely with them more often than during organized cat-assisted interventions, although one psychologist reported using a cat in therapeutic sessions. Otherwise, AAI with dogs and cats involved visiting an animal shelter and interacting with the dogs and the cats there (e.g., by providing care, walking the dogs). Donkeys, rabbits, and rodents were involved in specific AAI either individually or with other species on educational farms. Farm animals, fish, and birds were involved in AAI on educational farms. In some cases, fish were in an aquarium in the facilities and the ASD children were free to observe them. Camels,

alpacas, and male deer were always on educational farms with other more common species.

**AAI Objectives and Expected Benefits.** Only half of the facilities reported their AAI objectives (58.2%). Most of these facilities reported numerous objectives that were adapted to ASD children's needs according to educational programs personalized for each ASD child. Six objectives were reported. The most common aims were improvement of children's well-being and self-esteem (81.5%), their socialization (78.5%), and bodywork (60.7%). Less often reported objectives focused on education (12.6%), sensorial skills (6.7%), and communication (5.9%) (Table 2).

**AAI Evaluation Processes.** Only half of the facilities described how they assessed AAI (49.6%). Evaluation processes focused on individual assessment of each ASD child and on general assessment of the AAI. They aimed to assess whether the defined objectives were being reached, the effects on

**Table 2** Objectives and expected benefits of AAI.

Field	Objectives and Expected benefits
<i>Wellbeing &amp; Self-esteem</i>	<ul style="list-style-type: none"> <li>• Leisure activities, source of enjoyment and calm, enjoyable stimuli for ASD children</li> <li>• Development of self-confidence</li> </ul>
<i>Socialization</i>	<ul style="list-style-type: none"> <li>• Adaptation to a new environment</li> <li>• Encounter unfamiliar people</li> <li>• Develop relationships</li> <li>• Development in a group of children (e.g. pay attention to other children)</li> </ul>
<i>Bodywork</i>	<ul style="list-style-type: none"> <li>• Psychomotor development with work on body schema, body consciousness, body representation, posture and laterality</li> <li>• Motor development with work on muscular tone, body equilibrium and coordination</li> </ul>
<i>Education</i>	<ul style="list-style-type: none"> <li>• Management of fear, especially fear of animals</li> <li>• Learning the danger concept</li> <li>• Learning primary needs and care</li> <li>• Learning place in space and time</li> <li>• Work on autonomy and sense of responsibility</li> </ul>
<i>Sensory skills</i>	<ul style="list-style-type: none"> <li>• Stimulation of the senses</li> <li>• Discovery of one particular sense (e.g. odor, touch)</li> </ul>
<i>Communication</i>	<ul style="list-style-type: none"> <li>• Work on reading and expression emotions</li> <li>• Animal as a communication medium in other fields of management and care by the ASD child</li> </ul>

the recipient child, and the difficulties encountered to ensure the suitability of AAI for each ASD child and, when necessary, to adjust or stop AAI. Evaluation tools varied greatly among facilities, and assessments included professionals' observations of the child during AAI (e.g., informal observations, written records and minutes, observation tables), and conversations with children, parents, professionals involved in AAI, and other caregivers. However, the content and the formats of these assessments were not always clear. AAI assessments were also incorporated into preexisting evaluation processes generally used by facilities for individualized follow-up of each ASD child: clinical assessment, coordinated meetings with all the members of the interdisciplinary team of caregivers, and an annual review of each ASD child's personalized educational program.

**Difficulties Related to AAI.** Less than half of the facilities reported difficulties (48.3%), but most of these reports (86.6%) mentioned encountering some difficulties. The questionnaire responses revealed seven difficulties (Figure 4). The most common difficulties were budget constraints (47.3%) and lack of time (23.2%). The other difficulties were more marginal and concerned animal care and maintenance (12.5%), ASD children (10.7%), facility staff (6.3%),

doubts about benefits for ASD children (3.6%), and partners (3.6%). Specifically, the lack of time referred to management difficulties in coordinating staff and ASD children's schedules. Difficulties reported concerning ASD children mentioned their lack of enthusiasm, their excessive fear of animals, or, on the contrary, their overconfidence with animals that could put the ASD children at risk. Difficulties concerning facility staff were related to their lack of motivation and investment, their fear of animals, and staff shortages. When difficulties with a partner were mentioned, they concerned their lack of availability and competence.

