Heart Disease and Cancer, Diet and Exercise, Vitamins and Minerals: The Construction of Lifestyle Risks in Popular Health Discourse

GEORG MARKO

Karl-Franzens-University Graz

georg.marko@uni-graz.at

Abstract

This article proposes a conceptual framework for analysing the discursive construction of lifestyle risks in health. This framework suggests that a preoccupation with the negative (= negativization), and with individuals, their choices and responsibilities (= personalization and individualization) combined with an aura of science (= scientification) will introduce lifestyle risks as a perspective to any discourse, particularly discourses concerned with health. It is further argued that this connection might lead to a view of health and diseases that foregrounds medical aspects and individual responsibility at the cost of social aspects and political responsibilities.

The article tries to demonstrate how the framework can be translated into concrete research, starting from a Critical Discourse Analytical perspective and using corpus analytical tools. The data examined is a corpus of sixteen books giving advice on how to avoid cardiovascular disease. The contribution firstly shows how the analysis of keywords and elements of deontic modality can be interpreted with respect to the conceptual categories of the framework, and secondly how these categories might also lead to very concrete research foci such as the frequency of cardinals and lexemes for measuring units or the frequency and the lexical variation of lexemes for pathological conditions.

1. Introduction

I admit it, the reason for having six expressions in the title of this paper lies in the aesthetics of the tricolon of coordinated word pairs of the same semantic domains. However, the choice is far from random since it could be easily shown that people – at least in modern Western societies – have no difficulties in finding associative links between the expressions. Most of these links are probably concerned with the conceptual interaction of health, lifestyles and risks.

In this paper, I will explore this interaction, its discursive construction and its – potentially problematic – implications from a Critical Discourse Analytical perspective. What I will present is supposed to enter into a larger project on different constructions of lifestyle risks. As my thinking about this topic is still somewhat vague, with fuzzy edges and missing links, the research contained in this paper is not a compact and self-contained study in its own right, but rather (a more or less coherent) collection of ideas, linguistic data, and some

suggestions of how to link these. More euphemistically speaking, the purpose of my contribution is demonstration rather than exhaustive analysis. This means I will demonstrate how the construction of a link between health, lifestyle and risk could be researched, outlining a framework and illustrating some of the directions suggested by the latter. My particular emphasis lies on popular expert-to-lay communication promoting lifestyle changes to avoid cardiovascular diseases since I assume this discourse to be exemplary for its role in the aforementioned construction process.

I am aware that there are various approaches to the study of risk in the social sciencies and in psychology that could complement my own one. In some cases, I have deliberately decided against drawing upon other theories, most notably with psychometric research (cf. Lupton 1999: 19-24), the related social-amplification-of-risk model (cf., e.g., Pidgeon et al. 2003), and most models of risk communication (cf., e.g., Morgan et al. 2002) because I do not consider any construction of risk to be a misperception nor do I regard experts' view generally as more viable, which the aforementioned models seem to do. In other cases, the conceptions of risk appear to be too large-scale or too abstract to be easily applicable to an approach which eventually is concerned with the microanalysis of texts. This also applied to theories and research of connections between risk and health (cf., e.g., Alaszewski 2006, Titterton 2005).

2. The Conception of Health-Related Lifestyle Risks

Before outlining a framework for the analysis of the interaction mentioned above, I will briefly discuss the three main concepts, how they are linked and why they may be worth examining in a critically oriented study, which aims to deepen our insights into socio-culturally problematic areas of life.

Lifestyle has been described as a phenomenon of modern society cutting across and partly replacing more traditional categories such as class, gender or ethnicity. Lifestyle can be defined as any open set of freely-chosen[1], but socio-culturally meaningful practices and items by which I express and make perceptible who I am or who I want to be in terms of attitudes (as systems of ethical values) and tastes (as systems of aesthetic values) integrated into systems of beliefs (epistemological systems). The concept of lifestyle thus emphasizes choice in everyday matters and the fact that choices acquire meaning, especially regarding the definition of our social identities (Chaney 1996). This in turn implies a stronger focus on individual responsibilities, achievement and blame, and a greater importance of personal – as opposed to group-related – judgement.

If lifestyle is conceptually combined with risk – commonly defined as the possibility of choices having negative (but theoretically manageable) consequences – then the alternatives implied in choices are evaluated with respect to the desirability of their results. This means there are good and bad, right and wrong choices. On a first level, this evaluation applies to immediate causality. If I, for instance, decide to practice free-range skiing or paragliding, then I may get injured in an accident. Therefore a bad choice. On a second level, the evaluation extends to semiotic effects, i.e. effects on meaning,

especially concerning social identity. In other words, choices might affect the way people judge me and my personality. To stay with the example above, people may have a negative attitude towards me ('He's crazy and careless!') because of my skiing or paragliding. Therefore a bad choice in this sense, too. A 'lifestyle risk' is thus the possibility of a personal choice of behaviour having an immediate negative effect and a mediated unfavourable consequence for the perception of my identity.

With respect to health – the third factor considered – good and bad in the causative sense, of course, means detrimental or beneficial to personal health.

Theoretically, lifestyles could lead to three types of pathological conditions:

- **Injuries:** Here, the causal factor is the increase in likelihood created by the repetition of behaviours exposing people to strong physical effects, especially in extreme and adventure sports.

- **Infectious diseases:** esp. sexually-transmitted diseases such as HIV, hepatitis C, etc. Here, the causal factor is the increase in likelihood created by the repetition of certain behaviours which exposes persons to infectious agents.

- **Chronic diseases:** esp. cardiovascular diseases such as heart disease, diabetes, angina pectoris, and their effects – heart attacks and strokes. Here it is the accumulation of little things that is the causal factor.

Interestingly enough, the term *lifestyle diseases* is restricted to cardiovascular diseases, possibly because the risk behaviour is evaluated differently in the case of injuries and infectious diseases (see below) and because behavioural routines are perceived as more prototypically belonging to one's lifestyle than less frequent acts.

These behavioural routines encompass four domains, viz.:

- **Diet** (food and supplementation)

- **Exercise**

- **(Legal) Drugs** (esp. smoking, to a certain extent also alcohol, coffee, etc.)

- **Stress**

On the semiotic level, the evaluation of causal factors extends to social identities. Negative lifestyle choices are thus associated with a negative social identity, i.e. with morally problematic character traits (ranging from carelessness to self-indulgence) and/or aesthetically dispreferred features (e.g. obesity). Health-related lifestyle risks thus are those practices that because they are associated with ill health and because they are theoretically under your control can be interpreted as signs of a socially unfavourable – in ethical and aesthetic terms – identity. On the other hand, by taking positive lifestyle choices, engaging in 'good' behaviour you are also enacting a certain identity and you are 'enacting your health'. And it is clear that this healthy identity – with its association to good looks, productivity and creativity, care, etc. – is the morally and aesthetically preferred option.

At this point it becomes clear that most of what I have said about negative consequences for the semiotic level of healthy and unhealthy lifestyles almost exclusively applies to cardiovascular diseases. The reason for this is that the risk behaviour leading to injuries and infectious diseases is often perceived as courageous, adventurous, or experimental, thus being assessed positively. No such positive judgement appears to be applied to the behaviour leading to cardiovascular diseases.[2]

This connection of lifestyle risks and health of course has problematic implications because it foregrounds personal responsibility and eventually also personal guilt in health, thereby backgrounding socio-political factors as well as non-categorizable causality, i.e. chance. This highlights an individualistic conceptualization of health and disease over a social one. Besides, it may create a frantic preoccupation with particular aspects of life, e.g. diet or sports, strongly promoting ascetic virtues.

