

# Factor Analytic Study of Adolescent Attitudes towards Caves

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## Abstract

The protection of caves depends principally on the collaboration of the general public. One way to stimulate this collaboration is through the involvement of children and adolescents to caves while they are young so they will become interested in them. The present study presents a factor-analytic study identifying five factors underlying adolescent attitudes towards caves which can be explored.

“As cavernas não estão ali para serem dominadas, mas interpretadas e admiradas!” Lourdes Rezende de Souza.

The speleological patrimony of Brazil does not yet have a set of laws to protect it as such, although various decrees, resolutions and other measures provide some guidelines. For many years, caves were protected by their location, far from urban nuclei (FURQUIM, 1997), but in recent decades they have been at the mercy of the activities of man, from predatory tourism and mining to the construction of roads (PEREZ et al, 1986).

Na analysis of the limestone regions of the country, called Speleological Provinces (KARMANN, SÁNCHEZ, 1979), as can be seen in Figure 1, shows that they are no longer so far from urban nuclei. In fact, many are located in highly urbanized areas and have suffered the consequences of this. This, for example, is the case of Cajamar, in the the area of Greater São Paulo, where karst sink has occurred as a consequence of the use of water extracted from underground to supply the general public (OLIVEIRA et al, 1998; PRANDINI et al, 1995).



Figure 1

Nowadays, many people live in karst areas, or close to them, and this presents a tremendous demand for karst water, as well as the mining of minerals, agricultural activity, the construction of dams to supply electric energy and meet the demands of tourism and recreation (PILÓ, 1999).

This proximity of human communities leads to the need for educational awareness programs, since preservation requires a social commitment (PAULA et al, 1997). Before people are concerned with preservation, they must value what is to be preserved.

LABEGALINI (1995) has suggested the installation of a Program of Environmental Education in tourist areas to help overcome the impact of this activity on the environment. Such a task should be accompanied by various phases, from the development of projects to the execution of the necessary work and the implantation of a plan of management, which should remain in effect as long the area has touristic potential. This author also recommends that this program should be directed to the following groups:

- a) the population working in construction
- b) tourist guides
- c) the local population
- d) the visitors

The environmental education of the local population requires the implantation of programs in the schools, both elementary and secondary, as well as technical schools and the educational system in general in order to reach the local population. Some possibilities include projects in public parks, educative posters, lectures, etc.

In order to develop an effective program, however, it is necessary to understand how to reach the individuals involved. Without careful investigation this is not possible. The present investigation is a first step. In an attempt to provide a basis for such studies.

The methodology involved a study of the imaginary of adolescents of some 219 individuals, mostly from 13-16 years of age, although a few scattered individuals were as old as 20. All were studying in the schools in Campinas, and most had never visited a cave before.

A questionnaire was developed to test their feelings about caves. The spontaneously elicited comments about caves of the subjects in the study of FIGUEIREDO (1999) was used as a basis for the development of this questionnaire. This author identified the terms used to refer to caves in his population, which included individuals living in urban areas and karst areas, and those terms which were repeated by more than two or three individuals were included in our questionnaire. These terms were presented in a Likert-type format, using a seven-point scale for evaluation of importance. The subjects of the present study were then asked to evaluate each of these terms on this scale of 1 to 7 in relation to its importance in their feelings about caves.

A factor analysis of the results showed that five underlying factors can explain approximately 50% of the variation observed. These are shown below in Table 1, with their respective weightings (weightings above .4 are included, although given the limited size of the sample these results must be considered as only suggestive. The five most highly weighted factors have been identified as 1) Adventure, 2) Danger, 3) Scientific nature, 4) Factual description, and 5) Peace and security.

*Table 1. Factors revealed and relative weightings*

Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
.76 challenge	.68 silence	.72 minerals	.76 immense	.76 snug
.74 adventure	.62 bats	.65 speleothems	.67 large	.62 peace
.64 emotion	.58 loneliness	.55 stones/rocks	.49 deep	.61 balance
.58 mysterious	.53 dangerous	.55 exploitation*	.42 interesting	.54 living place
	.49 fear			

*\*The term used in Portuguese (explorar) has two independent meanings, one in relation to exploring the unknown, and the other of exploitation and the taking advantage of something. Given the other items in this factor, it was assumed that the interpretation had been the latter.*

Almost no differences were identified in relation to age or sex, nor did having visited a cave seem to influence the factors revealed. These factors suggest the mixed nature of feelings about caves. On the one hand, they excite the emotions with ideas of challenge and adventure, while they also solicit feelings of

danger and fear. What was surprising was the importance of the fifth factor in the group as a whole, apparently involving feelings of peace and security. Various subjects feel the attraction of caves as a site of peace and comfort (or reject this idea), whereas others are much more interested in the ideas of challenge and adventure (or, again, reject caves for this reason).

The results of this study can be seen to suggest that any program of environmental education should take varied factors into consideration. Not only is it necessary to approach the subject of caves in a factual way, including information about their importance, but more emotional aspects should also be included.

These results suggest that the aspects which are considered do not change after contact with caves. Since it is impossible to anticipate individual reactions from only vicarious experience, more direct contact caves is necessary.. Future studies are planned to study the effect of actual contact with caves on the profile of individuals in relation to these factors.

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