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# Health Policy Perception and Health Behaviours: A Multilevel Analysis and Implications for Public Health Psychology

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## ABSTRACT

Associations of health policy perception with health behaviours are analysed. Policy perception is differentiated in information about programmes and appraisal of health policy's contribution to policy goals, and conceptualized on the level of: (1) individuals; and (2) populations (as a social climate indicator). Survey data from the Biomed2-Project MAREPS gathered in Belgium, Finland, Germany, The Netherlands, Spain and Switzerland ( $N = 3343$ ) show that at the individual level, only policy information is associated with utilizing mammography, quitting smoking, physical activity and political participation in creating healthy environments. In contrast, multilevel regression analyses show that policy appraisal is related to physical activity and political participation as a social climate factor. Implications for integrating health psychology and public health within public health psychology are discussed.

HEALTH POLICY is an integral part of the socio-political environment of people and, as such, a *contextual factor* in prevention and health promotion in that it may operate as an *enabler of health behaviours*<sup>1</sup> (Stokols, 1992). In *health psychology*, however, health policy— even though being part of APA's revision of Matarazzo's (1980) groundbreaking definition of the discipline (*cf.* Stone, 1990, p. 5)— has been largely neglected, both in terms of theory, research and practice (Kaplan, 1995; Lorion, Iscoe, DeLeon, & VandenBos, 1996; Marks, 1996), and professional policymaking (DeLeon, Frank, & Wedding, 1995). This is unfortunate, especially considering that health psychology's population-oriented counterpart, *public health*, directly and successfully relates to policy both by Winslow's (1920) classic definition of the field (adopted by WHO in 1952) and in practice (Baggott, 2000), among others by reference to organized community efforts, organization of health services and development of a 'social machinery' for health. Against this background, this article aims to introduce a pathway by which health policy may be related to health behaviours via an essentially psychological process—its *perception*. At the same time, and with

similar emphasis, it will argue both on health psychology's classic level of analysis, *individuals*, and its public health counterpart, *populations*. In other words, by taking on a *multilevel perspective on the relation between policy perception and health behaviours*, it tries to contribute to bridging the gap between, and possibly integrating, the two fields of inquiry.

While generally, the term 'policy' has multifaceted and complex connotations (e.g. Parsons, 1995, p. 13ff.), it is within policy and environmental approaches to prevention and health promotion commonly defined as '... those laws, regulations, formal and informal rules, and understandings that are adopted on a collective basis to guide individual and collective behavior' (Mosher & Jernigan, 1989, p. 249), including those programmes and actions that are implemented in order to reach a policy's goals.

In this understanding, and relating the concept to the outcomes investigated in the present study, the *promotion of a given health behaviour* represents a *policy*.<sup>2</sup> Examples are the endorsement of screening utilization, prevention of smoking, promotion of physical activity and the encouragement of political participation in creating healthy environments.

By definition, the foremost objective of these policies is to maximize the probability that people choose the respective target behaviour (i.e. to utilize screening programmes, not to smoke or quit smoking, be physically active and participate politically, respectively). Given this, the question is via which pathways a policy may be associated to behaviour. Besides operating as an enabler, e.g. by providing facilities for physical activity, we suggest another pathway: policies may relate to behaviour via people's *policy perception*. The following example of a school setting by Kersell and Milsum cogently illustrates this pathway: The output of the process [perception of environmental factors] involves beliefs about the environment, which in turn could be either barriers or incentives for health care or particular behaviors. For example, in many high schools, there may be no organized programs for smoking cessation. Students might believe that there is no help available if they want to quit smoking. This belief could subsequently inhibit the intention to stop smoking. (1985, p. 125) In this example, the perception of high schools' smoking policies as environmental factors ('beliefs about the environment') encompasses both the existence of cessation programmes ('no organized programs') and the supportiveness of the policy environment ('no help available if they want to quit smoking'); ultimately, perception of smoking policy is hypothesized to be associated with behaviour ('inhibit the intention to stop smoking'). Accordingly, policy perception is proposed here as a *socio-psychological condition of health behaviours* that can be differentiated into (at least) two dimensions.

<sup>3</sup> First, people may be more likely to perform a target behaviour if they know about policy programmes to support the behaviour.

Such knowledge, *policy information*, should simply be important for behaviour because people can only utilize supportive programmes if they know about them; thus, behaviourpromoting effects of any programme are conditional on such information. Moreover, knowing about a programme is also a likely proxy for exposure to other aspects of that programme (e.g. social models associated with the programme). Second, people perceiving a health policy system as significantly contributing to a policy's goal (e.g. promoting physical activity) may also be more likely to behave more in line with the policy compared to those evaluating this contribution to be poor. Such positive *policy appraisal*—via processes possibly more complex than for policy information— may cause people to feel committed to co-produce a policy's outcome, e.g. via *normative beliefs* (Ajzen & Fishbein, 1980), *social responsibility* (Kals & Montada, 2001) or *health promotion values* (Rütten, von Lengerke, Abel, Kannas, Lüschen, Rodríguez Díaz, Vinck, & van der Zee, 2000b).

However, a problem with reasoning that policy perception may be associated with behaviour could be that health policies may be rather distal to most people, which might make it unlikely to find significant associations between individual policy perception and behaviour.

This concern is in line with social cognition models of health behaviour in which psychological variables related to the *self* (e.g. selfefficacy) are construed to be most proximal to behaviour (for overviews, see Conner & Norman, 1998; Schwarzer, 2001).<sup>4</sup> Yet, to infer from this cautionary argument that there may be no 'penetration' of health policy at the population level in terms of policy perception could be misleading. We assume that policy perception at such a collective level can have an influence on individual behaviour: specifically, research from ecological psychology on the mediating role of *social climates* for effects of behaviour settings on behaviour (Moos, 1976, 2002) suggests the possibility that policy perception may be operative in that the predominant level of information on and appraisal of a policy in groups of people (e.g.

populations) affects the individual behaviour of group members, doing so over and above their own individual information and appraisal.