My main question now is whether this connection is actually established. Do we link health in general or in particular social domains with lifestyle risks? In other words, does our thinking and evaluating in connection with health receive some 'lifestyle risk colouring', being thus imbued with the ideas described in the last paragraph. And how can we research this question?

2.1 Expert-to-lay Discourse, Health Promotion

I assume that socially shared beliefs and attitudes are created and modified in the way we communicate through language, i.e. in discourse. In order to understand beliefs and attitudes concerning, for example, the connection between health and lifestyle risks we thus have to examine discourse. But which discourse is relevant with respect to the question posed above?

One candidate is popular – i.e. one-to-many, not one-to-one – expert-to-lay discourse where disease is primarily defined as an individual medical problem which needs to be tackled with the advice of medically-trained experts. This discourse aiming to promote individual health with medical expertise is often called 'healthism' (cf. Lawrence and Germov 2004: 122-125). Healthist discourse appears primarily in the genres of the self-help book and internet forums providing expert (and lay) advice on medical matters.

Given the growing importance of healthism and considering that in contrast to private doctor-patient-interaction, the effects here are multiplied due to the high number of (potential) recipients, a focus on this discourse appears justified.

3. Methodology and Data

3.1 Corpus-based Critical Discourse Analysis

Focusing on constructions of health and lifestyle risks requires a focus on discourse. As the connections between these is assumed to imply biased conceptions of health not always apparent on the surface, tracing the former can be considered a practice of critique. The approach taken in this paper therefore is Critical Discourse Analysis (CDA).

In my own version of CDA (cf. Marko 2008, 2009), I posit three levels of discourse, viz. form, meaning and socio-cultural significance (adopted in a modified form from Fairclough 1989: 25). The research process itself has to look at all three so that analysis encompasses three dimensions, to be envisioned as follows.

Fig. 1: The three levels of Critical Discourse Analysis

Evaluation of socio-cultural significance

Interpretation of meaning

Description of form
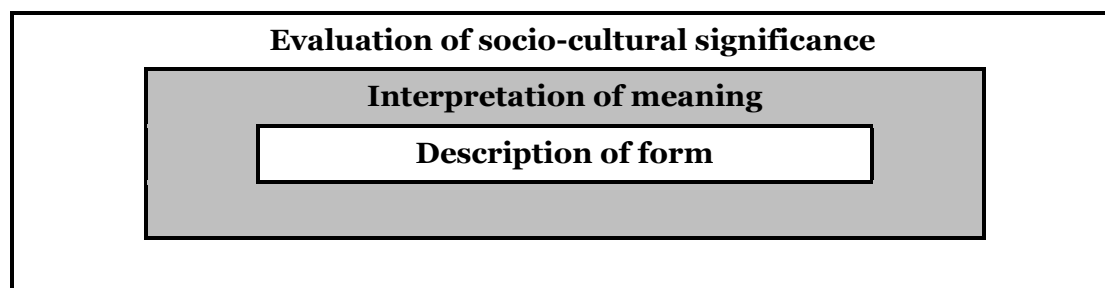
Of course, there is no one-to-one relationship between these levels and socio-cultural (or socio-political) significance cannot be read off from linguistic forms. But consistencies in form and meaning across a large number of different texts may add weight to the conclusion that a particular meaning may play a role in people's conception of a certain domain and may thereby gain socio-cultural significance.

This suggests that a purely qualitative study of individual pieces of discourse might not suffice. This is why I choose corpus analysis, i.e. the computer-assisted examination of large electronically-stored collections of text, as my preferred method in CDA. It allows me to retrieve structural patterns, interpret them in their verbal contexts and quantify them.

3.2 Data

For the present study, I have composed a corpus representing the discourse of healthism. I will here focus on self-help books concerned with cardiovascular diseases (with titles such as *50 Ways to Lower Your Cholesterol*, *How to Prevent Your Stroke*, or *Reversing Heart Disease*) because they seem to be the most prominent genre representing healthism.

The corpus contains 16 books that I scanned and transformed into electronic text files with the help of OCR software. The size of the corpus is 1,176,776 word tokens.

In order to see whether results are peculiar to the discourse under scrutiny, I will be using a reference corpus of general English in some of the analyses. I have decided on a combination of the Frown corpus and the FLOB corpus. These are corpora that were compiled at the University of Freiburg in Germany in the early 1990s (cf. Baker et al. 2006: 74).[3] A minor reason for this choice is that Frown represents American English and FLOB British English so that together they do not favour one of the two major varieties of English. More importantly, though, Frown and FLOB are the most recent general corpora covering a wide range of genres but focusing exclusively on written English. Even though comparisons with spoken language are relevant,

there are areas where this poses serious obstacles and may distort results (e.g. because in spontaneous conversation words are repeated much more often).

Statistically speaking, Frown and FLOB, which are approximately equal in size, comprise 2,017,365 word tokens overall.
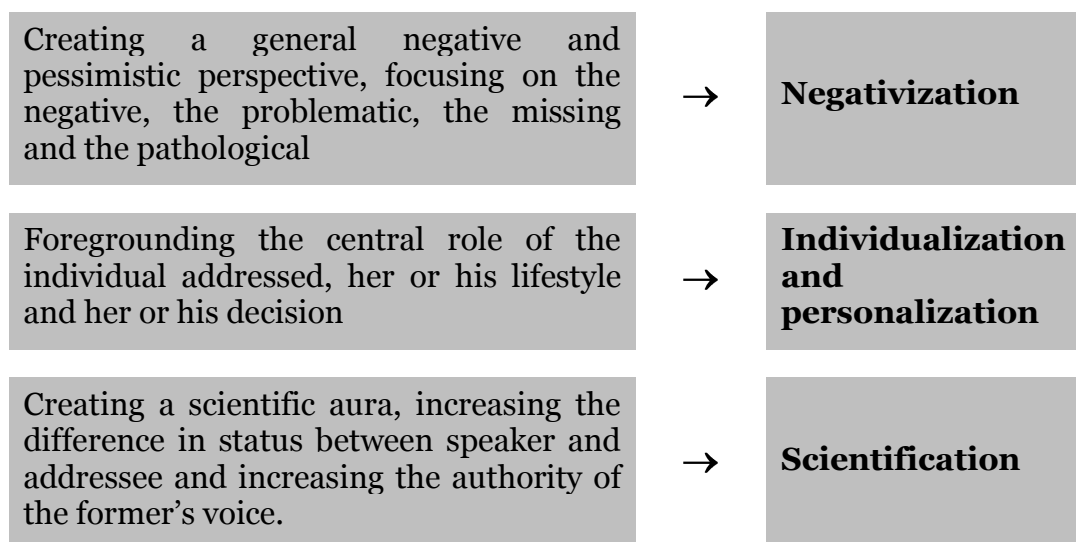
I am using WordSmith Tools 4.0, created by Mike Scott for Oxford University Press, as software for the corpus analysis.

4. Analytical Framework

In my approach to CDA, I first try to identify which large-scale conceptualizations – i.e. general terms in which the world is perceived and evaluated – can be expected to play a part in order to then look at the language to see whether there are elements contributing to these.