## Discussion

Our large-scale survey confirms the assumptions of many authors (e.g., Ansorge, 2011; Fine, 2015; Michalson, 2014) that animal-assisted interventions are a widespread complementary intervention offered to ASD children, as reported by 6 out of 10 facilities in France, their number having increased significantly since 2000. These interventions were not offered to all children with ASD as generally AAI was made available only after considering a child's personalized educational program (but independently of age;

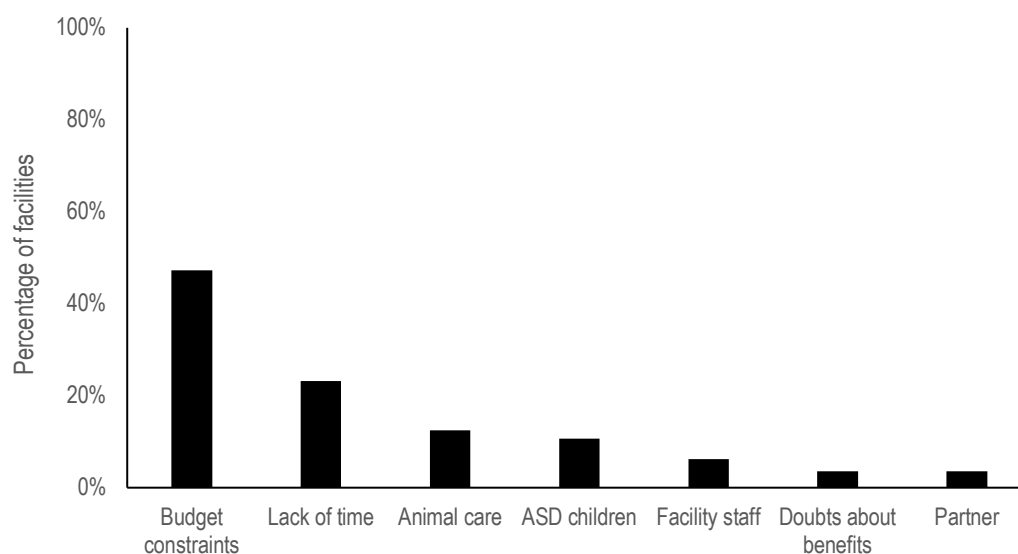


Figure 4. Difficulties faced by facilities concerning AAI for ASD children.

AAI was offered to 4- to 21-year-old children). As reported previously (O'Haire, 2012), AAI sessions were generally weekly, mainly involving horses, although other species were involved. The interventions were generally offered to groups more frequently than to individual children, although collective practices have been studied less often (O'Haire, 2012). Both facility staff and external collaborators with various professional backgrounds were involved in AAI (Michalon, 2014). They reported numerous benefits including improved well-being, self-esteem and socialization, and motor and psychomotor development. O'Haire et al. (2014) already showed that after an 8-week AAI program presented in 41 classrooms in 15 schools, the social approach behaviors and social skills of 5- to 12-year-old ASD children improved, while their social withdrawal behaviors decreased. A 10-week therapeutic horseback riding course decreased ASD children's irritability and hyperactivity and improved their social cognition and social communication (Gabriels et al., 2015). Nevertheless, our large-scale survey highlighted the fact that facilities faced difficulties related to AAI such as financial, staff, and schedule constraints. But these problems did not affect staff motivation as almost none of them said they wished to stop AAI. This is, to our knowledge, the first large-scale survey giving a qualitative and quantitative picture of AAI practices in an entire country and could provide the first step for gathering similar data in other countries.

Although the lack of facilities for ASD children in France is often stressed (Chossy, 2003), we contacted more than 2,000 facilities and obtained a relatively good response rate: 6 in 10 facilities in France offer AAI, a proportion that has risen significantly during the last 15 years. Altogether, this suggests the ASD professional network's increasing interest in AAI in this country. Positive attitudes toward AAI are common among staff involved in these practices (e.g., Berget, Ekeberg, & Braastad, 2008; Bibbo, 2013). The extensive media coverage of AAI and the recent advances in AAI research could explain this growing success.

