UNIVERSITEIT GENT

FACULTEIT ECONOMIE
EN BEDRIJFSKUNDE

HOVENIERSBERG 24
B-9000 GENT
Tel. : 32 - (0)9 – 264.34.61
Fax. : 32 - (0)9 – 264.35.92

WORKING PAPER

Health Advertising to promote Fruit and Vegetable Intake: Application of need-related Health Audience Segmentation.

Nele Geeroms[1]

Patrick Van Kenhove[2]

Wim Verbeke[3]

OCTOBER 2005

2005/336

[1] Department of Marketing, Ghent University, Ghent, Belgium
[2] Department of Marketing, Ghent University, Ghent, Belgium
[3] Department of Agricultural Economics, Ghent University, Ghent, Belgium

D/2005/7012/54

Given the importance of meaningful audience segmentation in creating effective health advertisements, this study proposes a new segmentation approach based on a theoretical structure of eight fundamental consumer needs. The authors demonstrate the usefulness of this new method in the process of developing appropriate health advertisements in the context of fruit and vegetable consumption. Results of a two-step cluster analysis reveal five different health segments to exist with different health-realted need patterns. Significant differences exist between these segments both with regard to (category-specific) fruit and vegetable consumption and reactions toward fruit and vegetable health advertisements. In general, a segment's reactions toward appropriate need-related health advertising were significantly more positive than its reactions toward health advertising that has a general character (i.e. not responsive to a segment's underlying needs). Based on these results some practical suggestions and recommendations are offered for health communicators to use when developing need-related health advertisements to audiences with specific health-related need patterns.

Consumption of diets rich in fruits and vegetables is important for attaining and maintaining a good health (e.g. Cox et al., 1996; Steinmetz & Potter, 1996; Van Duyn & Pivonka, 2000; Hu et al., 2000; Li et al., 2000; Lambert, 2001). Therefore, the World Health Organization (WHO, 1990) recommends a daily intake of at least 400g of vegetables and fruits, which is equivalent to about five 80g portions of fruits and vegetables per day (Williams, 1995). Nevertheless, statistical data show that the consumption levels of fresh fruits and vegetables remain substantially below this recommended level in many countries (e.g. Thompson et al., 1999; Naska et al., 2000; Ling & Horwath, 2001; Rurik & Antal, 2003; Vereecken et al., 2004).

To promote compliance with the "Five-a-day" recommendation, several nation-wide public health campaigns have been established (French et al., 2001), with varying results. Whereas some of the interventions actually did achieve the meant objectives (e.g. Dixon et al., 1998; French & Stables, 2003), others were less successful in modifying eating behavior (e.g. Donohew, 1990; Weaver et al., 1999; Ringold, 2002; Glanz & Yaroch, 2004; Safley et al., 2004).

As mentioned by several authors, this inconsistent success of previous public health campaigns might be due to the fact that some of these interventions disregarded the possibility that the total population consists of a number of smaller sub-groups, with distinct goal/need patterns that should be taken into account (e.g. Albrecht &

Bryant, 1996; Pollard et al., 2002; Verbeke, 2005). As posited by these authors, marketing health information that is insufficiently tailored or personally relevant and does not target a specific goal/need risks to be ineffective, as it is not appropriate for or does not appeal to a particular target audience (e.g. Fennis, 2003; Rapley & Coulson, 2005). To be effective, persuasive messages should be developed that are responsive to consumer goals/needs (e.g. Brehony et al., 1984; Lefebvre & Flora, 1988; Hastings & Haywood, 1994). Hence, also in social marketing areas, the real challenge lies in identifying and effectively reaching particular audience segments (Brown & Einsiedel, 1990; McGlone & Calantone, 1992; Wedel & Kamakura, 2000).

In this context of goal/need-related audience segmentation, this study outlines a new domain-specific (e.g. Van Raaij & Verhallen, 1994) segmentation approach based on a theoretical structure of fundamental consumer needs (Callebaut et al., 2002). In response to a specific product environment or behavioral domain, eight consumer needs can be identified, determined by two structural dimensions. Each of these need-states is present within every individual but depending on the concrete consumer situation, one or more needs may become predominant.

As health behavior involves the purchase and/or consumption of health-related consumer commodities and many health education issues can be conceptualized in terms of changing consumption habits (e.g. Slater & Flora, 1994), a heterogeneous health audience will be segmented based on this theoretical model of consumer needs. After identifying segments with different health-related need patterns, the authors explore the effectiveness of different persuasive messages to motivate each of the segments to behave healthier (in this case increasing fruit and vegetable intake[4]). It is implicitly assumed that different communication strategies should be employed for consumers with different health-related need patterns.

In the context of this study, four need-related printed health advertisements are tested (and compared to a more general ad), each with a different message tonality (informational vs. transformational) and directionality (self-directed arguments vs. other-directed arguments). The objective is to determine which message tonality and directionality fit best a particular segment or audience group's health-related needs and thus, could be recommended to use in persuasive messages designed to these segments.

---

[4] Fruit and vegetable intake is assumed to be a relevant case to be investigated in the context of need-related audience segmentation, as generic cognitive approaches are less likely to be effective because of low consumer involvement with regard to fruit and vegetable consumption (Verbeke et al., 2005). Moreover, a rich assortment of fruit and vegetable types is available to consumers – each with different features and/or health-related benefits – that can be positioned in the context of different health-related need patterns.

In what follows, we first outline the theoretical background on which our hypotheses are built and give an overview of the research method. Then, the empirical findings are presented, followed by a general discussion and recommendations to health practitioners and communicators. Finally, attention is paid to the limitations of the study and pathways for future research are proposed.

Theoretical background and hypotheses

Consumer goals/needs are important factors to consider when developing public health campaigns to large numbers of people. Based on work within the Means-End paradigm (e.g. Gutman, 1982; Olson & Reynolds, 1983), most conceptual models of goal/need-oriented consumer behavior generally posit a hierarchical organization of goals/needs, in which goals at lower levels in the hierarchy (subordinate goals, 'how' of behavior) serve as a means to achieve higher-level goals (superordinate goals, 'why' of behavior) as ends (e.g. Pieters et al., 1995; Bagozzi & Dholakia, 1999; Huffman et al., 2000).

Whereas previous research on consumer goals/needs has tended to emphasize lower-level goals such as product-specific benefits and features desired by a consumer (e.g. Bettman, 1979; Bettman et al., 1998), this study provides a more general approach by focussing on higher-level consumer goals in the form of basic needs that regulate behavior (e.g. Brunstein et al., 1998).

In this context Callebaut et al. (2002) propose eight fundamental consumer needs that are at work within every individual. Depending on the concrete (consumer) situation, one or more of these needs will become manifest and elicit some kind of goal-directed behavior (Mowen & Minor, 1997).

The relationships among the eight needs can be summarized in terms of a circumplex structure, determined by two basic, bipolar, conceptual dimensions (see Fig. 1). The first basic dimension refers to *'within-person'* needs, stemming from the inner-world of the individual (e.g. Ford & Nichols, 1987). It places an affective '*need for pleasure'* in opposition to a more cognitive *'need for control'*. When people are driven by an underlying need for pleasure, they are motivated by the desire to follow their impulses, appetites and instincts, to maximise pleasure without inhibition or self-control (e.g.. 'Enjoyment theory': Williams, 1968[5]). However, when an underlying need for control is manifest, people are motivated to suppress their inner feelings and emotions in order to behave in a way that is socially or morally acceptable. In this case, behavior becomes very functional and is driven by a desire

[5] A detailed explanation of the psychological theories that are referred to in this section is provided in Appendix I.

for structure; order and rational knowledge (e.g. 'Categorization theory': McGuire, 1974). The second basic dimension refers to *'person-environment'* needs, stemming from the relationship between the individual and the social environment (e.g. Ford & Nichols, 1987). It places a *'need for power'* in opposition to a *'need for belonging'*. Sometimes, people are motivated by the desire to be better than the rest, to feel superior, to be a leader (e.g. 'Self-assertion theory': McClelland, 1961). At other times, people are motivated by the desire to merge into the group and to be accepted and supported by their loved ones. Belonging also involves the need to take care of others and a need for obedience to norms and regulations of the group (e.g. Intimacy/Affiliation theory: McAdams & Powers, 1981).

Out of the dynamic interaction of the two dimensions, another four need-states emerge that combine elements of the personal and the social. Sometimes people are motivated by the desire to experience adventure, test their boundaries and discover new things. In this case they are driven by a *'need for vitality'* (upper-left quadrant in Fig.1) (e.g. 'Stimulation theory': McGuire, 1974) as opposed to a *'need for security'* (bottom-right quadrant in Fig.1). People driven by a need for security are motivated by the desire they feel to hide away, to feel safe, relaxed, calm and be protected (e.g. 'Regression theory': Freud, 1933). The bottom-left quadrant of the proposed human need structure refers to a *'need for recognition'* as people in this quadrant are motivated by the desire for others to recognize them for their appearance, skills, knowledge, to be respected by others (e.g. 'Achievement theory': McClelland, 1961). In opposition to the recognition need, a *'need for conviviality'* is placed (upper-right quadrant in Fig.1). Here, people are motivated by the desire to be with people, to open up socially, to share experiences and emotionally connect with others, to simply be together (e.g. 'Affiliation theory': McAdams & Powers, 1981).

<Insert Figure 1 here>

When operationalizing the above structure of human need states in a health context, we expect a *health-related* need structure to exist, that is reflective of the circumplex structure in Fig. 1. From a 'within-person' point of view, health could be expected to be dealt with in an *unrestricted, emotional* way (i.e. need for pleasure) as opposed to a more *controlled, functional* way of dealing with health (i.e. need for control). When 'person-environment' needs are manifest, we expect an *individualistic* interpretation of health to exist (i.e. need for power) in contrast to a more *altruistic* interpretation (i.e. need for belonging). Out of the dynamic interaction of the previous 'within-person' and 'person-environment' ways of dealing with health, we hypothesize four different

health audience segments to emerge with different health-related need patterns, corresponding to the four quadrants in Fig. 1 i.e.:

H1a: A vitality segment does exist combining elements of pleasure and power-related need patterns. For these people, health is mainly about being active (e.g. practicing sports) and having energy.

H1b: A conviviality segment does exist combining elements of pleasure and belonging-related need patterns. For these people, health is mainly about emotional well-being, enjoying life and feeling good socially.

H1c: A security segment does exist combining elements of control and belonging-related need patterns. For these people, health is mainly about physical well-being, avoiding illness and taking care of the health of others.