For instance, in the high school example cited above, it could be that a student in high school 'A' who appraises the school's smoking cessation policy as poor but at the same time is 'surrounded' by fellow students who as a group evaluate the policy as positive, may have the same probability to quit smoking than a student in high school 'B' whose individual policy appraisal is positive but that of his social environment is critical; as mediators of such compensatory effects, communication or social comparison processes may be operative. In theoretical terms, the high school in this case would be the *behaviour setting* (Barker, 1968), i.e. a supra-individual environmental unit in which individuals and groups of individuals behave, and which is characterized by a specific social climate towards its smoking cessation policy—indicated here by the frequency of positive policy appraisals among the students.

The hypothesis that such group-level characteristics may add to the explanation of individual behaviour over and above individual-level variables is also grounded in insights of multilevel approaches, e.g. within epidemiology (Diez-Roux, 1998) and health behaviour research (Duncan, Jones, & Moon, 1996).

Specifically, to exclude relevant group-level variables from explanatory models of given health-related outcomes has been called the *individualistic fallacy* (Diez-Roux, 1998), and closely corresponds to the individualistic bias of health psychology asserted by Marks (1996). In the present context, even if being informed about and positively appraising a given policy would not have effects on the individual level, living in an area where the majority of people are informed or hold positive evaluations may still increase the probability of an individual to show the respective target behaviour.

While there are different criteria to group people into clusters with varying degrees of health policy perception, one unit of analysis certainly relevant here is countries or nations: health policy is often significantly determined on this level because governments often differ in terms of policies related to health behaviours.

Thus, nations or regions in which people live may operate as *settings for health behaviours* by differentially implementing programmes and contributing to policy goals, both in fact and as perceived by the public. Corresponding to the latter, the following empirical analysis will, besides individual-level policy perceptions, examine population-level perceptions with regard to their relationships with different health behaviours.

To summarize, the present approach suggests the following: 1. *Policy perception*—as a socio-psychological condition—is associated with the occurrence of health behaviours.

2. Two dimensions of policy perception, i.e.

*information* in terms of knowledge about policy programmes to support a given behaviour, and *appraisal* in terms of evaluation whether the health policy system contributes to the policy's goal, are empirically distinct.

3. Policy perception operates both on the level of individuals and populations, i.e. the probability of a behaviour increases independently with *individual* policy information and appraisal, *and* with the *social climate* in terms of the *population* knowing of the policy (group-level policy information) and positively evaluating it (group-level policy appraisal).

4. Nations, or regions representing them, are relevant *settings for health behaviours* in that—as units of social climates—they are influential for individual health behaviours.

To put these assumptions to an empirical test, population survey data gathered within MAREPS,<sup>5</sup> an international research project within the EU-Biomed2-programme, were analysed using a multilevel approach for four policies: early detection of breast cancer, smoking prevention, physical activity promotion and political participation in creating healthy environments. As the project's overarching theme was health promotion policy and health behaviour, indicators for perception of and behaviours related to each policy were assessed. Specifically, samples from Belgium, Finland, Germany, The Netherlands, Spain and Switzerland were interviewed, in the present context representing the group-level unit of analysis in order to disentangle associations of individual- vs. group-level policy perception—the latter as an indicator of social climate—with health behaviours.

## **METHOD**

### **Survey instrument development**

The semi-standardized interview schedule was developed in joint co-operation by all project parties. It was translated from a German master form and its English equivalent into each other survey language as necessary (Dutch/Flemish: NIVEL, Finnish: University of Jyväskylä, Spanish: University of Barcelona). To further ensure language equivalency, bilingual translators were used, with continuous opportunities for consultation between project partners. The method, proposed at times, to translate around a set of languages and retranslate into the original as a final test of instrument equivalence 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 multinational survey methodology; Alwin, Braun, Harkness, & Scott, 1994). Finally, the interview schedule was functionally pre-tested and distributed to all survey institutions in its final form, including a centrally programmed structure adapted for telephone interviewing to endorse equivalency of implementation (for details, see Rütten et al., 2000a, ch. 3.2).

### **Sampling and fieldwork**

In each country, residents living in a private household and being 18 years of age or older were defined as the survey population.

However, except for The Netherlands where sampling targeted the entire population, and due to specific interests of the fieldwork funding institutions in the different countries, study populations were defined in terms of particular regions or administrative entities to represent each respective nation: Flanders for Belgium, the Pirkanmaa region for Finland, the states ('Länder') North Rhine-Westphalia and Saxony for the Western and Eastern part of Germany, respectively, Catalonia for Spain and the German-speaking part of Switzerland. Across these areas, telephone density was sufficient (> 90%) for telephone interviewing as the survey method.

According to these specifications, a sampling frame was constructed for each area from appropriate telephone directories. Simple random sampling was employed as presupposedly the most viable method in survey research, ensuring a broad representation of social structures.

Potential barriers to sample representativeness such as unequal inclusion probabilities of sampling units, imperfect application of selection criteria and biases from refusals (Dillman, 1978) were addressed as rigorously as possible.

For instance, problems due to unlisted subscribers were tackled with randomized last digit (RLD)-methods wherever possible; for inhousehold selection the last-birthday-method was used (O'Rourke & Blair, 1983), preventing biases from differential tendencies to answer the phone; also, at least one retry in case of initial refusal was made.

Fieldwork was conducted between October 1997 and May 1998. A total of 6248 adults 18 years or older were contacted via telephone (see Table 1). Except for Spain, where a shift to face-to-face interviewing was necessary due to acceptance problems regarding telephone interviews, application of the survey instrument did not render any major technical problems. In fact, using interviews rather than self-administered questionnaires emerged to be apt as they are quite effective in dealing with complex items, e.g. by providing opportunities to respond to queries posed by the interviewees. Of course, good training of interviewers is essential here, not least to present accurately items with more than one response option (as in Likert-scales).

### **Survey participants**

As Table 1 shows, survey implementation realized an overall sample across all countries of  $N = 3343$  survey participants completing the interview in an eligible manner. Thus, overall response rate is 53.5 per cent; national response rates range from 41.9 to 60.7 per cent among those countries who used telephone interviewing.

Two remarks are necessary regarding these rates. First, as the main purpose of the MAREPS project was to compare four different policies in a single investigation, high item response rates were regarded essential, which was one reason for choosing telephone interviewing since it usually yields more complete data (de Leeuw, 1992; van Campen, Sixma, Kerssens, & Peters, 1998); one of its disadvantages, namely that at times it falls behind mail surveys and face-to-face interviews in terms of sample response rates, was thus deliberately taken as a loss. Second, not all that could not be interviewed are refusals: there are prolonged



absences due to travel, for work reasons or for time spent in institutions; also, respondents not speaking the survey language and that for this reason could not be interviewed are included in the selected samples.

