Policy, competence and participation: empirical evidence for a multilevel health promotion model

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SUMMARY

This paper uses data from a European health promotion evaluation study (MAREPS) to empirically test some fundamental assumptions of health promotion theory. Analysis shows that both the competence of individual actors and the opportunities provided for by health-promoting policies are significant predictors of participation in health promotion action. It also demonstrates effects of health promotion values on such action. Moreover, people's perception of their own political efficacy, e.g. their influence on community decisions that effect their health, turns out to be a significant predictor of self-rated health. In conclusion, the paper encourages further research to investigate the effectiveness of health-promoting policy strategies within a multilevel health promotion framework. As the present results indicate, effective health-promoting policies may create opportunities that enable individuals and communities to increase control over the determinants of health, and thereby improve their health.

Key words: collective efficacy; community participation; cross-national comparison; health promotion policy

MULTILEVEL HEALTH PROMOTION MODEL

The Ottawa Charter has defined five domains of health promotion action: building healthy public policies, creating supportive environments, strengthening community action, developing personal skills and re-orienting health services (World Health Organization, 1986). Traditionally, these domains relate to different contexts of research and practice. For example, for building healthy policies, institutional and (inter-)organizational analysis and changes are major concerns, while developing personal skills is rather based on psychosocial models. For both theoretical and strategic purposes, however, it seems appropriate for further investigation to involve at least two or more of the Charter's five action domains. As has been stated by Levin and Ziglio [(Levin and Ziglio, 1996), p. 33]:

This is essential, given the central purpose of exploring the nature of domain interactions. Gaining an understanding of these relationships will provide for a rationale for strategic decision-making in health promotion. We should be able, as a minimum, to develop some insightful and informed hypotheses regarding the level, quality and relative contribution of action domains in combination. We should be able to identify the social pathways which connect components and begin to build some strategic hypotheses regarding the most efficacious ordering and timing of health promotion action.
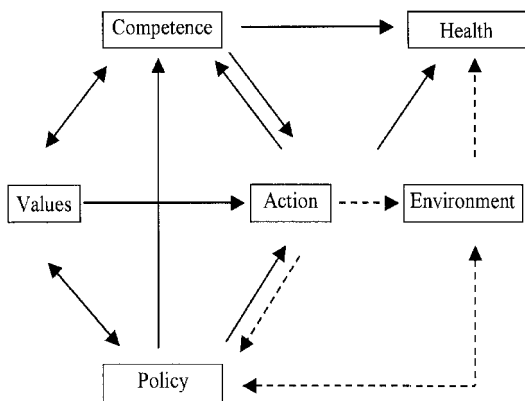
Fig. 1: Multilevel health promotion model.

The multilevel health promotion model employed in this analysis (Figure 1) has been derived from a general concept of 'logic of events' originally presented by von Wright (1976) and adapted as the theoretical framework for developing the present study. According to this framework, new opportunities, e.g. provided by health promotion policy, may stimulate individuals to participate in health promotion action, given that they want, have the ability and are committed to do so (Rütten *et al.*, 2000). Based on both this particular theoretical framework and previous empirical research the following section will: (i) define the various elements of the model; (ii) explain the relationship between them; and (iii) develop assumptions for empirical analysis (relationships indicated by broken lines in Figure 1 are not part of the empirical analysis).

Previous empirical research which contributed to a multilevel health promotion framework started from different perspectives which have been integrated in our model. One starting point is the re-emerging interest in policy and environmental approaches to prevention and health promotion (Milio, 1981; Rütten, 1995; Schmid *et al.*, 1995; Brownson *et al.*, 1997; Milio, 1998; Rütten, 2000a). For example, in terms of relationships to other levels, public as well as private organizations' policies can provide incentives and support and create new opportunities for the development of personal skills as well as for community participation. Accordingly, in our model policy may be defined as (inter-)organizational decision for strategic efforts to influence individuals and their environment; thus, policy is related to both competence and action (see arrows in Figure 1).

From a different point of view, several psycho-social concepts have encouraged multilevel investigation. For example, approaching health promotion from the perspective of social cognitive theory, Bandura (Bandura, 1997; Bandura, 1998) recently has emphasized the notion of 'collective efficacy' which he defines as people's belief in their efficacy to accomplish social change, thus playing a key role for collective action in health promotion and disease prevention. Accordingly, in our model the competence-construct comprehends people's motivation and perceived ability for community involvement, and is expected to be a significant predictor of participation in health promotion action.

Of course, this specific pathway between competence and action might be particularly strong because it may work in the opposite direction as well. As has been emphasized by Antonovsky [(Antonovsky, 1987; Antonovsky, 1996), p. 15], the strength of one's sense of coherence '(...) is shaped by three kinds of life experiences: consistency, underload–overload balance, and participation in socially valued decision-making'. Thus, participation in health promotion action may affect the development of individual competence, and vice versa (see arrows in both directions in Figure 1). Besides, as these psychosocial approaches have proven their significant health impact, in our model we expect direct health effects of competence as well.