H1d: A recognition segment does exist combining elements of control and power-related need patterns. For these people, health is mainly about being recognized for their appearance (e.g. looking good, being slim) and feeling in control over their body (e.g. self-management).

As specific goals/needs guide a person's behavior in a given situation (e.g. Carver & Scheier, 1981; Pervin, 1989), differences in behavioral patterns could be expected as a result of particular goal/need differences. In consumer goal structures, more specific behavioral sub-goals at lower levels in the hierarchy are instrumental to reach higher level goals or needs (e.g. Pieters, 1993). When applying this to the context of health, we expect different health-related behaviors to exist among people with different health-related need patterns, as different behavioral strategies will be appropriate to satisfy the different needs. With regard to fruit and vegetable consumption, this may translate into significant differences in consumption patterns among members of different health audience segments. Based on the theoretical arguments posited in this study and their operationalization in the context of health (i.e. H1a – H1d), we derive the following specific hypotheses:

H2a: Significant differences in daily fruit and vegetable consumption *frequency* will exist among the different health audience segments: as members of the conviviality segment are expected to enjoy the pleasures of life (e.g. tasty food even if rich in calories), they are supposed to consume significantly less fruits and vegetables compared to the other segments. However, as recognition segment members are assumed to prefer food which has a benefit with respect to physical appearance (i.e. low-calorie food) and reject what is bad for appearance (i.e. high-calorie food), their fruit and vegetable intake is expected to be significantly higher. Vitality and security segment members are

supposed to have average fruit and vegetable consumption levels, as their focus is set on rather balanced meals composed of all necessary food components (i.e. not only fruits and vegetables).

H2b: Significant differences in *type*-specific fruit and vegetable consumption will exist among the different health audience segments: to get power for their body, members of the vitality segment are expected to consume significantly more high-energy types of fruits and vegetables (e.g. bananas) compared to the other segments, whereas recognition segment members are assumed to consume significantly more low-calorie type of meals (e.g. raw vegetable salads) to keep their body slim. More classical or traditional fruit and vegetable types with high nutritional value (e.g. potatoes and cooked vegetables) are expected to be consumed significantly more by members of the security and conviviality segments, since these people are assumed to feel strongly about traditional family values and norms.

Besides impact on health-related behavior, we expect health-related need patterns also to influence consumer's cognitive reactions (i.e. attitude toward the ad (Aad) and behavioral intention (BI)) toward health advertisements. It is assumed that for health advertising to be effective, messages should not be delivered in homogeneous ways (e.g. Witte et al., 1996). Instead, health practitioners must assess, prior to delivering a message, the manifest health-related need patterns of the target audience. Messages are recommended to be developed with characteristics that are responsive to these manifest needs (e.g. Slater, 1996). From this association with higher-order goals/needs, need-related advertisements evoke more personal relevance (e.g. Rothchild, 1987; Eagle et al., 2004), revealing a tendency of a more positive Aad and BI (Darley & Lim, 1991).

In this study, two types of message characteristics are manipulated in response to people's health-related need patterns, i.e. message tonality and directionality. Based on the previous definitions of the needs that make up the proposed human need structure (see Fig.1), it is hypothesized that when *pleasure*-related need patterns are manifest, a *transformational* message tonality will be most appropriate, stressing hedonic consumer experiences whereas when *control*-related need patterns are manifest, health practitioners should avoid any confrontation with consumer emotions by using an *informational* advertising strategy, focusing on rationality and functionality (e.g. Rossiter & Percy, 1997). In the same way we assume that when *power*-related need patterns are manifest, the arguments used in health advertisements should be *self-directed,* stressing individual success whereas when *belonging*-related need patterns are manifest, arguments should be *other-directed,* focusing on social connectedness (e.g. Wang & Mowen, 1997). When combining the previous dimensions of message tonality and directionality, four

need-related health messages could be developed, each of which we expect to be personally relevant to one of the four hypothesized health audience segments and thus should evoke more positive reactions among the corresponding segment. Specifically, we hypothesize:

H3a: Compared to the other segments, the vitality health audience segment will respond more positively (Aad + BI) toward a *transformational/self-directed* health advertisement as this segment employs combinations of pleasure and power-related need patterns.

H3b: Compared to the other segments, the conviviality health audience segment will respond more positively (Aad + BI) toward a *transformational/other-directed* health advertisement as this segment employs combinations of pleasure and belonging-related need patterns.

H3c: Compared to the other segments, the security health audience segment will respond more positively (Aad + BI) toward an *informational/other-directed* health advertisement as this segment employs combinations of control and belonging-related need patterns.

H3d: Compared to the other segments, the recognition health audience segment will respond more positively (Aad + BI) toward an *informational/self-directed* health advertisement as this segment employs combinations of control and power-related need patterns.

When comparing each segment's most appropriate need-related health advertisement to a *general* advertisement (i.e. not responsive to consumer needs), we suggest the following:

H3e: A segment's reactions (Aad + BI) toward the most appropriate need-related advertisement will be significantly more positive than its reactions toward a general advertisement, as the latter advertisement is less personally relevant.

Method

Stimuli

Stimuli were five printed health advertisements promoting a daily intake of at least five portions of fresh fruits and vegetables (cfr. WHO, 1990). Four need-related advertisements were created by the experimenter by using a 2

tonality (informational versus transformational ad) by 2 directionality (self-directed versus other-directed ad) within-subjects design.

The tonality dimension was manipulated by using an informational versus transformational advertising strategy (e.g. Rossiter & Percy, 1997). The transformational ads used vivid pictures (either self-directed or other-directed depending upon the particular condition), paid attention to hedonic aspects of fruit and vegetable consumption (e.g. enjoying life, experiencing freedom) and put sentences in relatively personal first-person wording (either singular (I-sentences) or plural (we-sentences) depending upon the condition). The informational ad versions used mainly verbal arguments instead of pictures, paid attention to the functional aspects of eating fruits and vegetables (e.g. avoiding illness or avoiding getting fat) and wrote sentences in rather removed third-person wording. Directionality was manipulated by using either self-directed arguments emphasizing the themes of self-identity, individuality, unique lifestyle and private issue or other-directed arguments focusing on the theme of we-ness, relationship, family-commitment and joint decision (e.g. Wang & Mowen, 1997).

For comparison reasons, a fifth, general advertisement was presented to the subjects in addition to the four experimental conditions[6]. This additional advertisement had both, a more *neutral* tonality (neither informational nor transformational) and directionality (neither self-directed nor other-directed) and was part of an existing Belgian public health campaign concerning fruit and vegetable consumption, running at the time of research. All five advertisements are shown in Appendix II.

Participants

Participants were recruited via the World Wide Web by using an on-line survey method. A link to the questionnaire was placed on the website of a widespread national newspaper. Ensuring that repeated participation was impossible, a sample of 692 subjects was collected. 77 respondents were eliminated from the sample because of incomplete responses on key variables, yielding a final sample of N=615.

The respondents ranged in age from 17 to 77 years, with a mean age of 40.7. Compared with the available population statistics of the Belgian people (NIS, 2004), the sample was representative in terms of age, relationship status and children in the family. With regard to gender, women were slightly overrepresented (59.0%) as were people with a higher education (59.4%). A detailed overview of the sample characteristics can be found in Table 1.

[6] In the questionnaire all five advertisements were successively presented in a randomized way.

<Insert Table 1 here>

Measures

Attitude Toward the Ad (Aad) and Behavioral Intention (BI).

People's cognitive reactions toward the five health advertisements were measured by a five-item 'attitude toward the ad' scale (Aad) and a single-item 'behavioral intention' scale[7].

With regard to Aad, three items were based on Zinkhan, Locander & Leigh (1986) and the other two items were taken from the Attitude Toward the Ad scale of Burke & Edell (1989). All items ranged from 1 (totally disagree) to 8 (totally agree). For all five advertisements, the five-item scale reliabilities were very good. Cronbach's Alpha's ranged from .94 to .96, all exceeding the lower critical value level of .60. So, in each case, the scores of the five items were summed and averaged to form a composite measure of Aad.

Effects on behavioral intention were also measured for all five advertisements. Concretely, subjects were asked to indicate the likelihood of eating more fresh fruits and vegetables on an 8-point likelihood scale ranging from 1 (not at all likely) to 8 (very likely).

Health-related need patterns

In Appendix III an overview is given of the scale that was used to measure people's health-related need patterns. This scale consisted of 45 items. 15 items talked about health in a rather *explicit* way (fundamental meaning of health) whereas the other 30 items dealt with health more *implicitly* by focusing on perceived consequences of a bad health. Subjects rated these items on a 7-point Likert scale going from 1=totally disagree to 7= totally agree.

All items were constructed based on desk research and qualitative research (18 in-depth interviews and three group discussions) in which subjects – by means of the Laddering method (Reynolds & Gutman, 1988) - were encouraged to talk about their ways of dealing with health and health-related issues. Based on this procedure all eight positions in the circumplex human need structure (i.e. Fig. 1) were translated in a series of health statements

[7] The rationale for using a single-item behavioral intention scale is based on Rossiter (2002). This author proposes the use of single-item measures for assessing such concrete constructs as behavioral intention, as multi-item measures often involve the addition of unnecessary and conceptually inappropriate items in order to obtain a high internal reliability (Cronbach's alpha).

that made up the items in the health-related need pattern scale. As a result, initially, eight health constructs were supposed to underlie this scale.

A maximum likelihood confirmatory factor analysis (CFA), using Lisrel 8.50 was undertaken (Jöreskog & Sörbom, 1993) to determine if the eight-factor solution was tenable. The initial solution did not fit the data well, because of low loadings and poor unidimensionality of some items. These items that did not perform well were dropped (N=11). With regard to discriminant validity, the intercorrelation between the constructs 'pleasure' and 'conviviality' was very high (r=.85), as was the case with the correlation between 'security' and 'control' (r=.74). Hence, legitimated by the continuous nature of the proposed human need structure[8], we decided to respectively combine these adjacent positions into single constructs. An additional confirmatory factor analysis was performed with six health constructs, corresponding to the positions vitality, pleasure/conviviality (combined), belonging, security/control (combined), power and recognition. A satisfactory six-factor model emerged out of this analysis (see Table 2). To test discriminant validity, each of the 15 off-diagonal elements of Φ was fixed to 1.0, in turn, and the model was re-estimated. Changes in the $\chi 2$ goodness-of-fit were statistically significant for all 15 comparisons ($\Delta\chi 2$ ranging from 211 up to 252, df=1, $p<.05$) (Steenkamp & Van Trijp, 1991).