Although data concerning AAI participants' age were difficult to obtain, the age range (4 to 21 years

old) of children with ASD involved in AAI in our study corresponds to the age range of ASD children in these facilities (3 to 21 years old), which is greater than that of the populations in scientific studies (e.g., between 3 and 17 years old; O'Haire, 2012). As AAI has numerous positive impacts on ASD children (e.g., Borgi, De Santis, Contalbrigo, Farina, & Cirulli, 2016; Nimer & Lundahl, 2007), it would be interesting to investigate further the age distribution related to reported benefits. Indeed, the earlier ASD children benefit from suitable and proper support, the better the outcomes (Rogers, 1996). In addition to age data, our study showed that ASD children involved in AAI were generally selected in relation to their personalized educational program that takes their skills, their needs, their degree of autonomy, and their preferences into consideration. This individualization seems to be the most appropriate approach to ensure positive outcomes for ASD children (Hurtb, Shaw, Izeman, Whaley, & Rogers, 1999).

Our study revealed that most AAI were collective and held weekly, similar to other populations for whom AAI is provided (Stern & Chur-Hansen, 2013). These interventions used with other support and therapies for ASD children can have positive outcomes (Ospina et al., 2008; Rogers & Vismara, 2008). For example, both supervision and intervention intensity (Eledevik, Eikeseth, Jahr, & Smith, 2006) as well as method are known to affect outcomes for ASD children who receive early and intensive behavioral interventions (Eledevik et al., 2006). This type of intervention combined with AAI would probably have similar impacts, although intervening weekly is more the result of a compromise between the will to maximize outcomes and facility constraints. Indeed, as Stern and Chur-Hansen (2013) explained, "there is no accepted standard in relation to the duration of each session or the frequency of sessions to provide to participants. There is extreme variance in the duration of a session, which would obviously depend on the ability of the individuals to interact and stay focused." In addition, the professionals involved in AAI for ASD children came from various backgrounds, a consequence of the lack of legislation in France concerning these practices (Grandgeorge,

2015). However, a professional background is crucial because it can affect outcome (Eikeseth, Hayward, Gale, Gitlesen, & Eldevik, 2009), suggesting that legislation regulating AAI practices is needed. We assume that practicing AAI in a group yields benefits related to the animals as well as to the group. Some authors question whether the beneficial effects following AAI are “actually a function of the intervention per se or due to the generally elevated social activity level” that exists among individuals at that moment (Stern & Chur-Hansen, 2013, p. 135). Individual sessions probably convey a totally different experience as the relationships are then constructed between three interactants (Stern & Chur-Hansen, 2013; Wallace & Nadermann, 1987).

Our large-scale survey revealed that horses were the most common animals involved in AAI for ASD children in France. Interestingly, most children with disabilities involved in equine-assisted interventions are ASD children (Ansorge, 2011). As showed by numerous studies, interventions with horses improve social interactions, verbal communication, adaptive behaviors, motor skills, and quality of life (Ajzenman, Standeven, & Shurtleff, 2013; Bass, Duchowny, & Llabre, 2009; Borgi, Loliva, et al., 2016; Gabriels et al., 2015; Kern et al., 2011; Lanning, Baier, Ivey-Hatz, Krennek, & Tubbs, 2014). Horses seem to help challenge many of the difficulties of children with ASD. For example, they help calm children with ASD after therapeutic horseback riding (i.e., decrease in irritability and hyperactivity) and are a source of motivation as these children use more new words than did a control group who were offered similar methods but without horses (Gabriels et al., 2015). Horses are not the only species involved in AAI. Indeed, we found that not only were dogs used frequently in AAI for ASD children, as reported by other authors (Nimer & Lundahl, 2007), but also other species (e.g., guinea pigs, farm animals). This variety of animal species involved enables different types of interactions with children (Nielsen & Delude, 1989) and, by extension, different potential benefits. For example, children with ASD benefiting from AAI with dogs can develop their social interactions, their visual attention focusing on their dog partner, as well as reduce

their cortisol level, a marker of stress level (Martin & Farnum, 2002; Redeker & Goodman, 1989; Viau et al., 2010). Similar social improvements are common benefits of AAI with other species as shown following regular interactions with guinea pigs (Kršková, Talarovičová, & Olexová, 2010; O’Haire et al., 2013, 2014, 2015). Thus, the objectives and the expected benefits of AAI for ASD children should influence the choice of animal species (Sams, Fortney, & Willenbring, 2006), although some improvements seem common to all species presented during AAI.