I will present a framework of such conceptualizations that could serve as the agenda for a research project on the construction of lifestyle risks rather than being the starting point for a contribution to an edited volume. I will therefore just pick a few aspects that I consider particularly relevant both from a social as well as a linguistic point of view for my own analyses, which, as mentioned, just serve demonstrative purposes.

I start from the assumption that the conceptual salience of lifestyle risk is enhanced by the following:

Creating a general negative and pessimistic perspective, focusing on the negative, the problematic, the missing and the pathological	→ **Negativization**
Foregrounding the central role of the individual addressed, her or his lifestyle and her or his decision	→ **Individualization and personalization**
Creating a scientific aura, increasing the difference in status between speaker and addressee and increasing the authority of the former's voice.	→ **Scientification**

I have chosen these because they represent three aspects relevant to the concept of lifestyle risk. If a discourse is preoccupied with the negative sides of life, then this creates a conceptual background against which the notion of risk – as the potential of a negative consequence of a decision – gains a prominent status. If a discourse is concerned with concrete individuals, then this creates a conceptual setting in which the idea of lifestyle risk with its emphasis on individual responsibilities makes a lot of sense. And if a discourse draws upon the perspective of natural science, then this relates to

the concept of risk and its highlighting of rationality, calculability, and professional expertise.

It might be objected that working with a framework such as that above could lead to circularity. After all, have I not defined healthist discourse on the basis of these criteria? Does this not mean that I will necessarily find traces of these? To a certain degree this is right. But the question is not so much whether these conceptualizations can be found – this cannot be answered easily because it is usually a matter of degree anyway – but rather to what extent and in which quality they are part of the discourse, and by which means they are constructed?

The conceptualizations can be further divided into subcategories, which then allow a more subtle analysis. Some of these subcategories are listed below:

- **Negativization**

    – **Negative intensification:** intensifying negative aspects.

    – **Anti-hedonism**: downplaying and backgrounding potential benefits and pleasure dimensions.

    – **Pathologization:** conceptualizing the world in terms of diseases, injuries and other pathological conditions.

- **Individualization and personalization**

    – **Individualization:** conceptualizing the world in terms of individuals rather than in terms of collectives.

    – **Personalization**: emphasizing the immediate relevance to, and responsibility of, the addressee and/or the speaker, foregrounding the need for self-determination and self-responsibility, including self-observation and self-control.

- **Scientification**

    – **Quantification:** conceptualizing the world in terms of quantities, measurements and statistical relations.

    – **Fragmentation:** conceptualizing the world in terms of components rather than in holistic terms, e.g. nutrients, body parts, etc.

    – **Taxonomization:** conceptualizing the world in terms of detailed hierarchical systems of classification.

    – **Hierarchicalization:** conceptualizing the world in terms of unequal relationships, esp. expert-lay.

I am not saying that the concept of lifestyle risk only becomes relevant if a discourse shows clear signs of the operations of these conceptualizing tendencies because we can very well expect there to be tensions in one or the other area (e.g. a certain colloquial style may indicate a closer bond between speaker and addresses while other aspects may still increase the former's status as expert in possession of something the latter lack). But even if this is the case, I think that the said dimension will be foregrounded and will thus contribute to the tight association of lifestyle risks and health.

The structure presented above might be used in two different ways:

- **Framework-oriented approach:** We can look more closely at certain aspects that promise to be of wider relevance and interpret the results with respect to the above scheme.

- **Framework-guided approach:** We draw upon the framework to actually guide us in the selection of linguistic elements to be examined in more detail. This will provide a systematic, but necessarily *a priori* selective approach.

I will present analyses drawing upon the former and the latter approach.

5. Framework-oriented Approach

As with most aspects in corpus-based discourse studies, the two most relevant categories contributing to the emergence of patterns (which in turn contribute to the creation and maintenance of patterns of conceptualization) are frequency and variation. The implied claim is that salience is increased if something – however we define this linguistically – occurs very often and/or in great variation.

The following analyses will all draw upon frequency and lexical variation as the main parameters.

5.1 Keyword Analysis

By *keywords*, I here mean those words that occur most frequently in a corpus. These lexemes are important because they can be argued to play a significant role in the construction of particular world views.

As content words can be argued to contribute more substantially and more concretely to such constructions, I confine myself to them. With the help of a so-called stoplist, covering the closed class of function words as extensively as possible (articles, pronouns, prepositions, conjunctions, auxiliaries, etc.), WordSmith can produce wordlists extracting content words only.

The ten most frequent lexemes in the resulting list for the healthist corpus are presented in table 1.

Such individual words – however frequently they may be used – only allow a segmented glimpse of the conceptualizations at work. A more comprehensive picture can be gained if we look at the semantic domains under which the keywords can be subsumed. For this purpose, I took the first 500 most frequent content words (lemmatized, i.e. if more than one word form is included, e.g. singular and plural for a noun, then they are subsumed under one entry) and classified them semantically. There is no fixed list of such domains, so we have to explore the corpus to see which areas of meaning suggest themselves.

Table 1: The ten most common words in the healthist corpus

heart	7,976
disease	4,857
blood	4,587
cholesterol	3,603
risk	2,939
diet	2,894
people	2,840
patients	2,316
high	2,209
levels	2,181

Here is a proposed list of domains (and subdomains), complete with type and token frequencies and their members.

Table 2: Keywords of the healthist corpus assigned to different semantic domains.

Medicine	56 types/43,053 tokens (365.8 $^o/_{ooo}$[4])

General: *risk* (2,939); *health* (1,768); *medical* (986); *healthy* (699); *medicine* (464); *immune* (360); *safe* (239)

Diseases: *disease* (5,146); *(heart) attack* (1,663); *stress* (1,130); *symptoms* (829); *inflammation* (827); *pain* (694); *condition* (687); *diabetes* (620); *cancer* (566); *plaque* (536); *death* (514); *damage* (499); *stroke* (457); *atherosclerosis* (423); *deficiency* (373); *failure* (331); *depression* (318); *clinical* (316); *angina* (306); *chronic* (300); *hypertension* (281); *inflammatory* (272); *resistance* (266); *syndrome* (260); *infections* (239); *blockages* (233)

Persons and institutions: *patient* (2,803); *doctor* (1,686); *Dr* (682); *physician* (562); *hospital* (258)

Therapy: *drug* (1,853); *supplement* (1,541); *medication* (1,181); *program* (940); *treatment* (793); *surgery* (745); *therapy* (577); *statin* (535); *bypass* (533); *prevent* (486); *care* (381); *aspirin* (327); *prescription* (289); *treat* (289); *anti-inflammatory* (280); *angioplasty* (270); *protect* (254); *prevention* (247)

Scientific practice	17 types/13,351 tokens (113.5 $^o/_{ooo}$)

study (2,584); *cause (N + V)* (1,631); *test* (1,314); *result* (1,153); *factor* (1,074); *research* (899); *chapter* (720); *example* (624); *fact* (524); *book* (521); *researchers* (470); *university* (347); *evidence* (337); *reason* (333); *approach* (290); *reported* (272); *published* (258)

Body	26 types /30,629 tokens (260.2 $^o/_{ooo}$)

General: *body* (2,378); *cell* (1,290); *metabolic* (316)

Chemical substances specific to the body: *LDL* (1,156); *(mostly blood) sugar* (895); *homocysteine* (827); *insulin* (642); *HDL* (613); *hormone* (530); *enzyme* (235)

