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DEVELOPMENT AND VALIDATION OF SCALES ON ENVIRONMENTAL EXPERIENCES

The ENU ("Skalen zum Erleben der nichtmenschlichen Umwelt") is a German-language psychological instrument developed to obtain information about how people relate to their physical environment. The 62 statements cover various themes of environmental experiences, such as urban life, modern design, stimulus seeking, hobby crafting, privacy, nature, plants, and environmental concern. Many statements are from the "Environmental Response Inventory" (ERI) by McKechnie (1974). Some relationships between the ENU and demographic variables, environmental behavior, holiday preferences, postmaterialistic values and housing conditions are reported.

Introduction

A main problem of architects, city and regional planners, and other environmental designers is their insufficient knowledge of the users' needs and preferences. This causes environmental experts to base their design concepts on their own values and desires, assuming that these are also shared by the users. But this assumption is often wrong, and the created surroundings do not satisfy the users.

For research on environmental design we therefore require a psychological questionnaire which provides information on individual concepts, needs, values, preferences and interests concerning various aspects of the physical environment. Such a comprehensive, multiscale instrument has not yet been developed in Germany. But the Environmental Response Inventory (ERI) by McKechnie (1974) appears to be appropriate for this purpose. The ERI looks into "attitudes toward a wide array of environmental themes, including conservation, recreation and leisure activities, architecture and geography, science and technology, urban life and culture, aesthetic preferences, privacy and adaptation" (McKechnie, 1974, p.1). McKechnie developed the ERI "for interdisciplinary studies of man and the environment; these include research in the fields of architecture and urban design, city and regional planning" (McKechnie, 1974, p.1). In his contribution, Espe (1984) describes the rationale of the ERI, the meaning of the scales, and some research applications.

We feel that an environmental questionnaire based on the ERI but adapted to German conditions might prove useful in diverse research applications. We intend to employ it for the investigation of the

psychological aspects of green solar architecture. For the latter studies, however, several items have to be added concerning environmental aspects not included in the ERI.

The purpose of this paper is to present the new German language environmental questionnaire. The development of the instrument, the meaning of the scales, and some validation studies are briefly described (for a detailed report see Krampen, Seiwert and Espe, 1984 and Seiwert, 1984).

Development of the ENU

The first German studies with a translation of the ERI are reported by Espe (1984). As we felt that the ERI was too long for most research applications, the validity scale "communality" was omitted. Moreover, all items with non-optimal item statistics were deleted, as they obviously apply to special American situations only.

With the exception of the scale "Environmental Trust", all ERI scales could be replicated by factor analytic techniques. The scale "Environmental Trust" was thereupon replaced with the scale "Personliche Betroffenheit" by Kley and Fietkau (1979), which measures a special aspect of environmental distrust, namely, the apprehension and fear of ecological problems, such as pollution and scarcity of resources. Unfortunately, the number of remaining items for the scales "Pastoralism" and "Environmental Adaptation" was too small, indicating a considerable culture-dependence of these scales. Therefore, new items adjusted to German conditions had to be added.

Several new items had to be constructed concerning those environmental aspects which are not included in the ERI, such as the interest in plants and animals, the sensitivity to the influences of weather, and the preference for natural versus synthetic materials.

In this way, a modified version of the ERI was developed and revised according to the principles of classical test theory. The resulting new German-language environmental questionnaire is called ENU (Skalen zum Erleben der nicht-menschlichen Umwelt). The 62 items form 11 factors or scales which are briefly described below. Five scales correspond well with the respective American ERI scales.

- "City Life" (Großstadtleben) adapted from the ERI scale "Urbanism": preference for life in a large city; interest in cultural events, shopping, and meeting diverse people.
- "Modern Design" (Moderne Gestaltung) adapted from the reversed ERI scale "Antiquarianism": preference for highly designed, orderly, and modern environments.
- "Stimulus Seeking" (Reizsuche) adapted from the ERI scale of the same name: need for adventurous leisure activities and various intense physical sensations.
- "Hobby Crafting" (Basteln) adapted from the ERI scale "Mechanical Orientation": interest in and skill for mechanics, primarily hobby crafts.
- "Need for Privacy" (Alleinsein) adapted from the ERI scale for the same name: need for physical and psychological isolation.
- "Environmental Problems" (Umweltbelastung): apprehension and fear

with regard to ecological problems; environmental concern.
"Nature" ("Natur"): enjoyment of purely natural experiences; preference for natural environments not altered for man's benefit; this scale corresponds to the ERI scale "Pastoralism".
"Plants" ("Pflanzen"): interest in the care-taking of plants.
"Animals" ("Tiere"): interest in the care-taking of animals.
"Weather" ("Wetter"): sensitivity to the influences of weather.
"Smoking" ("Rauchen"): sensitivity to tobacco smoke.

Evaluation of the ENU

For our validation studies we employed the data from a quasi-representative sample of 494 persons from West Germany and West Berlin. In addition to the ENU, data pertaining to the following topics were collected: demographic measures, housing conditions, values orientation, holiday preferences, ecologically-oriented behavior. Multiple correlations were computed in order to obtain concise information about the relationship between an ENU scale (criterion variable) and a set of predictor measures. Those variables which had proved most important in the preceding bivariate analyses (see Krampen, Seiwert, and Espe, 1984, and Seiwert, 1984) were selected as predictor measures. We chose as criterion variables those 4 ENU scales which appear to be most useful for research on environmental design, especially on new architectural concepts such as green solar architecture.

"Plants" Scale (Multiple R = .49): According to the significant regression weights, the highest scores on the "Plants" scale are found among women (B = .23) who have a low level of education (B = -.13), do not live in large cities (B = -.12), prefer postmaterialistic values (B = .11), like to spend their holidays in uninhabited natural settings (B = .19), and who attend meetings of environmental organizations (B = .19).

"Nature" Scale (Multiple R = .50): The significant beta weights indicate that a high sensitivity to and appreciation of nature is found among young people (B = -.27) who have socially-oriented professions (B = .14), emphasize postmaterialistic values (B = .12), attend meetings regarding ecological or conservational issues (B = .14), are most interested in uninhabited wilderness (B = .14), and who are least interested in shopping (B = -.19) during their holidays.

"Modern Design" Scale (Multiple R = .63): According to the significant regression weights, the highest modernism scores can be expected among old people (B = .43) who do not have socially-oriented professions (B = -.15), do not live in large cities (B = -.13), prefer materialistic values (B = -.11), neither attend meetings regarding environmental problems (B = -.10) nor recycle glass and paper (B = -.12), and whose primary vacation interest is shopping (B = .20).

"City Life" Scale (R = .51): Respondents with a strong interest in urban life-style usually live in large towns (B = .36), have a high level of education (B = -.10). They prefer visiting places of cultural organizations (B = .14) and meeting people (B = .10) during their holidays, and are not interested in uninhabited natural settings (B = -.13).

Discussion

The validation of the ENU is far from complete, but the findings available at present seem promising. The scales still need to be tested in various applied research projects before their predictive and construct validity can be established.

We have never intended to construct an instrument that exhausts the domain of environmental experiences. But, we feel that the ENU comprises a broad range of themes which are important for disciplines concerned with the problems of environmental design, primarily architecture, and city and regional planning. Certainly, the ENU scales can be applied advantageously in other research areas too; for example in clinical psychology, as Krampen and Seiwert (1984) have shown.

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