### Measures

*Policy perception.* To assess how respondents felt informed about policies, respondents were asked for each policy how well they personally felt informed about specific programmes and actions, using five-point scales from 'very poorly' to 'very well'. The items read: How well do you feel informed about programmes and actions . . . for the early detection of breast cancer? . . . for the prevention of smoking? . . . for the promotion of sports and physical activity? . . . for the creation of healthy living and working conditions? For policy appraisal, it was inquired to what extent respondents thought that health policy in their country contributed to reaching each of the policies' goals, again using ratings given on five-point Likert-scales ('does not contribute at all' to 'definitely contributes'). These items read: To what extent do you think that health policy in our country contribute to . . . the early detection of breast cancer? . . . reduce the number of people who smoke? . . . people doing enough physical activity and sports? . . .

the population having healthy living and working conditions? *Behaviours.* *Screening behaviour for the early detection of breast cancer* was assessed by asking women to indicate if they had ever had any examination and how frequently X-ray mammography was conducted ('Have you ever been examined for breast cancer, or have examined yourself?' [dichotomous item] and 'How often do you participate in mammography with x-ray for early detection of breast cancer?' ['every half a year or more', 'once a year', 'every two years', 'more seldom', 'never']). *Smoking* was assessed by a single item in terms of current smoking status ('Are you a regular smoker, occasional smoker, i.e. less than one cigarette a day, ex-smoker or have you never smoked?'); all respondents were asked to categorize themselves as regular smoker, occasional smoker, exor never-smoker. *Physical activity* was assessed by asking respondents about their gymnastics, physical activity or sports, using a dichotomous item ('Do you do any gymnastics, physical activity or sports?'), thus distinguishing active from inactive people.<sup>8</sup> Finally, four items were employed for *political participation in creating healthy environments*: 'I attend public meetings, rallies or protests concerning the improvement of my living and working conditions', 'At my workplace, I speak/have spoken up for better working conditions', 'In order to do something for a healthy environment, I am involved in a political party or organization' and 'I work with others in my community to improve our joint living conditions'.<sup>9</sup> Five-point scales ranging from 'definitely true' to 'not true at all' were employed for the extent to which people were involved in the activities.

### [TABLE 1]

#### Construction of indices and analysis samples

For statistical analysis, the items utilized to assess policy information and appraisal were dichotomized in that for the former, the answer categories 'well' and 'very well' were coded '1' (all others: '0'), and for the latter, 'contributes' and 'definitely contributes' were coded '1' (all others: '0').

Regarding screening behaviour for the early detection of breast cancer, corresponding to recommendations by the European Commission (1996) a mammography frequency of 'at least every two years' was coded as the target behaviour ('1', in contrast to less: '0') for women aged 50 to 69. Thus, women of other age groups were not considered in the analyses for this policy, leading to an analysis sample for this policy of  $N = 522$ .

For the behaviour to be analysed within smoking prevention, i.e. quit smoking, a variable 'ex-smoker' was created in which 'ex-smoker' was coded '1' and 'regular smoker' and 'occasional smoker' were coded '0'. Correspondingly, never-smokers were not included in the analysis, rendering an analysis sample of  $N = 1521$ .

Regarding physical activity promotion, the dichotomous measure was coded '1' for active and '0' for inactive people (i.e. this variable was not re-coded for analysis).

Finally, a four-item scale based on the items for political participation in creating healthy environments was constructed (Cronbach's Alpha = .58) and, in a second step, dichotomized in that values above the scale's mid-point were coded '1', and all other values '0'.

All dichotomizations were conducted, besides for ease of presentation, in order not to jeopardize robustness of results by including rarely used answer categories in analyses.

### Statistical analysis and modelling

First, a description of policy perception and behaviour variables was carried out by crosstabulating these variables with 'nation', a procedure rendering an overview of their distributions as observed across national samples, and of the ecological correlations of policy perception with respective nation-level prevalences of respective target behaviours.

Second, bi-variate correlations on the level of individual respondents were computed for each of the four policies by correlating individual policy perception parameters with each other and with the respective target behaviour. Since social epidemiological research has previously shown that health behaviours can systematically vary with different socio-demographic variables (see e.g. Berkman & Kawachi, 2000), bi-variate correlations of behavioural variables (plus, for purposes of preliminary checks of multicollinearity in view of the subsequent regression models, of policy perception) with sex, age, education, marital status, current employment status and area of residence were calculated as well.

Third, turning to modelling the relationships of policy perception and behaviours according to the theoretical arguments developed in the first part of this article, a logistic regression analysis was conducted for each policy to test for the association of the respective behaviour with individual policy information and appraisal under adjustment for socio-demographics (as just mentioned), and nation (as a random factor).

Analyses used backward selection procedure (criterion:  $p < .05$ ) among policy perception parameters.

Finally, in order to test associations of nationlevel policy perceptions with target behaviours, and to disentangle them from those of their individual- level complements, a multilevel logistic regression analysis was conducted in terms of a contextual model for each policy, i.e. using the observed proportions of high policy information and positive policy appraisal as nation-level characteristics. Technically, the intercept was specified as a random effect due to the classification variable 'nation', again adjusting for socio-demographics. As above, backward selection procedure was used to identify policy perception parameters.<sup>10</sup> In general, and most notably for all correlation analyses, problems of multiple testing were considered of minor significance in an observational study (as opposed to clinical trials); all regression analyses were multiple, i.e. regressands were mutually adjusted for.

## RESULTS

### Description (across nations)

For all four policies, Table 2 shows the proportions of respondents feeling at least well informed about programmes, evaluating the contribution of the health policy system to the policy's goal positively, and reporting the respective target behaviour. Overall, it can be seen in comparing the policies that being physically active renders the highest proportions of all target behaviours in the relevant analysis sample (69.7%), closely trailed by participating politically (64.4%) and utilizing mammography screening on an at least bi-annual basis (44.1%) and quitting smoking (39.1%) following at some distance. At the same time, there is considerable cross-national variation apparent for all behaviours, with ranges from 18.2 per cent to 79.3 per cent (mammography in Switzerland vs. The Netherlands), 30.5 per cent to 56.9 per cent (quitting smoking in Spain vs. The Netherlands), 38.2 per cent to 88.2 per cent (physical activity in Spain vs. Finland) and 44.1 per cent to 69.8 per cent (political participation in creating healthy environments in Spain vs. The Netherlands).

