

Like Father, Like Son? On the Relationship between Parents' and Children's Familiarity with Species and Sources of Knowledge about Plants and Animals

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ABSTRACT

This study investigates whether parents consider themselves vital in transmitting species knowledge to their children, whether children's familiarity with species is actually related to that of their parents, and whether socio-demographic variables influence this relationship. Data were collected with the help of a picture test and a questionnaire. Overall, 402 parent-child-pairs participated in the study. Parents regarded themselves as main transmitters of species knowledge to their 5-11 year old children, but considered school education and outdoor experiences also important. While parents identified 29% of the plants and 35% of the animals presented to them, their children identified only 17% of the plants and 22% of the animals. Parents' and children's familiarity with species was positively related. However, the relationship was stronger for plants than for animals. Children's familiarity with species was also positively related to age, interest in nature and, in case of plants, rurality of their places of living.

Keywords: species identification, parents, children, sources of knowledge, family perception

INTRODUCTION

"It is just fun to be outside and get fresh air", exclaims a boy when using the Smartphone game 'Pokémon-Go'. This game is about catching as many virtual monsters as possible in the real world, and although the Pokémon characters represent a diverse population with complicated names, children and adults are happy to remember them, and to talk to other players about the characters already captured. For some people, Pokémon characters might be the only non-human beings they can correctly identify by name. This is partly confirmed by a British study, in which primary school children were clearly better in naming Pokémon figures than common local plants and animals (Balmford, Clegg, Coulson, & Taylor, 2002). Children might not improve their familiarity with species when getting older. Familiarity with plants and animals was found to decrease with age (Kellert, 1985; Lindemann-Matthies, 2002), while, for instance, familiarity with media celebrities increased (Kandler, 2011).

Several studies indicate that, at least in Western European countries, knowledge and perception of local plants and animals are very limited (Balmford et al., 2002; Bebbington, 2005; Lindemann-Matthies, 2002; Lindemann-Matthies & Bose, 2008). When, for instance, in Switzerland more than 6000 young people between the age of eight and 18 years were asked about local organisms, they could on average name only five plant and six animal species (Lindemann-Matthies, 2002). Children are also more interested in animals than plants (Flannery, 1991; Hershey, 1996; Wandersee & Schussler, 2001) and, as a consequence, know less about plants and have more difficulties in naming them than in naming animals (Wandersee & Schussler, 1999).

Knowledge of species is central for understanding ecology, nature and our place in it (Bebbington, 2005; Bilton, 2014; Leather & Quicke, 2009, 2010). Moreover, knowledge of plants and animals is at the very base of biodiversity conservation as people are unlikely to care about species which they do not know and cannot name (Pfeiffer, Scheiter, Kühl, & Gemballa, 2011; Pilgrim, Cullen, Smith, & Pretty, 2008; Prokop & Fančovičová, 2013; Scott et al.,

Contribution of this paper to the literature

- Children's interest in nature and their familiarity with species was strongly and positively related to their parents' interest in nature and species knowledge.
- The positive relationship between parents' and children's knowledge of species was stronger for plants than for animals.

2012). A restricted familiarity with species might also influence the number of species people expect to find in a community. This in turn might jeopardise conservation efforts due to the shifting baseline syndrome, whereby successive generations set their perceptions of change based on their own experiences rather than on those of previous generations (Miller, 2005; Pauly, 1995). Reconnecting people with nature, through relevant experiences in families, schools and recreation is thus seen as a major task for conservation education (Balmford & Cowling, 2006; Louv, 2006). Children in preschool and primary school age are an important target group, because young children are particularly interested in living organisms, and like hands-on activities and the investigation of plants and animals outside the classroom (Lindemann-Matthies, 2006). Hands-on activities with invertebrates, for instance, were found to decrease disgust in children and to increase positive emotions towards this group of animals (Fančovičová et al., 2018; Prokop & Fančovičová, 2017). Moreover, studies on significant life experiences of active and informed conservationists have shown that time in nature during childhood is the most frequent reason for their concern and commitment (e.g. Chawla, 2006; Hsu, 2009; Tanner, 1980). However, the question arises who actually transmits species knowledge to children these days, be it parents, formal education or other sources such as the media, and which of these sources are especially important. The present study aims to contribute to answering these questions.

