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## The response rate in postal epidemiological studies in the context of national cultural behaviour

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### SUMMARY

The purpose of this study was to analyse the effect of national cultural differences on the response rate, obtained in questionnaire based epidemiological studies on allergy and asthma, performed in Sweden (DBH) and Bulgaria (ALLHOME). The two studies used one and the same methodology, but the obtained response rate was different: 78.8% in DBH and 34.5% in ALLHOME. The differences in the obtained response rate and the reasons for these differences were analyzed on the basis of the Hofstede's cultural dimensions' indexes, which clearly show the distinction in the national cultural behaviour of people in Sweden and Bulgaria. It was found that national culture could strongly influence the response behaviour of people in epidemiological studies and Hofstede's indexes can be useful tool when designing and performing epidemiological studies, and in particular – questionnaire surveys.

**KEYWORDS:** *allergies, epidemiology, healthy homes and buildings, kindergartens, surveys*

### 1. INTRODUCTION

Postal questionnaires, phone calls, Internet, and face-to-face interviews are among the most used tools in carrying out epidemiological studies. When designing a study it is important to use both appropriate and validated questions and a winning strategy for delivering them to the targeted population. The obtained response rate is an appropriate measure for the efficiency of the selected strategy. High response rates reduce the extent of the non-respondent bias and give higher assurance that responders compose a representative sample. They are necessary background for obtaining quality databases and subsequent reliable analysis.

To compare results from epidemiological studies in different countries, one and the same strategy should be used. However, this could lead to unexpected effect, provoked by specifics of the national cultural behaviour. The delivery of the questionnaires to the parents through the schools seems to result in high parental activity and high response rate. ISAAC study obtained 85% response rate in Russia and 99% - in Romania (Strachan et al., 1997). Similar study in Russia got a response rate of 99% (Spengler et al., 2004). 92% response rate in Bulgaria and 97.8% in Romania, were reported by CESAR study (Leonardi et al., 2002). High response rate (97%) was obtained in Sweden as well, when questionnaires were sent via the school (Ronmark, 1998). When the questionnaires were sent directly to the family's post box, the results in some of the mentioned countries were different: 46.5% response rate was observed in Russia (Smith-Siversten, 2003) and 34.5% in Bulgaria (Naydenov, 2007).

The roots of these differences could be sought out in the specificity of the historical development, education, living standard, as well as relationship between the population and governmental structures. Identifying the cause would be crucial for the success of any project.

The objective of the present paper is to analyse the effect of national cultural behaviour on the different response rate obtained in questionnaire based epidemiological studies on allergy and asthma performed in Sweden (*DBH*, Bornehag et al., 2005) and Bulgaria (*ALLHOME*, Naydenov et al., 2005). Two different methods for delivery of questionnaires were examined: using the existing postal services and through institutions (kindergartens). The analysis is based on the Hofstede's cultural indexes, which are widely used in cross-cultural communication.

## 2. METHODS

The "*Dampness in Buildings and Health*" (*DBH*) study was carried out in Sweden in three phases between years 2000-2005. The aim of the study was to establish relationship between allergic symptoms and asthma among children and their exposure to different built environments (Bornehag et al., 2005). During the first phase of the project 14,077 questionnaires were distributed by post among families of preschool children in the county of Varmland, Sweden. The "*Association between Home Exposure and Asthma and Allergies among Children in Bulgaria*" (*ALLHOME*) was initiated in Bulgaria in 2004 and was focused on the impact of the indoor environment in homes on allergy and asthma morbidity among children (Naydenov et al., 2005). Being designed as a twin study to the *DBH* study, *ALLHOME* had two phases and used identical questionnaires, study tools and methodology, so as to make possible a cross-regional comparison of the *DBH* and *ALLHOME* results to be done (Naydenov, 2007). During the first stage of *ALLHOME* study 13,034 questionnaires were sent by post to parents of preschool children (age 2-7) in the cities of Sofia and Burgas.