Similar assertions hold with regard to crossnational variations of high policy information and positive policy appraisal. For instance, proportions of being well informed about programmes for the early detection of breast cancer vary from 60.6 per cent in Spain to 89.2 per cent in Finland, and an even higher variability is observed for positive policy appraisals with regard to national health policy's contribution to participatory creation of healthy environments, ranging from 26.4 per cent in Spain to 73.4 per cent in Finland.

Finally, for most policies it holds that the higher the proportion of high policy information is in a country, the higher is also the proportion of its residents reporting the behaviour; a similar pattern holds for policy appraisal. For example, the national sample with the lowest proportion of physical activity as noted before, Spain, also has the lowest proportion of positive policy appraisal (30.6%), while for its counterpart on the other extreme, Finland, the most positive policy appraisal is observed (75.1%). For overview, Fig. 1 plots all correlations (Pearson coefficients) of the proportions of high policyspecific information and positive policy-specific appraisal with those of the respective target behaviours. As the Figure shows, policy appraisal for physical activity promotion correlates to an extent of  $r = .95$  with the proportions of physical

activity behaviour across countries, trailed by an corresponding correlation of  $r = .86$  for political participation; notably, while insignificant, all other correlations are positive as well, with the sole exception of policy information and mammography utilization. As Fig. 2 visualizes by plots of the two strongest associations, Finland, The Netherlands and Switzerland score rather high on policy appraisal and behavioural prevalences with regard to both physical activity promotion and political participation in creating healthy environments, while Belgium, Germany and particularly Spain are located nearer to the co-ordinate systems' origins.

Of course, one cannot draw inferences at the level of individuals from these ecological correlations calculated at the level of national populations, as this would represent an *ecological fallacy*<sup>11</sup> (Robinson, 1950): estimates from analyses conducted at these two levels are totally distinct (Hox, 1995). Moreover, they are not adjusted for the observed socio-demographic variations across the different national samples shown in Table 1. However, on a merely descriptive level they show generally high concordances between group-level policy perception and national prevalences of behaviours; this holds especially for policy appraisal, with regard to which two correlations are even significant despite the low number of observational units ( $N =$  six nations).

### Bi-variate associations

#### [TABLE 2][FIGURE 1, 2]

Turning to the analyses related to individual health behaviours, Table 3 shows for each policy the inter-correlations of policy information, appraisal and the respective target behaviour, as well as their associations with socio-demographic variables on the individual level. To begin with the former set of associations, a first prominent result is that the correlations between policy information and appraisal vary around .20, with a range from  $\Phi = .23$  for the early detection of breast cancer to  $\Phi = .17$  for the other three policies. Though being significant without exception, the magnitude of these coefficients indicates considerable empirical distinctiveness of the two sub-concepts 'information' and 'appraisal'.

#### [TABLE 3, 4]

Second, inter-correlations of behaviours with policy information vary between  $\Phi = .03$  for quitting smoking and  $\Phi = .14$  for physical activity, reaching statistical significance for all policies except smoking prevention. For policy appraisal, coefficients between  $\Phi = .02$  for political participation and  $\Phi = .15$  for mammography utilization are found, being significant for all policies except political participation. Thus being on a lower level than the intra-conceptual associations within policy perception on this bivariate level, regression analyses reported below will test for these associations after adjustment for socio-demographic variables.

Finally, correlations of policy perception and behaviour with socio-demographics variables in general do not exceed the level of coefficients reported before. Exceptions are that there is a relatively strong tendency for older respondents and those currently married to have quitted smoking when compared to younger ones and unmarried, respectively. All in all, however, there is no indication in these bi-variate correlations that severe multi-collinearity problems were to be expected in the regression models reported next.

### Logistic regression models

To re-iterate, logistic regression models regressing each behaviour on individual policy perception were performed to elucidate whether individuals who are well informed about policy programmes are more likely to report the policy-specific target behaviour than those with poorer information, and whether analogous associations pertain to individuals' appraisal of the health policy system to contribute to a policy's goals (in both cases after adjusting for socio-demographics, and including nation as a random-factor regressand). As Table 4 shows, backward selection of policy perception parameter in each of the four regressions rendered a specific and significant contribution for policy information only; positive appraisal of a policy is not associated with behaviour on the level of individuals.

Specifically, the odds to utilize mammography screening for breast cancer on an at least biannual basis were two times higher for women in the target group informed about early detection programmes than for women reporting less information. In the same direction, the odds of reporting physical activity or political participation was around 1.7 times higher for respondents with high levels of information about physical

activity promotion, and those reporting to be well informed about programmes to create healthy environments, respectively, than for poorly informed individuals.

Contrary to expectation, however, the [table 5] association is reversed with regard to information about smoking prevention programmes and quitting smoking. Here, among the analysis sample of smokers and ex-smokers, the odds of informed respondents to report being quitters were about 1.5 times less than those uninformed.

Explorative model modifications showed that only when excluding all sociodemographic variables and nation from the model, the odds ratio was above 1 (albeit insignificant), pointing to suppressor effects of these structural variables for the observed negative relationship.

In sum, the main result of the logistic regressions is that while individual-level perception of health policy as contributing to a policy's goal (i.e. policy appraisal) is not associated to behaviours, policy information is so, and this—for the most part—in the hypothesized, i.e. positive direction.

### **Multilevel logistic regression models**

The final question to be answered empirically was whether the exclusion of policy information and appraisal as group-level characteristics in fact represented a severe individualistic fallacy.

In other words: does the probability of behaviours independently increase with a favourable 'social climate' in respondents' respective social environment in terms of people generally knowing a lot about the policies (high grouplevel policy information) and evaluating them positively (positive group-level policy appraisal)? Table 5 shows the results of the multilevel logistic regression models conducted in this regard, i.e. models using the proportions of high policy information and positive policy appraisal as random factors due to the classification variable 'nation'.