Studies on sources of knowledge about species provide rather inconsistent, and sometimes even contradictory, results. Student teachers in Germany, for instance, indicated parents and formal education as major sources of their species knowledge (Lindemann-Matthies, Remmele, & Yli-Panula, 2017). In a comparable study from several Nordic-Baltic countries, student teachers named the media most often, but also mentioned school and family. School and parents were also major sources for secondary school students' (9-18 years old) knowledge about crops in Germany (Fritsch & Dreesmann, 2015). Media, such as television, books and the internet, were rarely mentioned by young children (Gatt, Tunnicliffe, Borg, & Lautier, 2007; Tunnicliffe & Reiss, 1999, 2000; Tunnicliffe, Gatt, Agius, & Pizzuto, 2008), but mentioning of the media increased with age (Patrick & Tunnicliffe, 2011). In England and Iceland, the media were even the greatest source of learning about animals for 10 and 15 year old children, and the second most named source in Brazil, Finland, and the USA (Patrick et al., 2013).

In a range of studies, formal education was not a relevant source of knowledge about species (e.g. Gatt et al., 2007; Tunnicliffe & Reiss, 1999, 2000). However, most of these studies involved young children at preschool or primary school age. For preschool children (4-5 years old) in Malta, parents and direct observations in nature were the most important sources of knowledge about organisms (Gatt et al., 2007; Tunnicliffe et al., 2008). This was also the case for five and eight year old children in England (Tunnicliffe & Reiss, 1999, 2000), and for 9-12 year old children in Germany, who also mentioned their grandparents as a knowledge source (Scherf, 1988). Moreover, living in a family with a garden was associated with a positive attitude towards plants (Fančovičová & Prokop, 2010). Although direct observations in nature are mentioned as an important source of knowledge about organisms, they cannot be effective on their own. It needs a mediator (not further specified in the publications mentioned above) who brings knowledge to the children. In less developed countries such as India, community elders are most important in transferring species knowledge to the children (Chand & Shulka, 2003). This is also the case in rural Thailand, where grandparents and parents play an important role in introducing local plants to young children (Setalaphruk & Price, 2007). However, when the children become older and more involved with friends, they expand their knowledge while interacting and communicating with peers and other villagers (Setalaphruk & Price, 2007).

These findings indicate that for children of primary school age, parents are an important source of learning about organisms. However, little is known whether children's knowledge of plants and animals is actually related to that of their parents, and whether parents consider themselves vital in transmitting species knowledge to their children. The present study wants to fill these knowledge gaps. The main questions explored in this study were:

- (Q1) *How familiar are parents and their children with common local plants and animals?*
- (Q2) *Is children's familiarity with local plants and animals related to that of their parents?*
- (Q3) *What are parents' and children's main sources of knowledge about plants and animals?*
- (Q4) *Is children's familiarity with local plants and animals not only related to that of their parents, but also to their prime source of knowledge about species, interest in nature, age, sex and place of living?*

Table 1. Plant and animal species that parents and their children had to identify in four separate picture presentations