Other approaches investigated the relationship of health, sense of control, and enabling or restricting infrastructures. Analyses demonstrate the detrimental effects of restricted environments on health, and also show that control-enhancing infrastructures can promote health (Rodin, 1986; Syme, 1988; Rosenfield, 1989). This research also encourages the development of the multilevel health promotion model. For example, as has been stated by Syme (Syme, 1988), if the health impact of control over one's destiny is supported by research evidence, this would involve intervention not only at the individual level, but more importantly at the community level as well. With regard to an enabling work environment, this could include interventions supporting worker participation in the organization of work. Such approaches provide additional evidence for significant pathways in our model from support by organization policy to increasing competence, and further to health (see arrows in Figure 1).

Shared values are supposed to play a crucial role in the development of health promotion research and practice (McQueen, 1991; McQueen, 1994; McQueen and Anderson, 2000). To our knowledge, however, there are not many empirical studies directly dealing with this issue. For example, regarding the strategic question of the most efficacious ordering and timing of health promotion action, it would be important to know how far health promotion values directly effect such action and how they interact with both competence and opportunities. On one hand, a strong commitment to health promotion values, which for the following empirical analysis will be defined as perceived obligation to create and sustain healthy environments, might encourage individuals to participate in community action even if there is less support by public or private policies. On the other hand, it can be expected that this effect will only occur if the respective individual has the competence for action, too. Thus, in our model the effect of values on action is supposed to be moderated by competence and opportunities (see one-way arrow and two-way arrows in Figure 1).

Citizen participation in community action is another important perspective for developing a multilevel health promotion model. In particular, within the context of empowerment theory and research, the issue of citizen participation has been placed in a multilevel framework (Rappaport, 1987; Zimmerman, 1990; Wallerstein, 1992; Wallerstein and Bernstein, 1994). For example, the relationship between individual levels of empowerment, including participatory behavior, and organizational empowerment, including opportunities to develop skills for citizen participation, have been discussed [(Zimmerman, 1990); see also the interaction model of psychological empowerment and community empowerment in (Wallerstein, 1992)]. Empowerment research also provided both for some general discussion and concrete suggestions regarding measurement issues at different levels [e.g. measuring perceptions of individual, organizational and community control (Wallerstein, 1992; Israel *et al.*, 1994; Schulz *et al.*, 1995)], and more recently elaborated specific approaches to evaluation (Fetterman, 1996).

Considering the crucial role of citizen participation and empowerment issues in health promotion research and practice, it seems particularly remarkable that only a small amount of empirical investigation was directly assigned to the very relationship of participation and health. As has been stated in a recent review article, there is a serious lack of empirical studies in the health literature that expressly affirm the widely reputed health and social benefits of community participation (Zakus and Lysack, 1998). Moreover, the results of the few empirical studies available appear to be rather ambiguous (Schwartz, 1976; Booth and Welch, 1978; Peterson, 1987). With regard to our model, we expect that participation in health promotion action can indirectly effect health in different ways. First of all, by improving the environment, e.g. working and living conditions, that affects the health of those participating; second, by encouraging the development of new policies which may affect health in ways explicitly dealt with in our model; and third, by improving personal competence and strengthening self-efficacy, sense of coherence and sense of control (with the positive health implications mentioned above). However, negative experiences in community participation as well as overload of demands through intensive participation may lead to the opposite, i.e. negatively affect the health of the participating actors (see arrow in Figure 1).

In sum, the present paper makes the following assumptions.

(1) Health-promoting policy implementation in terms of strategic efforts providing for opportunities in the living and working environment affects both the competence of individual actors and their health-promoting actions. Thus, the effect of such policy on action is partly direct and partly mediated by the competence of individual actors.
(2) Competence in terms of motivation and ability to create healthy living and working environments has a direct effect on health-promoting action. In addition, competence directly affects health.
(3) Commitment to health promotion values in terms of perceived obligation towards a healthy environment affects health-promoting action. It also can moderate the effects of policy and competence on health-promoting action. In particular, in the case of high competence but little support by health-promoting policy, increasing value commitment leads to a significant increase in health-promoting action.
(4) Participation in health promotion action affects health in a curvilinear way. While both

non-participation and very intensive participation are associated with negative health effects, moderate levels of participation can lead to increasing competence that positively affects health. Thus, the positive effect of participation on health is mediated by competence.