First, results show that the magnitude and direction of the odds ratios related to individuallevel policy perception regressands do not change compared to those found before: again, for all policies, significant estimates are only found for policy information, and they are in the hypothesized direction with the exception of the smoking prevention.

Looking at the results for policy perception in terms of group-level characteristics, however, for two of the policies—physical activity promotion and creating healthy environments— significant and substantial estimates are found. Beginning with the former policy, people living in a national environment in which the majority of people feel well informed about related policy programmes have about 4.3 times higher odds to report being physically active than those in which only a minority is well informed. Specifically, with the odds ratios for nation-level regressands in Table 5 referring to sample ranges of proportions of favourable policy perception, it can be said that a 40.2 per cent higher proportion—in this case a 71.1 per cent-majority compared to a 30.9 per cent-minority (see Table 2)—of people well informed about physical activity promotion leads to 4.3 times higher odds of behaviour. Analogously, the odds to report physical activity are about 40.1 times higher for respondents living in a national environment with a 75.1 per cent-proportion of people perceiving the health policy system as significantly contributing to its people being physically active than for those surrounded by a respective 30.6 per cent-minority (see Table 2, sample range: 44.5%).

Finally, a comparable assertion holds for the policy of creating healthy environments: respondents in a social environment with a positive group-level policy appraisal have 4.7 times higher odds to participate politically than those in environments with an opposing grouplevel perception (actual sample range: 47 per cent, i.e. a maximum of 73.4 per cent and a minimum of 26.4 per cent positive appraisals).

Thus, while policy appraisal as an individual characteristic is not significantly associated to behaviours, as a group-level characteristic it is: individuals' probability of engaging in physical activity and political participation is higher when a majority of people in their country perceive the health policy system as contributing to these policies' goals.

### **DISCUSSION**

This article set out to introduce policy perception as a socio-psychological condition via which health policy may be related to health behaviours.

Policy information (knowledge about policy programmes to support a specific behaviour) and policy appraisal (evaluation whether the health policy system contributes to a policy's goals) were examined as characteristics of individuals and populations, the latter in terms of social climate-variables. Empirically, they were tested within uni- and multilevel analyses for their association with four health behaviours among relevant target groups (utilizing mammography, quitting smoking, physical activity and political



participation in creating healthy environments) within a population survey sample of 3343 adult respondents from six European countries.

Results can be summarized as follows. First, except for early detection of breast cancer, highly positive ecological correlations are found between policy information and appraisal on one hand and behaviour on the other across the six national samples. That is, better informed populations, and populations who appraise a policy positively, behave—as a group—more in line with the policies (not controlling for sociodemographics, however). Second, individual behaviours are mostly positively related to individual-level policy information by modest but significant odds ratios, but—contrary to expectations—not to policy appraisal. That is, the more informed one is about relevant policy programmes, the more likely he or she is to utilize mammography, be physically active and participate politically. Third, while high nationlevel policy information only makes it more likely for people to be physically active, nationlevel policy appraisal is associated with two of the four investigated behaviours. Namely, if the majority of people in one's social environment perceives health policy as contributing to the goals of physical activity promotion and participatory creation of health environments, one is much more likely to be physically active, and more likely to participate politically, than if positive policy appraisals are held only by a minority.

Before relating these results to the theoretical assumptions put forward above, some cautionary notes pertain to the study's design.

First, since it is observational, associations between behaviours and policy perceptions could reflect consistency of people's perceptions rather than their role as socio-psychological determinants of behaviour; future, e.g. quasiexperimental studies may be needed to decide between these alternative interpretations. Second, the cross-sectional design leaves conclusions about causal directions to future longitudinal studies. For example, it is possible that results indicate causation that would reverse the descriptions above to say that behaviours trigger policies which people then may know of and be evaluative about, not the other way around. However, assuming that transactional processes probably underlie the association in that policies and populations *reciprocally* affect each other (von Lengerke, 2001, p. 15), causative effects may actually be operative in both directions. Third, operational indicators have in their majority been limited to single items due to practical restrictions.<sup>12</sup> However, care was taken to use items well proven in former research: e.g. the item on smoking is compatible with recommendations by WHO (1998, p. 94ff.), and that on physical activity with a measure previously found valid and reliable (Ainsworth et al., 1993; see also Note 8). Also, since empirical distributions (see Table 2) indicate further support for indicators' validity (e.g. the frequent mammography utilization and the related high policy appraisal in The Netherlands, or the similar pattern for physical activity in Finland, which match former policy analysis by Rütten et al., 2000a), results seemed worth reporting, keeping in mind the need of further indicator development.<sup>13</sup> Finally, biases may result from sub-optimal data representativeness, both due to the 53.5 per cent-response rate and regional sampling in five of six countries. Regarding the former, while there are slight over-representations of women in Germany, The Netherlands and Switzerland, and of young respondents in Spain and elders in Finland, no notable variations pertain to education and marital status. In fact, the most extreme cross-national differences seem to relate to regional sampling in pertaining to respondents' areas of residence (see Table 1): while in the Finnish sample, drawn from a region in Central Finland (Pirkanmaa), 70.3 per cent live in rural areas, the Catalan respondents in their majority (83.1%) live in urban areas, possibly due to Barcelona residents.

Thus, results cannot without further ado be generalized to the level of national populations; strictly speaking, data—especially with regard to policy perceptions as indicators of social climate—only allow to attribute results to processes within the selected regions (which does not, however, invalidate social climatehypotheses).

All in all, restrictions due to data representativeness appear to be limited, and of course socio-demographics and area of residence were adjusted for in regression analyses testing for the associations of policy perception and behaviours.

These reservations given, results have clearcut implications for the assumptions that triggered the present empirical analyses. First, policy perception does show associations with health behaviours. Second, information and appraisal are empirically distinct dimensions of policy perception: both their fairly minor intercorrelations and their disparate associations with behaviours support this conclusion. Third, these disparate associations, i.e. that policy information is linked to behaviours mostly at the individual level,

whereas significant effects of appraisal are only found when specified as a group-level characteristic, imply a need to amend the assumption on the policy perception–behaviour relationship: specifically, individual-level information and population-level appraisal of policies targeting health behaviours seem to be associated to health behaviours.