Plant species (presentation 1)		Plant species (presentation 2)	
Common name	Scientific name	Common name	Scientific name
Birch	<i>Betula pendula</i>	Pine	<i>Pinus sylvestris</i>
Buttercup	<i>Ranunculus repens</i>	Oak	<i>Quercus robur</i>
Strawberry	<i>Fragaria vesca</i>	Buttercup	<i>Ranunculus acris</i>
Geranium	<i>Geranium pratense</i>	Cuckoo flower	<i>Cardamine pratensis</i>
Poppy	<i>Papaver rhoeas</i>	Geranium	<i>Geranium robertianum</i>
Dead-nettle	<i>Lamium purpureum</i>	Primrose	<i>Primula elatior</i>
Clover	<i>Trifolium pratense</i>	Dead-nettle	<i>Lamium album</i>
Cornflower	<i>Centaurea cyanus</i>	Clover	<i>Trifolium repens</i>
Chamomile	<i>Matricaria chamomilla</i>	Sage	<i>Salvia pratensis</i>
Thistle	<i>Cirsium arvense</i>	Daisy	<i>Bellis perennis</i>
Yarrow	<i>Achillea millefolium</i>	Knapweed	<i>Centaurea jacea</i>
Dandelion	<i>Taraxacum officinale</i>	Lily of the valley	<i>Convallaria majalis</i>
Animal species (presentation 3)		Animal species (presentation 4)	
Common name	Scientific name	Common name	Scientific name
Badger	<i>Meles meles</i>	Wild boar	<i>Sus scrofa</i>
Fox	<i>Vulpes vulpes</i>	Rat	<i>Rattus norvegicus</i>
Fat dormouse	<i>Glis glis</i>	Eurasian coot	<i>Fulica atra</i>
Tit	<i>Parus major</i>	Chaffinch	<i>Fringilla coelebs</i>
Gull	<i>Larus ridibundus</i>	Lizard	<i>Lacerta agilis</i>
Trout	<i>Salmo trutta f. fario</i>	Pike	<i>Esox lucius</i>
Slow worm	<i>Anguis fragilis</i>	Newt	<i>Ichthyosaura alpestris</i>
Salamander	<i>Salamandra salamandra</i>	Frog	<i>Pelophylax esculentus</i>
Toad	<i>Bufo bufo</i>	Grasshopper	<i>Chorthippus parallelus</i>
Cockchafer	<i>Melolontha melolontha</i>	Hoverfly	<i>Episyrphus balteatus</i>
Colorado beetle	<i>Leptinotarsa decemlineata</i>	Old world swallowtail	<i>Papilio machaon</i>
Peacock butterfly	<i>Inachis io</i>	Roman snail	<i>Helix pomatia</i>

METHODS

Data Collection

The present study involved 402 children at primary school age and 402 parents. Data were collected with the help of a picture presentation and a questionnaire, always in a similar way and by two researchers. Pairs of one parent and one child were approached in well-visited playgrounds or parks in four rural and three urban areas in southwest Germany, and asked for their participation. Almost all parent-child-pairs agreed to take part. While one researcher provided each parent with the picture presentation (a sheet bearing 12 colour photographs of either wild flowers or wild animals) and an accompanying questionnaire, the other researcher presented only the pictures to each child, asked the child to name the depicted organisms and wrote down the names. If parents agreed, the children received some sweets to thank them for their participation.

Participation was voluntary and anonymity guaranteed to the participants. A pilot test was carried out with 20 children and their parents, who did not participate in the present study. No changes to the pictures and the questionnaire were needed. All data collection exercises required approximately 15 minutes time.

Pictures and Questionnaire

Overall, 24 plant species and 24 animal species were presented to the study participants. To reduce the number of species a participant had to identify, the species were included in four separate presentations, i.e. two for plants and two for animals (as shown in [Table 1](#)). Each presentation was shown to approximately 100 parent-child-pairs, and the subsequent questionnaire item on sources of knowledge about species referred either to plants or to animals. All species were shown as photographs. They were in colour and of high resolution quality. Typical features of the species were clearly visible. Species selection followed a range of criteria. Plants and animals had to be (1) typical for Germany, (2) characterized by typical features, (3) already been used in other species identification tests (e.g. Lindemann-Matthies et al., 2017; Palmberg et al., 2015), and (4) from different taxonomic orders and functional groups (e.g. trees and herbs; e.g. mammals and insects).