Construct reliabilities were evaluated by calculating the composite reliabilities. Reliabilities of the six multiple-item scales were satisfactory as they ranged from .61 to .82 (see Table 2). Scores of each item were summed and averaged to represent the corresponding construct. These composite construct measures were used in all further analyses.

<Insert Table 2 here>

Fruit and vegetable consumption

To estimate people's habitual intake of fresh fruits and vegetables, a short food frequency questionnaire (FFQ) was used, developed and validated by Bogers et al. (2004). This instrument had a reference period of 1 month and included those types or categories of fruits and vegetables that were consumed most frequently in Belgium. Participants were asked to indicate for each category, both their average consumption frequency and portion size. Consumption frequency was measured on a 9-point scale going from 1= never or less than 1 day a month to 9= 7

[8] The relationships among the eight needs describe a continuum within a two-dimensional circumplex rather than discrete need categories. Hence, in CFA, some positions of the human need structure may emerge in combination with adjacent positions, rather than that they will show up as separate constructs.

days a week. To indicate portion size, a 5-point scale was used going from 1= 1 serving to 5= 5 or more servings. Total intake, expressed in number of servings per day, was calculated by multiplying consumption frequency with portion size. Consumption of the various fruit and vegetable categories was summed to obtain total fruit consumption, total vegetable consumption, and total fruit and vegetable intake.

Results

Manipulation Checks

Additionally, in participants' questionnaire, two manipulation checks were included. These measures asked about how people perceived a particular advertisement[9] respectively in terms of tonality (informational vs. transformational) and directionality (self-directed vs. other-directed). Informational and transformational ad content was measured with three semantic differential items that were based on the standard scale of Puto & Wells (1984): objective information vs. experience-oriented; formal vs. informal; rational vs. emotional. Self-directedness and other-directedness were also measured with three semantic differentials derived from Wang & Mowen (1997): individualistic vs. altruistic; self-identity vs. family commitment; ego-ness vs. we-ness. In both cases, each semantic differential used a 5-place scale response format. Tonality and directionality scores were derived by averaging over the corresponding items, such that higher scores reflect respectively higher transformationality and other-directedness.

ANOVA results indicated that both our tonality and directionality manipulations had been successful. Transformational advertisements were perceived as significantly more 'transformational' compared to the informational advertisements (M=3.9 vs. M=2.6; $F(1, 611)= 295.21$, $p<0.05$). Also, other-directed advertisements were perceived as significantly more 'other-directed' compared to the self-directed advertisements (M= 3.9 vs. M= 2.5; $F(1, 611)= 429.57$, $p<0.05$).

Different Health Audience Segments (H1)

To address the first hypothesis, a two-step cluster analysis (hierarchical clustering using Ward's method, followed by a K-means clustering) was performed on the six health constructs developed before. Although a four-cluster

[9] In this case, respondents were randomly assigned to only one of the four experimental conditions.

solution was hypothesized, the best fit with the data was obtained by a *five*-cluster solution, based on significant differences between the cluster groups on each of the six constructs (see Table 3).

A correspondence analysis of the scores of the five clusters on the health statements revealed a health-related need structure (see Fig. 2), reflective of the proposed human need structure in Fig. 1. The vertical axis of Fig. 2 reflects the *within-person* dimension of the theoretical human need structure as it refers to the way in which the individual translates 'health' for himself. As expected, on the one hand health gets meaning throughout its emotional aspects of enjoyment and freedom (e.g. pleasure), whereas on the other hand, health is dealt with in a very physical manner with a focus on functionality and control (e.g. control). The horizontal axis of Fig 2 refers to the *person-environment axis* of the proposed human need structure as it shows how the fundamental meaning of health is related to the social environment. As was expected in this case, an altruistic, normative way of dealing with health could be discovered with a focus on social well-being and responsibility (e.g. belonging), in contrast to a more ego-centered interpretation of health, focusing on feelings of independence of others and activity (e.g. power). Out of the dynamic interaction of both dimensions, five health audience segments emerge (i.e. results of cluster analysis), with different health-related need patterns.

Variable mean scores in Table 3 and cluster-item associations in Fig. 2 are suggestive of the nature of the health-related need patterns for each cluster. In support of H1a, a vitality segment could be detected (i.e. Cluster 1) which we called *'Energetic Experimenters*'. Members of this segment perceive health mainly in terms of vitality and energy (M=6.0). 50.7% of them associates health with 'living an active life'; 49.3% with 'keeping the body in a good condition' and 42.0% would perceive it as (extremely) bad not to be able anymore to practice sports because of health problems. 'Energetic Experimenters' have an average age of 37.7, the youngest segment and compared to average (41.0%), males are slightly overrepresented in this segment (52.7%). About 43.0% of Cluster 1 is working as an employee, 49.5% has no children (which is more than the other segments) and 65.2% has a fulltime employment status. 'Energetic Experimenters' are the largest segment and represent 34% of the total sample.

Cluster 2 subjects, called *'Harmonious Enjoyers'*, are representative for the conviviality segment hypothesized in H1b. These people are mainly involved with emotional health (M=5.8). 'Emotional well-being' (75.2%); 'enjoying life' (67.3%) and 'keeping up good social contacts' (32.7%) are very important to them. Compared to the other segments, 'Harmonious Enjoyers' are slightly older (average age 43.9) with more retired people (19.0%). Most of them have children (67.3%) and here also, males are a bit overrepresented compared to average (48.5%). 16% of our sample belongs to this segment.

Also H1c was supported as a security segment could be identified (i.e. Cluster 3), called '*Normative Carers'*. In contrast to cluster 2, 'Normative Carers' are heavily concerned with the physical aspects of health (M=5.7). Being healthy means in particular 'avoiding illness' and 'having no physical health problems' (50.6%). In addition, members of Cluster 3 perceive health as a social responsibility (M=5.8). 'Taking care of other family members' health' (29.9%), is considered as very important. Most of the people in Cluster 3 are women (59.7%) with an average age of 43.6. More than the other segments Normative Carers work at home (14.3%). This segment accounts for 17% of the sample.

Respondents in Cluster 4 (18% of the sample) are called '*Conscious Experts'* and could be considered as the recognition segment posited in H1d. For them, health is mainly about management (M=5.4) and physical appearance (M=5.6). They deal with health in a very self-conscious way with the focus on the health of their own body. As opposed to the other segments, 'staying slim' (24.8%); 'looking good' (10.1%); 'being stylish' are very important aspects of feeling healthy for members of Cluster 4. They know their own body the best and as a result, they want to manage their health by themselves, without needing advice from others. Among them, the majority are women (74.1%), fulltime employed (63.3%) and 41.3% works as an employee. The average age of this second youngest segment is 40.2.

Finally, a fifth health audience segment emerged, that was not explicitly hypothesized but seemed to be congruent with the control position of the proposed human need structure. As Normative Carers, members of Cluster 5 also are engaged with the physical/functional aspects of health (M= 5.7), but with as main objective 'having the competence to do their job' (27.7%) and 'being able to organize life and to work functionally' (41.5%), rather than 'taking care of the health of others'. These '*Rationalists'* represent 15% of the total sample. Here also, women are highly overrepresented (75.3%) with a mean age of 41.9. Most of them are employees (52.1%) with a fulltime employment status (54.3%).

<Insert Table 3 here>

<Insert Figure 2 here>

Health-Related Consumer Behavior (Fruit and Vegetable Consumption) (H2)

Hypothesis 2 concerning the impact of health-related need patterns on health-related consumer behavior was tested via one-way ANOVA. No significant differences were found between the segments with regard to the *total intake*

of fruits and vegetables (F(4, 552)= .85, p>.05), as all cluster means fluctuated tightly around the sample mean of 5.4 servings a day. Hence, H2a was not supported.

Significant differences were found between the five health audience segments with regard to the *types* of fruits and vegetables that were consumed. In line with H2b, Energetic Experimenters (i.e. vitality segment) (M=0.7) consumed significantly more *bananas* than did Harmonious Enjoyers (M= 0.3), Normative Carers (M= 0.3), Conscious Experts (M=0.2) and Rationalists (M=0.3) (F(4, 522)= 3.23, p<.05). Also as expected, Harmonious Enjoyers (i.e. conviviality segment) (M=1.9) and Normative Carers (i.e. security segment) (M=2.1) had a significantly higher consumption of *potatoes* than did Energetic Experimenters (M=1.1), Conscious Experts (M=1.0) and Rationalists (M=1.3) (F(4, 522)= 6.81, p<.01). The same pattern could be found for the category of *cooked vegetables*: Harmonious Enjoyers (M=2.6) and Normative Carers (M=2.8) ate significantly more cooked vegetables than did Energetic Experimenters (M=2.1), Conscious Experts (M=2.1) and Rationalists (M=2.2) (F(4, 552)= 4.17, p<.01). However, in contrast with H2b, no significant differences were found between the health segments with regard to the consumption of raw vegetable salads (F(4, 552)= 1.54, p>.05).

Reactions Toward Health Communication Messages (H3)

The third hypothesis concerning the reactions toward *need-related* health advertising was also tested via one-way ANOVA. Results indicate that each of the five health segments – when compared to the other segments – responds more positively (Aad + BI) toward the advertisement that was hypothesized to be most responsive to its health-related need patterns. In support of H3a, Energetic Experimenters (i.e. vitality segment) had significantly higher Aad (M=5.7) and BI (M= 5.1) scores for the *transformational/self-directed* health advertisement (i.e. Ad 2) compared to the other segments (F(4, 611)= 6.93, p<.01 for Aad and F(4, 611)= 8.64, p<.01 for BI). Also H3b was supported as Harmonious Enjoyers (i.e. conviviality segment) had significantly higher measures of both Aad (M=5.9) and BI (M=5.7) for the *transformational/other-directed* advertisement (i.e. Ad 1) compared to the four other segments (F(4, 611)= 5.91, p<.01 for Aad and F(4, 611)= 3.84, p<.01 for BI). For the *informational/other-directed* health advertisement (i.e. Ad 4), Normative Carers (i.e. security segment) showed significantly higher measures of Aad (M= 6.8) and BI (M= 6.7), compared to the other segments (F(4, 611)= 21.89, p<.01 for Aad and F(4, 611)= 15.41, p<.01 for BI), which supported H3c. Finally, also H3d was supported as Conscious Experts (i.e. recognition segment) scored significantly higher on Aad (M= 4.7) and BI (M= 4.5) for the *informational/self-directed* advertisement (i.e. Ad 3) (F(4, 611)= 4.57, p<.01 for Aad and F(4, 611)= 7.86, p<.01 for BI). In addition to

the Conscious Experts, also Rationalists (i.e. control segment) scored significantly higher on Aad (M= 4.6) and BI (M= 4.5) with regard to Ad3, which is plausible given this segment's specific location in the health-related need structure (see Fig. 2).

