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# PSYCHOLOGICAL FOUNDATION OF INTERVENTIONS TO PROTECT BRYOPHYTES

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*SUMMARY* — The present paper deals with known measures aimed at changing human behaviour and attitudes to species and habitat conservation. Three different ways of approaching the problem are presented: behavioural approaches, cognitive approaches and social approaches. Each group of them may give rise to several kinds of intervention aimed at changing attitudes and behaviour. Corresponding practical advice is given for bryophyte conservation as well as for general nature conservation. Finally, a concerted strategy of psychological intervention in favour of endangered bryophytes is proposed: 1. to gain attention — 2. to explain the aims — 3. to call forth a positive attitude — 4. to bring about willingness to act — 5. to induce appropriate behaviour — 6. to achieve continuance of action.

*KEYWORDS* — Conservation, behaviour, attitude, intervention programme, psychology

*ZUSAMMENFASSUNG* — Psychologisch begründete Interventionsformen für den Mooschutz

Es wird versucht, einige bekannte und belegte Massnahmen zur Änderung der Einstellung und des Verhaltens bei Menschen für den Arten-, Biotop- und Naturschutz anwendbar zu machen. Zunächst werden drei verschiedene Ansätze zur Einstellungs- und Verhaltensänderung vorgestellt: Verhaltensorientierte, kognitionsorientierte und sozial orientierte Ansätze. Unter den genannten Ansätzen werden verschiedene Interventionsformen zu Einstellungs- und Verhaltensänderungen aufgezeigt und jeweils dazu passende Hinweise für den Moos- und Naturschutz abgeleitet. Zusammenfassend wird eine konzertierte Strategie psychologischer Interventionsformen zum Mooschutz vorgeschlagen, welche folgende Elemente enthält: 1. Aufmerksamkeit erlangen — 2. Ziele verständlich machen — 3. Positive Einstellung erzeugen — 4. Handlungsbereitschaft herstellen — 5. Zum Handeln veranlassen — 6. Handlungskontinuität erreichen.

## Introduction

Psychology seeks to explain human experience and behaviour. Unfortunately, there is no psychology that can explain man's experience and behaviour in relation to bryophytes. In fact, we have hardly any empirical psychological knowledge at all on the relationship between man and nature (as a first theoretical approach see Seel & al. 1993). This would probably not even be relevant to the subject of this conference, the conservation of bryophytes. For this reason I will try to apply some known and proven methods of changing people's attitudes and behaviour to the field of conservation of species, biotopes and nature. I will not attempt to cover behavioural change with regard to general environmental protection, legal and economic determinants or the superordinate goal behind all the efforts: the maintenance of biodiversity.

We will first look at some general principles of attitude and behaviour change (Kruse & al. 1990, Schahn & Giesinger 1993) and then discuss specific forms of intervention, always trying to apply these to the area of bryophyte conservation. Finally, I would like to discuss concrete measures and sketch out concerted strategies of psychological intervention forms for bryophyte conservation.

## Approaches to change attitudes and behaviour

How can attitudes and behaviour be influenced and changed? There are three fundamental approaches to change attitudes and behaviour:

**1. Behavioural approaches:** In this view, behaviour can be changed by changing its external determinants. The premise of the behaviourist line is that inner factors and processes are not relevant to change in behaviour. Behaviour changes when either the antecedents or the consequences of it are altered.

**2. Cognitive approaches:** It is assumed that for behaviour to change, change in cognitive factors, such as in knowledge or values, or change in inner processes, such as conflicts or resistance, is required.

**3. Social approaches:** The position is that the behaviour of the individual is influenced by the opinions and the behaviour of other persons. Therefore, behavioural change can be accomplished by changing social determinants.

These approaches notwithstanding, attitudes and behaviour are not easily changed. But we can identify determinants which will tend to lead to changes in attitudes and behaviour. Changes reported here are almost exclusively those which have been demonstrated empirically in the field of environmental protection. According to Urmi & al. (in press) there are three ways in which bryophytes are to be protected: direct protection of the species, conservation of the natural and semi-natural habitats of them and general protection of the environment. As mentioned above, general environmental protection will not be discussed here. In order to achieve direct protection of species, attitude and behaviour change in individuals is appropriate. However, in order to protect natural habitats of bryophytes, we cannot only depend upon responsible individuals, but require the efforts of groups of persons and whole communities, as will be discussed later on. Because measures to protect bryophyte habitats may also further general nature conservation, this will also be mentioned.