The facilities clearly defined their AAI objectives. They included areas where scientific studies have shown that ASD children can benefit from AAI: social interactions, communication, and behavior (O’Haire, 2012). Other objectives reported focus on education, sensorial skills, self-esteem, and bodywork and these effects should be investigated by scientific researchers. Evaluations of benefits reported by facilities were carried out during and/or after AAI, but the content and formats of these assessments were not always clearly detailed. As Butterly, Percy, and Ward (2013) reported, evaluations appeared to be based mainly on subjective assessments. Systematic and objective follow-ups are required to ensure suitability, to assess risks to both the ASD children and the animals involved, and to make evident all possible AAI effects (Butterly et al., 2013). These follow-ups may also help facilities that face various difficulties related to developing AAI (e.g., animal care and maintenance, enthusiasm and safety of ASD children, investment and availability of facility staff, availability and competence of partners). The main constraints reported were the lack of finance and time, which certainly also holds for other kinds of activities for ASD children.

As our response rate was not high, the results of this survey cannot be extrapolated to all French facilities that include ASD children. We may have overestimated the rate of facilities using AAI for ASD children, as the facilities that replied may have felt more motivated by our large-scale survey than facilities that do not have AAI. Nevertheless, our large sample size should be sufficient to give a general picture of the situation in France. Approximately 40%

of the facilities did not offer AAI. All may not be AAI friendly. However, facilities from all 22 French regions responded, thus attenuating this limitation. Some questions frequently received no answers or imprecise answers (e.g., age range). This could be explained by several nonexclusive reasons: length of questionnaire, facilities not feeling concerned, or facilities could not supply the information as they were not directly involved in AAI. Indeed, as explained by Schuurmans et al. (2016, p. 6), “it is quite plausible that management staff has a different depth of knowledge of AAI programs in their organization than recreational staff. A manager will possibly know more about guidelines and protocols, whereas recreational staff will probably know more about the practical side of things.” That is why incomplete questionnaires were discarded from our large-scale survey.

## Conclusion and Recommendations

Our study presents, to our knowledge, the first large-scale survey giving a qualitative and quantitative picture of AAI practices in an entire country. As confirmed by the growing scientific literature in this field, AAI is a complementary intervention aiming to enhance outcomes in addition to traditional treatments for ASD people as well as various other vulnerable clients (e.g., elderly people, those with developmental disabilities, inmates; Allison & Ramaswamy, 2016; Bernabei et al., 2013; Berry, Borgi, Francia, Alleva, & Cirulli, 2013; O’Haire, 2012). To ensure good AAI practices respecting all partners involved, numerous guidelines have been proposed, but none specifically concern ASD people. We argue that specific guidelines are essential. As a first step, our study enables us to formulate some preliminary recommendations. Although individualization of the program for each ASD child is recommended, AAI in groups can present situations that help improve their social skills (e.g., socialization with peers via an animal, paying attention to other children, managing frustration). Of course, collective AAI must be in small groups and requires a sufficient number of qualified professionals—for interventions with both ASD children and

animals—to ensure children’s well-being and improvement as well as animal welfare.

## Summary for Practitioners

### Introduction

Autism spectrum disorder (ASD) is a common neurodevelopmental disorder characterized by pervasive difficulties since early childhood concerning reciprocal social communication and restricted, repetitive interests and behaviors. ASD requires early, continuous, global, and coordinated interventions involving interdisciplinary teams. A myriad of treatment options are available for individuals with ASD, with varying levels of effectiveness. Animal-assisted interventions (AAI) that include animals in the treatment process are one of the most widespread complementary interventions. These practices can take a variety of forms, for example, involving diverse species of animals (i.e., horses, dogs, rabbits, guinea pigs, llamas). AAI appears to help improve multiple areas of functioning known to be impaired in ASD children, namely socialization skills, communication, and behavior. An increase in positive social behavior and social interactions, and a decrease in social isolation and self-absorption have been reported, as well as improvement in communication and use of language and probable decrease of ASD severity. However, the scientific literature does not always reflect the practices of AAI professionals. That is why large surveys concerning defined populations and countries become informative. Here, we made a large-scale survey of AAI offered to children with ASD in French intervention facilities, focusing especially on both quantitative and qualitative data to evaluate more precisely how many French intervention facilities offer AAI to children with ASD, the types of intervention they offer (e.g., the animal, type of children, the context), and their aims.