To test H3e, for each segment, a Paired Samples T-test was conducted between a general advertisement and the most appropriate need-related advertisement (see Table 4). For BI, in all five cases, the most appropriate need-related advertisement elicited a significant higher score compared to the general advertisement (Ad5). With regard to Aad, significant differences between the appropriate need-related advertisement and the general advertisement were only found for three segments. For Conscious Experts and Rationalists, the need-related advertisement did not elicit more positive Aad scores than Ad5. Hence, H3e was fully (Aad + BI) supported in three of the five cases and partially (only BI) supported in all five cases.

<Insert Table 4 here>

Discussion and Recommendations

This paper contributes to the study of health communication by proposing a new health audience segmentation approach based on a theoretical structure of eight fundamental consumer needs and by demonstrating the usefulness of this method in the process of creating effective health advertisements.

Analysis of Hypothesis 1 shows that *five* different health audience segments can be identified, instead of the four-cluster solution that was hypothesized on a theoretical basis. In practice – besides the four hypothesized segments – one additional health segment seems to be important for which health has another distinct meaning. The five health segments can be organized among two dimensions; yielding a health-related need structure that is a reflection of the theoretical human need structure proposed in this study.

Although theoretically expected, no significant differences in *total* fruit and vegetable *intake* can be found among the different health audience segments. These results may indicate that people's health-related need patterns have rather low (or no) influence on daily fruit and vegetable consumption in general. As a result, *'low'* fruit and vegetable consumers are not predominant in one particular segment but instead are equally dispersed over all five segments. However, as expected, consumer's health-related need patterns do have a significant influence on category-specific fruit and vegetable consumption (i.e. bananas, potatoes, cooked vegetables). Following Means-

End reasoning, this may be due to the fact that different fruit and vegetable *types* with different features or (health-related) benefits are instrumental to achieve different health-related need patterns. For example, the perception of bananas as a source of energy and power (e.g. vitality need) may account for the higher consumption of this type of fruit among Energetic Experimenters, whereas potatoes and cooked vegetables may be more preferred by Normative Carers and Harmonious Enjoyers because need-related associations are made between these types of vegetables and for instance tradition (common habit), family health and tastefulness.

Tests of Hypothesis 3 suggest that significant differences exist among the health audience segments with regard to their reactions (Aad + BI) toward need-related health advertising. When compared to the other segments, all health audience segments responded more positively (Aad + BI) toward the advertisement that was hypothesized to be most responsive to their health-related need patterns. Moreover, when comparing the most appropriate need-related advertisement to a general advertisement, in almost all cases a segment's reactions (Aad + BI) toward the need-related advertisement were significantly more positive than its reactions toward the general advertisement. The failure to observe significant differences in Aad between the appropriate need-related advertisement and the general advertisement for Conscious Experts and Rationalists may probably be due to the fact that these subjects are less influenced by advertising. For none of the advertisements, Conscious Experts and Rationalists had an Aad en BI score significantly exceeding the value of 4.5 with some scores even falling below the value of 4.0 (neutral value). These results may indicate that these respondents will stick to their own ideas about health-related issues, rather than giving advertising the opportunity to make up their minds.

This analysis of Hypothesis 3 demonstrates the need to carefully diagnose the manifest health-related need patterns of the target audience, prior to delivering health advertisements. Also the results indicate that different advertising strategies might be appropriate for people with different health-related need patterns. In what follows, we develop specific message recommendations for developing health advertisements targeted toward different audiences. First, with regard to message *tonality* we suggest that:

1. When *pleasure*-related need patterns are manifest among members of the target audience, then the tonality of the advertisements developed should be *transformational*, focusing on emotional/sensory cues and hedonic experiences, as people in such situation tend to follow their emotions and impulses.
2. Conversely, when *control*-related need patterns are manifest, people tend to avoid confrontations with their emotions and passions. In this case, health practitioners should rather make people think by using an *informational* advertising strategy, focusing on verbal arguments and functional aspects of consumption.

With regard to the *directionality* of the arguments used in health advertisements we propose the following:

1. When *power*-related need patterns are manifest, then the arguments used should be *self-directed,* focusing on individuality and private issue, as people in this case tend to take decisions independently and strive for personal success.
2. Conversely, when *belonging*-related need patterns are manifest, then the arguments used in health advertisements should be *other-directed,* stressing the themes of we-ness and family-commitment, as people here want to feel part of a group and be accepted by their loved ones.

Based on these more general suggestions, we also formulate some specific recommendations on how to develop appropriate advertisements for the five health audience segments obtained in this study:

1. *Energetic Experimenters:* for people with a *vitality*-need with regard to health, health advertisements should use a *transformational/self-directed* advertising strategy, as this segment is positioned within the upper-left quadrant of the human (health-related) need structure (combination of pleasure and power). Besides using vivid images that express movement and vitality, health practitioners should focus on individual consumer experiences such as feeling free, getting energy and power for the body, feeling very much alive and kicking. To increase the perception of being addressed personally, sentences might be put in first-person wording (I-sentences), rather than using removed third-person wording.
2. *Harmonious Enjoyers:* as these people deal with health mainly in terms of emotional well-being (e.g. pleasure/conviviality), advertisements designed to them should avoid focusing too much on functional aspects of consumption. Rather, health advertisements should express how the recommended behavior (e.g. eating more fruits and vegetables) might be instrumental to achieve a complete and happy life together with family and friends. As in the previous case, a *transformational* advertising strategy can be strongly recommended (e.g. using vivid pictures, informal language…). However, in this case, the arguments used in the advertisement should not be self-directed. Rather, *other-directed* arguments should be employed that focus on connectedness and harmony between people.
3. *Normative Carers:* for this segment positioned within the bottom-right quadrant of the human need structure (combination between control and belonging), we recommend an *informational/other-directed* advertising strategy. As Normative Carers are mainly concerned with the physical aspects of health, recommendations in the advertisements should focus in particular on functional benefits such as avoiding illness and health problems. Instead of using vivid images, members of this segment should be convinced

by strong verbal arguments, providing important (health-related) information and focusing on the advice and norms of expert-others (doctor, dietician…). In addition, advertisements designed to these people should emphasize the *social responsibility* aspect that is associated with health. Communicating how the recommended responses may contribute to the preservation of the health of close others (family, children…), might be an appropriate strategy to deal with this issue.

4. *Conscious Experts/Rationalists:* in order to counteract these people's disinterest toward advertising, advertisements designed to them might emphasize one's own independent capacities to deal with health. Make members of these segments feel like *natural experts* – being able to keep control over their health by themselves – and your health advertisement might be more successful. As health-related need patterns of these segments are a combination of control- and power-related needs, an *informational/self-directed* advertising strategy is suggested, with mainly verbal arguments focusing on outward appearance (looking good, looking thin) and showing off competence.

Limitations and Future research

This study has several limitations. First, because standard measurement instruments appear not to exist to assess people's health-related need patterns, it became necessary to develop our own health scale. Given the conceptual purpose of this paper, we feel confident this 'self-made' scale performed well to generate six reliable health constructs that served as a solid basis for segmentation. However, from a methodological point of view, additional tests should be done to further improve this scale's psychometric properties. Second, with regard to differences in health-related consumer behavior as a result of differences in health-related need patterns, only two aspects of fruit and vegetable consumption were considered in this study, i.e. consumption *frequency* and *types* of fruits and vegetables that were consumed. Future studies may concentrate on assessing the relationship between health-related need patterns and other aspects of fruit and vegetable consumption (e.g. buying process, decision factors…) or consumption of other food products with a predominant health image (e.g. fish). In the same way some future research opportunities may exist with regard to the relationship between health-related need patterns and people's reactions toward health advertising. In this study only two broad dimensions of advertising strategy were tested, i.e. message *tonality* and *directionality*. Future studies may investigate some other relevant aspects of campaign development and message creation (e.g. different appeals, different types of endorsers, etc…). Also, the usefulness of the proposed need-related health audience segmentation method could be demonstrated in the context of health

prevention instead of health promotion. For example, when attempting to develop increasingly successful *antismoking or fat reduction* advertisements, health communicators may consider the manifest health-related need patterns of the target audience. Finally, in this study, only perceived effects of need-related health advertising were assessed, as a better performance was only demonstrated with regard to consumer's self-reported reactions toward health advertisements. In general, far more positive Aad and BI scores were reported for need-related advertisements compared to advertising that is not need-related. Future experimental intervention studies may also investigate actual behavioral effects, by assessing the potential effectiveness of need-related health advertising in increasing real fruit and vegetable intake.

.

Appendix I: Explanation of Psychological Theories

Enjoyment theory (Williams, 1968):

This theory stresses the human need for pleasure or sensuous gratification for oneself.

Categorization theory (McGuire, 1974):

This theory attempts to explain the human need for structure, order, and rational knowledge as well as the human need for consistency and objectivity.

Self-assertion theory / Achievement theory (McClelland, 1961):

These theories collectively view people as competitive achievers always seeking success and admiration, and striving to develop their potentials in order to enhance their self-esteem.

Intimacy/Affiliation theory (McAdams & Powers, 1981):

This theory focuses on people being altruistic, cohesive, and seeking acceptance and affection in relationships with (close) others.

Stimulation theory (McGuire, 1974):

This theory stresses the need in human organisms for stimulation and self-expression through play and creativity.

Regression theory (Freud, 1933):

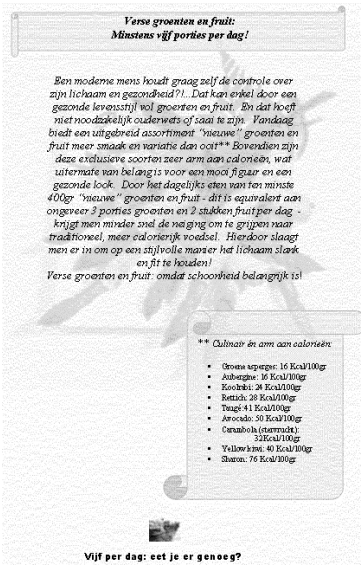
This theory focuses on the reversion to an earlier or less mature pattern of feeling or behavior. Actually it posits that sometimes people need to withdraw, to return emotionally to early childhood experiences and worry-free moments.