DATA AND METHOD

Frame of study

The present study was conducted as part of MAREPS, an international research project developing a Methodology for the Analysis of the Rationality and Effectiveness of Prevention and Health Promotion Strategies on behalf of the European Union. The project comprises policy-maker and population surveys conducted in Belgium, Finland, Germany, The Netherlands, Spain and Switzerland. The project empirically examines different elements of health promotion policy in general and specifically analyses the development, implementation, impact and evaluation of four different policies. Considering aspects of both general relevance and international comparability, the following policies were selected: (i) early detection of breast cancer; (ii) prevention of smoking; (iii) promotion of sports and physical activity; and (iv) creation of healthy living and working conditions. This paper only reports results for the issue of healthy living and working conditions as investigated in the population survey.

Survey instrument development

The interview schedule of the population survey was developed in joint co-operation by all project parties. It was translated from the master-questionnaire in German and an accompanying English version into each of the other survey languages. As far as possible bilingual translators were used, with continuous opportunities for consultation between project partners ensured in the process. The method, proposed at times to translate around a set of languages and re-translate into the original at the end as some kind of final test of equivalence of the instrument, appeared neither practical nor would that have been possible within the constraints of the available budget [nor is the utility of this procedure even close to undisputed in multi-national survey methodology; e.g. (Alwin *et al.*, 1994)]. Finally, the schedule was functionally pre-tested and its

final form distributed to the survey institutions in the different countries.

Fieldwork and sampling

Fieldwork was conducted between October 1997 and May 1998 following guidelines developed jointly by all project partners. In every country, sampling as rigorously as possible addressed potential barriers to sample representativeness [e.g. unequal inclusion probabilities of sampling units, imperfect application of selection criteria, difficult localization of selected units, the use of substitutions, and biases from refusals (Dillman, 1978)]. The core presupposition was that simple random sampling is generally the most viable method in survey research, not least because it ensures a broad representation of social structures. Sampling frames were constructed that included adults 18 years old or older and residing in the respective country or region selected.

Sample description

A total of 6248 adults 18 years old or older were contacted, via a telephone-administered semi-standardized interview schedule, to ask them about their behavior, motivation and policy perceptions related to breast cancer, smoking, physical activity, and healthy living and working conditions. This resulted in the realized sample sizes shown in Table 1.

In total, 3343 adults, after one retry in the case of initial refusal, completed the interview in an eligible manner. Thus, the overall response rate is 53.5%, ranging from 41.9 to 60.7% across countries which used telephone interviewing.

Several points have to be considered in evaluating these response rates. First, one purpose of the MAREPS project was to compare four different policies in a single investigation. Therefore, high item responses were regarded essential; thus, telephone interviews were chosen as the survey method which, while competing and at times falling behind mail surveys and face-to-face interviews in terms of sample response rate, usually attained higher item response rates, i.e. yielded more complete data (de Leeuw, 1992; van Campen *et al.*, 1998).

Second, not all the cases that could not be interviewed in the different countries are refusals: there are prolonged absences due to travel, for work reasons, or for time spent in institutions. Also, respondents who did not speak the survey

Table 1: MAREPS population survey, sample description

	Belgium (Flanders)	Finland[a] (Pirkanmaa)	Germany Eastern part (Saxony)	Germany Western part (Northrhine-Westfalia)	Netherlands whole country	Spain[b] (Catalonia)	Switzerland (German speaking-part)	Total
Gross sample	1174	1100	2865	1403	1071	760	848	9221
Net sample	805	659	1676	963	872	545	728	6248
Realized sample	389	400[a]	913	489	366	380	406	3343
Response rate in %	48.3	60.7	54.5	50.8	41.9	69.7	55.8	53.5
{female}								
n	209	211	548	270	217	206	240	1901
(%)	53.7	52.8	60	55.2	59.3	54.2	59.1	56.9
{male}								
n	180	189	365	219	149	174	166	1442
(%)	46.3	47.3	40	44.8	40.7	45.8	40.9	43.1
Age								
M	43	54	48	46	48	40	446	47
SD	16.15	16.05	17.06	16.36	16.77	17.1	15.5	16.92
Income (gross yearly in 1000 ECU)								
M	34.86	25.87	23.89	31.7	28.86	23.35	57.46	31.76
SD	29.63	17.51	12.18	15.4	19.51	19.82	31.99	23.6

[a]In Finland, the net sample was determined excluding persons either: (i) not listed in the telephone book; or (ii) not identifiable via last name and address.
[b]In Spain, the survey was conducted face-to-face after starting with telephone interviews; however, the original sample drawn for the telephone survey was utilized, thus minimizing sampling differences to the other countries.

language and for this reason could not be interviewed are included in the numbers within the row showing the net samples.

Third, while among those ultimately interviewed there is a certain over-representation of women in Germany, The Netherlands and Switzerland, and of young respondents in Spain and older ones in Finland, no notable variations pertain to education, and the rank distribution of the yearly gross income resembles those of European data. All in all, variances appear to be of limited extent.