Table 2. Sources of knowledge about (a) plants and (b) animals. In a multiple choice question, parents were asked to indicate for themselves and for their child those three sources they considered most important. Given in the table is for each source the proportion of parents who indicated this source as one of their three choices. Marked in bold are the four most important sources for parents and their children

Source	(a) Knowledge about plants		(b) Knowledge about animals	
	Parents (%)	Children (%)	Parents (%)	Children (%)
Parents	52.5	79.7	55.5	80.5
Primary school	39.6	59.4	40.5	58.0
Self-acquired (various media)	36.1	8.9	35.0	7.5
Outdoor experiences	28.2	27.7	38.0	31.5
Secondary school	25.2	-	27.5	-
Television	23.3	13.9	25.5	13.0
Books / Newspapers / Magazines	20.8	21.3	21.5	21.5
Grandparents	14.9	18.8	13.0	24.0
Gardening	12.9	5.0	-	-
Hobby	10.4	1.5	11.0	1.5
Studies / Formation	9.4	-	10.0	-
Kindergarten	8.9	54.0	8.5	51.5
Computer / Internet	8.4	0.5	9.0	1.0
Siblings	2.5	3.0	2.0	3.0
Friends	2.5	4.0	1.0	2.5
Societies	1.0	1.5	1.0	1.5
Influential teachers	1.0	0.0	0.5	0.0

The survey consisted of two parts. The first part (picture presentation) investigated parents' and children's familiarity with the species presented (see Q1 and Q2). Study participants were asked to name, as precisely as possible, the plants / animals that were shown to them on paper. An answer was considered correct if the common name of a plant or animal at the species or genus level was provided. In case of some animals, higher taxonomic order classifications were also scored as correct for taxa that taxonomically are split into different genera, but which are not differentiated in the German language (see [Table 1](#)). For example, hoverfly was accepted as correct for all species of hoverflies that may belong to different genera, and frog for species of the genus *Pelophylax* and *Hyla*. The names of the plants or animals could be written right next to the pictures.

The second part of the survey (questionnaire) investigated parents' and children's sources of knowledge about species and interest in nature, and the children's weekly amount of time spent in nature, their age, sex and place of living (see Q3 and Q4). Only parents had to fill in the questionnaire. They had to provide information about themselves and about their offspring. In a multiple choice task, each parent had to indicate for himself / herself and for his or her child the three most important sources of knowledge about plants / animals, and to rank-order the chosen sources by priority (answer options in [Table 2](#)). All answer options were taken from previous literature (e.g. Gatt et al., 2007; Lindemann-Matthies et al., 2017; Patrick & Tunnicliffe, 2011; Scherf, 1988; Tunnicliffe et al., 2008). Each parent had also to estimate his or her own interest in nature and that of the child (on 5-step scales, ranging from 1: very low to 5: very high) as well as the weekly amount of time the child spends in nature (less than two hours, 2-5 hours, 6-10 hours, more than 10 hours). Finally, each parent had to provide information about his or her child's age, sex and place of living, i.e. the place where the child had spent most of its life so far (large city with more than 100,000 inhabitants; medium-sized city with 50,000-100,000 inhabitants; small city with less than 50,000 inhabitants; rural area).

Participants and Data Analysis

Overall, 402 parents (68% women) and 402 children (51% girls) participated in the study. Children were between five and eleven years old ($M = 8.0$, $SD = 1.89$). So far, 44.8% of the children had spent most of their lives in rural areas, 29.1% in large cities, 14.2% in medium-sized cities and 11.7% in small ones.

General linear models (Type II SS) were used to test for influences on children's familiarity with species (number of plant / animal species correctly identified). The final minimum adequate models were obtained by backward elimination of non-significant ($P > 0.05$) variables. As this type of analysis does not allow strong correlations between explanatory variables ($r > 0.35$), Pearson correlations between nominal and metric explanatory variables were tested first (Crawley 2005). The following variables and factors were initially included in the models: parents' familiarity with species (number of plants / animal correctly identified), children's most important sources of knowledge about plants / animals (chosen by more than 10% of the parents; see [Table 2](#)), interest in nature (scores of 1-5), weekly amount of time spent in nature (< 2h, 2-5 h, 6-10 h, >10 h), age, sex and place of living (large city,