Appendix II: Stimuli Advertisements

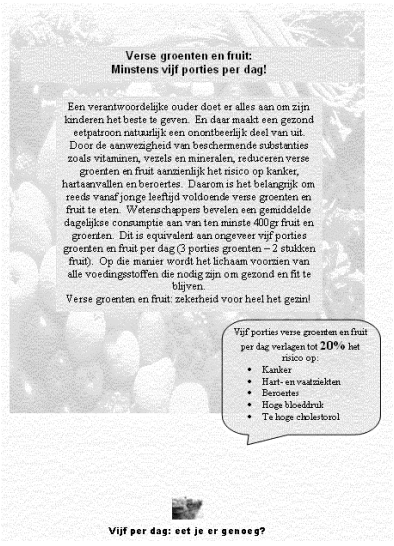
Ad 1 (transformational/other-directed)

Ad 2 (transformational/self-directed)

Ad 3 (informational/self-directed)



Ad 4 (informational/other-directed)



Ad 5 (general ad)

Verse groenten en fruit:
Minstens vijf porties per dag!

Appendix III: Health-related Need Pattern Scale

Explicit items

*For me, health is **mainly** about…*

Exp1 …keeping the body in a good condition (fitness, jogging, aerobics…)
Exp2 …having the energy to do the things I want to do
Exp3 …taking time to relax and to enjoy life
Exp4 …living in harmony with my family
Exp5 …having no physical health problems
Exp6 …living an active life (practicing sports…)
Exp7 …taking care of other family members' health
Exp8 …following the advice of expert-others (doctor, dietician,…)
Exp9 …developing a healthy lifestyle of my own
Exp10…looking good
Exp11…reducing physical health risks with regard to heart, lungs, liver…
Exp12…staying slim
Exp13…emotional well-being, feeling good mentally
Exp14…keeping up good social contacts
Exp15…feeling in control over my body

Implicit items

Because of health problems, it would be (extremely) bad not to be able anymore to…

Imp1 …help others
Imp2 …feel secure in life
Imp3 …work functionally
Imp4 …live an active social life
Imp5 …behave independently
Imp6 …be successful
Imp7 …be classy
Imp8 …feel protected
Imp9 …be playful
Imp10...work creatively
Imp11…get stability in life
Imp12…share time with family
Imp13…enjoy life
Imp14…stay slim
Imp15…perceive warmth and conviviality
Imp16…stay beautiful
Imp17…practice sports
Imp18…organize and control life
Imp19…be cheerful
Imp20…be powerful
Imp21…have fun with others
Imp22…get rest in life
Imp23…have close friends
Imp24…be spontaneous
Imp25…care for my family
Imp26…think rationally
Imp27…be ambitious
Imp28…be competent
Imp29…live an adventurous life
Imp30…be stylish

References

Albrecht, T.L., & Bryant, C. (1996). Advances in segmentation modeling for health communication and social marketing campaigns. *Journal of Health Communication,* 1, 65-80.

Bagozzi, R.P., & Dholakia, U. (1999). Goal setting and goal striving in consumer behavior. *Journal of Marketing,* 63, 19-32.

Bettman, J.R. (1979). *An information processing theory of consumer choice*. Reading, M.A.: Addison-Wesley Publishing Company.

Bettman, J.R., Luce, M.F., & Payne, J.W. (1998). Constructive consumer choice processes. *Journal of Consumer Research,* 25 (dec), 187-217.

Bogers, R.P., Van Assema, P., Kester, A.D.M., Westerterp, K.R., & Dagnelie, P.C. (2004). Reproducibility, validity and responsiveness to change of a short questionnaire for measuring fruit and vegetable intake. *American Journal of Epidemiology,* 159, 900-909.

Brehony, K.A., Frederiksen, L.W., & Solomon, L.J. (1984). Marketing principles and behavioral medecine. In L. Frederiksen, L.J. Solomon, & K.A. Brehony (Eds.). *Marketing health behavior: principles, techniques and applications* (pp. 3-23). New York: Plenum Press.

Brown, J.D., & Einsiedel, E.F. (1990). Public health campaigns: mass media strategies. In E.B. Ray & L. Donohew (Eds.). *Communication and health: systems and applications* (pp. 153-170). Hillsdale, NJ: Erlbaum.

Brunstein, J.C., Schultheiss, O.C., & Grässmann, R. (1998). Personal goals and emotional well-being, the moderating role of motive dispositions. *Journal of Personality and Social Psychology,* 75 (2), 494-508.

Burke, M.C., & Edell, J.A. (1989). The impact of feelings on ad-based affect and cognitions. *Journal of Marketing Research,* 26 (feb), 69-83.

Callebaut, J., Hendrickx, H., & Janssens, M. (2002). The Naked consumer today. Antwerpen/Apeldoorn: Garant.

Carver, C.S., & Scheier, M.F. (1981). *Attention and self-regulation: a control theory approach to human behavior*. New York: Springer-Verlag.

Cox, D., Anderson, A., McKellar, S., Reynolds, J., Lean, M., & Mela, D.J. (1996). Vegetables and Fruits: barriers and opportunities for greater consumption. *Nutrition & Food Science,* 96 (5), 44-47.

Darley, W.K., & Lim, J.S. (1991). Personal relevance as moderator of the effect of public service advertising on behavior. *Advances in Consumer Research,* 18, 303-309.

Dixon, H., Borland, R., Segan, C., Stafford, H., & Sindall, C. (1998). Public reactions to Victoria's " 2 Fruit 'n' 5 Veg Every Day" campaign and reported cosumption of fruit and vegetables. *Preventive Medicine,* 27 (4), 572-582.

Donohew, L. (1990). Public health campaigns: individual message strategies and a model. In E.B. Ray & L. Donohew (Eds.). *Communication and Health: Systems and Applications* (pp.136). Hillsdale, New Jersey: Erlbaum.

Eagle, L., Bulmer, S., Kitchen, P.J. & Hawkins, J. (2004). Complex and controversial causes for the obesity epidemic: the role of marketing communications. *International Journal of Medical marketing,* 3,4, 271-287.

Fennis, B.M. (2003). Advertising, consumer behaviour and health: exploring possibilities for health promotion. *International Journal of Medical Marketing,* 3,4, 316-326.

Ford, M.E., & Nichols, C.W. (1987). A taxonomy of human goals and some possible applications. In D.H. Ford (Ed.). *Humans as self-constructing living systems: getting the framework to work* (pp. 289-311). University Park (Pa): Pennsylvania State University, college of human development.

French, S.A., & Stables, G. (2003). Environmental interventions to promote vegetable and fruit consumption among youth in school settings. *Preventive Medicine,* 37, 593-610.

French, S.A., Story, M., & Jeffery, R.W. (2001). Environmental influences on eating and physical activity. *Annual Review of Public Health,* 22, 309-335.

Freud, S. (1933). *New introductory lectures on psycho-analysis*. New York: W.W. Norton.

Glanz, K., & Yaroch, A.L. (2004). Strategies for increasing fruit and vegetable intake in grocery stores and communities: policy, pricing and environmental change. *Preventive Medicine,* 39, S75-S80 Suppl. 2.

Gutman, J. (1982). A means-end chain model based on consumer categorization processes. *Journal of Marketing,* 46, 60-72.

Hastings, G.B., & Haywood, A.J. (1994). Social marketing: a critical response. *Health Promotion International,* 9(1), 59-63.

Hu, F.B., Rimm, E.B., Stampfer, M.J., Ascherio, A., Spiegelman, D., & Willett, W.C. (2000). Prospective study of major dietary patterns and risk of coronary heart disease in men. *American Journal of Clinical Nutrition,* 72, 912-921.

Huffman, C., Ratneshwar, S., & Mick, D.G. (2000). Consumer goal structures and goal-determination processes: an integrative framework. In S. Ratneshwar, D.G. Mick, & C. Huffman (Eds.). *The why of consumption: contemporary perspectives on consumer motives, goals and desires* (pp. 9-35). London/New York: Routledge.

Jöreskog, K., & Sörbom, D. (1993). *Lisrel 8: Structural Equation Modeling with the SIMPLIS command language.* Chicago: SSI Scientific Software International, Inc.

Lambert, N. (2001). Food choice, phytochemicals and cancer prevention. In L. Frewer, E. Risvik, & H. Schifferstein (Eds.). *Food, people and society* (pp 131-154). Berlin: Springer.

Lefebvre, R.C., & Flora, J.A. (1988). Social marketing and public health intervention. *Health Education Quarterly,* 15, 299-315.

Li, R., Serdula, M., Bland, S., Mokdad, A., Bowman, B. & Nelson, D. (2000). Trends in fruit and vegetable consumption among adults in 16 US states: behavioural risk factor surveillance system, 1990-1996. *American Journal of Public Health,* 90, 777-781.

Ling, A.M.C., & Horwath, C. (2001). Perceived benefits and barriers of increased fruit and vegetable consumption: validation of a decisional balance scale. *Journal of Nutrition Education,* 33, 257-265.

McAdams, D.P., & Powers, J. (1981). Themes of intimacy in behavior and thought. *Journal of Personality and Social Psychology,* 40, 573-587.

McClelland, D.C. (1961). *The achieving society*. Princeton, New Jersey: Van Nostrand.

McGlone, T.A., & Calantone, R.J. (1992). A goal programming model for effective segment determination: a comment and application. *Decision Sciences,* 23, 1231-1239.

McGuire, W. (1974). Psychological motives and communication gratification. In J.F. Blumer & Katz (Eds.). *The uses of mass communication: current perspectives on gratification research* (pp.110-121). Beverly Hills: Sage.

Mowen, J.C., & Minor, M. (1997). *Consumer Behavior* (5th Ed.). Prentice Hall.

Naska, A., Vasdekis, V.G.S., Trichopoulou, A., Friel, S., Leonhauser, I.U., Moreiras, O., Nelson, M., Remaut, A.M., Schmitt, A., Sekula, W., Trygg, K.U., & Zajkas, G. (2000). Fruit and vegetable availability among ten European countries: how does it compare with the 'five-a-day' recommendation? *British Journal of Nutrition,* 84, 549-556.

NIS (2004). *Private Households Statistics*. Brussels: NIS, National Institute for Statistics.

Olson, J.C., & Reynolds, T.J. (1983). Understanding consumers' cognitive structures: implications for marketing strategy. In L. Percy, & A.G. Woodside (Eds.). *Advertising and consumer psychology* (pp. 77-90). Lexington, MA: Lexington Books.

Pervin, L.A. (1989). Goal concepts: themes, issues and questions. In L.A. Pervin (Ed.). *Goal concepts in personality and social psychology* (pp. 473-479). Hillsdale, NJ: Erlbaum.