### **Psychological forms of intervention for the conservation of bryophytes and of the natural environment**

In the following, I will introduce various forms of intervention leading to attitude and behaviour change as suggested by the three approaches outlined above. From these I will derive appropriate suggestions for measures to protect bryophytes and environment.

#### **1. Behavioural approaches: Changing behaviour through change in behavioural antecedents and behavioural consequences (Geller 1982, Fisher & al. 1984)**

##### **Environmental alteration (Options for Behaviour)**

This term denotes the antecedents inherent in a situation, the possibilities and opportunities to perform certain kinds of behaviour. The more appropriate options are open, the more likely is appropriate behaviour.

For the protection of bryophytes species, this means that in order to prevent direct damage to bryophytes (for example, damage incurred by trampling), we must create paths, routes (including routes for climbers) and observation posts which lead people around the species to be protected.

##### **Prompts (Instructions)**

Prompts are usually requests which are supported by information and tips on correct behaviour. We can distinguish between asking people to do things and asking them to avoid a certain kind of behaviour. Instructions are most effective when they are given directly, that is, they must be given at the place and time the behaviour is to be carried out. Instructions are not effective where the cost incurred by following them is too high or where they would affect important behaviour. Additionally, if they are phrased too strictly, they provoke resistance.

Prompts can be used to protect bryophyte species directly, especially those growing in restricted areas and substrates such as erratic boulders or active calcareous tufa. Signs urging people to watch out, to heed instructions or to refrain from harmful behaviour are most effective when they appear directly on the spot, or in nature guides and on nature maps at the relevant positions. Such instructions should not be phrased as strict demands, as this can elicit a counteraction in persons who then, deliberately or not, disregard them.

##### **Incentives and rewards**

Incentives and rewards encourage appropriate behaviour by influencing the anticipated profit/loss relation of it. These can be financial supplements, shopping coupons, lotteries or special

**discounts.** People respond well to rewards. Rewards can, however, hinder the growth of inner motivation to change behaviour, if persons put changes in their attitudes and behaviour down to the fact that they can receive rewards. For this reason, rewards must be given in the correct proportion and also together with appropriate attitudes. Small rewards or rewards given sporadically can be more effective than large ones.

Participation in protecting a species or a natural habitat can be triggered in individuals and in communities by means of special incentives: monetary rewards which balance out any expenditures, or the naming of a community as a community protecting a biotope, designating a particular biotope as a tourist attraction, etc.

### **Feedback**

Feedback on one's own behaviour helps make one conscious of the consequences of one's behaviour, and any discrepancies between actual and desired behaviour become apparent. Feedback on the effects of one's own behaviour contributes to making behavioural ability more optimal. Attention becomes drawn to discrepancies between goals and actual results. Feedback is all the more effective the more frequently it is given.

It is exceedingly important to inform individuals and communities about behaviour taking care of nature so that at least those persons who wish to act accordingly can do so. Feedback on the progress a species is making or on the reappearance of species having vanished is very motivating to those who have made efforts.

## **2. Cognitive approaches: Behavioural change by means of changing cognitive factors or processes (Frey & al. 1990, Nöldner 1990, Spada 1990)**

### **Needs**

Persons have needs which they attempt to satisfy. In Maslow's (1954) well known hierarchy of needs they try to satisfy them according to the following priorities: vital physiological needs (hunger, thirst, reproduction); safety needs (protection from pain and fear, striving for order and control); needs for social attachment (love, nurture, security, social membership); esteem needs (striving for achievement, recognition and acceptance); need for self-realization.

We can assume that the need for self-esteem is predominant for many persons. Persons who devote efforts to nature conservation will therefore respond to praise, recognition and thanks. In the same way, communities which take measures to protect a biotope should receive recognition, for example receive a public award, because such awards serve to further motivate members of the community.

### **Values**

In environmental protection circles and organizations, it is frequently assumed that a change in values is necessary if environmentally responsible behaviour is to increase. Value change cannot, however, be directly initiated, and it is surely a long-term process. Value change can be elicited, among other ways, by shifting the main emphases in individual value systems or by changing the conditions of an individual's life. These are not easy or simple routes. In addition, we can assume that many people would probably highly value 'diversity in nature', but they would not behave accordingly. This leads to the question of the conditions which have to be met in order that values become effective in directing behaviour. Value attitudes become motivating and relevant to behaviour when 'new' behaviour can be shown to conform to the value system. They also have an effect on behaviour when it can be shown that values stand in relation to concrete goals with regard to the natural environment, and when specific behaviour can be shown to lead to the reaching of these goals.

