



Research Journal of Education

ISSN(e): 2413-0540, ISSN(p): 2413-8886

Vol. 2, No. 3, pp: 34-37, 2016

URL: <http://arpgweb.com/?ic=journal&journal=15&info=aims>

Attitudes of School Children in Germany and Costa Rica towards Invertebrates - A Comparison

Jürgen Drissner*

Prof. Dr. Biologist, Botanical Garden, University of Ulm D - 89081 Ulm, Germany

Mariangela Simonte

Student, state examination (biology) Botanical Garden, University of Ulm D - 89081 Ulm, Germany

Katrin Hille

Dr. Psychologist Transfercenter for Neuroscience and Learning University of Ulm Beim Alten Fritz 2 D - 89075 Ulm, Germany

Abstract: Negative feelings and an insufficient awareness of invertebrates seem to be culturally universal and can be found in different countries and continents. To better understand the underlying mechanisms we want to compare the attitudes of school children in Germany and Costa Rica towards invertebrates. The sample of the study comprised a total of 271 school children (grade 4, 5 and 6); 134 Costa Rican students (61 girls, 73 boys) and 137 German students (53 girls, 84 boys). Attitudes towards small animals such as beetles, wood lice, centipedes or spiders were assessed with the help of a semantic differential. Altogether students marked their choices for 13 bipolar adjective pairs that focused on the perceived value of animals and the emotions towards them. Only 3 of the 13 bipolar adjective pairs showed significant differences. Although Costa Rican schoolchildren rated invertebrates more dangerous than German schoolchildren, especially the Costa Rican boys rated the invertebrates more interesting and more precious in comparison with the German students.

Keywords: Attitudes towards invertebrates; Small animals; invertebrates, Insects; environmental attitudes.

1. Introduction

When children are asked to list the animal-species they know, they generally talk about animals that are not found in their own environment (Lock, 1995). Vertebrates which seem to be more remarkable and extraordinary are mentioned, whereas small animals (invertebrates and insects) are hardly ever discussed (Kellert, 1993; Snaddon *et al.*, 2008). Worse still, the small animals that do get mentioned are associated with feelings of disgust and abhorrence. Negative emotions towards small animals pose a genuine obstacle for an effective ecological education (Bixler *et al.*, 1999) or education in sustainable development. It should be noted that the majority of these invertebrates are harmless and that invertebrates are essential for our ecological system. Moreover, many of them are classified as endangered species or on the brink of extinction (Bixler *et al.*, 1999; Wagler and Wagler, 2011; Wilson, 1987). The extinction of species has been dramatically accelerating, and it is difficult to predict the outcome (Rockström *et al.*, 2009). If children are not familiar with the animals they encounter in their own natural environment, they will find it difficult to address issues of biodiversity and ecological problems (Heywood, 1995; Weilbacher, 1993). Furthermore we can only miss a species if we have had some kind of attachment to it (Fawcett, 2002; Lindemann-Matthies, 2002; Weilbacher, 1993). Values and feelings cannot develop without knowledge. Taking or avoiding action, caring for something and adopting a gentle approach are inspired by feelings that come from within – from the heart, so to speak (Winkel, 1995). Therefore one should take every chance to raise interest in and to instil awareness of invertebrates, eradicating any negative emotions such as disgust along the way.

The above mentioned feelings and the insufficient awareness of invertebrates seem to be cultural universals, being found in different countries and continents (Davey *et al.*, 1998; Patrick *et al.*, 2013). That's why we want to find out what causes this phenomenon and compare in this study the attitudes towards invertebrates among school children in Germany and Costa Rica.

2. Methods

The sample comprised 271 school children (grade 4, 5 and 6); 134 Costa Rican students (61 girls, 73 boys) and 137 German students (53 girls, 84 boys).

Attitudes towards small animals such as beetles, wood lice, centipedes or spiders were assessed with the help of a semantic differential. Students were asked to mark a scale between two bipolar adjectives (for example: "Boring - Fascinating", "Useless - Valuable" or "Disgusting - Cute"). Altogether students indicated their choice for 13 bipolar adjective pairs that focused on the perceived value of animals and the emotions towards them (e.g. fear and disgust). See questionnaire [Table 1](#).

*Corresponding Author

Table-1. Semantic differential to assess the attitudes towards small animals such as beetles, wood lice, centipedes or spiders

	1	2	3	4	5	6	7	
boring								fascinating
dangerous								safe
useless								valuable
disgusting								cute
uninteresting								interesting
unnecessary								necessary
bad								good
morbid								natural
repulsive								appealing
uncool								cool
dull								funny
weird								harmless
worthless								precious

3. Results

Gender-specific and country-specific differences were analysed. Only 3 of the 13 bipolar adjective pairs showed significant differences: dangerous – safe, uninteresting – interesting and worthless – precious. German students rated the invertebrates generally safer in comparison with the Costa Rican school children. Costa Rican boys rated the invertebrates more precious in comparison with German boys and girls. Furthermore the Costa Rican boys rated the small animals more interesting than the German girls. The results are presented in Table 2, 3 and 4.