Pieters, R. (1993). A control view on the behaviour of consumers: turning the triangle. In G.J. Bamossy, & W.F. Van Raaij (Eds.). *European Advances in Consumer Research,* 1, 507-512.

Pieters, R., Baumgartner, H., & Allen, D. (1995). A means-end chain approach to consumer goal structures. *International Journal of Research in Marketing,* 12, 227-244.

Pollard, J., Kirk, S.F.L., & Cade, J.E. (2002). Factors affecting food choice in relation to fruit and vegetable intake: a review. *Nutrition Research Reviews,* 15, 373-387.

Puto, C.P., & Wells, W.D. (1984). Informational and transformational advertising: the differential effects of time. In T.C. Kinnear (Ed.). *Advances in Consumer Research* (Vol 11, pp. 638-643). Provo, UT: Association for Consumer Research.

Rapley, J., & Coulson, N.S. (2005). Stages of change and consumption of fruit and vegetables among adolescent females: associations with decisional balance and self-efficacy. *British Food Journal,* 107(9), 663-669.

Reynolds, T.J., & Gutman, J. (1988). Laddering theory: method, analysis and interpretation. *Journal of Advertising Research,* 28 (feb/March), 11-31.

Ringold, D.J. (2002). Boomerang effects in response to public health interventions: some unintended consequences in the alcohol beverage market. *Journal of Consumer Policy,* 25 (1), 27-63.

Rossiter, J.R. (2002). The C-OAR-SE procedure for scale development in marketing. *International Journal of Research in Marketing*, 19, 305-335.

Rossiter, J.R., & Percy, L. (1997). *Advertising and promotion management.* New York: McGraw-Hill.

Rothchild, M. (1987). *Advertising.* Lexington, MA: D.C. Heath.

Rurik, I., & Antal, M. (2003). Nutritional habits and lifestyle practice of elderly people in Hungary. *Acta Aliment. Hung,* 32, 77-88.

Safley, C.D., Poling, E.B., Wohlgenant, M.K., Sydorovych, O., & Williams, R.F. (2004). Producing and marketing strawberries for direct market operations. *Horttechnology,* 14 (1), 124-135.

Slater, M., & Flora, J. (1994). Is health behavior consumer behavior? Health behavior determinants, audience segmentation, and designing media health campaigns. In E.M. Clark, T.C. Brock, & D.W. Stewart (Eds.). *Attention, Attitude and Affect in Response to Advertising* (pp.273-285). Hillsdale, NJ: Erlbaum Associates.

Slater, M.D. (1996). Theory and method in health audience segmentation. *Journal of Health Communication,* 1, 267-283.

Steenkamp, J.B., & Van Trijp, H. (1991). The use of Lisrel in validating marketing constructs. *International Journal of Research in Marketing,* 8, 283-299.

Steinmetz, K.A., & Potter, J.D. (1996). Vegetables, fruits and cancer prevention. *Journal of the American Dietetic Association***,** 96, 1027-1039.

Thompson, B., Demark, W., Taylor, G., McClelland, J.W., Stables, G., Havas, S., Feng, Z., Topor, M., Heimendinger, J., Reynolds, K.D., & Cohen, N. (1999). Baseline fruit and vegetable intake among adults in seven 5-a-day centres located in diverse geographic areas. *Journal of the American Dietetic Association,* 99, 1241-1248.

Van Duyn, M.A., & Pivonka, E. (2000). Overview of the health benefits of fruit and vegetable consumption for the dietetics professional: selected literature. *Journal of the American Dietetic Association,* 100 (12), 1511-1522.

Van Raaij, W.F., & Verhallen, T.M.M. (1994). Domain-specific market segmentation. *European Journal of Marketing,* 28 (10), 49-66.

Verbeke, W. (2005). Agriculture and the food industry in the information age. *European Review of Agricultural Economics,* 32(3), 347-368.

Verbeke, W., D'Hooghe, K., & Pieniak, Z. (2005). Benefit beliefs, attitudes and behaviour towards fresh vegetable consumption in Poland and Belgium. Acta Alimentaria, 34(4), in press.

Vereecken, C.A., Keukelier, E., & Maes, L. (2004). Influence of mother's educational level on food parenting practices and food habits of young children. *Appetite,* 43, 93-103.

Wang, C.L., & Mowen, J.C. (1997). The separateness-connectedness self-schema: scale development and application to message construction. *Psychology & Marketing,* 14 (March), 185-207.

Weaver, M., Poehlitz, M., & Hutchison, S. (1999). 5 a day for low-income families: evaluation of an advertising campaign and cooking events. *Journal of Nutrition Education,* 31 (3), 161-169.

Wedel, M., & Kamakura, W.A. (2000). *Market segmentation: conceptual and methodological foundations (2nd ed.).* Boston: Kluwer Academic Publishers.

WHO. (1990). *The world health organization report, diet, nutrition and the prevention of chronic diseases.* WHO Technical Report Series 797.

Williams, C. (1995). Healthy eating: clarifying advice about fruit and vegetables. *British Medical Journal,* 310, 1453-1455.

Williams, R.M. (1968). Values. In E. Sills (Ed.). *International encyclopedia of the social sciences* (pp. 89-103). New York: Macmillan.

Witte, K., Cameron, K.A., McKeon, J.K., & Berkowitz, J.M. (1996). Predicting risk behaviors: development and validation of a diagnostic scale. *Journal of Health Communication,* 1, 317-341.

Zinkhan, G.M., Locander, W.B., & Leigh, J.H. (1986). Dimensional relationships of aided recall and recognition. *Journal of Advertising,* 15 (1), 38-46

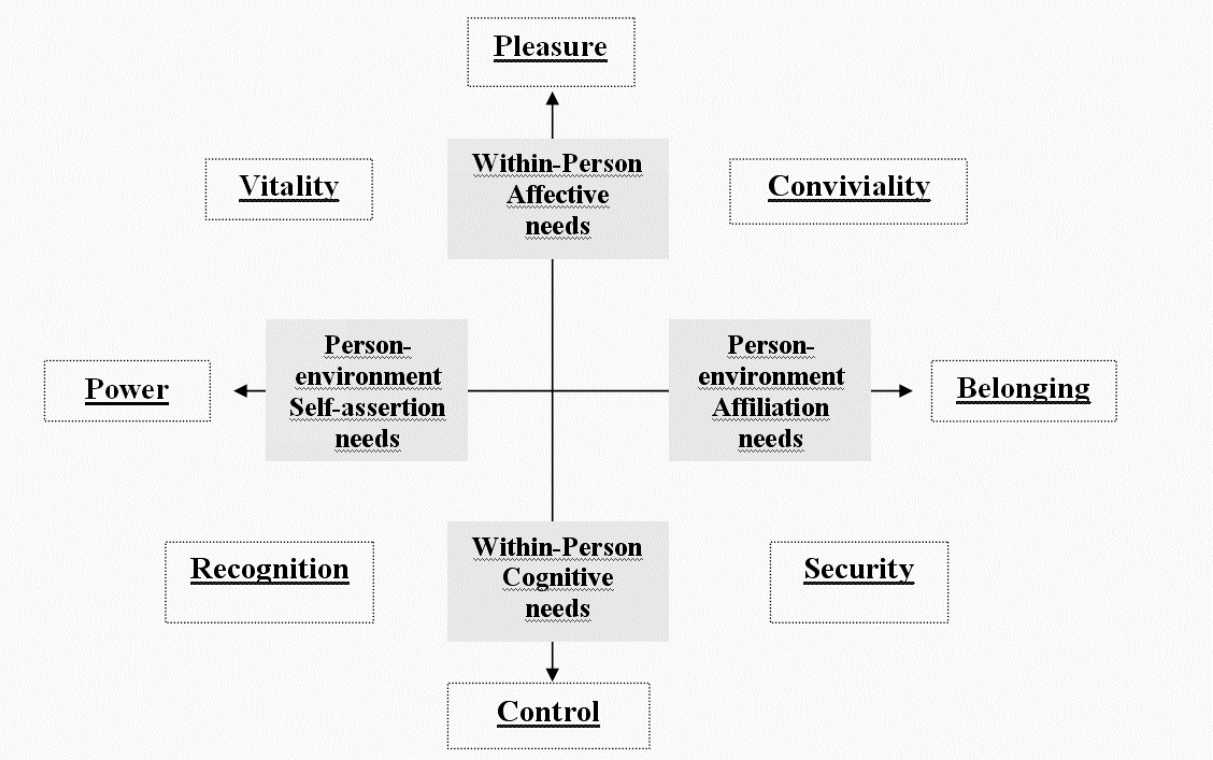


Figure 1. *The proposed Human Need Structure*

Table 1
Sample Characteristics (% of respondents, n=615)

	Sample	Population*
Gender		
Male	41.0	48.9
Female	59.0	51.1
Age		
<25	11.4	4.4
25-34	22.5	24.0
35-44	27.1	28.3
45-55	23.7	24.7
>55	15.3	18.9
MEAN	40.7	
Education		
Lower education (until the age of 18)	40.6	67.4
Higher education (beyond the age of 18)	59.4	32.6
Profession		
Labourer	7.0	
Employee	41.2	
Executive	6.6	
Self-employed	4.8	
Functionary	11.9	
Keeping house	6.1	
Retired	9.4	
Unemployed	2.9	
Student	6.4	
Other…	3.8	
Relationship status		
Single	22.6	27.1
Relationship/married	77.4	72.1
Children in family		
No (=no children)	37.3	35.1
Yes (=children)	62.7	64.9
Employment Status		
Part time employed	14.4	
Full time employed	58.9	
Not applicable	26.7	

* Source: NIS (2004). Private Households Statistics. Brussels: NIS, National Institute for Statistics

Table 2
Results of Confirmatory Factor Analysis
Measurement Model

Measurement Model (Measures)				
Health Construct	**Original Number of Items**	**Final Number of Items**	**Item Labels***	**Composite Reliability**
1. Health = Energy (i.e. vitality-need)	7	5	Exp1, Exp2, Exp6 Imp17, Imp29	.77
2. Health = Emotional well-being (i.e. pleasure/conviviality-need)	11	7	Exp3, Exp13, Exp14 Imp4, Imp15, Imp21, Imp23	.70
3. Health = Social responsibility (i.e. belonging-need)	5	5	Exp4, Exp7 Imp1, Imp12, Imp25	.62
4. Health = Physical well-being (i.e. security/control-need)	10	7	Exp5, Exp8, Exp11 Imp2, Imp8, Imp11, Imp22	.61
5. Health = Management (i.e. power-need)	4	4	Imp6, Imp20, Imp27, Imp28	.70
6. Health = Outward appearance (i.e. recognition-need)	8	6	Exp10, Exp12 Imp7, Imp14, Imp16, Imp30	.82
Measurement Model (Fit Indices)				
NNFI	.90			
RMR	.069			
RMSEA	.062			
GFI	.87			

