



Mapping health behaviors: Constructing and validating a common-sense taxonomy of health behaviors



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ABSTRACT

Objective: Health behaviors (HBs) are major determinants of health, illness, and mortality. Theoretical efforts aimed at understanding their nature and the processes involved in their initiation and maintenance have largely ignored differences among them. Therefore, the objective of this research was to establish a reliable and valid common-sense taxonomy of HBs.

Methods: The first study created a comprehensive list of 66 HBs based on the views of laypeople ($N = 70$), health professionals ($N = 30$), and a literature review. In the second study, a sample of laypeople ($N = 268$) selected the most important HBs. In the third study, a similarity card-sorting technique was administered to a representative sample ($N = 450$) in an effort to uncover the structure of HBs. The fourth study replicated the structure ($N = 627$) and assessed its stability and generalizability.

Results: A complete list of 66 HBs was developed, of which 45 were judged as most important. Classifications of HBs identified two main categories: psychosocial, including psychological, social, and work issues; and physical, composed of risk avoidance, nutritional habits, and prevention. The hierarchical classification further separated each category into distinguishable clusters and subclusters. The results were replicated, and additional analyses revealed a high level of stability of the taxonomy across different demographic sub-groups.

Conclusions: The taxonomy can provide a framework for research and a map for program developers looking for meaningful links between specific groups of HBs and particular behavior change techniques. This should optimize the cost-effectiveness of promotion and intervention programs, and thus increase health and decrease health-care burden.

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1. Introduction

The leading causes of premature mortality and morbidity, such as poor diet, physical inactivity, and tobacco use, are behavior related and thus preventable (Leventhal et al., 2008; Mokdad et al., 2004). These HBs can be defined as “activities that may help to prevent disease, detect disease and disability at an early stage, promote and enhance health, or protect from risk and injury” (Steptoe and Wardle, 2004, p. 25). Social-cognitive theories were developed to explain them based on factors including attitudes, perceptions, beliefs, self-efficacy, and intentions to change behavior (Sutton, 2001).

Numerous empirical investigations of these theories focused on

single or only a few behaviors (smoking, exercise, etc.) assumed to represent HBs in general. However, there is evidence that the predictive significance of specific theoretical constructs is moderated by the type of behavior (McEachan et al., 2011). For example, intentions have less impact on behaviors performed frequently in stable contexts, such as seat belt use, compared with behaviors performed occasionally and/or in unstable contexts, such as vaccination (Webb and Sheeran, 2006).

Notwithstanding the differences between HBs, considering them as completely distinct from each other is also incompatible with evidence. For example, physical activity, fruit and vegetable consumption, and limited television watching were found to be correlated among high-school students (Driskell et al., 2008), as were cigarette smoking, alcohol, and hard-drug use (Hays et al., 1984). Thus, there appears to be a consistent internal organization to the clustering of HBs.

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1.1. Prior classifications of HBs

Several categories of HBs proposed in the past were based on conceptual considerations regarding their functions: for example, health (disease prevention), illness (detection), and sick-role behaviors (for the purpose of getting well) (Kasl and Cobb, 1966); or behaviors that promote health and “inoculate” against future illness versus behavioral pathogens that increase the risk of disease and death (Matarazzo, 1983). These categorizations represent top-down qualitative models based on experts' interpretations. Following the development of self-regulatory models (e.g., Leventhal et al., 1980), outcomes are seen as also dependent on laypeople's cognitive representations, perceptions, and interpretations (e.g., Cameron and Moss-Morris, 2004).

While most research focused on illness perceptions (e.g., Hagger and Orbell, 2003), little attention was paid to lay perspectives of HBs. One exception is a study that used behavior frequency reports to develop a third-order factor model consisting of a single bipolar dimension differentiating between health-enhancing and health-threatening behaviors (Røysamb et al., 1997). Another study used 11 key characteristics of HBs to produce a classification consisting of three key dimensions: “easy immediate pay-offs” versus “effortful long-term pay-offs,” “private unproblematic” versus “public and problematic,” and “important routines” versus “unimportant one-offs” (McEachan et al., 2010).

