

**Bilingual – “Biological”?**  
**The Impact of Language on Environmental Consciousness<sup>1</sup>**  
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**Abstract**

In this article the results of a mini-survey testing the environmental awareness of English-German bilinguals and its dependence on the two languages are presented. The participants were asked questions in their two native languages, with the purpose of revealing their level of ecological consciousness (awareness). Though not drastically, the answers still vary depending on the native languages of the respondents. It seems to speak for the fact that our behaviour is in a certain sense influenced by our native language. The field of ecology is used here for narrowing down behavioural patterns in general to a certain area, where it is easier to conduct the analysis. In the article, the results of the mini-study are discussed concerning the analysis of language impact on the environmental consciousness of individuals and of society. The article contributes to the study of the Sapir-Whorf hypothesis and presents bilingual research as a way of doing ecolinguistics.

**1. Statement and theoretical framework**

It has been common knowledge for quite a long time that the languages people speak affect their cultural views, their (non-linguistic) behaviour and their opinions about certain issues. Wilhelm von Humboldt (cf. Humboldt 1999 [1836]) claimed in the 19th century that language expresses the spirit of each nation. Later, in the early 20th century, the Sapir-Whorf hypothesis gained many followers with its ideas about linguistic relativity, i.e. about the fact that language determines our cognitive categorizations as well as our thoughts (cf. Whorf 1979 [1956]). Though the hypothesis was criticised by some scholars, it still remains popular and finds its supporters, both direct ones, who refer to it, and indirect ones, who just voice similar ideas.

The Sapir-Whorf hypothesis (and the study of language impact in general) plays a significant role in applied aspects of bilingual research, as many studies (though, according to Hamers and Blanc 1989, 106, not enough and few containing the necessary theoretical background) are conducted with the objective of strongly or weakly supporting it (cf. Ervin-Tripp 1964; Hamers and Blanc 1989; Ogunnaiké et al. 2010; Pavlenko 2005 et al.). The reason is the following implication about the interaction between culture and language: “each cultural group possesses a unique non-verbal behavioural repertoire inseparable from language” (Hamers and Blanc 1989, 106). This presumes that “the bilingual’s non-verbal behaviour must vary according to the language he uses,” up to even influencing personality traits (ibid). A bilingual is an “individual who has access to two or more distinct linguistic codes. A bicultural bilingual has native competence in his two languages, identifies with both cultural groups and is perceived by each group as one of them” (Hamers and Blanc 1989, 264). Bilinguals kindle the interest of many scientists because they show the combination of two codes with two cultures, potentially also two personalities. Bilinguals are sometimes studied in terms of their speech patterns, i.e. the syntactic, morphological, phonetic etc. features of their talk, in other words, in terms of their intralinguistic characteristics. However, their extralinguistic ones are also highly important. In applied research, the behaviour and brain of bilinguals are not the long-term objective but rather a means of research, whereas the linguistic influence on the behaviour of individuals (on all levels) takes the central place; thus the non-verbal

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behaviour of bilinguals is studied as well. This shows that studies on bilinguals can contribute to the general linguistic and philosophical research which at first sight is not closely related to bilingualism. The point is that studies on non-verbal behaviour of bilinguals help evaluate and measure the power language has on individuals and (consequently) on society. Studying a bilingual allows the researcher to test 'two native speakers of different languages within one social individual'. This enables him to exclude social variables to a very high extent.

The concept of language power should not be discussed just in connection with Sapir and Whorf. It was also addressed by many other scholars. Among these, I wish to point out first of all John Austin with his idea of "performative verbs," which was adopted later by Pierre Bourdieu in his "performative magic of language." According to Austin (within the framework of the speech act theory), "performative verbs" function as actions, because meta-language here overlaps with object language (cf. Austin 1975). Bourdieu's "performative magic of language" is the socio-instrumental power of language, i.e. a magic enabling language to mould social practice (cf. Bourdieu 1990; Audehm 2001). Performativity can be interpreted in the framework of bilingualism as follows: each language creates certain concepts in the mind of a bilingual, which are more activated while he/she is speaking one of his languages and can be considered to be less active while speaking the other: "in switching the bilingual activates a feature which keeps the items of language B inactive while he is speaking language A" (Haugen 1972, 315). In this context we can say that bilingualism is beneficial since it offers to the speakers alternative conceptualizations (cf. Pavlenko 2005, 447).