Organs: *heart* (7,976); *coronary* (1,528); *cardiac* (632); *cardiovascular* (547); *brain* (539); *liver* (535); *stomach* (277)

Body parts: *chest* (410)

Tissue: *muscle* (656); *skin* (381)

Blood/vessels: *blood* (4,587); *artery* (2,580); *(mostly artery) wall* (288); *vessels* (282); *bloodstream* (276); *arterial* (253)

Chemical substances	31 types/23,861 tokens (202.8 $^o/_{ooo}$)

cholesterol (3,603); *vitamin* (2,910); *fat* (2,831); *acid* (1,664); *protein* (902); *(vitamin) C* (862); *(vitamin) E* (838); *antioxidant* (798); *fatty* (622); *(vitamin) B* (577); *calcium* (554); *niacin* (553); *omega (3 types/6 types/9)* (514); *triglycerides* (514); *saturated* (488); *carbohydrates* (448); *oxygen* (424); *magnesium* (420); *alcohol* (416); *(vitamin) D* (407); *minerals* (398); *folic (acid)* (373); *B6*

(359); *zinc* (358); *fiber* (341); *salt* (319); *glucose* (306); *CoQ10* (293); *(free) radicals* (283); *amino (acid)* (245); *substances* (241)

Food	31 types/24,149 tokens (205.2 º/ₒₒₒ)

General: *food* (3,377); *diet* (3,217); *eat* (2,277); *supplement* (1,541); *intake* (734); *nutrients* (647); *nutrition* (557); *meal* (470); *dietary* (462); *nutritional* (340); *drink* (256)

Aliments: *oil* (1,531); *vegetable* (1,067); *fish* (929); *sugar* (895); *fruit* (784); *water* (552); *meat* (512); *milk* (422); *beans* (383); *grains* (380); *nuts* (338); *salt* (319); *rice* (317); *seeds* (313); *dairy* (290); *eggs* (261); *olive* (257); *soy* (250); *garlic* (238); *wheat* (233)

Exercise	2 types/2,350 tokens (20.0 º/ₒₒₒ)

exercise (2,097); *walking* (253)

Communication	4 types/2,023 (17.2 º/ₒₒₒ)

say (714); *tell* (643); *ask* (426); *talk* (240)

Mental	10 types/7,148 tokens (60.7 º/ₒₒₒ)

know (1,556); *see* (1,075); *feel* (917); *think* (890); *want* (736); *feeling* (578); *experience* (469); *believe* (315); *mind* (309); *remember* (303)

Social	2 types/966 tokens (8.2 º/ₒₒₒ)

American (724); *national* (242)

Colour	2 types/790tokens (6.7 º/ₒₒₒ)

white (433); *red* (357)

Lifestyle work	9 types/4,795 tokens (40.7 º/ₒₒₒ)

Processes of change: *change* (1,061); *start* (693); *begin* (691); *become* (573); *end* (289)

Processes of control: *control* (597); *plan* (418)

Processes of selection: *choose* (239); *determine* (234)

Persons	10 types/7,613 tokens (64.7 º/ₒₒₒ)

people (2,840); *women* (1,238); *men* (718); *group* (593); *family* (544); *person* (491); *children* (364); *world* (291); *individuals* (274); *friends* (260)

Quantification	72 types/52,455 tokens (445.8 º/ₒₒₒ)

General: *level* (3,381); *include* (1,113); *weight* (969); *amount* (953); *age* (675); *dose* (668); *number* (659); *whole* (586); *rate* (576); *total* (502); *average* (391); *combination* (321); *complex* (296)

Attributes: *high* (2,733); *low* (1,846); *long* (854); *small* (705); *little* (618); *large* (579); *elevated* (418); *low-fat* (331)

Change in quantity: *increase (N + V)* (2,082); *reduce* (1,119); *add* (566); *avoid* (452); *loss* (448); *reduction* (345); *lose* (276); *addition* (274); *excess* (268); *balance* (264)

Numbers: *half* (406) + 22 numbers in numerical representation

Frequency: *daily* (692); *common* (571); *usually* (388); *regular* (344)

Units of measurement: *day* (2,195); *percent* types/*per cent* (2,051); *year* (1,977); *mg* (1,912); *week* (994); *calories* (741); *minutes* (487); *months* (433); *dl* (413); *grams* (362); *g* (313); *hours* (263); *mcg* (262); *cup* (233)

Evaluative	20 types/12,306 tokens (104.6 º/ₒₒₒ)

good (3,302); *well* (1,259); *important* (1,101); *benefit* (825); *great* (660); *normal* (633); *major* (444); *natural* (427); *significant* (395); *simply* (371); *bad* (367); *improve* (365); *simple* (353); *powerful* (282); *severe* (274); *refined* (269); *serious* (254); *easy* (248); *key* (241); *necessary* (236)

Epistemic	10 types/3,921 (33.3 º/ₒₒₒ)

likely (657); *possible* (474); *really* (467); *actually* (462); *certain* (396); *probably* (380); *sure* (350); *true* (262); *clear* (239); *real* (234)

As even a cursory look will reveal, attempting to quantify the size of semantic domains bears some problems. Most importantly, it suggests that the semantic categories have clear boundaries, which obviously is not the case. Thus many of the terms for chemical substances pertaining to the body could very well be assigned to the class of chemical substances, too, or vice versa

(e.g. *cholesterol*, which additionally could be classified as food component). And individual decisions – e.g. to assign *risk* and *safe* to the general medical domain – might be doubted. However, if such issues are kept in mind, then we can still draw conclusions from the data.

The results appear to support some of the assumptions mentioned before, e.g. that the prominent position of the domain of medicine – including the subdomain of diseases – is indicative of the importance of both scientification and pathologization. Scientification could also be promoted by the high ranks of quantitative expressions (pointing, unsurprisingly, to the subdomain of quantification) and lexemes relating to the body and to chemical substances (which indicate a certain preoccupation with fragmenting the world).

But due to the problems addressed above, such conclusions remain tentative, though they possibly point to areas worth further investigation.

5.2 Discourse Prosody and Deontic Modality

Semantic prosody refers to the phenomenon of linguistic elements showing preferences to co-occur with particular semantically-defined sets of words (cf. Louw 2000, cited in McEnery et al. 2006: 83). Semantic prosodies are thus indicators of how elements of meanings are related with each other, which may, in turn, be interpreted as signs of ideological associations. If semantic prosodies are specific to particular discourses rather than of the language system in general, then we can speak of discourse prosodies (cf. Baker 2006: 86-88).

Practically speaking, discourse prosodies become manifest in the collocational patterns that linguistic units show, i.e. the group of words with which they co-occur in a corpus.

We can distinguish between:

- **Lexical discourse prosodies:** the semantic preferences of particular words and lexemes.

- **Grammatical discourse prosodies:** the semantic preferences of particular grammatical constructions.

While lexical prosodies have received ample treatment, grammatical prosodies feature rarely in discourse analysis. Considering that certain grammatical constructions occur much more regularly in texts, they, however, deserve a closer look. This, in addition to the discourse-specific importance of the structure to be examined, is the reason why I will be dealing with the latter in the following.

The grammatical category I will concentrate on is deontic modality. Deontic modality covers all elements in a language that express obligation and desirability. The elements in question primarily include modal and semi-modal verbs and grammatical mood, especially the imperative (cf. Palmer 1986).