Measures, dimensional analysis and scale construction

Respondents rated several statements on five-point Likert scales to indicate whether and how they engaged in health promotion action, and to what extent they perceived values, competence and policy-induced opportunities for the action. For dimensional analysis and scale construction, items were submitted to principal component analyses (PCA; extraction criterion: Eigenvalue > 1).

Health promotion action

A PCA on eight behavior items yielded two factors shown in Table 2, labeled political participation

and ecological behavior. For present purposes, only indicators for respondents' political participation are analyzed.

Determinants of health promotion action

Regarding values, competence and policy-induced opportunities, 10 different aspects of these constructs were assessed, again using five-point Likert scale items [categories definitely true/true/(partly)/not true/not true at all]. The PCA on these items resulted in the structure presented in Table 3, showing that a three-component structure can be found empirically. Accordingly, sum scores of scales, each divided by the number of items defining the scale, were constructed for the three constructs.

A note is necessary here on the rather low internal consistencies of the scales, especially in the cases of competence and policy-induced opportunities, as indicated by their Cronbach's α's. These low coefficients seem to imply that the items in each of these scales do not measure the respective constructs very well. However, the constructs, particularly competence, are theoretically modeled in a multifaceted manner. E.g. it comprises both notions of action-related efficacy ('I can influence community decisions that affect my health.') and more general ability ('Community

Table 2: PCA of eight items indicating health promotion action (n = 1540)

Scales (Cronbach's α) Items (communalities)	A	B
(A) Political participation (0.58)		
(1) In order to do something for a healthy environment, I am involved in a political party or organization (0.49)	**0.70**	–0.04
(2) I work with others in my community to improve our joint living conditions (0.47)	**0.69**	0.09
(3) I attend public meetings, rallies or protests concerning the improvement of my living and working conditions (0.47)	**0.68**	0.12
(4) At my workplace, I speak/have spoken up for better working conditions (0.28)	**0.52**	0.14
(B) Ecological behavior (0.46)		
(1) I drive a car as rarely as possible (0.42)	–0.04	**0.65**
(2) I mind to buy food articles which are from ecological cultivation (bio-products) (0.42)	0.18	**0.63**
(3) I vote for the politician who speaks up for a healthy environment (0.45)	0.01	**0.57**
(4) In my behavior, I show consideration for the health of my fellow human beings (0.33)	0.35	**0.57**
Eigenvalue	**1.9**	**1.5**
Percent of variance	**23.1**	**18.9**

Varimax-rotated, orthogonal solution.
Loadings above 0.5 are shown in bold.
English translations of originally German items are shown.

Table 3: PCA of 10 items indicating theoretical determinants of health promotion action (n = 1751)

Scales (Cronbach's α) Items (communalities)	A	B	C
(A) Values (0.65)			
(1) We must do something, otherwise we will drown in our own waste (0.50)	**0.71**	–0.01	–0.04
(2) We must leave a healthy environment to the next generations (0.48)	**0.70**	0.07	0.12
(3) My greatest wish is a better environment for our children (0.48)	**0.69**	–0.07	0.01
(4) In my actions I feel obliged to the environment (0.50)	**0.69**	0.09	–0.03
(B) Competence (0.41)			
(1) Community involvement is not my thing (0.51)	0.02	**–0.72**	–0.04
(2) I want to do something for the community (0.56)	0.31	**0.67**	0.13
(3) I can influence community decisions that affect my health (0.40)	–0.13	**0.61**	0.14
(C) Policy-induced opportunities (0.32)			
(1) My community takes all measures to support environmentally sound behavior (0.54)	0.09	–0.06	**0.73**
(2) My company supports/has supported commitment for a better environment (0.44)	0.09	0.09	**0.66**
(3) In my neighborhood, everybody thinks only for him or herself (0.32)	–0.12	0.16	**–0.53**
Eigenvalue	**2.1**	**1.4**	**1.3**
Percent of variance	**20.9**	**13.9**	**13.0**

Varimax-rotated, orthogonal solution.
Loadings above 0.5 are shown in bold.
English translations of originally German items are shown.

involvement is not my thing'). It was decided that the validity of these broad scales as predictors of political participation and health in the regression analyses reported below is worth reporting in the present context—of course keeping in mind the low internal consistency as a problem specifically for further scale development in terms of evaluation instruments.

Health status was self-rated by respondents by choosing one of the categories: very good/good/satisfactory/not so good/bad as their answer to the item 'In general, would you say that your

health is ... ?'. This kind of operationalization in terms of self-rated health has been shown to be valid and predictive in numerous studies (Idler and Benyamini, 1997).