### Methods

A detailed inventory of child and adolescent intervention facilities in France allows the census of 2,645 facilities. The online survey responses were collected

from January to the end of October 2013. Three hundred and eighty-six (386) of the 495 surveys received were complete and useable. They allowed our large-scale survey on animal-assisted intervention (AAI) characteristics and the three categories of partners involved in AAI, that is, the child with ASD or client, the animal(s), and the professional(s) involved. All results were anonymized and analyzed using descriptive statistics.

## Results

Here we present the most important results:

**Characteristics of the Facilities Using AAI for ASD Children.** Of the facilities surveyed, 60.1% used AAI for ASD children, that is, 232 facilities, with most of them beginning to do so after the year 2000. Most of these facilities were day care or week care facilities (84.1%), although a few interventions occurred at home (15.9%).

**Characteristics of ASD Children Involved in AAI.** Three-quarters of the facilities specified how they chose the children involved in AAI and only 7.7% offered AAI to all ASD children without selection. Their selection was based mainly on each ASD child's personalized educational program, and sometimes on organizational difficulties. Obviously animal allergies as well as animal phobia were considered before selecting the ASD children. About two-thirds of the facilities using AAI for ASD children only offered collective interventions and 10.1% offered individual interventions. About a quarter of the facilities alternated these two kinds of interventions according to the children and their objectives. Sizes of groups in collective interventions ranged from 2 to 15 ASD children (mean: 4 ASD children in a group), and 68.3% of ASD children participated in weekly AAI sessions, but frequencies varied greatly. For example, 10.2% of the facilities could change the AAI frequency in order to fulfill ASD children's needs.

**Animal Species Involved in AAI.** A large variety of animal species were involved in AAI for

ASD children and some facilities used several species. The most common species were horses (79.7%) and dogs (25.9%), followed by rabbits (17.2%), farm animals (e.g., cow, goat, sheep, pig, poultry; 16.8%), and donkeys (12.5%); rodents (e.g., hamster; 8.6%), cats (5.2%), fish (5.2%), and birds (2.2%) were used less often. Around half of the facilities used only one species in AAI.

**Professionals Involved in AAI.** Half of the facilities reported that both AAI professionals belonging to their own staff and external collaborators were involved. In 40% of the facilities only AAI professional staff members were involved. The facility staff AAI professionals involved were specialized: support teachers, social workers, psychomotor therapists, and so on. Some of them had dual qualifications to manage both ASD children and animals during AAI. The external collaborators were solicited by the facilities: some were self-employed and others worked in partner centers like equestrian centers.

**AAI Characteristics.** Only half of the facilities reported their AAI objectives. Six objectives were reported: children's well-being and self-esteem (81.5%), socialization (78.5%), bodywork (60.7%), education (12.6%), sensorial skills (6.7%), and communication (5.9%). Evaluation processes focused on the individual assessment of each ASD child and on general assessment of the AAI. Evaluation tools varied greatly among facilities, and assessments included professionals' observations of the child during AAI and conversations with children, parents, professionals involved in AAI, and other caregivers. Finally, less than half of the facilities reported difficulties: budget constraints (47.3%), lack of time (23.2%); and more marginally, animal care and maintenance (12.5%), ASD children (10.7%), facility staff (6.3%), doubts about benefits for ASD children (3.6%), and partners (3.6%).

## Discussion

To our knowledge, this is the first large-scale survey giving a qualitative and quantitative picture of AAI practices in an entire country for ASD children and

could provide the first step for gathering similar data in other countries. As confirmed by the growing scientific literature in this field, AAI is a complementary intervention aiming to enhance outcomes in addition to traditional treatments for ASD people as well as various other vulnerable clients (e.g., elderly people, those with developmental disabilities, inmates). To ensure good AAI practices respecting all partners involved, numerous guidelines have been proposed, but none specifically concern ASD people. We argue that specific guidelines are essential. As a first step, our study enables us to formulate some preliminary recommendations. Although individualization of the program for each ASD child is recommended, AAI in groups can present situations that help improve their social skills (e.g., socialization with peers via an animal, paying attention to other children, managing frustration). Of course, collective AAI must be in small groups and requires a sufficient number of qualified professionals—for interventions with both ASD children and animals—to ensure children's well-being and improvement as well as animal welfare.

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## Compliance With Ethical Standards

**Funding:** No funding was given for this study.

**Conflict of Interest:** All authors declare that they have no conflict of interest.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent:** Informed consent was obtained from all individual participants included in the study.

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