Deontic modality is interesting from a pragmatic point of view because it is often used for performing directive speech acts such as requests, warnings, advice, or instructions. This is particularly relevant for a genre such as self-help books, in which tips, advice, instructions and recommendations – i.e.

directive speech acts implying benefits for the addressee (as opposed to orders or requests) – should feature strongly. Looking at instructions and the semantic domains they realize will allow insights into what is constructed as medical and thus perhaps also moral obligations in my self-help books. A further interesting aspect is that things that readers are recommended to do are by implication things they do not normally do.

I will look at two kinds of elements, viz. imperatives (e.g. *eat more nuts*) and deontic modal verbs (e.g. *you must/should/have to/ought to/need to eat more nuts*),[5] not just because they cover the majority of all instances of deontic modality, but also because they slightly differ in meaning. Thus modal verbs seem to highlight the personal costs of obligation – *you should eat more nuts*, for instance, does not sound as if nuts were believed to be delicious – and will therefore probably be interpreted as more tentative advice than imperatives, which do not allow any doubts concerning the usefulness and benefits of the action recommended.

As my corpus is not tagged, imperatives can only be found by looking for verbal forms directly (or almost directly, e.g. after an *always* or *just*) following a sentence break defined by punctuation marks. Lacking an overt subject, verb forms occurring in such a position must be imperatives. This, however, means that I will miss out on a certain number of these forms, e.g. those following an *if*-clause (e.g. *if you suffer from zinc deficiency, eat more nuts*).

Collecting all verbs – whether simple, e.g. *promise*, or complex, e.g. *make a promise*, positive, e.g. *eat*, or negated, e.g. *don't eat*[6] – occurring in either the imperative or with a modal verb (from the above set), I categorized them according to one of the following semantic domains. These suggested themselves by an informal exploration of the data.

- **Lifestyle change:** general acts of changing that are at least vaguely associated with lifestyles and do not fall into one of the other categories. These include in particular acts of starting and discontinuing.

- **Quantitative change:** acts of increasing, e.g. *add*, *increase*, balancing, e.g. *keep a balance*, and reducing, e.g. *lower*, *avoid*, amounts.

- **Exercise:** acts pertaining to physical activity, e.g. *go for a jog*, *exercise*.

- **Foodways:** acts concerned with the preparation and consumption of food, e.g. *boil*, *eat*.

- **Mental:** emotion, e.g. *not be afraid*, perception, e.g. *look at*, and cognition, e.g. *think about*.

- **Social:** acts concerned with creating or maintaining social contact, e.g. *meet*, *partner with*.

- **Communication:** e.g. *say*, *make a promise*.

- **Conative:** acts of trying, e.g. *try*, *attempt*.

Finally, I counted all types and tokens in the respective categories. The results can be found in the table below. The percentages represent the size of the respective category relative to the overall number of imperatives or modal

verbs (i.e. *50%* means that half of all imperatives or modal verbs fall into a certain category). The values do not add up to a 100% because there were verbs that could not be classified.

Table 3: The sizes of the different semantic domains of the verbs occurring as imperatives or with a modal verb.

	Imperatives				Deontic modals			
	Types		Tokens		Types		Tokens	
Lifestyle change	58	8.1%	314	7.6%	29	11.7%	106	14.8%
Quantitative change	66	9.2%	514	12.4%	25	10.1%	72	10.0%
Exercise	48	6.7%	183	4.4%	12	4.9%	20	2.8%
Food	59	8.3%	462	11.1%	11	4.5%	93	13.0%
Mental	181	25.4%	1337	32.2%	67	27.1%	197	27.5%
Social	50	7.0%	83	2.0%	8	3.2%	10	1.4%
Communication	20	2.8%	240	5.8%	19	7.7%	64	8.9%
Conative	9	1.3%	184	4.4%	4	1.6%	15	2.1%
TOTALS[7]	714		4,158		247		717	

Although I do not have comparative data about general English – a similar analysis of Frown and FLOB proved to be technically problematic – the number of instances of deontic modality appears high. If true, then this in itself adds to the personalization and individualization of the healthist discourse since deontic modality as used in self-help books is targeted at an individual(ized) addressee.

The main difference between imperatives and deontic modals is the disparity in overall frequencies, with three times as many different verbs for imperatives and almost six times as many occurrences. There are also differences between the individual categories, especially the fact that deontic modals show a slight preference for the general lifestyle change category. But none of these appears to be very dramatic, deserving more profound discussion.

Generally speaking, the results in the table do not reveal any surprising details because many of the quantitative difference simply reflect the specificity of the class, i.e. mental processes simply constitute a much wider class than for instance conatives or foodways. However, the very fact that all of the classes are represented shows which aspects of life are the main targets of personal obligations and thus are most likely to be affected by lifestyle risks.

The only exceptional case are social acts. Even if we add communicative acts, which could also be seen as social in nature, to the class, then it still is smaller than would be expected from such broad a category. The main focus in healthist discourse thus appears to be on what the addressees can do themselves. So eventually there is a tendency to position them as loners, which adds an asocial facet to individualization (which could be associated with certain tenets of capitalism).

Possibly the most interesting category is that of quantitative changes. Even in the absence of comparative data, it is reasonable to assume that such processes would not figure as prominently in general language as in healthism. This suggests that recommendations for lifestyle changes very often mean changes of quantities, providing support for the assumption that

healthism incorporates a quantifying view of the world and thus at least an element of lifestyle risk.

A closer look at the members of the category shows that we can further distinguish between verbs denoting additive changes or reductive changes. Table 4 lists all the verbs in these two categories.

Table 4: Verbs in deontic modality denoting quantitative changes in the healthist corpus

Imperatives _Additive changes (↑)_	**Deontic modals** _Additive changes (↑)_
Types: 18 _Tokens: 46_	_Types: 6_ _Tokens: 12_
add *(61)*; increase *(31)*; include *(21)*; supplement *(9)*; combine *(5)*; incorporate *(5)*; not[8] combine *(3)*; recharge *(3)*; fill (up) *(2)*; boost; expand; fill; integrate; load up on; not add; not increase; not supplement; stock up on	_increase_ (6); _add_ (2); _fill up on sth_; _gain (weight)_; _integrate_; _supplement_
Reductive changes (↓)	_Reductive changes (↓)_
Types: 46 _Tokens: 355_	_Types: 16_ _Tokens: 56_
avoid *(136)*; reduce *(41)*; limit *(33)*; eliminate *(19)*; remove *(19)*; stay away from *(10)*; minimize *(7)*; lose (weight) *(6)*; clean *(5)*; cut *['eliminate']* *(5)*; cut back on *(5)*; keep something low/to a minimum *(5)*; lower *(5)*; not give up *(5)*; decrease *(4)*; get rid of *(4)*; cut out *(3)*; end *(3)*; restrict *(3)*; skip *(3)*; throw out *(3)*; clean out *(2)*; cut down on *(2)*; go easy on *(2)*; hold *('discontinue')* *(2)*; pour off *(2)*; toss (out) *(2)*; back off on; drop; eradicate; get a handle on; go cold turkey; lift; limit yourself to; not deprive yourself; not leave out; not miss; not skip; not write off; omit; put away; send back; slow down; soothe (stress); throw away; trim	_avoid_ (10); _lose_ (10); _reduce_ (6); _cut out_ (5); _limit_ (5); _cut_ (4); _lower_ (4); _restrict_ (3); _quit_ (2); _decrease_; _dispel_; _eliminate_; _get rid of_; _remove_; _run a deficit_; _slow down_

.
It is interesting to note that reductive changes by far outnumber additive ones in the healthist corpus in both lexical variation and frequency. So minimization plays a more prominent role. If there is the need to reduce and eliminate, then this implies that there is too much. Health-related lifestyle risks are thus implicitly constructed as problems of excess, which indirectly promotes ascetic lifestyles as morally and aesthetically preferential.