In the field of nature conservation, this means that nature-oriented values in persons will activate behaviour if we succeed in bringing together values and concrete goals (for example, 'increasing biodiversity') and goals and concrete behaviours (for example, 'creating varied habitats').

### **Attitudes**

Persons tend to develop new attitudes more readily when these attitudes are held by several independent but consistent sources of information, and when it can be shown that these sources are not acting in their own interests. Further, it is important to proceed without exaggerated intentions to influence (with too much pressure) and without treating the public as infantile. A certain degree of credibility on the basis of trustworthiness and factual knowledge must be demonstrated. Attitudes become effective in guiding behaviour when they are central, important and functional, and when they correspond to perceived expectations and subjective norms in the social environment. Also, if we succeed in inducing 'new' behaviour by means of positive consequences, corresponding attitudes can then follow.

The attitude of 'Bryophytes should have their place in nature' should be represented in a concerted program of many independent organizations (WWF, SBN [Swiss Association for Nature Conservation], BUWAL [Federal Office of Environment, Forests and Landscape], Botanical Societies, etc.). Those in bryophyte research should support their credibility by publicly committing themselves to stop collecting any bryophytes on the Red Data List (even if they have already ceased to do so). Protection of species and biotopes should not be forced through pressure, but rather planned together with those who can help (landowners, authorities, farmers etc.). Experts on bryophytes should not preach 'from above' that they alone possess the necessary knowledge about nature. Introduction of a kind of 'experimental' attitude in protection efforts would present a possible way to reduce fear of definite changes. For example, instead of closing off a valuable biotope as a natural reserve, one could invite the public to participate in observing the results of partial measures (for example, the building of paths).

### **Factors in consciousness of nature**

Corresponding to environmental consciousness, we can assume that consciousness with regard to nature is determined by the following factors:

**Knowledge of nature** — Educating people with regard to processes in nature continues to be necessary. Knowledge on the occurrence and special characteristics of bryophytes must be spread, as well as information on the important role they play as bio-monitors in protecting the environment.

**Perception of nature** — We need to work with people and help them to perceive nature as being more than a green backdrop to life. They need to begin to perceive bryophytes: How do they look? What distinguishes them from other plants? How important are they as indicators of biotic communities and of environmental quality?

**Being emotionally affected by the issue** — Disappearance of the bryophytes is an issue that does not easily move a lot of people emotionally, certainly not in the way that the extinction of a large mammal or a bird species can affect people. Help could be given by bringing people's attention to the aesthetic beauty of bryophytes in small biotopes. For example, good pictures of biotopes with and without bryophytes could be shown, side-by-side, using photomontage. The loss of beauty and the threat to a natural habitat, as shown through the disappearance of bryophytes, could evoke people's emotional involvement.

**Assignment of responsibility** — Only persons who feel responsible for something act accordingly. In order that people become actively engaged in protecting nature and bryophytes, this must become an issue for persons and communities and should not, for example, become a matter delegated to some institution or governmental department.

### **Self-efficacy (to exercise control)**

Control over the environment that is, the experience that changes in the environment can be caused by one's own behaviour, is a central human need. In order to protect nature, it will be important to show people how they can contribute to positive changes in nature.



**Reactance (resistance)**

Human beings tend to want to have as much room to act, as much leeway as possible, and they defend themselves against restrictions of their personal freedom. Any limitations to their freedom lead to resistance (reactance), which is expressed in the form of contrariness, aggression, neglect, passivity or negative evaluation. There is the danger that 'forbidden' objects, areas and behaviour can be seen as having increased value.

It is extremely important that measures to protect nature are developed in cooperation with the persons who will be involved that their suggestions be accepted and that their reactions receive attention and consideration.

**Conflicts**

People strive for consistent, contradiction-free relations within their cognitive systems (values, attitudes, readiness to act, perception of one's own behaviour, and so on). It is for this reason that self-commitment to certain actions is effective, especially when publicly declared. Self-commitment exercises effective pressure (for consistency between self-commitment and behaviour), because behaviour contrary to the commitment would cause both self-esteem and one's reputation to suffer. Contradictions are the weak point in many behavioural routines, and it is to them that efforts can be directed. If people are made aware of contradictions between their attitudes ("I am in favour of nature conservation") and their behaviour (example: hiking through the courtship area of a species during a critical period), they will feel uncomfortable. This can lead to changes in behaviour. However, tact must be exercised when revealing these contradictions, or we might provoke opposite reactions. If persons and communities can be moved to public commitment to perform concrete acts to protect nature and the bryophytes, they will then make efforts to fulfill their self-commitment.