Actually, that individual policy appraisal is not associated to behaviour does not come altogether unexpected: as noted before, underlying processes might be more complex compared to those operative for policy information—a complexity the present analysis may not have been able to capture. Fourth, so much the more remarkable is that policy appraisal as a characteristic of national/regional-level behaviour settings is positively related to behaviour for at least two policies (while group-level information for the majority of policies is not).

Possibly, processes of societal communication or negotiation that create social climates (Moos, 1976, 2002) favourable for health behaviours pertain to the evaluative dimension of policy perception. The fact that in particular physical activity and political participation are associated with group-level appraisal (and, contrary to expectation, not mammography and quitting smoking) might be related to the salutogenic orientation of the related policies: as these promote health and integration (vs. early detecting or preventing disease in the case of screening or smoking prevention; see Rütten et al., 2000a, p. 27), the relevant behaviours may be more responsive to social climate. Also, another explanation may be that the behavioural enactment of physical activity and political participation is more socially embedded—quite obviously in the case of political participation (as a social activity by definition), and probable with regard to physical activity as well (e.g. in terms of mass sports).<sup>14</sup> In future analysis, factors responsible for the observed associations of health policy perception and health behaviours in terms of third variable explanations will have to be delineated.

On one hand, as stated before, particularly positive policy appraisals may cause people to feel committed to co-produce a policy's outcome, e.g. via normative beliefs (Ajzen & Fishbein, 1980), social responsibility (Kals & Montada, 2001) or health promotion values (Rütten et al., 2000b). On the other hand, wealth may be a crucial variable: health behaviours have been shown to be less prevalent in less successful economies where economic pressures take priority over health policy issues; if policy perception turned out to be associated with individual and national wealth as well, it may well be a variable actuating the present associations.

Furthermore, it may be worthwhile to assess the relevance of policy perception for *social capital* approaches in health research (Macinko & Starfield, 2001). Specifically, policy appraisal as a characteristic of groups may turn out to be an important dimension of interpersonal *trust* (here: trust in the health policy system), a central feature of social capital (Putnam, 2000).

This characteristic could then be introduced both in explicit multilevel analysis across nations (e.g. similar to analysis across US states such as in Subramanian, Kawachi, & Kennedy, 2001) as well as in ecological analysis of relationships between social capital variables and prevalences of behaviour (designed in ways, however, which adjust for variations in other relevant variables, e.g. socio-demographics; see Durlauf, 2002).

In terms of application, the present results point to the need to provide information for individuals, possibly via health education measures, and concurrently foster favourable social climates in populations in terms of positive policy appraisal, which may be most effectively achieved by healthy public policies and measures to enhance public support. In this, the present study complements former research, e.g. within the Minnesota Heart Health Programme (Jeffery, Forster, Schmid, McBride, Rooney, & Pirie, 1990; Schmid, Jeffery, Forster, Rooney, & McBride, 1989; Schmid, Jeffery, Forster, Rooney, Klepp, & McBride, 1990) on community attitudes and public support in relation to different health policies, which found substantial correlations between support and health behaviours, and concluded that while 'it would be naive to suggest that public opinion alone is sufficient to ensure enactment of policy measures' (Jeffery et al., 1990, p. 17), 'a more direct attempt to engender public support for policy level interventions could be effective' (Schmid et al., 1989, p. 801).

In sum, that policy perception correlates with health behaviours at all underlines the need to include health policy in health behaviour research. Moreover, that the associations also pertain to policy perception as a characteristic of social climate, i.e. of populations and not only of individuals, underlines the requirement put forward by *social systems theory* (Anderson, Carter, & Lowe, 1999) to explore the role of social environments for health behaviours.<sup>15</sup> To conclude, while health psychology and public health have

traditionally assigned different importance to health policy, the present study both theoretically and empirically questions such divergence. At the same time, multilevel approaches such as pursued here may assist in overcoming another (but related) difference between the two fields, namely that their contributions have traditionally been accomplished by health psychology focusing on individual and personal vs. public health on population and societal processes (Winett, King, & Altman, 1989). For instance, in the present context one might have been, within a 'pure' health psychology approach, satisfied with testing associations of individual policy perceptions with individual behaviour, while in a classic public health perspective, only population-level perceptions may have been correlated with behaviour.<sup>16</sup> Both protocols would have risked fallacies—individualistic in the former and sociologicistic in the latter case (Diez- Roux, 1998).

To prevent such jeopardy, and in line with the widely acknowledged need to integrate scientific and professional disciplines in order to grasp the multidimensional nature of health behaviours (Abel, 1991) and health promotion (Rütten, 1995), the recently emerging field of *public health psychology* (Diekstra, 1990; Ewart, 1991; Hepworth, this issue; Schmidt, 1994; Tanabe, 1982; von Lengerke, 2001; Wardle, 2000) may overcome criticisms of public health as focusing too much on social technology (Leviton, 1996) and health psychology as suffering from individualistic bias (Marks, 1996). By linking, among other things, health policy (as a classic public health issue) to health behaviours (so far a realm of health psychology), and doing so within multilevel approaches, it might ultimately contribute to bridging the gap between health psychology and public health.

#### **ACKNOWLEDGEMENTS.**

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#### **Notes**

1. To prevent misunderstandings, it should be noted that for ease of presentation, the term 'health behaviours' is used here as an umbrella term for all behaviours related to health—including, e.g. risk behaviours, which have been contrasted to 'health behaviours' (e.g. Nutbeam, 1998).
2. Of course, one could also define the 'promotion of health behaviours' as one monolithic policy, but—at least in practice—policies targeting behaviours tend to be basically organized along the lines of behavioural domains.
3. See Rütten, Lüschen, von Lengerke, Abel, Kannas, Rodríguez Díaz, Vinck and van der Zee (2000a, ch. 5.2.1.) for other concepts related to the perception of policy.
4. However, particularly these models have been asserted to neglect environmental factors such as health policy to the extent that 'the external world is being finally removed from the psychological equation' (Ogden, 1995, p. 258); thus, policy perception might not be a variable exceptionally considered by them in the first place.
5. Methodology for the Analysis of the Rationality and Effectiveness of Prevention and Health Promotion Strategies (for details, see Rütten et al., 2000a).