Table-2. Means and p-values for adjective pair dangerous – safe; gender and countries considered separately.

	Bonferroni Test; adjective pair: dangerous - safe				
		1	2	3	4
		4,1	4,5	5,5	5,2
1	girls Costa Rica (N = 61)		1,000	0,000	0,005
2	boys Costa Rica (N = 73)	1,000		0,015	0,180
3	girls Germany (N = 53)	0,000	0,015		1,000
4	boys Germany(N = 84)	0,005	0,180	1,000	

Table-3. Means and p-values for adjective pair uninteresting – interesting; gender and countries considered separately.

	Bonferroni Test; adjective pair: uninteresting - interesting				
		1	2	3	4
		5,4	5,5	4,5	5,0
1	girls Costa Rica (N = 61)		1,000	0,122	1,000
2	boys Costa Rica (N = 73)	1,000		0,028	0,541
3	girls Germany (N = 53)	0,122	0,028		1,000
4	boys Germany (N = 84)	1,000	0,541	1,000	

Table-4. Means and p-values for adjective pair worthless - precious; gender and countries considered separately.

	Bonferroni Test; adjective pair worthless - precious				
		1	2	3	4
		5,6	6,1	4,9	5,3
1	girls Costa Rica (N = 61)		0,717	0,368	1,000
2	boys Costa Rica (N = 73)	0,717		0,003	0,024
3	girls Germany (N = 53)	0,368	0,003		1,000
4	boys Germany (N = 84)	1,000	0,024	1,000	

4. Discussion and Conclusion

Costa Rican and German students differ in their attitudes towards invertebrates in only 3 of 13 bipolar adjective pairs. This is surprising considering that the students grew up in different cultures and on different continents. More differences could have been expected.

One of the three differences that were found is easy to explain: Costa Rican school students view invertebrates generally as less safe. Dangerous invertebrates like scorpions or tarantulas are species of the natural environment in Costa Rica. Furthermore the Costa Rican curriculum mentions explicitly that invertebrates are carriers of diseases and gives instructions on how to handle so-called dangerous species. Hence it is no surprise that Costa Rican school children rated invertebrates as more dangerous. Nevertheless they rated invertebrates more interesting and precious in comparison with their German peers. This raises the question why the German students have such low attitudes? If invertebrates pose no danger in Germany, why are they even less appreciated than in countries where they are

dangerous? This lack of appreciation for invertebrates is a phenomenon not only found in Germany but also in many other countries where most invertebrates of the natural environment are not only harmless but also very important for our ecological systems. In order to improve these attitudes and to raise awareness of small animals different concepts call for hands-on experiential learning through direct contact with animals in their environment, the involvement of emotions and the aim to shape values in a holistic approach. Normally, experiential learning such as excursions is suggested as a means for a modern environmental education. Studying nature outside of the classroom is the most effective and, at the same time, the most pleasurable way to teach children about various species and biodiversity. This approach should, in fact, be adopted more often (Lindemann-Matthies, 2006). Several scientists also emphasize the relevance of the active process of learning about diversity in natural habitats (Chawla, 1998; Haan, 2005; Mayer, 1993). Furthermore, biology lessons can be made more enjoyable by studying living plants and animals first-hand (Barker *et al.*, 2002; Lock, 1998). Also direct contact with nature helps to enhance ecological awareness, a positive environmental attitude and a caring approach towards living creatures (Fawcett, 2002; Haase, 2003; Lock, 1998; Yore and Boyer, 1997).

Studies of Drissner *et al.* (2008; 2010; 2011) indicated that it is possible to change students' awareness, attitude and emotions towards invertebrates. Furthermore Drissner *et al.* (2008; 2010; 2011) could show that learning outside of school could improve students' knowledge and emotions towards invertebrates. The students who encountered small animals in their natural habitat demonstrated better knowledge of and more positive emotions towards the animals, even though, for some of the students, it had been five years since the visit of the outside learning forum. Furthermore students showed a significant improvement on nine of 13 bipolar adjective pairs (same questionnaire as in the present study): more fascinating and valuable, cuter, more interesting and necessary, better, cooler, more harmless and more precious. The students later reported that they enjoyed learning about small animals more than before.

Measuring attitudes towards invertebrates with special regard to cross-cultural aspects is very important in light of the increasingly smaller number of children valuing the animals in their environment, despite the fact that they are ecologically extremely important. Against this background e.g. Snaddon and Turner (2007) call for efforts to emphasize small animals and their significance. To search for changes and especially baselines of attitudes towards invertebrates in different countries could be a sound beginning.