## 2. Hypothesis

I am especially interested in the influence of language on the ecological culture of societies and in ecolinguistic issues<sup>2</sup> in general. This is the reason why I am focusing on the ecological behaviour of bilinguals and on their environmental consciousness. My intention is to try to understand whether (and if yes to what extent) environmental consciousness is affected by the language a person speaks, on the evolutionary, the structural or/and the social level (cf. Fill 2010, 3)<sup>3</sup>. This approach belongs to the field of ecolinguistics, in particular to the theories of the constructive power of language, especially in what is called eco-discourse (see, for instance Mühlhäusler 2003; Fill 2001, 46).

At this point, it seems reasonable for me to define what I exactly mean by 'language' and 'language/linguistic power/influence/impact'. Basically we can look at language from two points of view: the intralinguistic one (the semiotic level<sup>4</sup> and the grammatical, partly also the functional levels) and the extralinguistic one (the social level and social context, associations, and only in part the functional level) (see Fill 2001, 46 and Pavlenko 2005, 434 about the levels of language). In the present work I mean language more in the intralinguistic sense, namely as a system of meanings and connotations: i.e. I try to see which effect the same ideas contained in different languages - by means of various different structures - can have on the individual. The idea is that the individual as a native speaker of a certain language belongs to the group of people whose perception of information is affected by the respective language patterns (consisting of meanings etc.). In the framework of this article, I pay rather less attention to the grammatical topics. And yet, social context is unavoidable in this discussion because both extralinguistic and intralinguistic factors build the language, and in most cases they are inseparable. Thus, saying 'language', I will imply the system of meanings and connotations and their perception by the individual, and, when I want to stress the extralinguistic factor, I will mention it explicitly.

My general starting point is thus the Sapir-Whorf hypothesis, and I am trying to contribute to its research, namely on a specific field, which has never been combined with the hypothesis of

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<sup>2</sup> I am also interested in language impact on society in general but investigating ecological attitudes allows me to narrow down the context and make the experiment more concrete. Moreover, environmental awareness is one of the new topics intensively talked about, and it offers a broad field for analysis.

<sup>3</sup> In his turn, Lucy (1996) points out the semiotic, structural and functional levels of interaction between language and thought (quoted from Pavlenko 2005, 434).

<sup>4</sup> language as a system of sems and so of meanings and connotations

linguistic relativity before. There have already been many studies strongly/weakly supporting this hypothesis. I consider myself its moderate adherent, so I presume the existence of language impact on the behaviour of individuals, which is why I was wishing to conduct a confirming experiment. This experiment can help me answer the following questions relevant for my research (the level of generalizing is increasing in this sequence):

1. Does the language of the question determine or at least influence the answer? (Here I am referring mostly to 'parole' as in Saussure 1976 [1916]).
2. Is it the connotations of language (referring to 'langue' as in Saussure 1976 [1916]) that determine/influence the answer, or the social context associated with them?
3. Does language have a role in constructing the environmental awareness of a person and thus of the whole of a community? (referring to 'langue' as stated before)

### 3. Practical background

I would like to pay special attention to two studies on the non-verbal behaviour of bilinguals which in a certain sense influenced my research: *The language of implicit preferences* (cf. Ogunnaike et al. 2010) and *An analysis of the interaction of language, topic and listener* (cf. Ervin-Tripp 1964). In the first one, after conducting the so called Implicit Association Tests (IAT) with Arabic-French bilinguals in Morocco and Spanish-English ones in the United States, the authors come to the conclusion that