6. English equivalents of German-language master form interview items are presented here; for versions actually used in the survey (Dutch/Flemish, Finnish, German, Spanish), please contact the first author.
7. To assess screening behaviour for breast cancer early detection and physical activity, the survey instrument comprised more items than are indicated in this section; for parsimony of presentation, only those used in the present study are introduced.
8. This very simple measure is comparable to that in the Lipid Research Clinics (LCR) Questionnaire, only that the latter concentrates on strenuous exercise, while the MAREPS measure does not have that limitation (interviewers were even advised to explain physical activity in a very broad sense including physically commuting to work, gardening and competitive sports). The LCR measure has been found to be relatively valid and reliable in adults (Ainsworth, Jacobs, & Leon, 1993).
9. In developing these items, previous suggestions for measuring empowerment by Israel, Checkoway, Schulz and Zimmerman (1994) and Schulz, Israel, Zimmerman and Checkoway (1995) were drawn upon.
10. All regression analyses were carried out using the GLIMMIX-macro with SAS System for Windows 8.02.
11. As opposed to inferences from the individual on an aggregate level, i.e. atomistic fallacies (Diez- Roux, 1998).
12. As a matter of fact, resorting to single items was in large part attributable to the MAREPS telephone survey's major problem that it had to identify many more than those concepts subject to the present analysis for all four policies (see Rütten et al., 2000a, Table 5.2.2.1), leading to severe restrictions due to interview length.
13. This holds for policy perception as well: besides developing multi-item scales, policy appraisal items could alternatively ask for the contribution of 'programmes and actions' (instead of 'health politics') to reach policy goals.
14. Parenthetically, it should also be noted here that among the four investigated policies, screening for breast cancer not only is the most 'medical' policy, but also the only one restricted to one sex, namely female subjects.
15. Moreover, culture may have to be taken into consideration. For instance, the connotation of physical activity may be quite different in Spain compared to more Nordic countries, e.g. in that a walk on the beach may not be included in the concept—which may co-determine Spain's respective outlier position regarding this behaviour and its policy-related social climate (see Fig. 2). By and large, further research is needed to clarify the relation of social climates and cultural factors (such as in values and practices; Hofstede, 2001) in the health context.
16. Correspondingly, within psychology the subdiscipline that predominantly has been suggesting population- or group-based indicators such as social climate is ecological psychology (Barker, 1968; Moos, 1976, 2002)—notably a field closer to the public health perspective than many other areas of psychology.

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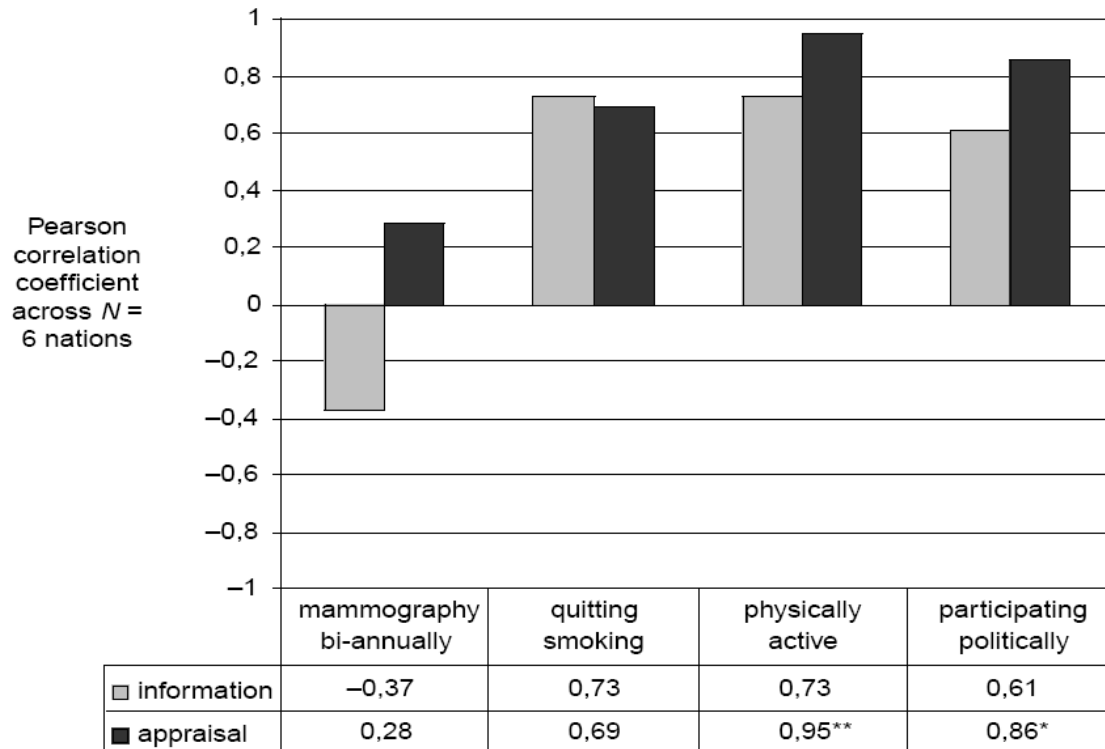


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## TABLES AND FIGURES

Figure 1. Ecological correlations between observed proportions of target behaviour and observed proportions of high policy-specific information or positive policy-specific appraisal.



\* $p < .05$

\*\*  $p < .01$

\*\*\*  $p < .001$

Figure 2. Plots of proportions of: (a) physical activity; and (b) political participation in creating healthy environments, by proportions of positive policy appraisal in six European countries.