2. An overview of the current research

A taxonomy of HBs can serve many purposes, such as explaining cognitive differences associated with them, identifying factors influencing multiple behaviors by delineating a set of related HBs, and explaining the heterogeneity in the findings of evaluations of behavior change interventions. Conceptual typologies, based on experts' notions (e.g., Vickers et al., 1990), offer important insights into HB attributes, but do not necessarily reflect laypeople's perspectives, which might have predictive power beyond other factors (e.g., Idler and Benyamini, 1997). Results from behavior frequency reports may reflect patterns with important clinical significance (e.g., Rothman and Salovey, 1997), which can differ markedly from perceptions (e.g., a physically active person may have less time for watching television, without perceiving a connection between the two behaviors). Finally, although the “key characteristics” approach (e.g., McEachan et al., 2010) has the advantage of clearly characterizing the dimensions underlying the classification, it may also influence the creation of those dimensions by priming the specific characteristics upon which HBs are judged. A complementary technique employing direct similarity judgments that reflect participants' unmediated cognitive schema could uncover new clusters of HBs that represent perceptual similarity.

The present research used a bottom-up approach to develop a common-sense taxonomy of HBs expected to reveal the structure of HBs according to laypeople's perceptions. The taxonomy is based on the assumption that HBs have a structure of both superordinate and subordinate categories (Stavri and Michie, 2012). Focusing on lay perspectives dictates that the behaviors under investigation should be elicited from laypeople and judged by them. It also entails monitoring the proportion of participants working in the health field and excluding those with chronic illness, which might affect their perception of HBs (Ayers and Kronenfeld, 2007).

In line with these considerations, four consecutive studies were conducted in order to develop a comprehensive list of HBs; select those considered important by laypeople; classify them by direct similarity judgments using a card-sorting procedure and analyze the data by hierarchical and dimensional methods to reveal the underlying structure of HBs; and replicate the results in a larger

sample to test the stability and reliability of the structure. All study protocols were approved by the university's ethics review board.

3. Study 1: creating a comprehensive list of HBs

Previous studies investigating the structure of HBs used either a list of government-recommended HBs (e.g., McEachan et al., 2010), behaviors based on hypothesized dimensions (e.g., Vickers et al., 1990), or an arbitrary list (e.g., Røysamb et al., 1997). Consistent with the bottom-up approach of the present research, a comprehensive list of HBs was compiled based on laypeople's perceptions, to which information collected from professionals and the literature was added, in order to ensure that central HBs were not absent from the list due to memory accessibility issues (e.g., infrequent engagement or taboos).

3.1. Method

3.1.1. Participants and procedure

The current study included the following three samples: A lay sample, a validation lay sample, and health promoters. Lay samples were collected by snowball sampling (Goodman, 1961), with the experimenters' acquaintances as initial informants. Some questionnaires were distributed to residents in the community by the experimenters (in coffee shops, hair salons). Health promoters were recruited from a 1-year course in health promotion, during which they were asked to participate in a study on HBs. All participants filled out the measures.

3.1.2. Measures

3.1.2.1. *Eliciting HB questionnaire.* The definition of HBs (Steptoe and Wardle, 2004) was presented, followed by instructions to write down any HB that comes to mind in a table with 30 lines.

3.1.2.2. *Demographic items.* Participants were asked to indicate their age, gender, education, place of birth, and the number of years working in the health field, if applicable.

3.1.3. Literature review

A systematic literature search was conducted at the beginning of 2011. The *PsycINFO* database elicited 1106 references of peer-reviewed journals with the words “health behavior” in their title, and 19 and three papers with “health behavior” plus “review” or “meta-analysis,” respectively. Only results in electronic format were included.

3.1.4. Data analysis

An initial list of HBs was obtained from the lay sample. Its comprehensiveness was ensured by reviewing behaviors elicited by a validation sample that was divided into two groups: the first 20 people added a small number of new items, and saturation was achieved after reviewing the items of the other 20 participants, which added only one new item. In parallel, a list of items elicited by health promoters was developed. An initial list from the literature search was created using meta-analyses and review articles, to which individual articles provided little additional information, and saturation was achieved after reviewing 50 of them.

3.2. Results

The characteristics of the participants are presented in Table 1. The validation lay sample did not differ from the main lay sample in terms of age $t(66) = -0.795$, $p > 0.05$, and gender $\chi^2(1) = 0.22$, $p > 0.05$.

The selection process of the behaviors is illustrated in Fig. 1. A

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