**Attributed causes of behaviour**

People tend to see the behaviour of others as stemming from their personal motivation; their own behaviour is however usually attributed to aspects of the situation. Moreover, people often over-estimate the prevalence of their own views within society and also over-estimate their own willingness to act with regard to problems. If others do not behave in an environmentally responsible way, they attribute this to a lack of environmental consciousness. As for themselves, however, conditions of the situation are seen as responsible. Due to this, general appeals to the public to protect nature will have no effect on most persons, whereas specific instructions in actual situations, for example identifying plants at their growing site and the request that people refrain from pulling them up, will result in nature-responsible behaviour.

**Information processing**

Human beings process information according to the following principles (among others):

- They place too much weight upon concrete, conspicuous bits of information that stand out in some way
- They have the need to have bases for decisions which are as clear as possible
- In dealing with complex problems, they tend to form irreversible focuses or superficiality and have too little readiness to make decisions and take on responsibility
- They react more sensitively to loss than to possible gain.

Attractive information on bryophytes can be given if we consider the special characteristics of these plants, as for example in the case of bryophytes which grow in special places or under special conditions. What needs to be done to protect bryophytes must be outlined as clearly as possible, even if the matter is complicated. In particular, we must make sure that the measures we suggest do not seem to the layperson to contain any contradictions (even though the expert may see no contradictions). If we do not attempt to present a very simplified picture of the necessary measures, there is the danger that people concerned will feel powerless in the face of a complex situation, and they will not be able to make decisions. This phenomenon

is responsible, for example, for the frequent argument that more research be needed before action can be undertaken. Finally, telling people how many different species of bryophytes which will be extinct if we do not protect them will be much more effective than telling them how many species can be saved. For example, an effective bit of information is to explain that certain plants having special pharmaceutical properties will be lost to mankind.

### **3. Social approaches: Behaviour change through change in social determinants** (Gifford 1987, Ernst & Spada 1993, Spada & Opwis 1985)

#### **Models**

Behaviour can be influenced by means of both verbal instructions and models for behaviour. People do not learn only from their own direct experience, but also vicariously through observation of others.

Visible, conspicuous, well-proven and positively evaluated models as well as their positive experience should be presented as examples to emulate. Through observation or through the communications of prominent and respected persons relating their positive experiences with efforts to protect nature, people will be animated to behave in similar ways. 'Pioneers' can be good models. In addition, communities will tend to engage themselves in efforts to protect bryophytes and nature if they hear about positive experiences other communities have made.

#### **The Commons Dilemma**

When using a resource available to all (common property), an interpersonal conflict arises, because each individual person has an interest in greatest possible benefit (use) for himself, while at the same time, resulting depletion of the resource or damage due to use must be borne by all. Mostly, damage to the resource is greater than the benefit. However, for the person causing the damage, this benefit is mostly greater than the share of the damage that affects him alone. Benefit is thus individual, but damage is social. Moreover, benefit occurs immediately, while damage shows up only with a temporal lag. These factors result in an overtaxing of the individual and unintentional overuse of the common resource.

Common resources may be animals and plants in nature, but also habitats, small biotopes and nature reserves can be called common goods. When defined this way, problems in the use of resources by all involved can become conceptualized. Discussion can begin on the question of why only certain individuals, for example the quarry owner, or only certain groups, such as a conservation organization, are allowed the exclusive use of a habitat. In order to solve such ecological-social conflicts, knowledge of others' behaviour is crucial: the conflict can be significantly reduced when use becomes visible to the public, communication takes place and binding agreements are made.