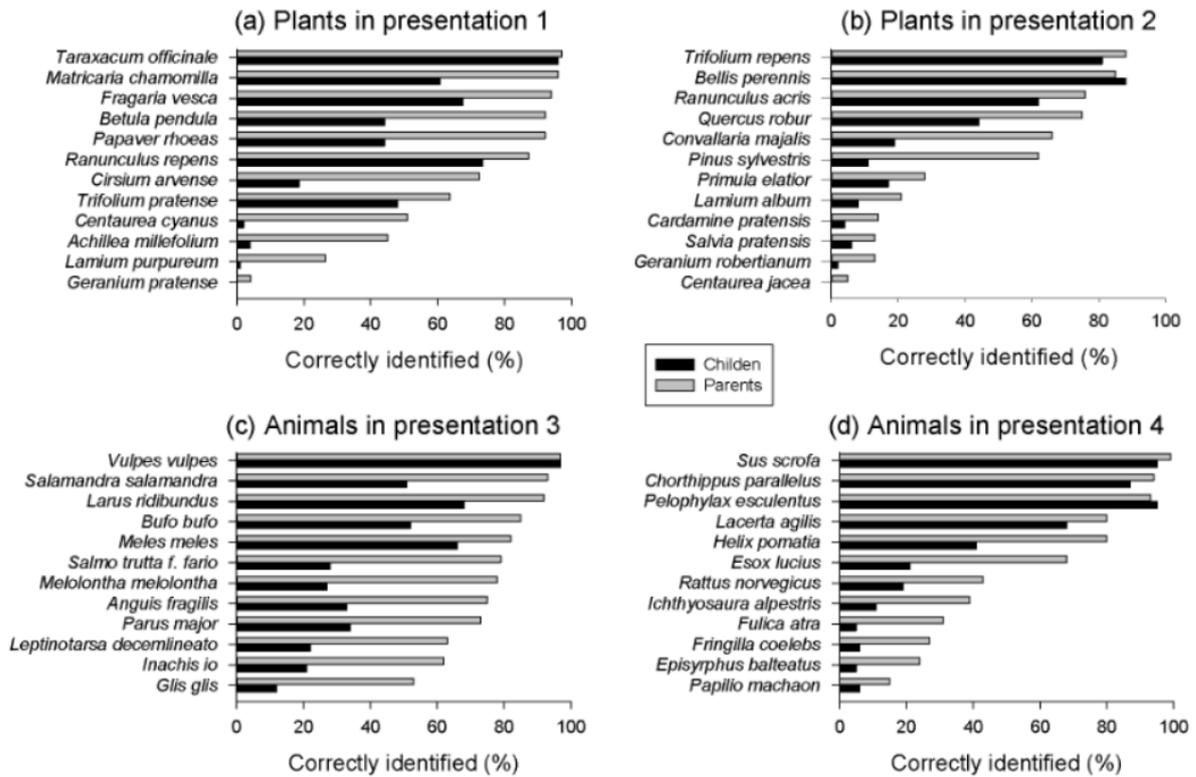


Figure 1. Proportion of parents and their children who correctly identified plant and animal species presented to them as pictures. Each parent-child-pair ($n = 402$) had to identify either 12 plant species (presentations 1 and 2) or 12 animal species (presentations 3 and 4)

medium-sized city, small city, rural area). All analyses were carried out with IBM SPSS Statistics for Windows, version 24.

RESULTS

(Q1) Familiarity with Local Plants and Animals

On average, parents could correctly identify 29% of the plant species and 35% of the animal species shown to them as pictures ($M_{plants} = 6.9 \pm 0.20$ and $M_{animals} = 8.4 \pm 0.18$ out of 24, respectively). Their children could correctly identify 17% of the plant species and 22% of the animal species ($M_{plants} = 4.0 \pm 0.15$ and $M_{animals} = 5.3 \pm 0.17$ out of 24, respectively).