Analyses

For the following analyses, a sample reduced in size was used for several reasons. On one hand, prevalent missing data problems, e.g. in the income variable, made it expedient to exclude cases subject to this problem. On the other hand,

several of the items to assess political participation, policy-induced opportunities, competence and values, presupposed for respondents to have had a job position at some point in time (e.g.: 'My company supports/has supported commitment for a better environment.'). Thus, analyses were restricted to people to whom this condition applies.

First of all, self-rated health, health promotion action and its determinants (i.e. the components of the model) were analyzed for cross-national variation. Secondly, zero-order correlation analysis was conducted. Thirdly, two hierarchical regression analyses were carried out in which: (i) political participation was regressed on nation, age, sex, yearly income, and policy-induced opportunities, competence and values, including the latter's interactions; and (ii) self-rated health was regressed on nation, age, sex, yearly income, political participation, and opportunities, competence and values, again including the latter's interactions.

In both regression equations, predictors were entered in a theory-driven manner to determine which variables make unique contributions to variance, how much variance can be predicted, and whether predicted variances are greater than expected from chance alone. Specifically, in each equation nation was entered in the first step in the form of dummy variables to control for this effect. Secondly, age, sex and income were entered simultaneously. After that, in the first regression, model components and interactions were introduced, respectively. Interaction terms included the following: values $\times$ competence, values $\times$ opportunities, competence $\times$ opportunities and values $\times$ competence $\times$ opportunities, and were introduced in order to check for possible compensatory effects [for details of this procedure, see (Aiken and West, 1991), p. 43]. In the second equation, political participation was additionally entered as a predictor before policy-induced opportunities, competence, values and their interactions.

The use of these quite complicated statistical techniques may be justified by the attempt to put the assumptions of the present multilevel model to a strict test. For example, in order to evaluate the general importance of the model it appeared to be necessary to control both for cross-national variances and effects related to socio-demographic variables. Moreover, to estimate the relative and combined contributions of the different elements in the model as suggested above, mediating as well as moderating and interaction effects had to be taken into account.

In contrast to other, less sophisticated methods, hierarchical regression analysis provides appropriate statistical techniques to deal with these different issues.

RESULTS

Cross-national variations

Table 4 shows means and standard deviations of the model variables for each country. To highlight aspects most relevant in the present context, the Spanish respondents on average reported lowest ratings regarding the variables policy-induced

Table 4: Scale means and standard deviations

	n	Mean	SD
Belgium			
Policy-induced opportunities		3.26	0.79
Competence		3.25	0.70
Values	216	4.15	0.61
Political participation		2.32	0.73
Self-rated health		3.94	0.86
Finland			
Policy-induced opportunities		3.38	0.73
Competence		3.43	0.71
Values	179	4.37	0.50
Political participation		2.43	0.82
Self-rated health		3.74	0.94
Germany, Western part			
Policy-induced opportunities		3.07	0.74
Competence		3.25	0.67
Values	281	4.17	0.39
Political participation		2.39	0.65
Self-rated health		3.73	0.90
Germany, Eastern part			
Policy-induced opportunities		3.04	0.69
Competence		3.16	0.54
Values	435	4.16	0.37
Political participation		2.42	0.54
Self-rated health		3.64	0.93
Netherlands			
Policy-induced opportunities		3.24	0.65
Competence		3.73	0.48
Values	156	3.68	0.62
Political participation		2.46	0.59
Self-rated health		4.19	0.74
Spain			
Policy-induced opportunities		2.49	0.77
Competence		2.82	0.76
Values	177	4.27	0.57
Political participation		1.72	0.80
Self-rated health		3.44	0.94
Switzerland			
Policy-induced opportunities		3.28	0.66
Competence		3.14	0.68
Values	307	4.16	0.43
Political participation		2.39	0.64
Self-rated health		4.24	0.81

Table 5: Zero-order correlations (Pearson)

	Health	Sex	Age	Income	Political participation	Opportunities	Competence
Sex (1: male)	0.03						
Age	−0.23[d]	0.06[c]					
Income	0.18[d]	0.06[c]	−0.09[d]				
Political participation	0.08[c]	0.04[b]	0.05[b]	0.05[b]			
Opportunities	0.09[d]	−0.04[a]	0.14[d]	0.08[d]	0.20[d]		
Competence	0.12[d]	−0.3[a]	−0.02	0.03[a]	0.40[d]	0.19[d]	
Values	−0.06[b]	−0.04[b]	0.15[d]	−0.02	0.10[d]	0.07[c]	0.11[d]

[a]$p < 0.10$; [b]$p < 0.05$; [c]$p < 0.01$; [d]$p < 0.001$; $n = 1751$.