The degree to which Moroccan people are "pro-Morocco" depends crucially on the test language, and this difference could [...] emerge because of the contextual effect of language we identify here [...] Language in which a measure of implicit attitudes was administered influenced the resulting attitude that was evoked [...] the direction of this influence stems from favorable attitudes towards the linguistic ingroup that are embedded in the language [...] interpretation of attitude studies that use the IAT (and no doubt other measures) must take test language into account... that attitudes squarely belong among those concepts of mind that can be influenced by language. Language [...] is involved in constructing and shaping their very nature. (Ogunnaike et al. 2010, 1002-1003)

The authors point out the prospects for future work which are also relevant for my mini-study. They plan "to determine whether the resultant effects are driven by language per se, or by attendant properties of language." Also they plan to find out "the boundary conditions of these effects" and the relation of "the individual's identification with one language or the other, or perception of the relative status of the languages" to these effects (ibid, 1003).

The latter study is a sociolinguistic research conducted with the help of Thematic Apperception Tests. In the described experiment the speech of Japanese women married to Americans and so speaking lots of English in their everyday life was focused on, namely the topic-audience-language correlations (cf. Ervin-Tripp 1964, 94). The participants were asked to describe a set of topics in English, some of which were connected with Japanese, and some – with American reality. "When the informants were instructed to speak English, they had difficulty only when they spoke of Japanese topics" (ibid, 97). "Most of the uniquely human forms of social behaviour are dependent on shared language, so that the structure of language use in society may be related to societal functioning in unique ways" (ibid, 100).

Another interesting study has to be pointed out: Kousta et al. (2008, 855) use bilingual research as a method of investigating the strength and pervasiveness of language effects on cognition... [They] also show how the investigation of linguistic relativity through bilingualism makes it possible to ask a wide range of questions concerning the link between language and thought... [They] found that bilingual speakers performed differently in each of their languages [...]

## 4. Methodology description

The experiment described in the following is a sociolinguistic mini-survey whose practical part was carried out in Graz (Austria) and Zurich (Switzerland) in 2011.

### 4.1. Respondents

In total 34 volunteers of different ages and genders were interviewed on an unpaid basis. 28 of them have been raised bilingually or have been living and working in a foreign country for at least 15 years with full exposure to the respective language. I tested only those respondents both of whose languages I am able to speak, and so I was restricted within the following group: English, German, Russian, Italian, Spanish, French. The translated questions were checked by native speakers (independent experts) and discussed with them before the start of the experiment. To raise the objectivity grade of the mini-study, I also interviewed six German- and English-speaking monolinguals and asked them the same set of questions twice (in this case in just one language), with the same Questions combining key, i.e. in the same order (see *Appendix*)<sup>5</sup>. This enabled me to exclude language variation as an independent variable and to see the general tendency of answer variation for this question set.

I had to exclude from the analysis the results of four bilingual participants: one because of obviously insufficient skills in one of the languages (though confessing himself bilingual), one because of having German just as a third language (which might decrease its perception), and the other two because of not considering themselves 'full bilinguals'. It is clear that absolute objectivity would hardly be possible in such an experiment but excluding some candidates helps us at least get rid of some explicit risks. I also excluded one of the monolinguals because of his taking too much time for responses which violated the rules of the experiment.

Thus, in the final stage I had the results from 29 participants: 24 bilinguals and five monolinguals. These results I divided into groups according to languages represented. In this article I deal with the results from 14 English-German bilinguals: all these participants' having one language in common enables us to analyse the results in a more organized way, otherwise the results would be quite chaotic and the experiment would run the risk of consisting of non-representative and fragmentary case studies (since one to four bilinguals with the same language combination are too few to show a regularity). I also take into consideration the results of five German- and English-speaking monolinguals.

### 4.2. Pilot study

In the course of this research I first did a pilot study where I interviewed just two Italian-German<sup>6</sup> bilinguals (both having a German-speaking mother and an Italian-speaking father) and a German monolingual and analysed the collected data. After asking the bilingual participants questions from the list I also conducted general interviews with them about their bilingual background and ecological views that turned out to help me understand the future results. Moreover, they made some useful observations about their feeling concerning the interview and organizing the sequence of questions. Based on the results of the pilot study, another paper was published (cf. Khrypchenkova, 2011).