Of the plants presented, common dandelion (*Taraxacum officinale*), white clover (*Trifolium repens*) and daisy (*Bellis perennis*) were most commonly identified correctly by both parents and children (Figure 1a, b). Of the animals presented, wild boar (*Sus scrofa*), red fox (*Vulpes vulpes*) and meadow grasshopper (*Chorthippus parallelus*) were the most commonly identified taxa (Figure 1c, d). In almost all cases, children were less familiar than parents with the species presented. However, children and parents hardly differed in the order of their familiarity with the depicted plants and animals.

(Q2) Relationship between Children' and Parents' Familiarity with Plants and Animals

There was a positive relationship between parents' and children's familiarity with species. However, the relationship was stronger for plants than for animals (plants: $r = 0.57$, $P < 0.001$; animals: $r = 0.31$, $P < 0.001$; Figure 2).

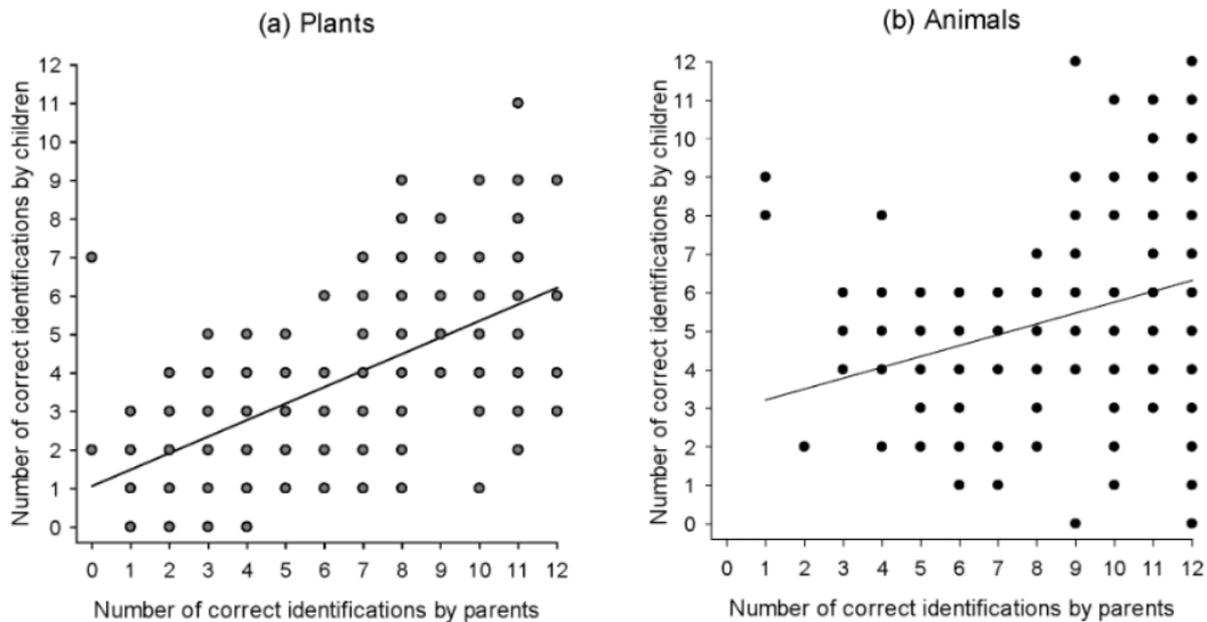


Figure 2. Relationship between parents ($n = 402$) and their children ($n = 402$) in their familiarity with (a) plants and (b) animals. One dot can represent more than one case

(Q3) Sources of Knowledge about Plants and Animals

Parents, formal education during childhood and outdoor experiences were indicated by the parents as major sources of their own and their children's knowledge about plants and animals (Table 2). The parents also considered their own acquisition of knowledge about species quite important.

(Q4) Associations between Certain Variables and Children's Familiarity with Plants and Animals

Parents estimated their own interest in nature and that of their children as rather high (mean scores of 4.0 ± 0.05 on the 5-step scales). Children's interest in nature increased with that of their parents ($r = 0.44$, $P < 0.001$). About 49% of the parents answered that their child spends more than ten hours per week in nature, while only 4% estimated this time as less than two hours. The others assessed the time between two and five hours (12.9%) or between six and ten hours (34.1%). There were no differences in estimations between parents who had received the plant presentation and those who had received the animal one (all $P > 0.710$).