The response rate within the phase of the questionnaire studies, obtained in Bulgaria (34.5%), was in contrast with the response rate, obtained in Sweden (78.8%). The values were calculated as the ratio of the number of questionnaires returned to the number of questionnaires distributed. The questionnaires contained similar questions (small amount of them being not simply translated from Swedish, but adopted in Bulgarian to be closer to the Bulgarian lifestyle) and were distributed via post, using one and the same methodology. Therefore the response rate was adopted as a starting point for assessment of the influence of the cultural behaviour in the two studies: *ALLHOME* and *DBH*.

The dimensions for evaluating cross-cultural differences, proposed by Hofstede (1997), were used to analyse the effect of the culture on the obtained response rate in *DBH* and *ALLHOME* studies. Hofstede's theory was selected, as being often used in cross-cultural communications and worldwide validated for many countries. The analysis was focused on the first four dimensions of Hofstede's theory: *power distance*, *individualism/collectivism*, *masculinity/femininity* and *uncertainty avoidance*. The fifth dimension, namely *long-term orientation*, related mainly to East-West cultural differences, was not appropriate for the present comparison. The four used dimensions, as defined in Hofstede (1997), are:

- *Power distance*, represented in numbers by the *Power Distance Index (PDI)*, reflects the extent to which the less powerful members of organizations and institutions (like the family) accept and expect that power is distributed unequally.
- *Individualism* (versus its opposite, *collectivism*), represented in numbers by the *Index of Individualism (IND)*, is the degree to which individuals are integrated into groups. As

higher IND is as loose the ties among individuals in the society are. The word “collectivism” in this sense has no political meaning: it refers to the group, not to the state.

- *Masculinity* (versus its opposite, *femininity*) refers to the distribution of roles between the two genders and has no sexual meaning. It is represented in numbers by the *Index of Masculinity (MAS)*: as higher MAS is, as bigger the differences between the roles of men and women in the society are.
- *Uncertainty Avoidance* deals with a society's tolerance for uncertainty and ambiguity. It is represented by the *Uncertainty Avoidance Index (UAI)*: high UAI values show that members of the society feel uncomfortable in unstructured situations - novel, unknown, surprising, different from usual.

When Hofstede developed his model for cultural dimensions, he could not obtain information about several countries in Central and Eastern Europe, including Bulgaria. Therefore Bulgaria was introduced in Hofstede’s database later on. Other studies, performed in Bulgaria, using Hofstede methodology, reported slightly different figures, concerning cultural indexes (Davidkov, 2004). Therefore the current analysis was based on both Hofstede indexes for Bulgaria and Sweden reported in (Hofstede and Hofstede, 2005) and data presented in (Davidkov, 2004) for Bulgaria only.

### 3. DISCUSSIONS

#### 3.1 Way of delivering the questionnaires

The explanation of the difference in the response rate in Sweden and Bulgaria, from the point of view of cultural behaviour can be found in both the *Power Distance Index (PDI)* and the *Index of Individualism (IND)*. Table 1 shows the values of the four indexes, used for Sweden and Bulgaria (according to Hofstede and Hofstede, 2005; Davidkov, 2004). Apparently, Bulgaria has a high PDI=70-75 and differs completely from Sweden (PDI=31).

According to Hofstede’s theory, in Bulgaria, as in other countries with high PDI (like Malaysia 104, Mexico 81, Arabian counties 80, India 77, Brazil 69; Hofstede and Hofstede, 2005) the school is an institution, treated with respect. Teachers have big influence on the children and, conversely, on their parents. Therefore the distribution of the questionnaires through the teachers can be taken as obligatory “homework” by the parents. The result is high response rate, as the one obtained in the CESAR study in Bulgaria – 92% (Leonardi et al., 2002). Obviously, the avoidance of the school (kindergarten) authorities in ALLHOME study could be a reason for the observed low response rate.

In contradiction, the influence of the authority of the teachers or the school as an institution on parents’ reaction would be minimal in countries with low PDI like Sweden (i.e. Netherlands 38, Germany 35, New Zealand 22, Denmark 18, Israel 13; Hofstede and Hofstede, 2005). The Hofstede’s theory shows that the use of any institution would not influence significantly the personal decision and responsibility of parents. This is supported by the data for Sweden (Strachan et al., 1997; Naydenov et al., 2005), where similar response rate was obtained regardless the methodology, used for distribution of the questionnaires.