Table 6: Political participation regressed on nation, age, sex, income, policy-induced opportunities, competence, values and their interactions

Step	Predictor	r^e	B^f	R^2	R^2 change	F change
(1)[g]	Switzerland versus Spain	0.19	0.24[d]	0.089	0.089	28.3[d]
	Netherlands versus Spain	0.15	0.22[d]			
	Germany (West) versus Spain	0.19	0.25[d]			
	Finland versus Spain	0.14	0.19[d]			
	Germany (East) versus Spain	0.23	0.36[d]			
	Belgium versus Spain	0.15	0.19[d]			
(2)	Sex (1 = male, 0 = female)	0.08	0.07[c]	0.093	0.004	2.9[b]
	Age	0.02	0.02			
	Income	0.00	0.00			
(3)	Policy-induced opportunities	0.11	0.10[d]	0.11	0.017	31.7[d]
(4)	Competence	0.33	0.34[d]	0.223	0.113	253.4[d]
(5)	Values	0.08	0.08[c]	0.228	0.005	10.5[c]
(6)	Competence × opportunities	0.01	0.01	0.235	0.007	6.0[d]
	Values × opportunities	−0.08	−0.06[c]			
	Values × competence	0.08	0.06[c]			
(7)	Values × competence × opportunities	−0.08	−0.05[c]	0.24	0.005	10.9

$n = 1751$; [a]$p < 0.10$; [b]$p < 0.05$; [c]$p < 0.01$; [d]$p < 0.001$.
[e]r = partial correlation coefficient.
[f]B = unstandardized regression coefficient.
[g]Dummy variables (reference group is Spain).

opportunities, competence and political participation. Their average is lowest in self-rated health as well.

In reported health promotion values, however, Spain, besides Finland, had the highest scores. On the contrary, the Dutch rank very high on average in policy-induced opportunities, competence and political participation, and also have quite high marks in self-rated health despite the lowest commitment to health promotion values.

Zero-order correlations

Table 5 shows zero-order correlations of the variables. Pearson coefficients for political participation range from $r = 0.04$ with sex and $r = 0.40$ with competence; with self-rated health, there is a bivariate correlation of $r = 0.08$. For health, significant coefficients range from −0.06 with values to −0.23 with age. Associations within the variables policy-induced opportunities, competence and values are weak to moderate (range from 0.07 to 0.19).

Hierarchical regression analysis for political participation

Following the procedure suggested by Aiken and West [(Aiken and West, 1991), p. 43], both predictors and criteria were z-standardized before regression analysis. Correspondingly, B-coefficients are reported.

The overall regression equation is significant. After controlling for nation, Table 6 shows that sex, policy-induced opportunities, competence and values have significant regression coefficients.
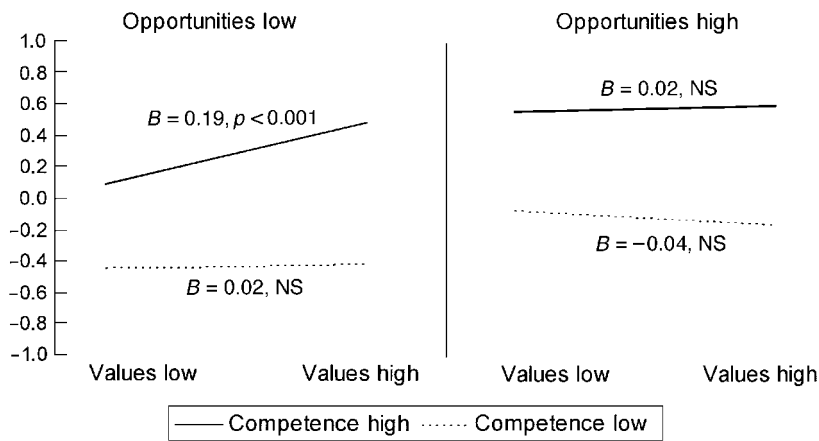
Fig. 2: Three-way interaction values × competence × policy-induced opportunities; dependent: political participation.

At the same time, three of the four interaction effects finally introduced in this model are significant ($p < 0.05$): values × opportunities, values × competence and values × opportunities × competence. As Figure 2 visualizes, the effect of values is moderated jointly by competence and policy-induced opportunities in the sense that values only significantly predict political participation when both opportunities are low and competence is high.

Hierarchical regression analysis for self-rated health

Table 7 shows that, after controlling for nation and socio-demographics, and before including the determinants of political participation, this behavior has a very small but borderline significant, positive association with health.

When determinants of political participation are controlled for, however, even this weak association between participation and behavior vanishes (Table 8). Specifically, competence, playing a moderate but significant role for health in this analysis, can be identified as being the mediator in this regard. This regression yielded no significant interaction terms at all. Thus, they were omitted from the model.