Another category worth a closer look is that of mental processes and more specifically, cognitive processes. As can be seen in the table below, there are two subcategories that show relatively high type and token numbers considering the narrowness of the areas of meaning. These categories are planning/selecting and controlling/monitoring.

Table 5: Verbs in deontic modality denoting acts of planning/selecting and controlling/ monitoring

Imperatives *Planning and selecting*	Deontic modals *Planning and selecting*
Types: 15 *Tokens: 170*	*Types: 9* *Tokens: 20*
consider (*73*); choose (*42*); take charge of (*9*); make list/plan (*8*); select (*8*); decide (*6*); plan (*6*); make decision/choice (*4*); pick (*4*); schedule (*4*); prioritize (*2*); jot down; make commitment; make up your mind; not pick	*consider* (*6*); *plan* (*4*); *make* [choice/decision] (*3*); *decide* (*2*); *choose*; *design*; *determine*; *identify*; *take charge of*
Controlling and monitoring	**Controlling and monitoring**
Types: 47 *Tokens: 494*	*Types: 22* *Tokens: 70*
see *['compare']* (*88*); make sure (*44*); check (*34*); note (*32*); look for (*29*); find (*27*); follow (*24*); be aware (*14*); notice (*14*); find out (*13*); pay attention (*12*); be careful (*11*); check with somebody (*11*); monitor (*11*); set *['determine']* (*11*); write (down) (*11*); beware (*10*); check out (*10*); watch out (*9*); seek (*8*); ensure (*7*); watch *['check']* (*7*); be cautious (*6*); control (*6*); identify (*5*); be alert (*4*); observe (*4*); keep track of (*3*); keep up to date/up with (*3*); protect (*3*); separate (*3*); determine (*2*); discover (*2*); examine (*2*); scrutinize (*2*); be wary; check somebody out; detect; fix; look to; look up; make observation; manage; not take chances; record; seek out; set aside	*find* (*9*); *be aware* (*8*); *be careful* (*7*); *seek* (*7*); *check* (*5*); *pay attention* (*5*); *monitor* (*4*); *be monitored* (*3*); *ensure* (*3*); *follow* (*3*); *make sure* (*3*); *check with sb* (*2*); *watch* ['check'] (*2*); *beware*; *investigate*; *keep track of*; *make certain*; *not find*; *notice*; *search*; *search out*; *set aside*

In the light of the fact that both lifestyle and risk are notions for which choice plays an important part, it is significant that the discourse of healthism creates an atmosphere in which choosing (and planning) are assigned an obliging urgency, thus highlighting the individual's personal responsibility for her or his health.

The prominence of processes of controlling and monitoring suggests that healthism also emphasizes the need for constant self-observation, which probably also contributes to strengthening self-responsibility and thus the trend towards individualization and personalization in healthism.

6. Framework-guided Approach

In this chapter, I will demonstrate how a study of health-related lifestyle risks could start at the framework presented above. For this purpose, I will take two of the conceptualizations mentioned, namely pathologization and quantification, in order to examine some linguistic elements that could be argued to contribute to the latter's construction.

6.1 Pathologization

In connection with health, pathologization – i.e. a perception of the world characterized by an inclination towards the ill – is probably the most important category of negativization.

The simplest way of creating pathologization is through persistent reference to a wide range of different pathologies. I will therefore look for lexemes denoting such pathologies in the healthist corpus and compare it to data from Frown and FLOB.

Since pathological conditions do not share formal features, the only way to trace them in a corpus is to use an extensive list of given terms and have WordSmith check each of these in the material. I have compiled such a list using the Karolinska Institutet's (n.d.) 'Alphabetical List of Specific Diseases/Disorders' and editing it (quite substantially) for my purposes.

Table 6: Lexemes for diseases and other pathological conditions (types and tokens).

Healthism				Frown and FLOB		
Types	Tokens	$^o/_{ooo}$		Types	Tokens	$^o/_{ooo}$
1,172	23,106	196.4		440	2,574	12.8

What counts as the same lexeme and thus as the same pathological condition is far from clear (e.g. are the adjectives *chronic* and *infectious* in *chronic disease* and *infectious disease* just modifiers of the lexeme *disease* or are they components of established expressions?). But having applied the same criteria for the description of both corpora, the fact that a corpus approximately half the size of the other one contains almost three times as many expressions for pathological conditions should suffice to see a strong pathologizing moment in the healthist discourse.

There are 1,172 different pathological conditions mentioned. This clearly qualifies as overwording, i.e. the phenomenon of a proliferation of terms covering a particular semantic domain, indicating an ideological preoccupation with the said domain (cf. Fairclough 1989: 115, Goatly 2000: 64). In the list we find two types of overwording (for this distinction, cf. Marko 2009):

- **Taxonomic overwording:** detailed distinction of a field, e.g. various different types of cancers.

- **Clustering:** proliferation of synonyms or near-synonyms, e.g. conditions referred to as *deficiency, deficit, depletion, imbalance.*

While we may not be surprised to see that pathological conditions play a great role in books on cardiovascular diseases, the facts that there is a vast list of conditions going far beyond the aforementioned diseases and that in a lot of cases, varying expressions are used for the same or a similar disease will definitely contribute to the salience of negativization and thus of lifestyle risk.

The overwording, incidentally, is not just paradigmatic, but can also occur syntagmatically, i.e. in a coherent text passage, as for instance here:

You name it: heart disease, Alzheimer's, Parkinson's, arthritis, diabetes, kidney disease, macular degeneration, and skin wrinkles – these are all manifestations of unchecked rust.
However, high cortisol levels for long periods of time are dangerous, leading to such problems as thinning of the bones, osteoporosis, diabetes, cataracts, high blood pressure, insulin resistance, weakening of the cardiovascular system and the immune system, and damage to the gastrointestinal tract.

However, there is not just a vast variety of expressions, but these also occur very frequently in the healthist corpus, viz. more than 23,000 times, which amounts to one reference per 50 words. The comparison to Frown and FLOB, where a reference to a disease or injury can only be found every 800 words on average, supports the assumption that this focus on the pathological is peculiar to healthism. Considering the focus of the books, the predominance of the semantic domain of pathology is not surprising. But the extent still seems impressive indeed and will contribute to the perception of health as an area in which lifestyle risks operate.

Such general observations on frequencies and lexical variation should be followed by a more thorough analysis of which aspects of pathology appear to be particularly significant in the healthist corpus. Even though I will not go into great depths here, the mere opposition of types of cancer with types of deficiencies shows that while the healthist discourse does talk about traditional diseases, it is strongly preoccupied with deficiency and thus with lack. This is a strange inconsistency with the conclusion drawn in the previous chapter with respect to the importance of the necessity of reduction.

Table 7: Comparisons of compounds with *deficiency* and *cancer* in the healthist discourse.