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<sup>5</sup> In the monolingual cases the sequence of two questions within a pair was significant as the only independent variable.

<sup>6</sup> Starting the research with Italian-German bilinguals at the pilot stage, I then analysed English-German respondents at the main one. However, I still gained some new results from Italian-German bilinguals which might be a part of a new experiment.

### 4.3. Procedure

The participants were asked two sets of 13 questions on the topic ‘environment’: one in English, the other (absolutely the same) in German<sup>7</sup>. All the questions followed the mixed order, having been coded with the help of a certain key. It was important that the pairs of questions were not too close to each other, otherwise the participants would have in their short-term memory the answer to the same question in another language. During the analysis of the results, two questions were eliminated because they turned out not to be understood completely by the respondents and therefore provoked difficulties and too long pauses in answering.

The respondents had to answer every question on a 10-point scale, from 0 to 10, where 0 meant *absolutely negative* and 10 – *absolutely positive* (the latter addition was specified for every question). Before the beginning of the interview the participant was fully instructed about the procedure. All of the interviews were conducted individually (i.e. with only the interviewee and the interviewer present), most of them personally, and some by other online-means: via telephone (three respondents), Skype (two respondents), Facebook-chat (one respondent). The mini-survey had only to be done online because the time slot for the answer had to be controlled and kept as short as possible, otherwise the respondent, once realizing that the questions recurred, would unconsciously seek to prolong the interval and to think back to what he/she already answered to the same question in the other language. Each question was asked immediately after the previous one was answered. If it was taking the participant too long to answer the previous one, he/she was reminded of the necessity of quick answers. It was highly important that both working languages belonged to the recipient’s mother tongues, since only on these conditions was he/she sure to understand the question fully and give a relevant answer to it. If there was a comprehension loss in one of the question sets, the question and its sense might be appreciated in a more negative way than could have been, and the result would be running the risk of being biased.

Language was the independent variable in my data analysis (except for the German monolingual), and it determined scores given for a certain answer by a certain person. I tried to keep age and gender as controlled variables, analysing respondents with different characteristics. As for social background and personal features, I considered these as extraneous variables in this experiment, because though they might be important, they are hardly to control in any experiment of this kind and their importance can even hardly be proved. Still, this point might be considered as one of the problems of the present mini-study.

### 5. Data presentation and analysis

The results were summed up in tables according to languages and processed by means of Open Office Calc 3.2.0. A question in English was put together with the same one in German for comparing the results. All of the questions implied that higher scores for the answer would mean a higher environmental awareness level of the respondent. The results were evaluated in the following way.

1. *First evaluation.* Counting up and comparing the environmental awareness level (EAL) of every person shown in both languages:  $EAL(x)L_a$  vs.  $EAL(x)L_b$ <sup>8</sup>. The results showed an ‘environmental advantage’ of English (nine people with English against four with German and one neutral: i.e. with no variations in the total result). Before claiming however that English influences the ecological conscience of a person more than German, I deemed it important to check if similar differences in the result also occurred in the case of monolingual respondents. The maximal difference in the two EAL sums is not higher than two points. I considered therefore that a result with an EAL variation up to two points for a bilingual should not be considered significant to prove the existence of an influence of language on the level of ecological awareness of a person. Making

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<sup>7</sup> For the commented list of the questions - in English – see Appendix 1.

<sup>8</sup> Under EAL I mean literally the sum of all answers (with some results recounted - see above) in every language



language an independent variable, however, causes stronger answer variation within a question pair (in the answers of the same respondent in two different languages).

Total scores EN vs. DE (EAL)  
(9 EN – 4 DE – 1 neutral)  
→ EN>DE

2. *First check.* Finding out the respondents demonstrating strong answer variation<sup>9</sup> between  $L_a$  and  $L_b$  and excluding other results as insignificant. Here we have five more cases that we can consider ‘neutral’ and so only eight significant ones, of which six are in favour of English and two of German. We see that English still seems to be the language that influences the level of ecological awareness more strongly.