Concerning the comparably limited linear relationship between political participation and health, Figure 3 descriptively visualizes a possible explanation. It shows self-rated health as a function

Table 7: Self-rated health regressed on nation, age, sex, income and political participation

Step	Predictor	r^e	B^f	R^2	R^2 change	F change
(1)[g]	Switzerland versus Spain	0.19	0.31[d]	0.081	0.081	25.6[d]
	Netherlands versus Spain	0.15	0.21[d]			
	Germany (West) versus Spain	0.19	0.11[c]			
	Finland versus Spain	0.14	0.12[d]			
	Germany (East) versus Spain	0.23	0.11[c]			
	Belgium versus Spain	0.15	0.17[d]			
(2)	Sex (1 = male, 0 = female)	0.04	0.04[a]	0.139	0.058	38.9[d]
	Age	−0.24	−0.23[d]			
	Income	0.06	0.06[b]			
(3)	Political participation	0.04	0.04[a]	0.140	0.001	3.1[a]

$n = 1751$; [a]$p < 0.10$; [b]$p < 0.05$; [c]$p < 0.01$; [d]$p < 0.001$.
[e]r = partial correlation coefficient.
[f]B = standardized regression coefficient.
[g]Dummy variables (reference group is Spain).

Table 8: Self-rated health regressed on nation, age, sex, income, political participation, policy-induced opportunities, competence and values

Step	Predictor	r^e	B^f	R^2	R^2 change	F change
(1)[g]	Switzerland versus Spain	0.18	0.29[d]	0.081	0.081	25.6[d]
	Netherlands versus Spain	0.13	0.18[d]			
	Finland versus Spain	0.07	0.09[c]			
	Germany (East) versus Spain	0.06	0.10[b]			
	Belgium versus Spain	0.11	0.15[d]			
(2)	Sex (1 = male, 0 = female)	0.05	0.05[b]	0.139	0.058	38.9[d]
	Age	−0.24	−0.24[d]			
	Income	0.05	0.05[b]			
(3)	Political participation	0.01	0.01	0.140	0.001	3.1[a]
(4)	Policy-induced opportunities	0.06	0.06[b]	0.144	0.004	6.5[b]
(5)	Competence	0.06	0.06[b]	0.147	0.003	6.7[b]
(6)	Values	0.01	0.01	0.147	0.000	0.0

$n = 1751$; [a]$p < 0.10$; [b]$p < 0.05$; [c]$p < 0.01$; [d]$p < 0.001$.
[e]r = partial correlation coefficient.
[f]B = standardized regression coefficient.
[g]Dummy variables (reference group is Spain).

of political participation; for demonstration, a division of the latter's empirical distribution in eight equal groups is approximated. As has been previously assumed, there is a weak tendency in the direction of a parabolic form of association between these variables.

DISCUSSION

Cross-national comparison of variables related to health promotion policy, competence, values and participation as well as to self-rated health show remarkable variations between the countries of the MAREPS study (see Table 4). In particular, the cases interviewed in Spain differ specifically from those in other countries. They show lowest average rates for policy-induced opportunities, competence and political participation. Moreover, their average is lowest in self-rated health. In terms of values, however, Spain follows Finland which rates highest here.

In order to test the general assumptions of our multilevel health promotion model, it is crucial to measure if the cross-national differences shown in Table 4 can be explained by the variables included in the model. To demonstrate empirical evidence of the model, particularly variances in political participation and perceived health status should be explained by the internal variables policy-induced opportunities, competence and values.

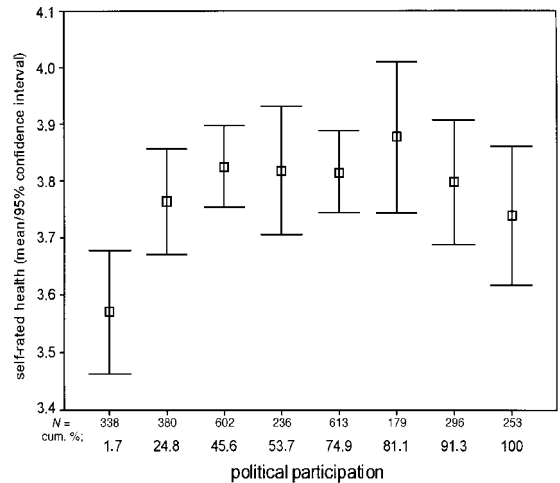Corresponding to the cross-national variations outlined in Table 4, the hierarchical regression

Fig. 3: Non-linear relationship between participation and health.

analysis for political participation shows a significant effect of the nation variable. Using the extreme case of Spain as a reference group, this country significantly differs from all other nations involved in the study (see Table 6). However, after having controlled for nation, the further steps of the regression analysis show additional significant effects of policy-induced opportunities, competence and values as well as of some of their interaction terms.