Table 1. Cultural dimensions for Bulgaria and Sweden.

Country	Author	PDI	IND	MAS	UAI
Bulgaria	Hofstede and Hofstede (2005)	70	30	40	85
	Davidkov (2004)	75	49	50	68
Sweden	Hofstede and Hofstede (2005)	31	71	5	29

Distribution of questionnaires via kindergarten's authorities was tested at a later stage of the ALLHOME study, carried out in 8 kindergartens in Sofia. The kindergartens were situated in one of the regions, covered in the postal ALLHOME survey and the delivered through the teachers questionnaires were identical. The response rate in this case exceeded 90% (Naydenov, 2007).

The listed in Table 1 *Index of Individualism* for Bulgaria (IND=30-49) and Sweden (IND=71) reveals that the Bulgarian society is more collectivistic than the Swedish one. For people, accustomed to collectivistic or "group" relations, the "eye to eye" communication is very important. In ALLHOME study, the sender of the questionnaire in the post box was accepted as "anonymous", regardless of the explanations inside. The sender was not part of the "parent's group", thus the questionnaire deserved no big attention and efforts. On the contrary, the teachers in kindergartens were known, they belong to the "group" and the parents showed their respect when filling in the questionnaire. Therefore distributing the questionnaires in the classrooms, to all children and their parents could have a positive impact on the response rate in collectivist cultures.

### **3.2 The responsible parent**

ALLHOME and DBH questionnaires included not only questions on children's/family's health, but also questions on different aspects of the building characteristics (Bornehag et al., 2005; Naydenov, 2007). The parents needed to be well informed about both the health of the children and the family habits, as well as to be familiar with aspects of the construction of the building, repairs, etc. Some of the questionnaires in ALLHOME study were not completed, as the parent was not able to answer to one or more groups of questions. It could be assumed, that some of the questionnaires were not sent back due to the impossibility of the parent to answer to all questions, though there is no statistical evidence for this hypothesis.

Here, the cultural dimension *masculinity vs. femininity* can explain the parental response. The *Index of Masculinity* of Bulgaria is much higher (MAS=40-50, see Table 1) than that of Sweden (MAS=5). In cultures with high MAS (e.g. Slovakia 110, Japan 95, Austria 79, Italy 70, etc.; Hofstede and Hofstede, 2005), men dominate a significant part of the society and power structure. In feminine cultures (e.g. Norway 8, The Netherlands 14, Denmark 16, Costa Rica 21, Finland 26, Portugal 31; Hofstede and Hofstede, 2005) there is a low level of differentiation and women are treated equally to men in all aspects of the society. Besides, low MAS societies take much more care about preserving nature and people's quality of life.

In cultures with high MAS gender roles are clearly distinct: men are supposed to be focused on material success, whereas women are concerned with the quality of life. Similar trend can be observed in Bulgarian families, where mothers take care of the children (even though they are also supposed to work), and fathers are occupied with the livelihood. High percentage (71.5%) of the questionnaires in the ALLHOME study was filled in by mothers and a very small part by fathers (1.9%) or both parents (24.9%). Since the main focus in the study is on the child's health (mother's responsibility) more active participation of the mothers was obvious. However the prime recipient of the questionnaire was not taken into account in these analyses. The observed conformity can be even more profound in typical masculine countries.

The MAS index can be effectively used in deciding to whom the questionnaire should be addressed. Inability to fill part of the questionnaire (which is not of his/her competence), could make the respective parent to decide not to send the questionnaire back and be in favour

of the low response rate. Thus, the involvement of both parents should be insisted on in masculine societies and even considered as a technical necessity.