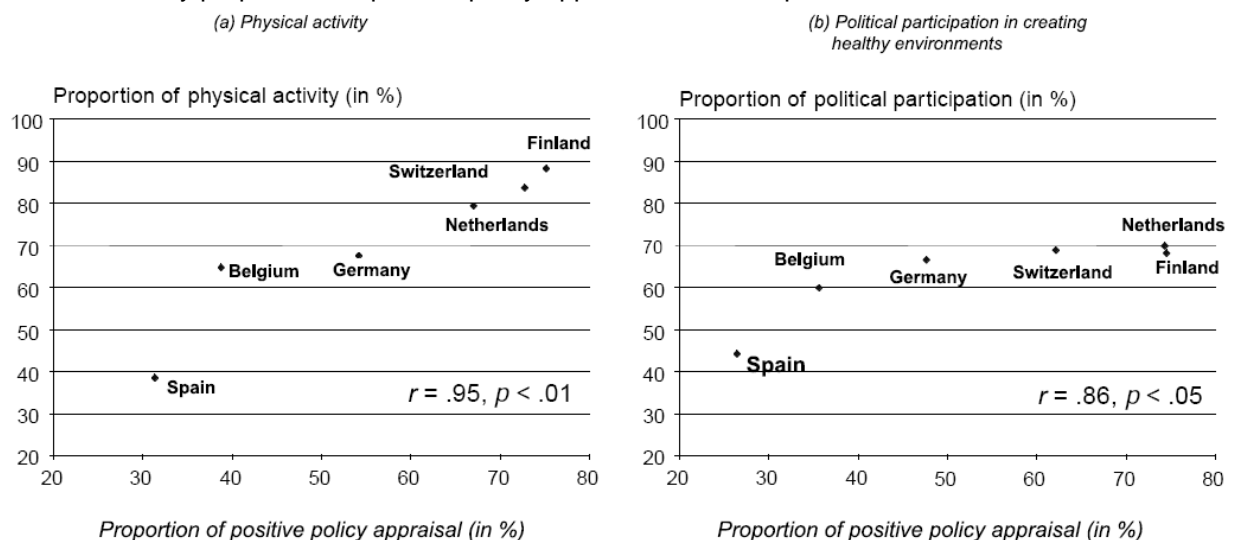


Table 3. Policy-specific inter-correlations<sup>a</sup> of policy perception parameters and behaviours, and their correlations with socio-demographics

	<i>Early Detection of Breast Cancer (analysis sample: women aged 50 to 69 with valid socio-demographics, N = 522)</i>			<i>Prevention of Smoking (analysis sample: smokers and ex-smokers with valid socio-demographics, N = 1521)</i>			<i>Promotion of Physical Activity (analysis sample: all with valid socio-demographics, N = 3075)</i>			<i>Political Participation in Creating Healthy Environments (analysis sample: all with valid socio-demographics, N = 3022)</i>		
	<i>policy information (1: high, 0: low)</i>	<i>policy evaluation (1: high, 0: low)</i>	<i>bi-annual mammo-graphy (1: yes, 0: no)</i>	<i>policy information (1: high, 0: low)</i>	<i>policy evaluation (1: high, 0: low)</i>	<i>quit smoking (1: yes, 0: no)</i>	<i>policy information (1: high, 0: low)</i>	<i>policy evaluation (1: high, 0: low)</i>	<i>being physically active (1: yes, 0: no)</i>	<i>policy information (1: high, 0: low)</i>	<i>policy evaluation (1: high, 0: low)</i>	<i>being politically active (1: yes, 0: no)</i>
Policy evaluation (1: high, 0: low)	.23***			.17***			.17***			.17***		
Policy-specific behaviour	.11*	.15***		.03	.08**		.14***	.09***		.13***	.02	
1: female, 0: male	–	–	–	.05	–.02	–.08**	.02	.03	–.02	.01	.03	–.09***
Age (in years) <sup>b</sup>	–.03	.05	–.05	.11***	.14***	.40***	.12***	.15***	.00	.16***	.08***	–.02
Years of schooling <sup>b</sup>	.03	.00	–.01	.06*	.03	.03	.00	–.04*	.16***	.00	–.02	.11***
1: married, 0: not married	.07	.07	.08	.12***	.10***	.21***	.11***	.05**	.01	.12***	.05*	.08***
1: currently employed, 0: currently not employed	.00	–.09*	–.02	–.03	–.07*	–.18***	–.02	–.06**	.06**	–.06**	–.08***	.15***
1: urban area of residence, 0: rural area of residence	–.10*	–.13**	.00	–.04	–.11***	–.08**	–.07***	–.11***	–.09***	–.07***	–.12***	–.07***

Notes: <sup>a</sup> Phi-coefficients; <sup>b</sup> point-biserial coefficients

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$



Table 4. Results of logistic regression models (backward selection)

<i>Policy</i>	<i>Behavioural indicator (regressor)</i>	<i>N</i>	<i>Parameters of policy perception (regressands)</i>	<i>OR<sup>a</sup></i>	<i>95%</i>	<i>CI<sup>b</sup></i>
Breast cancer screening	mammography every two years (vs. less)	522 (women, age 50–69 only)	individual-level policy information	2.05**	1.21	3.48
Smoking prevention	quitting smoking (vs. smoking)	1521 (smokers and ex-smokers)	individual-level policy information	.76*	.58	.99
Physical activity promotion	being physically active (vs. not)	3075	individual-level policy information	1.74***	1.47	2.07
Creating healthy environments	participating politically (vs. not)	3022	individual-level policy information	1.69***	1.43	2.00

*Note:* Adjusted for sex, age, marital status, education (years), area of residence (urban/rural) and employment status (employed/not employed)

<sup>a</sup> Odds ratios refer to high (vs. low) score of individual-level regressands

<sup>b</sup> CI: Confidence Intervals

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

Table 5. Results of multilevel logistic regression models (backward selection)

<i>Policy</i>	<i>Behavioural indicator (regressor)</i>	<i>N</i>	<i>Parameters of policy perception (regressands)</i>	<i>OR<sup>a</sup></i>	<i>95%</i>	<i>CI<sup>b</sup></i>
Breast cancer screening	mammography every two years (vs. less)	522 (women, age 50–69 only)	individual-level policy information	2.11**	1.24	3.60
Smoking prevention	quitting smoking (vs. smoking)	1521 (smokers and ex-smokers)	individual-level policy information	.75*	.58	.97
Physical activity promotion	being physically active (vs. not)	3075	individual-level policy information	1.74***	1.47	2.07
			nation-level policy information	4.26**	1.56	11.59
			nation-level policy appraisal	40.15***	16.76	96.30
creating healthy environments	participating politically (vs. not)	3022	individual-level policy information	1.69***	1.43	1.99
			nation-level policy appraisal	4.70**	1.55	14.22

*Note:* Adjusted for sex, age, marital status, education (years), area of residence (urban/rural) and employment status (employed/not employed)

<sup>a</sup> Odds ratios refer to high (vs. low) scores of individual-level and to sample range for nation-level regressands

<sup>b</sup> CI: Confidence Intervals

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$