Deficiencies		Cancer	
deficiency	194	*cancer*	411
zinc deficiency	27	*breast cancer*	78
vitamin deficiency	21	*lung cancer*	38
magnesium deficiency	20	*colon cancer*	22
vitamin C deficiency	20	*prostate cancer*	21
(vitamin) B12 deficiency	19	*stomach cancer*	14
nutritional deficiency	18	*bladder cancer*	12
CoQ10 deficiency	11	*bowel cancer*	6
dietary deficiency	8	*liver cancer*	5
nutrient deficiency	8	*ovarian cancer*	5
enzyme deficiency	7	*skin cancer*	5
iron deficiency	7	*colorectal cancer*	4
protein deficiency	7	*pancreatic cancer*	4
progesterone deficiency	6	*cervical cancer*	3
B vitamin deficiency	5	*gastric cancer*	3
estrogen deficiency	5	*kidney cancer*	3

copper deficiency	4		uterine cancer	3
iodine deficiency	4		marrow cancer	1
selenium deficiency	4		mouth cancer	1
(vitamin) B6 deficiency	3		renal cell cancer	1
calcium deficiency	3		testicular cancer	1
essential fatty acid deficiency	3		vaginal cancer	1
folic acid deficiency	3			
mineral deficiency	3			
potassium deficiency	3			
testosterone deficiency	3			
(essential) fatty acid deficiency	2			
fat deficiency	2			
niacin deficiency	2			
vitamin D deficiency	2			
(vitamin) B3 deficiency	1			
acetylcholine deficiency	1			
alcohol deficiency[9]	1			
borderline deficiency	1			
carnitine deficiency	1			
chromium deficiency	1			
chronic oxygen deficiency	1			
cofactor deficiency	1			
D-ribose deficiency	1			
essential fat deficiency	1			
insulin deficiency	1			
L-carnitine deficiency	1			
manganese deficiency	1			
Omega 6 deficiency	1			
Omega-3 deficiency	1			
oxidant deficiency	1			
oxygen deficiency	1			
phosphorus deficiency	1			
taurine deficiency	1			
thyroid deficiency	1			
trace element deficiency	1			
vitamin A deficiency	1			
vitamin B deficiency	1			
vitamin K deficiency	1			

6.2 Quantification

One of the essential features of science is the reduction of qualitative differences to quantitative dimensions. Therefore quantification, i.e. the perception of the world in quantitative terms, seems a highly relevant topic in connection with scientification and its relevance for the introduction of lifestyle risks into a discourse.

There are various ways in which linguistic elements can contribute to the creation of quantification in a discourse. The most straightforward one is the presence and variation of cardinal numbers, whether represented as figures (e.g. *8* or *12,594*), as lexemes (e.g. *seven* or *three thousand nine hundred*), or as combinations of the two (e.g. *3.1 million*). It is these that I will examine in the healthist corpus in comparison with the Frown and FLOB corpus.

Let us first take a look at the verbal representations of cardinals, including the mixed forms because the number is only the modifying element and the word the head. The results in the table below – in both the type and token columns – only consider full lexemes, even if they consist of more than one orthographic word. *Three million nine hundred and forty thousand and seventy two* thus counts as one lexeme, which implies that all its component words have not be counted extra (so *three* in the sequence is not additionally counted as single-word *three*).

Table 8: Type and token frequencies of cardinal numbers (verbal representation).

Healthism				Frown and FLOB		
Types	Tokens	°/ooo		Types	Tokens	°/ooo
253	9,881	84.0		503	14,890	73.8

The difference between 84 and 74 occurrences of a verbal representation of a number per 10,000 words might not be massive. But it is still important that there is a gap and, as expected, it is in favour of the healthist corpus.

I have included type numbers only for reasons of completeness in the table above. Types, however, do not play that much of a role here because mentioning more different numbers will not be perceived as adding to the lexical variation of the text in the same sense as mentioning different types of diseases does, as above. It will therefore not contribute to the construction of quantification. Besides, differences in type numbers are difficult to interpret if they are on the same quantitative level since there is no linear relationship with the overall size of the corpus.[10]

I will now turn to the numerical representation of cardinals as found in the two corpora. The results below just include those cardinals that are not part of mixed representations.

Table 9: Type and token frequencies of cardinal numbers (numerical representation).

Healthism				Frown and FLOB		
Types	Tokens	°/ooo		Types	Tokens	°/ooo
1,400	18,545	157.6		2,903	21,978	108.9

The first interesting detail in the results above is that numerical representations are almost twice as common as verbal representations in healthism, a relation not found to be as clear in general English, as represented by Frown and FLOB. Given the more scientific character of the former, this can be interpreted as a sign of quantification being an important factor in healthism. This impression is enhanced by the fact that the gap between the healthist corpus and Frown and FLOB in the frequencies of cardinals is much more significant with numerical representations than it was with verbal representations.

Another aspect worth looking at is measuring. Measuring is not the simple counting of instances, but counting with respect to some units. As these have to be represented linguistically, I can look at them in the two corpora.

Units do not share any formal features. I therefore again had to resort to compiling a list of expressions from this semantic field for WordSmith to use as a search file. Table 10 contains both the type and token frequencies of the expressions for units of measurement found in the two corpora.

Table 10: Units of measurement (types and tokens).

Healthism				Frown and FLOB		
Types	**Tokens**	**$^o/_{ooo}$**		**Types**	**Tokens**	**$^o/_{ooo}$**
97	15,473	131.5		131	12,867	63.8

The difference between the two corpora with respect to types, which sees an advantage of Frown and FLOB (which definitely is also a result of the larger size of the latter), indicates that a wide range of different genres also means that there are more categories of measurement. Whether this has any relevance for quantification is more difficult to say.

What is significant, though, is the fact that units of measurement are more than twice as common, relatively speaking, in healthism than in general English. This suggests that there is indeed quantification and thus scientification in healthism, introducing an element of risk.

In order to gain some insights into which areas of life deserve to be measured in healthism, I categorized the units and calculated type and token frequencies. Results are presented in table 11.

We have to take the predominance of measurements of time with a pinch of salt since it is due to the high frequencies of words such as *year*, *month*, *day* or *week*, which are of course not always used in a strictly measuring/quanti-fying sense. But apart from time, what strikes the eye is the fact that in opposition to general language, measuring and thus quantifying in healthism seems to be especially prominent in the categories of weight, volume, energy and mathematics. The first three are all primarily concerned with the intake of substances, mostly food, supplementation and medication. This suggests that the scientification of healthism mainly consists of a strict monitoring and controlling of what you feed – in all senses of the word – your body with. There thus is a connection with scientification and individualization.

Table 11: Type and token frequencies of different categories of measurement.

	Healthism			Frown and FLOB		
	Types	Tokens	º/ₒₒₒ	Types	Tokens	º/ₒₒₒ
Amount of substances[11]	11	192	1.6	4	80	0.4
Weight	16	3,385	28.8	15	303	1.5
Space	23	620	5.3	35	1,043	5.2
Volume	13	1,133	9.6	14	258	1.3
Time[12]	10	6,748	57.3	18	7,871	39.0
Speed/rhythm	5	81	0.7	7	39	0.2
Energy	4	929	7.9	14	63	0.3
Pressure	1	24	0.2	5	27	0.1
Radiation	3	5	0.0	2	6	0.0
Temperature	2	11	0.1	4	91	0.5
Acoustics	0	0	0	5	37	0.2
Money	6	153	1.3	5	1,681	8.3
Mathematics[13]	3	2,192	18.6	3	1,368	6.8
TOTALS	97	15,473		131	12,867	

The high position of the mathematical class is due to the high frequencies of the word *percent* and the symbol *%*. This indicates that statistical evaluation of any kind – there is a wide range of applications of percentages in the healthist corpus, from risk calculations to proportions of nutrients – also plays a substantial part in healthism. This is in line with the notion of risk as statistically controllable.