### **3.3 Effect of the participation**

When people are supposed to participate voluntarily in campaigns, usually in their free time, they react differently, but their reaction can be predicted, using Hofstede's cultural dimensions. The participation of parents, teachers and pediatricians in DBH (Bornehag et al., 2005), ALLHOME (Naydenov et al., 2007) is an excellent example of such voluntary work in the name of the society (through science). According Hofstede's theory, people in societies with high *Uncertainty Avoidance Index* (UAI) (e.g. Greece 112, Portugal 104, Guatemala 101, Belgium 94, Japan 92, France 86, Spain 86, South Korea 85, Israel 81, etc.; Hofstede and Hofstede, 2005) disbelieve that new findings or studies that show better solution for social problems, will be considered by the respective authorities and will be put into the practice. The high UAI for Bulgaria (UAI=68-85, see Table 1) is a sign that parents in Bulgaria disbelieved that their participation in ALLHOME study could lead to changes in the health system, improvement of their building conditions, etc. The last could discouraged them to participate in the questionnaire study and resulted in a low response rate.

In the contrary, belonging to a culture with low UAI (like Singapore 8, Jamaica 13, Denmark 23, UK 35; Hofstede and Hofstede, 2005) parents in Sweden (UAI=29) did probably believe that their voluntary participation in DBH study would be of benefit for the society as a whole. This reaction can be definitively interpreted together with the *masculinity index* (MAS index). Cultures with low MAS index accept any study or campaign, which reflects social problems and needs voluntary work. This binds also well with the low PDI for Sweden, which infers that people use any opportunity to express their opinion in context of improving their own lives (working conditions, interpersonal communication, etc). The high IND index shows also that personal opinion can and will provoke a change, as opposed to collectivistic cultures, where the personal opinion is disregarded in the context of the collective will.

### **3.4 Outside interference**

*Role of the time needed.* ALLHOME questionnaire consists of more than 100 questions and sub-questions that required time to be answered. The nature of the questions supposed careful reading and answering, making it even more time-consuming than i.e. a common marketing questionnaire. It can be suspected that people from a culture with high UAI (like Bulgarian one) would less tend to fill in such questionnaires and this can result in low response activity.

*Role of the pediatrician.* An interesting tendency was recorded during the ALLHOME study: parents rejected their participation in the study after discussions with their general practitioner doctor (GP). The low IND and high PDI explain the greater influence of the GPs opinions on the parents' decision, than the competence of the allergologists, involved in the ALLHOME study. The main reason was again the proximity of the GP to the family and his authority (as the teacher in the kindergarten), compared to the "unknown" organizers of the study. Therefore, the involvement of physicians, "closer" to the target group, should be encouraged, when planning postal epidemiological surveys in countries with either low IND or high PDI. Contacting the relevant specialist before the beginning of the survey can be an important factor for obtaining a higher response rate.

*Role of the media.* ALLHOME was among the first studies performed in Bulgaria on the association between allergy/asthma and indoor environment besides CESAR (Leonardi et al. 2002) and ISAAC (Strachan et al., 1997). For a country with high UAI, such novelty could be

accepted as a “threat”. The effect is even more profound since the study dealt with the children and family's health, lifestyle and home – things sacred for Bulgarian culture. Proper media coverage on the project could have a positive result in such societies. The use of well-known faces for advertising the aims of the study is very important for collectivistic cultures: the advertising “stars” could make people feel involved in the problem of the “group”, organizer of the campaign. Both DBH and ALLHOME studies used a letter, attached to each questionnaire, where a well-known person asked people for cooperation. Unfortunately, there was no information if and how the letters influenced the parents' decision to participate in the studies.

*The authors.* The authors (of Bulgarian and Swedish origin, some of them living for a long period in Denmark) realize that their national culture influenced the presented analysis. However they believe that their cultural diversity helped them to look on the problem from different angles, as epidemiological studies are team work and cultural differences should always be taken in consideration since they can be crucial for the success of the whole study.

#### **4. CONCLUSIONS**

Epidemiological studies in both Sweden and Bulgaria on allergy and asthma prevalence, based on postal questionnaire surveys among preschool children, resulted in substantial differences in the response rates in the two countries. Hofstede's cultural dimensions, used to assess the difference in the two cultures, offered a plausible explanation of these discrepancies. Hofstede's indexes can be used to develop winning strategies for increasing the response rates in future epidemiological studies.

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