References

- Barker, S., Slingsby, D. and Tilling, S. (2002). Ecological fieldwork: Is there a problem? *Environmental Education*, 71: 9-10.
- Bixler, R. D., Floyd, M. F. and Myron, F. (1999). Hands on or hands off? Disgust sensitivity and preference for Environmental Education activities. *The Journal of Environmental Education*, 30(3): 4-11.
- Chawla, L. (1998). Significant life experiences revisited: a review of research on sources of Environmental Sensitivity. *Journal of Environmental Education*, 29(3): 11-23.
- Davey, G. C. L., Mc Donald, A. S., Hirisave, U., Prabhu, G. G., Iwawaki, S., Jim, C. I., Merckelbach, H., Jong, P. J., Leung, P. W. L. and Reimann, B. C. (1998). A cross-cultural study of animal fears. *Behaviour Research And Therapy*, 36(7-8): 735-50.
- Drissner, J., Haase, H.-M. and Hille, K. (2010). Short-term Environmental Education - Does it work? -An evaluation of the "Green Classroom". *Journal of Biological Education*, 44(4): 149-55.
- Drissner, J., Hille, K., Debatin, S. and Haase, H.-M. (2008). Das Grüne Klassenzimmer im Botanischen Garten der Universität Ulm – eine Wirkungsanalyse. *Diskurs Kindheits- und Jugendforschung*, 2(2):209-18.
- Drissner, J., Haase, H. M., Nikolajek, M. and Hille, K. (2011). Environmental education in a 'Green Classroom. *Resonance* 16 (2): S. 180–86.
- Fawcett, L. (2002). Children's wild animal stories: questioning inter-species bonds. *Canadian Journal of Environmental Education*, 7(2): 125-39.
- Haan, G. (2005). Vorwort. In J. Kandeler, *Kinder lernen Umwelt schützen, Handbuch für Umweltpädagogik in Kindergarten und Grundschule*. Natur und Umwelt: Berlin.
- Haase, H.-M. (2003). *Worldrangers: Ein pädagogischer Beitrag für eine nachhaltige Entwicklung. Hintergründe und Praxisvorschläge für eine zeitgemäße Umweltbildung*. Hamburg: Dr. Kovac.
- Heywood, V. H. (1995). *Global biodiversity assessment*. Cambridge University Press: Cambridge.
- Kellert, S. R. (1993). Values and perceptions of invertebrates. *Conservation Biology*, 7(4): 845-55.
- Lindemann-Matthies, P. (2002). The influence of an educational programme on children's perception of biodiversity. *The Journal of Environmental Education*, 33(2): 22-31.
- Lindemann-Matthies, P. (2006). Investigating nature on the way to school: Responses to an educational programme by teachers and their pupils. *International Journal of Science Education*, 28(8): 895-912.
- Lock, R. (1995). Biology and the environment – A changing perspective? Or "there's wolves in them there woods!" *Journal of Biological Education*, 29(1): 3-4.
- Lock, R. (1998). Fieldwork in the life sciences. *International Journal of Science Education*, 20(6): 633-42.
- Mayer, J. (1993). Bedeutung der Formenkunde für die Umweltbildung. *Verhandlungen der Gesellschaft für Ökologie*, 22: 379-84.

- Patrick, P., Byrne, J., Tunnicliffe, S. D., Asunta, T., Carvalho, G., Hava-Nuutinen, S., Sigurjónsdóttir, H., Óskarsdóttir, G. and Tracana, R. B. (2013). Students (ages 6, 10, and 15 years) in six countries knowledge of animals. *NORDINA*, 9(1): 18-32.
- Rockström, J., Steffen, W., Noone, K., Persson, A., Chapin, F. S., Lambin, E. F., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R. W., Fabry, V. J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P. and Foley, J. A. (2009). A safe operating space for humanity. *Nature*, 461(24 September 2009): 472-75.
- Snaddon, J. L. and Turner, E. C. (2007). A child's eye view of the insect world: perceptions of insect diversity. *Environmental Conservation*, 34(1): 33-35.
- Snaddon, J. L., Turner, E. C. and Foster, W. A. (2008). Children's perceptions of rainforest biodiversity: Which animals have the lions's share of environmental awareness? *PLoS ONE*, 3/7(e2579): 1-5.
- Wagler, R. and Wagler, A. (2011). Arthropods: Attitude and incorporation in preservice elementary teachers. *International Journal of Environmental & Science Education*, 6(3): 229-50.
- Weilbacher, M. (1993). The renaissance of the naturalist. *The Journal of Environmental Education*, 25(1): 4-7.
- Wilson, E. (1987). Little things that run the world. *Conservation Biology*, 1(4): 344-46.
- Winkel, G. (1995). *Umwelt und Bildung: Denk- und Praxisanregungen für eine ganzheitliche Natur- und Umwelterziehung*. Kallmeyersche Verlagsbuchhandlung: Seelze.
- Yore, L. B. and Boyer, S. (1997). College students' attitudes towards living organisms: The influence of experience & knowledge. *The American Biology Teacher*, 59(9): 558-63.