At this point I considered it necessary to find out whether the EAL of these eight selected respondents was higher/lower than the one of the others and so whether it should be considered an independent variable. However, it turned out that there is no correlation between a respondent’s liability to show answer variation and his/her EAL: the average EAL for 14 bilingual respondents in EN and DE is 79.5, and of these eight significant cases some lie above the average level and some – below.

First check  
Eliminate results with the difference 0–2 in total  
(6 EN – 2 DE – 6 neutral)  
There remain 8 valid tests  
(6 EN – 2 DE)  
→ EN>DE

3. Looking at individual questions which provoked these variations:  $Q_n(x_1+\dots+x_{14})_{EN/DE}$  and finding out their share in the total EAL. This step is less important than the other ones because it is mostly based on question differences and has no direct connection with the determination of language per se (here language does not come up as an independent variable). Still the question analysis brought quite interesting results. The questions which produced the strongest variations are questions 2, 4, 10 and 11, from which 2, 10 and 11 come up more than once (see *Appendix*). It is interesting to notice that questions 2, 4 and 11 all belong to the same type: the respondent was asked to evaluate an element of reality, which is a very subjective thing and liable to variation. I also looked at the share of each question in the total score for every respondent in German and English:

$Q_2(x_1+\dots+x_{14})_{EN}=49.4\%$ ;  $Q_2(x_1+\dots+x_{14})_{DE}=50.6\%$  → DE>EN  
 $Q_4(x_1+\dots+x_{14})_{EN}=50.78\%$ ;  $Q_4(x_1+\dots+x_{14})_{DE}=49.22\%$  → EN>DE  
 $Q_{10}(x_1+\dots+x_{14})_{EN}=53.14\%$ ;  $Q_{10}(x_1+\dots+x_{14})_{DE}=46.86\%$  → EN>DE  
 $Q_{11}(x_1+\dots+x_{14})_{EN}=50.68\%$ ;  $Q_{11}(x_1+\dots+x_{14})_{DE}=49.32\%$  → EN>DE

Here we see that for Question 2 the result in German exceeded the one in English, but for the other three it was the other way round. This also gives an ‘advantage’ to English, though a rather slightly distinguishable one.

*Second check*  
Eliminate results with the difference 0–2 in specific questions  
(5 EN – 0 DE – 9 neutral)  
There remain 5 valid tests  
(5 EN – 0 DE)

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<sup>9</sup> Under strong variation within a question I mean the difference of three points or more.

→ EN>DE

The aforesaid does not necessarily mean that English is more ‘ecological’ than German and that it is more ‘ecologically favourable’ from the intralinguistic point of view (see terms in section *Hypothesis*), otherwise the variations would be much bigger, and the percentage of neutral results – much lower. It just shows that the language factor can be considered an important ‘contextual affector’. As far as social context and associations are concerned, they are more likely to influence the answers, a fact which was referred to by the respondents themselves (some of them gave their feedback after the mini-survey). Thus, English is perceived as the language of globalisation, of development, of technologies and of the respective vocabulary. That is why for many people concepts like *recycling* might sound ‘better’ in English and rather unusual in German (this point can actually be tackled both from the intralinguistic and the extralinguistic points of view). Another reason might be personal associations: e.g. some would associate questions in English with the situation in the UK. However, we cannot fully trust these associations as they do not always correspond to reality: a bilingual respondent would sometimes leave a country as a child and would not have a fully adequate perception of it. Summarising all the reasons, I wish to stress that the English questions gaining more points cannot be fully explained and should be tested by means of more experiments. More important for me is the conclusion that language influences the answer to the questions in the environmental context.