In line with our assumption (2), the effect of competence on political participation is particularly strong ($B = 0.34$), while the main effects of policy-induced opportunities and values are significant but rather moderate ($B = 0.10$; $B = 0.08$, respectively). Moreover, competence shows both mediating and moderating effects regarding the two other constructs. While the effect of policy-induced opportunities on participation is $B = 0.14$ in the third step of the regression, this effect decreases ($B = 0.10$) after introducing competence in the fourth step of the analysis. This indicates, in line with assumption (1), that the effect of opportunities is in part mediated by competence.

With regard to values, the significant interaction terms with competence ($B = 0.06$) and policy-induced opportunities ($B = -0.06$) indicate, in line with assumption (3), the effects of values on political participation are moderated by opportunities and competence: only in cases where the former is comparably low and the latter comparably high do values significantly predict participation.

Hierarchical regression regarding self-rated health again shows strong effects of the variable nation introduced in the first step of the analysis. Spain as reference group differs significantly from all other nations. By introducing age, sex and income variables in the second step, additional variance is explained. After having controlled for these well-known demographic and economic influences as well, the impact of our model variables on perceived health remains quite low. Nevertheless, weak but observable effects point in the direction of our assumption (4). The borderline significant effect ($B = 0.04$) of political participation when introduced in the third step disappears in the step where policy-induced opportunities and competence come in, thus indicating mediating effects of opportunities and competence. Their betas are also low but significant. Beyond that, as specified in assumption (4), the relationship between participation and health turns out to be curvilinear (see Figure 3). In this particular case, further sophistication of the model and additional non-linear statistical analysis might help to appropriately investigate the complex relationship of political participation and health in the future.

CONCLUSION

In drawing final conclusions, first of all the preliminary status of this study has to be considered. On one hand, its cross-sectional design may be sufficient for investigating structural relationships, but it is not fully adequate regarding the dynamic interplay between different elements of the model; other potential methodological weaknesses of the study, e.g. related to the sample and the internal consistency of scales, have been mentioned above. Thus, further research, among other things, may revise the results of this study by employing longitudinal designs and using other items for scale development.

On the other hand, the theoretical model proposed in advance of the study and adapted for the present analysis has been found to be useful as a conceptual framework for approaching the complexity of health promotion action. In particular, it helped to develop and test assumptions on both key elements of a multilevel health promotion model and their relationship with each other.

One key result of this study is the strong correlation between competence and political participation in health promotion action. Although the present study's cross-sectional data are not appropriate for testing a process model, we would on theoretical grounds expect strengthening effects in both directions, i.e. competence enables participation and participation improves competence.

In any case, this crucial relationship is in itself determined by other factors that immediately lead from psychosocial concepts to other levels of investigation. In particular, our analyses show significant impact of opportunities created by health-promoting policies on competence and participation. In addition, commitment to health promotion values can positively effect the development of health promotion action. These results of our analyses generally underline the necessity of multilevel approaches in health promotion research and practice.

Further advancements in health promotion theory should be grounded on empirical evidence. In order to test theoretical models of the complex interaction between different action domains of the Ottawa Charter, quantitative and qualitative methodologies of health promotion implementation research must be developed. On one hand, results of our analyses legitimize a key role of a multilevel empowerment theory in this context, and they especially justify attempts to operationalize empowerment concepts for health promotion research. On the other hand, more specific policy approaches are needed to further investigate the crucial effect of public and

organizational opportunities on health promotion impact. Moreover, other potential determinants of policy impact, e.g. target setting and resources, should be taken into account (Rütten *et al.*, 2000).

To focus on policy is also appropriate regarding more strategic issues of health promotion action. Obviously, public and private health-promoting policies affect both competence and participation as well as their interaction. For example, they can support participation and improve individual competence in terms of sense of coherence, sense of control and self-efficacy—and they can also contribute to healthier environments through encouraging joint community action for living and working conditions. Thus, even if there are no immediate and direct health effects, health-promoting policies may indirectly effect health in multiple ways. In the long run, the implementation of health-promoting policies might turn out to be the most efficient investment for health.

Such conclusions drawn with the necessary caution from the findings of this study may have implications for health promotion practice as well. In particular, the synergies mentioned above between policy, competence and participation support the development of a multilevel strategy in health promotion implementation. For example, against the background of these results, collaborative planning approaches, fostering community engagement and inter-sectoral alliance building, and orienting towards healthy public policy development appears to be especially valuable; they may result in increasing competence of individual actors, new supportive social networks and organizational structures as well as in policy-induced opportunities for further health promotion action (Fawcett *et al.*, 2000; Rütten, 2000a). However, it has to be considered that such approaches may also fail, e.g. because of major barriers in the larger policy environment, or low social capital in the community. In this case, they may even lead to frustration and decreasing confidence in collective efficacy (Kreuter *et al.*, 1998; Rütten, 2000b). Thus, further research should also specify the contexts in which multilevel health promotion strategies are most appropriate.

ACKNOWLEDGEMENTS

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