In the general linear model (backward selection), children's familiarity with plants (number of correctly identified species) was positively related to age ($b = 0.25$, $F_{1,195} = 16.57$, $P < 0.001$), interest in nature ($b = 0.27$, $F_{1,195} = 5.59$, $P = 0.019$) and their parents' familiarity with plants ($b = 0.31$, $F_{1,195} = 48.44$, $P < 0.001$). It was also related to children's places of living ($F_{3,195} = 6.68$, $P < 0.001$). Children from rural areas could identify more plant species correctly than those from more urban areas (rural area: $M = 4.6 \pm 0.18$; small city: $M = 3.8 \pm 0.34$; medium-sized city: $M = 3.3 \pm 0.31$; large city: $M = 3.5 \pm 0.21$). Children's familiarity with plants was not related to their weekly amount of time spent in nature.

Children's familiarity with animals (number of correctly identified species) was also positively related to age ($b = 0.49$, $F_{1,196} = 40.40$, $P < 0.001$), interest in nature ($b = 0.66$, $F_{1,196} = 19.26$, $P < 0.001$) and their parents' familiarity with animals ($b = 0.24$, $F_{1,196} = 19.42$, $P < 0.001$). However, it was neither related to their places of living nor to the weekly amount of time spent in nature.

DISCUSSION

Common meadow plants such as dandelion (*Taraxacum officinalis*) and daisy (*Bellis perennis*) were among the plant species best known to both children and their parents (as in Hesse, 1984; Lindemann-Matthies, 2002; Lückmann & Menzel, 2013), while large and charismatic mammals such as red fox (*Vulpes vulpes*) and wild boar (*Sus scrofa*), and also insects such as meadow grasshopper (*Chorthippus parallelus*) were among the best known animal species (as in Eschenhagen, 1982; Lindemann-Matthies et al., 2017). Both children and parents identified

more animal than plant species correctly, which reflects the general tendency that children and adults are more interested in animals than plants (Flannery, 1991; Lindemann-Matthies, 2005; Lindemann-Matthies et al., 2017; Palmberg et al., 2015; Wandersee, 1986; Wandersee & Schussler, 1999) and are also more informed about animals (Hershey, 1996; Lindemann-Matthies, 2002).

Children's familiarity with local organisms was positively related to their age and interest in nature. Other studies have also shown an age-dependent development of interest in and knowledge of species (Gatt et al., 2007; Lindemann-Matthies, 2002; Löwe, 1992). Interest in and knowledge of species was found to increase until the beginning of adolescence and then declined strongly between the age of twelve and fifteen. As children in the present study were rather young (on average eight years old), they were still in the increasing stage. With the onset of adolescence, humans become open towards ideas of adult society like social equality (Piaget & Inhelder, 1983; Schenk-Danzinger, 1983), and may, as a consequence of an increased interest in social issues, decrease their interest in plants and animals.

Children's familiarity with local plants was also positively related to the rurality of their place of living. This is in line with findings from other studies, in which children and adolescents from the German countryside could list more taxa than those from urban areas (Jäkel, 1992; Lückmann & Menzel, 2013). Moreover, Swiss children from rural areas perceived more wildflowers in their immediate environment than those from urban areas (Lindemann-Matthies, 2002). It is unlikely that children in rural areas receive more formal instruction about species than those in urban areas, given that school curricula and nature-related activities do not differ substantially between both groups (Lückmann & Menzel, 2013). It is more likely that children from the countryside have more opportunities to get in touch with local plants, and, in doing so, use mediators such as family members or friends to find out their names (Setalaphruk & Price, 2007).