#### **We mutually 'trap' each other in behaviour which damages the environment**

In large anonymous social systems, members mutually 'block' or 'trap' each other in their environmentally damaging behaviour (Mosler 1993). Through acts which threaten the environment, everyone hinders possible development of alternative, environmentally correct behaviour in everyone else. The way a social system utilizes resources has a significant influence upon the behaviour of individual persons, because it determines the potential total profit of individual resource use: If many overuse a resource still profitable to use, then the individual must also overuse (use of a depleted resource will no longer profit anyone). If the individual does not overuse, then he will suffer not only from the long-term damage to the resource caused by overuse, but also in that his own direct profit will be small. When the collective overuses, overuse by individuals seems 'rational'. In this way, the collective pattern of behaviour is maintained right up to final depletion of a resource; one's own individual contribution to sparing the resource by means of more modest use seems, in view of the environmental damage caused by others, insignificant and also unreasonable.

In a region where most farmers make intensive use of hedgerows, green fallow land and zones edging forests, an individual farmer will make less profit if he does not do likewise. Moreover,

he must also, along with the others, bear any damage done, such as damage to beneficial insects as they lose their habitats.

Appropriate use of nature must start out at the level of a small group which takes on the commitment to act in an environmentally responsible way, makes the commitment public and allows checks and controls on their behaviour. This kind of supervised, public commitment creates trust and can thus call into being a reciprocal influence leading to environmentally appropriate behaviour. This could trigger a snowball effect leading to extensive behavioural change with regard to the environment.

### **A psychological intervention programme for the conservation of bryophytes and nature**

Following the different possibilities of effecting change in attitudes and behaviour presented above, I would like to outline a concrete suggestion for proceeding. This proposal of an intervention programme is derived from a successful environmental protection programme (tin recycling) developed by Kok & Siero (1985). It comprises six steps:

#### **1. To gain attention**

We must gain the public's attention for bryophyte conservation. Here, the points I mentioned under information processing can come into play: vivid, conspicuous, attention-getting information must be presented to the public, for example by means of artistically beautiful photographic material or a television documentary on interesting, astounding forms of life (specialists) and the special development of bryophytes. The special importance of the bryophytes as indicator plants within the field of nature conservation must be explained. We should not assume from the start that nobody will be interested in bryophytes, but rather carefully think about what the really astounding phenomena in bryophytes are and then, perhaps in consultation with media experts, find ways to present these phenomena in an accordingly fascinating way.

#### **2. To explain the aims**

The program's goals must be understandable. Again, the field of information processing can aid us here: in order to ensure their own credibility, bryophyte researchers must of course present the complexity of the problems, but only in such a way that they supply the public with clear bases for decision-making.

#### **3. To call forth a positive attitude**

Unconcern in bryophytes must be changed into the positive attitude that "Bryophytes should have their place in nature". The most important step here is to make sure that representatives of this attitude are very credible persons in the eyes of the public. This can be achieved when they make a public commitment to refrain from collecting endangered bryophyte species. A further step is the initiation and carrying through of a concerted campaign in which various organizations emphasize the importance of bryophyte protection.

#### **4. To bring about willingness to act**

The most important influencing factors in willingness to participate in protecting bryophytes are social determinants. The key here is to find persons and also communities who are willing to serve as pioneering models and to communicate the positive experiences they have in protecting bryophytes. Further, it seems important to conceive of nature and bryophytes protection as a commons dilemma: conflicts need to be spelled out early along, and agreements must be reached. In addition, self-commitment of responsible persons and also communities should be sought after by, for example, creating incentives or by means of special tourist attraction programs and so on.

#### **5. To induce appropriate behaviour**

People can be induced to act mainly through factors which stand in direct relation to behaviour, as for example through special offers, instructions or incentives. As mentioned previously, this means for nature and bryophyte protection that we create paths, routes and observation



posts, position instructive notices at crucial sites and create specific incentives such as compensations and awards.

#### 6. To achieve continuance of action

Lasting, continuing efforts to protect nature and the bryophytes can be achieved with positive experiences. Most important here will be the use of rewards (of an appropriate magnitude) and positive feedback on the success of efforts. As this will be rather difficult in the area of bryophytes, a new kind of monitoring system could be developed which would tap even the smallest changes in the development of bryophytes. Reports of success, together with the experience that oneself can effect positive changes and also act in a way which is consistent with one's own values and attitudes, will have the greatest effect upon continuity with regard to behaviour.

### Conclusion

In summary, let me state again the two most important points for efforts to initiate effective conservation of bryophytes:

1. To gain public attention to the problem of bryophyte conservation.
2. To carry through a concerted programme having as its goal community commitment to conserving habitats.

Achieving these aspects, and taking into consideration the other points discussed here, will with great probability lead to a significant and lasting contribution towards saving the beauty and diversity of our flora and fauna.

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