– *For the full text item labels see Appendix III

Table 3

Cluster mean scores on the six health constructs (one-way ANOVA)

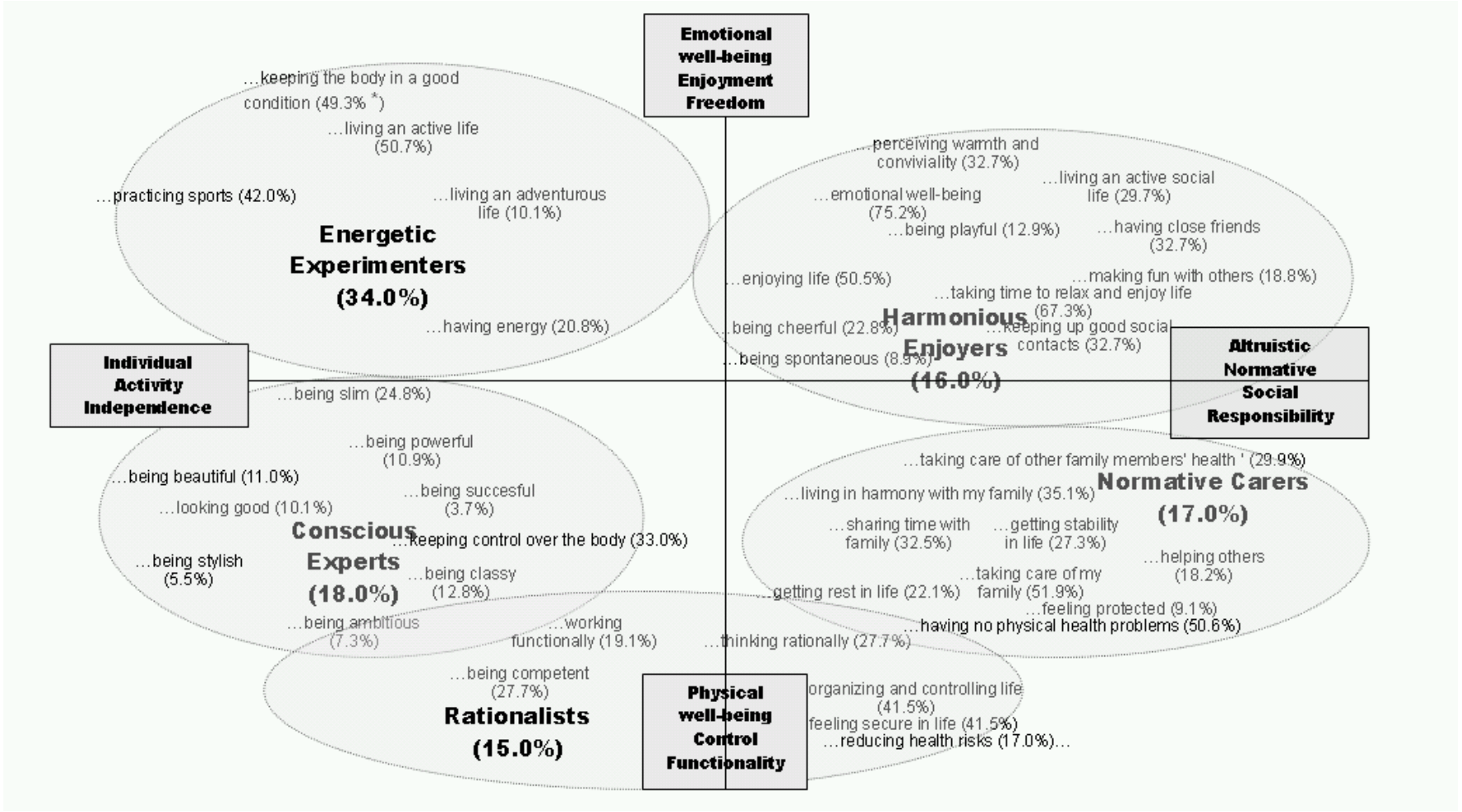
Health Constructs (*)	Total sample	Cluster 1 (Energetic Experimenters)	Cluster 2 (Harmonious Enjoyers)	Cluster 3 (Normative Carers)	Cluster 4 (Conscious Experts)	Cluster 5 (Rationalists)	P-value (F-test)
Health = Energy (i.e. vitality-need)	4.5	**6.0**^{c}	4.1^{b}	2.7^{a}	4.4^{b}	3.0^{a}	0.000**
Health = Emotional well-being (i.e. pleasure/conviviality-need)	5.2	5.1^{a}	**5.8**^{c}	5.4^{b}	4.8^{a}	4.9^{a}	0.000**
Health = Social responsibility (i.e. belonging-need)	5.2	4.8^{a}	5.3^{b}	**5.8**^{c}	5.0^{a}	5.3^{b}	0.000**
Health = Physical well-being (i.e. security/control-need)	5.3	4.8^{a}	5.2^{b}	**5.7**^{c}	5.0^{a,b}	**5.7**^{c}	0.000**
Health = Management (i.e. power-need)	3.7	3.5^{b}	2.9^{a}	3.0^{a}	**5.4**^{c}	3.7^{b}	0.000**
Health = Outward appearance (i.e. recognition-need)	3.5	3.3^{b}	2.2^{a}	2.5^{a}	**5.6**^{d}	3.8^{c}	0.000**
	N= 615	**N=207**	**N=101**	**N=104**	**N=109**	**N=94**	

Note: The superscripts indicate significantly different means ($p<.05$) where the alphabetical order of the superscripts represents the ascending order of the means. Tukey's honestly significant difference test has been applied to assess significance between the segments.

** $p<.01$

(*) For the items of the scales for the health constructs:

- 1 corresponds to 'totally disagree'
- 7 corresponds to 'totally agree'



***** % respondents in the corresponding cluster that associates health with the respective health statement.

Figure 2. *Health-related need structure*

Table 4

Paired Samples T-test (general ad vs. need-related ad)

Health Segment	Cognitive Reactions	Need-related Ad	General Ad	P-value (T-test)
Energetic Experimenters	Aad	5.7	4.7	.001**
	BI	5.1	4.3	.000**
Harmonious Enjoyers	Aad	5.9	4.9	.002**
	BI	5.7	4.3	.000**
Normative Carers	Aad	6.8	4.3	.000**
	BI	6.7	4.3	.000**
Conscious Experts	Aad	4.7	4.5	.856 (n.s.)
	BI	4.5	3.9	.010*
Rationalists	Aad	4.6	4.6	.857 (n.s.)
	BI	4.5	3.9	.030*

* p<.05
** p<.01
n.s. (not significant)

UNIVERSITEIT GENT

FACULTEIT ECONOMIE EN BEDRIJFSKUNDE
HOVENIERSBERG 24
9000 GENT

Tel. : 32 - (0)9 – 264.34.61
Fax. : 32 - (0)9 – 264.35.92

04/259 **D. VANDAELE, P. GEMMEL,** Development of a measurement scale for business-to-business service quality: assessment in the facility services sector, September 2004, 30 p.

04/260 **F. HEYLEN, L. POZZI, J. VANDEWEGE,** Inflation crises, human capital formation and growth, September 2004, 23 p.

04/261 **F. DE GRAEVE, O. DE JONGHE, R. VANDER VENNET,** Competition, transmission and bank pricing policies: Evidence from Belgian loan and deposit markets, September 2004, 59 p.

04/262 **B. VINDEVOGEL, D. VAN DEN POEL, G. WETS,** Why promotion strategies based on market basket analysis do not work, October 2004, 19 p. (forthcoming in *Expert Systems with Applications*, 2005)

04/263 **G. EVERAERT, L. POZZI,** Bootstrap based bias correction for homogeneous dynamic panels, October 2004, 35 p.

04/264 **R. VANDER VENNET, O. DE JONGHE, L. BAELE,** Bank risks and the business cycle, October 2004, 29 p.

04/265 **M. VANHOUCKE,** Work continuity constraints in project scheduling, October 2004, 26 p.

04/266 **N. VAN DE SIJPE, G. RAYP,** Measuring and Explaining Government Inefficiency in Developing Countries, October 2004, 33 p.

04/267 **I. VERMEIR, P. VAN KENHOVE,** The Influence of the Need for Closure and Perceived Time Pressure on Search Effort for Price and Promotional Information in a Grocery Shopping Context, October 2004, 36 p. (published in *Psychology & Marketing,* 2005).

04/268 **I. VERMEIR, W. VERBEKE**, Sustainable food consumption: Exploring the consumer attitude – behaviour gap, October 2004, 24 p.

04/269 **I. VERMEIR, M. GEUENS**, Need for Closure and Leisure of Youngsters, October 2004, 17 p.

04/270 **I. VERMEIR, M. GEUENS**, Need for Closure, Gender and Social Self-Esteem of youngsters, October 2004, 16 p.

04/271 **M. VANHOUCKE, K. VAN OSSELAER**, Work Continuity in a Real-life Schedule: The Westerschelde Tunnel, October 2004, 12 p.

04/272 **M. VANHOUCKE, J. COELHO, L. V. TAVARES, D. DEBELS**, On the morphological structure of a network, October 2004, 30 p.

04/273 **G. SARENS, I. DE BEELDE**, Contemporary internal auditing practices: (new) roles and influencing variables. Evidence from extended case studies, October 2004, 33 p.

04/274 **G. MALENGIER, L. POZZI**, Examining Ricardian Equivalence by estimating and bootstrapping a nonlinear dynamic panel model, November 2004, 30 p.

04/275 **T. DHONT, F. HEYLEN**, Fiscal policy, employment and growth: Why is continental Europe lagging behind?, November 2004, 24 p.

04/276 **B. VINDEVOGEL, D. VAN DEN POEL, G. WETS**, Dynamic cross-sales effects of price promotions: Empirical generalizations, November 2004, 21 p.

04/277 **J. CHRISTIAENS, P. WINDELS, S. VANSLEMBROUCK,** Accounting and Management Reform in Local Authorities: A Tool for Evaluating Empirically the Outcomes, November 2004, 22 p.

04/278 **H.J. SAPIENZA, D. DE CLERCQ, W.R. SANDBERG**, Antecedents of international and domestic learning effort, November 2004, 39 p.

04/279 **D. DE CLERCQ, D.P. DIMO**, Explaining venture capital firms' syndication behavior: A longitudinal study, November 2004, 24 p.