## 6. Problems

- The impartiality of the experiment is hard to measure because the ecocultural competence includes many subjective factors. Moreover, we can never say for sure what the reasons for certain variations are: they can be not just language difference, but also gender, age factors, education in the family etc. (about *variables* see above). This may count as one of the most important problem of the mini-study. However, I did not expect to get concrete quantitative results but only to find out the general tendency.
- During the translation of the questions from English into other languages deficiencies and loss of sense were unavoidable, despite thorough corrections and native speaker advice.
- The difficulty of defining a bilingual and the rather small quantity of them provoked complications in respondent selection, but still a necessary minimum of suitable candidates was found.
- The project was conducted without financial support (apart from a scholarship for covering the life expenses), which is why a special equipment and help of software professionals could not be used. A computer programme would make carrying out the study easier, more accurate (first of all in terms of time spans control and data analysing), more impersonal (which in this context means more objective) and feasible in more languages because in this case the researcher would be able to delegate the authority and have the questions translated by other professionals even into languages he/she does not speak (as he/she would not have to work directly with the participant). Moreover, a reward of approximately 10 USD would be desirable as it could gain more participants and make their selection more random. On the other hand, the lack of financial resources can also be considered positive because it shows that small sociolinguistic experiments can also be carried out by only a few experimenters, with little costs and without specially prepared software.
- Most of the participants knew already before the experiment that it had to do with language and therefore were more attentive to linguistic issues while answering. As one of the participants remarked, it would be better for the research not to let them know it. However, this seems difficult to implement as the participants still have to be properly informed about the mini-survey.

## 7. Conclusion and development perspectives

- The language of the question does not fully determine the answer (which speaks against the strong version of the Sapir-Whorf hypothesis). But the answers are influenced by the context language (referring to ‘parole’ as stated before), and English seems to be especially ‘strong’ in this sense.

- ‘Language’ in the intralinguistic sense influences the answer to a question rather less: otherwise I could unequivocally have defined English as ‘more/less ecological’ than German, which I have not been able to do. Instead, I have come to the conclusion that not the language itself but far more its implications, associations connected with this language in the brain of an individual (thus, the extralinguistic aspect) influence a person’s attitude and consequently his/her answer. These implications, however, tend to accumulate and in some cases call forth implications, more or less general for all speakers of this language. So, e.g. “German and English... are used to signify the contrasting cultural styles and standards, which the bilinguals encounter in daily interaction” (Eppler 2004). It also has to be mentioned that (as far as grammar is concerned) German and English have different basic sentence types (English prefers to convey its grammatical information through marking by means of word order while German would rather use inflectional morphology). This is why they, though activating “an overlapping network of brain regions,” still do this with differential patterns (Newman et al. 2010, 7539). In their study Newman et al. used neuroimaging and found out that there is “a dissociation between the neural substrates of word order and morphosyntactic processing under conditions in which lexical-semantic content was held constant” (ibid, 7542). Thus, English showing higher scores than German speaks for its different implications.

- It is true that language participates in constructing our behavioural patterns. According to Hamers and Blanc (1989, 106), “Language processing is... integrated in a complex pattern of human behaviour.” As the environmental competence of an individual is built in the general context of his/her social life, we can say that it is affected by our mother tongue; and the environmental awareness level of society is made up of those of its members.

- I cannot say that language heavily influences society – it would be pretentious to say so. But behavioural patterns, moral standards and attitudes are deeply connected with the language. For now science has not revealed the nature of the connection between these elements, but this study, like many others, gives us further proof of this connection.

This mini-study could be continued in different directions (see *Problems* above): investing more financial resources, offering participation reward, involving computer programmes and software specialists, broadening the language palette – also through conducting the research in different parts of the world (with the aim of gaining respondents with different language pairs), developing the questions sets, making thematic variations. It is definitely worth the attention because, as already mentioned, working with bilingual participants helps scholars look at the constructing power of language quite objectively and contributes to research in both the applied investigation of bilingualism and ecolinguistics.