In the present study, parents regarded themselves as chief transmitters of species knowledge to their children (chosen as 1st, 2nd or 3rd priority by 80% of parents; see [Table 2](#)). In addition, they indicated family members (parents and grandparents), education in primary school (and for children the kindergarten) as well as outdoor experiences as main sources of species knowledge. In comparable studies, parents and direct observations were also regarded as important knowledge sources about plants and animals (Gatt et al., 2007; Scherf, 1988; Tunnicliffe & Reiss, 1999, 2000; Tunnicliffe et al., 2008). However, in contrast to the present study, preschool and primary school education were hardly mentioned (Gatt et al., 2007; Palmberg et al., 2015; Patrick & Tunnicliffe, 2011; Patrick et al., 2013). One explanation could be that the present investigation asked parents to indicate the sources of knowledge for their children, while in other studies children themselves were asked during face-to-face interviews. Parents might actually be better judges of learning sources than young children. Moreover, in the present study a multiple choice format was used (based on the results of previous studies), while in other studies interviewees could only express what immediately came to their mind.

Like father, like son? Yes, children's interest in nature and their familiarity with species was strongly and positively related to their parents' interest in nature and species knowledge. Parents' familiarity with plants and animals was a strong indicator of their children's performance, which was not only the case for the number of correctly identified species, but also for the identity of the plants and animals most frequently recognized. Similar results were found in a German investigation, in which not only species knowledge of parents and their children was positively correlated, but also their estimation and appreciation of plant diversity (Lindemann-Matthies et al., 2004). The present data indicate a stronger parent-child-relationship in terms of plants ($r = 0.57$) than animals ($r = 0.31$). One reason could be that children depend less on their parents' knowledge when it comes to animals. As outlined above, children are more in favour of animals than plants (e.g. Fančovičová & Prokop, 2011; Lindemann-Matthies, 2005; Wandersee & Schussler, 1999) and might thus gather knowledge about animals more often on their own, e.g. by watching TV, reading books or through direct observations in nature (Bjerke, Kaltenborn, & Ødegårdstuen, 2001). In contrast to animals, plants are often considered as lifeless and boring (Fančovičová & Prokop, 2011; Lindemann-Matthies, 2005) and might not trigger own observations in nature or the use of books and electronic media. Moreover, school education often neglects plants in favour of animals (Drea, 2011; Wandersee & Schussler, 1999). In consequence, children depend more on their parents' knowledge of plants than of animals. However, as parents in the present study could identify less than a third of the plant species presented, they might not be efficient knowledge transmitters for their children.

Caution should be exercised in generalizing the results of the present study, as the data are based on a survey with only 402 parent-child-pairs in one region of Germany. Moreover, two-dimensional pictures of plants and animals may not be as good to identify as their three-dimensional originals. A comparison with findings from other studies, where living plants or animals were presented, should thus be taken with care.

CONCLUSIONS

The present results demonstrate the crucial role of parents and formal education, especially at the preschool and primary school level, as well as outdoor experiences in familiarizing children with common local organisms. In times of decreasing nature experiences (Louv, 2006), but ever increasing loss of biodiversity, outdoor experiences are especially important. Outdoor educational programmes can significantly relieve “plant blindness” (Fančovičová & Prokop, 2011) and foster positive attitudes towards animals other than “loveable mammals” (Lindemann-Matthies, 2005). However, as teachers can rarely equal the influence of parents or other family members on a child’s life, it has been suggested that schools should also reach out to families, communicating the importance of sharing appreciation for the natural world and seeking to include family members in environmental education activities as often as possible (Chawla, 2008).

Although in the present study the media were only of average importance as a source of knowledge about organisms, they could nevertheless be very useful. Let’s go back to the Pokémons. Millions of people have spent the past year walking around, hunting for critters in an ‘augmented reality’ world (Nature, 2016). And while they wander through parks and neighbourhoods, they might spot other ‘wildlife’ too. Why not encourage parents and their children to report not only fictional characters, but also real plants and animals found on the chase (Balmford et al., 2002; Nature, 2016). Maybe a girl will then exclaim that “it is just fun to be outside and get fresh air, but it is even more fun to get to know local species”.

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