UNIVERSITEIT GENT

FACULTEIT ECONOMIE EN BEDRIJFSKUNDE
HOVENIERSBERG 24
9000 GENT

Tel. : 32 - (0)9 – 264.34.61
Fax. : 32 - (0)9 – 264.35.92

04/280 **T. FASEUR, M. GEUENS**, Different Positive Feelings Leading to Different Ad Evaluations: The Case of Cosiness, Excitement and Romance, November 2004, 17 p.

04/281 **B. BAESENS, T. VAN GESTEL, M. STEPANOVA, D. VAN DEN POEL**, Neural Network Survival Analysis for Personal Loan Data, November 2004, 23 p. (Forthcoming in *Journal of the Operational Research Society*)

04/282 **B. LARIVIÈRE, D. VAN DEN POEL**, Predicting Customer Retention and Profitability by Using Random Forests and Regression Forests Techniques, December 2004, 30 p. (Forthcoming in *Expert Systems with Applications*, 2005).

05/283 **R. I. LUTTENS, E. OOGHE,** Is it fair to "make work pay"?, January 2005, 28 p.

05/284 **N. A. DENTCHEV,** Integrating Corporate Social Responsibility In Business Models, January 2005, 29 p.

05/285 **K. FARRANT, G. PEERSMAN**, Is the exchange rate a shock absorber or a source of shocks? New empirical evidence, January 2005, 26 p. (forthcoming *Journal of Money Credit and Banking*, 2005)

05/286 **G. PEERSMAN**, The relative importance of symmetric and asymmetric shocks and the determination of the exchange rate, January 2005, 24 p.

05/287 **C. BEUSELINCK, M. DELOOF, S. MANIGART**, Private Equity Investments and Disclosure Policy, January 2005, 44 p.

05/288 **G. PEERSMAN, R. STRAUB**, Technology Shocks and Robust Sign Restrictions in a Euro Area SVAR, January 2005, 29 p.

05/289 **H.T.J. SMIT, W.A. VAN DEN BERG, W. DE MAESENEIRE**, Acquisitions as a real options bidding game, January 2005, 52 p.

05/290 **H.T.J. SMIT, W. DE MAESENEIRE**, The role of investor capabilities in public-to-private transactions, January 2005, 41 p.

05/291 **A. VEREECKE, S. MUYLLE**, Performance Improvement Through Supply Chain Collaboration: Conventional Wisdom Versus Empirical Findings, February 2005, 33 p.

05/292 **A. PRINZIE, D. VAN DEN POEL**, Incorporating sequential information into traditional classification models by using an element/position- sensitive SAM, February 2005, 32 p. (Forthcoming in *Decision Support Systems*).

05/293 **D. DEBELS, M. VANHOUCKE**, A Decomposition-Based Heuristic For The Resource-Constrained Project Scheduling Problem, February 2005, 25 p.

05/294 **D. DEBELS, M. VANHOUCKE**, A Bi-Population Based Genetic Algorithm for the Resource-Constrained Project Scheduling Problem, February 2005, 10 p.

05/295 **W. VANDEKERCKHOVE, N.A. DENTCHEV** Network perspective on stakeholder management: Facilitating entrepreneurs in the discovery of opportunities, February 2005, 31 p.

05/296 **N. MORAY, B. CLARYSSE,** Institutional Origin and Resource Endowments to Science-Based Entrepreneurial Firms: A European Exploration, February 2005, 39 p.

05/297 **B. CLARYSSE, M. KNOCKAERT, A. LOCKETT,** How do Early Stage High Technology Investors Select Their Investments?, March 2005, 38 p.

05/298 **A. PRINZIE, D. VAN DEN POEL,** Constrained optimization of data-mining problems to improve model performance: A direct-marketing application, March 2005, 32 p. (forthcoming in *Expert Systems with Applications*, 2005).

05/299 **B. LARIVIÈRE, D. VAN DEN POEL,** Investigating the post-complaint period by means of survival analysis, March 2005, 25 p.

UNIVERSITEIT GENT

FACULTEIT ECONOMIE EN BEDRIJFSKUNDE
HOVENIERSBERG 24
9000 GENT

Tel. : 32 - (0)9 – 264.34.61
Fax. : 32 - (0)9 – 264.35.92

05/300 **D. VANDAELE, P. GEMMEL,** Impact of Support Services on End-users' Satisfaction, March 2005, 28 p.

05/301 **T. DEMUYNCK, L. LAUWERS,** Nash rationalizability of collective choice over lotteries, April 2005, 16 p.

05/302 **R. BRACKE, M. DE CLERCQ,** Implementing Extended Producer Responsibility in Flemish Waste Policy: Evaluation of the Introduction of the Duty of Acceptance, April 2005, 24 p.

05/303 **Ph. DE MOOR, I. DE BEELDE,** Environmental Auditing and the Role of the Accountancy Profession: A Literature Review, April 2005, 34 p.

05/304 **G. SARENS, I. DE BEELDE,** Internal Auditor's Perception about their Role in Risk Management Comparison between Belgian and US Companies, April 2005, 25 p.

05/305 **Ph. VAN CAUWENBERGHE, I. DE BEELDE,** On the IASB Comprehensive Income Project, Neutrality of Display and the Case for Two EPS Numbers, May 2005, 29 p.

05/306 **P. EVERAERT, G. SARENS,** Outsourcing bij Vlaamse Ondernemingen: een Exploratief Onderzoek, May 2005, 36 p.

05/307 **S. CLAEYS, G. LANINE, K. SCHOORS,** Bank Supervision Russian Style: Rules vs Enforcement and Tacit Objectives, May 2005, 60 p.

05/308 **A. SCHOLLAERT, D. VAN DE GAER,** Boycotts, power politics or trust building: how to prevent conflict?, June 2005, 34 p.

05/309 **B. MERLEVEDE, K. SCHOORS,** How to Catch Foreign Fish? FDI and Privatisation in EU Accession Countries, June 2005, 32 p.

05/310 **A. HEIRMAN, B. CLARYSSE,** The Imprinting Effect of Initial Resources and Market Strategy on the Early Growth Path of Start-Ups, June 2005, 38 p.

05/311 **A. MAES, G. POELS, J. GAILLY, R. PAEMELEIRE,** Measuring User Beliefs and Attitudes towards Conceptual Models: A Factor and Structural Equation Model, June 2005, 25 p.

05/312 **S. VANDEVOORDE, M. VANHOUCKE,** A Comparison of Different Project Duration Forecasting Methods using Earned Value Metrics, June 2005, 18 p.

05/313 **K. BAEYENS, T. VANACKER, S. MANIGART,** Venture capitalists' selection process: the case of biotechnololy proposals, June 2005, 23 p.

05/314 **M. VANHOUCKE, D. DEBELS,** The discrete time/cost trade-off problem under various assumptions. Exact and heuristic procedures, June 2005, 32 p.

05/315 **G. POELS, A. MAES, F. GAILLY, R. PAEMELEIRE,** User Attitudes towards Pattern-Based Enterprise Information Models: A Replicated Experiment with REA Diagrams, July 2005, 32 p.

05/316 **B. MAENHOUT, M. VANHOUCKE,** An Electromagnetic Meta-Heuristic for the Nurse Scheduling Problem, July 2005, 34 p.

05/317 **M. VANHOUCKE, S. VANDEVOORDE,** A simulation and evaluation of earned value metrics to forecast the project duration, July 2005, 30 p.

05/318 **I. VERMEIR, M. GEUENS,** Need for Closure and Youngsters' Leisure Time Preferences, July 2005, 25 p.

UNIVERSITEIT GENT

FACULTEIT ECONOMIE EN BEDRIJFSKUNDE
HOVENIERSBERG 24
9000 GENT

Tel. : 32 - (0)9 – 264.34.61
Fax. : 32 - (0)9 – 264.35.92

05/319 **D. VANTOMME, M. GEUENS, S. DEWITTE,** How to Portray Men and Women in Advertisements? Explicit and Implicit Evaluations of Ads Depicting Different Gender Roles, July 2005, 34 p.

05/320 **B. WEIJTERS, M. GEUENS,** Evaluation of age-related labels by senior citizens, July 2005, 27 p.

05/321 **S. STEENHAUT, P. VANKENHOVE,** An Empirical Investigation of the Relationships among a Consumer's Personal Values, Ethical Ideology and Ethical Beliefs, July 2005, 36 p.

05/322 **V. VANSTEEGER,** The current state of accounting harmonization: impediments to and benefits from harmonization, August 2005, 30 p.

05/323 **G. POELS, F. GAILLY, A. MAES, R. PAEMELEIRE,** Object Class or Association Class? Testing the User Effect on Cardinality Interpretation, August 2005, 14 p.

05/324 **G. BUCKINX, G. VERSTRAETEN, D. VAN DEN POEL,** Predicting Customer Loyalty Using The Internal Transactional Database, August 2005, 33 p.

05/325 **M. KNOCKAERT, A. LOCKETT, B. CLARYSSE, M. WRIGHT,** Do human capital and fund characteristics drive follow-up behaviour of early stage high tech VCs?, August 2005, 27 p.

05/326 **H. DEWITTE, E. VERHOFSTADT, E. OMEY,** Testing Karasek's learning- and strain hypothesis on young workers in their first job, August 2005, 27 p.

05/327 **A. KARAS, K. SCHOORS,** Heracles or Sisyphus? Finding, cleaning and reconstructing a database of Russian banks, September 2005, 26 p.

05/328 **M. BUELENS, D. BOUCKENOOGHE, D. DE CLERCQ, A. WILLEM,** An Assessment of Validity in Small Business and Entrepreneurship Research, September 2005, 33 p.

05/329 **G. LANINE, R. VANDER VENNET,** Failure prediction in the Russian bank sector with logit and trait recognition models, August 2005, 31 p.

05/330 **W. BUCKINX, D. VAN DEN POEL,** Assessing and exploiting the profit function by modeling the net impact of targeted marketing, September 2005, 30 p.

05/331 **J. CHRISTIAENS, P. WINDELS,** Management Reform in Flemish Local Authorities: Testing the Institutional Framework, September 2005, 24 p.

05/332 **W. BRUGGEMAN, P. EVERAERT, S.R. ANDERSON, Y. LEVANT,** Modeling Logistics Costs using Time-Driven ABC: A Case in a Distribution Company, September 2005, 47 p.

05/333 **E. LABRO, M. VANHOUCKE,** A simulation analysis of interactions between errors in costing system design, September 2005, 50 p.

05/334 **L. POZZI,** Income uncertainty and aggregate consumption, October 2005, 47 p.