### Appendix. Questions and comments<sup>10</sup>

*I. What is your attitude towards the idea of recycling? 0 - very negative; 10 - very positive. In this type of question the environmental attitudes of the respondents are disclosed through speaking about understanding a certain concept.*

*II<sup>11</sup>. Wie ist Ihre Einstellung zu Bioprodukten? 0 - es hat keinen Sinn, sie zu produzieren; 10 - sie sind unbedingt notwendig.*

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<sup>10</sup> The questions are presented in the English language.

<sup>11</sup> As already said, for monolingual cases the question coming as first was marked with x, the same one coming as second – with x’.



2. How necessary do you find the introduction of ecology lessons in the primary/elementary school? 0 – not necessary at all; 10 – very necessary and important. In this type of question the respondent is asked to evaluate an element of reality.

10'. Inwiefern empfinden Sie einen Haufen für Recycling sortierten Mülls als Unordnung? 0 - ich sehe Müll immer als Unordnung, egal ob recycelt oder nicht; 10 - einen Haufen sortierten Müll sehe ich als Ordnung.

3. How necessary do you find the introduction of ecology lessons in high school/university? 0 – not necessary at all; 10 – very necessary and important. See comment on question 2.

- Question excluded<sup>12</sup>

4. How necessary do you find the raising of ecological awareness of the society (social advertising, brochures etc.)? 0 – not necessary at all; 10 – very necessary and important. See comment on question 2.

7'. Wie ökologisch bewusst finden Sie sich selbst? 0 - gar nicht ökologisch bewusst; 10 - extrem ökologisch bewusst.

Question excluded

1'. Inwiefern positiv schätzen Sie die Idee des Recyclings ein? 0 - sehr negativ; 10 - sehr positiv.

5. What is your attitude towards the concept of consumer society? 0 – very good; 10 – very bad. See comment on question 1.

3'. Wie notwendig finden Sie die Einführung des Ökologie-Unterrichts in der älteren Schule/Hochschule? 0 - gar nicht notwendig; 10 - äußerst notwendig.

6. How regularly/thoroughly do you sort the waste? 0 – never; 10 – always and very thoroughly. In this type of questions concretely personal environmental awareness level of the respondent is studied.

9'. Wie ökologisch bewusst finden Sie Ihre Familie? 0 - gar nicht ökologisch bewusst; 10 - extrem ökologisch bewusst.

7. How environmentally conscious do you find yourself? 0 – not environmentally conscious at all; 10- extremely environmentally conscious. See comment on question 6.

2'. Wie notwendig finden Sie die Einführung des Ökologie-Unterrichts in der Grundschule? 0 - gar nicht notwendig; 10 - äußerst notwendig.

8. To what extent are you ready to make an effort in order to improve the ecological situation in the world? 0 – not ready at all; 10 – ready to do everything. See comment on question 6.

4'. Wie notwendig finden Sie die ökologische Aufklärung der Gesellschaft (Sozialwerbung, Broschüren usw.)? 0 - überflüssig, gar nicht notwendig; 10 – unentbehrlich.

9. How environmentally conscious do you find your own family? 0 – not environmentally conscious at all; 10- extremely environmentally conscious. See comment on question 6.

- Question excluded

- Question excluded

5'. Wie gut ist Ihre Einstellung zum Konzept der Konsumgesellschaft? 0 - sehr schlecht; 10 - sehr gut.

10. Do you see a heap of waste separated for recycling as disorder? 0 – I see waste as disorder, not important if sorted or not; 10 - I see a heap of separated waste as order. See comment on question 1 and also Abrahamson and Freedman 2007.

6'. Wie regelmäßig/sorgfältig sortieren Sie den Müll? 0 - nie; 10 - immer/sehr sorgfältig.

11. What is your attitude towards bioproducts? 0 – there is no sense to produce them; 10 – they are absolutely necessary. See comment on question 2.

8'. Inwiefern sind Sie bereit, sich Mühe zu geben, um die ökologische Situation in der Welt zu verbessern? 0 - gar nicht bereit; 10 - bereit, alles Mögliche zu machen.

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See Procedure.

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