7. Conclusion

The ideas behind this contribution are that the notion of lifestyle risks can imbue our thinking and evaluating in the domain of health, possibly leading to a problematically one-sided view of health and disease as exclusively medical problems and as an individual responsibility, and that this connection is established in discourse. I proposed a framework explaining how this could happen and how it could be researched from a Critical Discourse Analytical perspective and with corpus analytical tools.

I then went on to demonstrate how the directions of research suggested by the framework could be implemented in concrete analyses, focusing on a corpus of sixteen self-help books concerned with cardiovascular diseases. I used the model either as the target for the interpretation of data (= framework-oriented) – here I examined the most common content words and verbs used for giving advice or instructions – or as the source determining the aspects to be examined (= framework-guided) – here I examined expressions denoting pathological conditions, supposed to contribute to pathologization, and lexemes for numbers and measuring units, supposed to contribute to quantification.

The exemplary analyses described in the article show both the merits and the shortcomings of my approach. As for the merits, the procedure allows a systematic way of bridging the gap between the analysis of linguistic details and socio-cultural significance. This – theoretically, at least, as I have not

touched upon this in the paper itself – includes the possibility of refuting hypotheses, something unfortunately not very common in CDA. On the other hand, the framework also functions as a kind of Procrustean bed, narrowing the focus on certain aspects while neglecting others. Although this cannot be completely avoided, a review of the framework incorporating more ideas from social theories on lifestyles and risks will lead to conceptual distinctions benefiting concrete research. In addition, the analyses have also shown the problems of a quantitative corpus-based approach to discourse analysis with the conflict between needing distinct categories for counting and having to take into account that the human mind allows blurry boundaries and multi-category membership.

Notes

1   It seems clear that the individual freedom in the choice is relative as socio-economic factors may constrain the availability of alternatives.

2   This, however, does not fully explain why no such negative judgements apply to the other dominant chronic disease, namely cancer. The reason is probably that in our conception of cancer the causal factors are less clear than with cardiovascular diseases.

3   They use the same principles as the Brown corpus and the Lancaster-Oslo-Bergen (=LOB) corpus both composed thirty years earlier because they were originally designed for a historical comparison 1960s vs. 1990s (cf. Mukherjee 2009: 43).

4   $^0/_{000}$ means 'occurrences per 10,000 words'.

5   As in imperatives the addressee is the implied agent of the actions, i.e. the person supposed to carry them out, I will confine the search for the modal verbs mentioned to occurrences with the second person pronoun *you* as the subject, i.e. *you should eat more nuts* but not *they should eat more nuts*.

6   Considering the distinction between acts the addressee is advised to perform and those that s/he is advised *not* to perform essential, I differentiated between verbs occurring in negations and those that do not.

7   Includes verbs not classified.

8   Even if negated, additive acts are indicate a preoccupation with addition (not with reduction) and have therefore been classified here.

9   ironic

10 Mind that type numbers are an unreliable measure due to the fact that they just count orthographic words – i.e. words between spaces and/or punctuation marks – while my analysis of cardinals was much more detailed, as mentioned above.

11 This primarily includes the unit of *mol* (and its variants).

12 A caveat: words such as *day, month* or *year* are not always used in the strict sense of a unit of measuring.

13 This primarily includes the word *percent*.

References

Alaszewski, A. (2006). Health and risk. In P. Taylor-Gooby and J.O. Zinn (eds.), *Risk in Social Science*. Oxford: Oxford University Press. pp. 160-179.

Baker, P. (2006). *Using Corpora in Discourse Analysis*. London: Continuum.

Baker, P., Hardie, A. and McEnery, T. (2006). *A Glossary of Corpus Linguistics*. Edinburgh: Edinburgh University Press.

Chaney, D. (1996). *Lifestyles*. London: Routledge.

Fairclough, N. (1989). *Language and Power*. London: Longman.

Goatly, A. (2000). *Critical Reading and Writing*. London: Routledge.

Karolinska Institutet (n.d.). 'Alphabetical List of Specific Diseases/Disorders.' http://www.mic.ki.se/Diseases/Alphalist.html [accessed 2 April, 2009].

Lawrence, M and Germov, J. (2004). Future food: The politics of functional foods and health claims. In J. Germov and L. Williams (eds.). *A Sociology of Food and Nutrition: The Social Appetite*. Oxford: Oxford University Press. pp. 119-147.

Louw, B. (2000). Contextual prosodic theory: Bringing semantic prosodies to life. In C. Heffer, H. Sauntson and G. Fox (eds.), *Words in Context: A Tribute to John Sinclair on his Retirement*. Birmingham: University of Birmingham. Pp. 48-94.

Lupton, D. (1999). *Risk*. London: Routledge.

Marko, G. (2008). *Penetrating Language: A Critical Discourse Analysis of Pornography*. Tübingen: Narr.

Marko, G. (2009). *Introduction to Critical Discourse Analysis: A Course Handout*. Unpublished teaching material: English Department, Karl-Franzens-University Graz.

McEnery, T., Xiao, R. and Tono, Y. (2006). *Corpus-Based Language Studies: An Advanced Resource Book*. London: Routledge.

Morgan, M.G., Fischhoff, B., Bostrom, A. and Atman, C.J. (2002). *Risk Communication: A Mental Models Approach*. Cambridge: Cambridge University Press.

Mukherjee, J. (2009). *Anglistische Korpuslinguistik: Eine Einführung*. Berlin: Erich Schmidt Verlag.

Palmer, F.R. (1986). *Mood and Modality*. Cambridge: Cambridge University Press.

Pidgeon, N., R.E. Kasperson and P. Slovic (eds.) (2003). *The Social Amplification of Risk*. Cambridge: Cambridge University Press.

Titterton, M. (2005). *Risk and Risk Taking in Health and Social Welfare*. Philadelphia: Jessica Kingsley Publishers.

Corpus

Challem, J. (2003). *The Inflammation Syndrome: The Complete Nutritional Program to Prevent and Reverse Heart Disease, Arthritis, Diabetes, Allergies, Asthma*. Hoboken, NJ: John Wiley and Sons.

Esselstyn, C.B. (2007). *Prevent and Reverse Heart Disease: The Revolutionary, Scientifically Proven, Nutrition-Based Cure*. New York et al.: Avery.

Holford, P. (1997). *The Optimum Nutrition Bible*. London: Piatkus.

Holford, P. (1998). *Say No to Heart Disease*. London: Piatkus.

Hyman, M. and Liponis, M. (2003). *Ultra-Prevention: The 6-Week Plan that will Make you Healthy for Life*. New York et al.: Atria Books.

Kastan, K. (2007). *From the Heart: A Woman's Guide to Living Well with Heart Disease*. Cambridge, MA: Da Capo Press.

Kowalski, R.E. (2003). *The New 8-Week Cholesterol Cure*. London: Harper Collins.

Krumholiz, H.M. (2005). *The Expert Guide to Beating Heart Disease: What You Absolutely Must Know*. New York: Harper Collins.

McCully, K.S. and McCully, M. (2000 [1999]). *The Heart Revolution: The Extraordinary Discovery that Finally Laid the Cholesterol Myth to Rest*. New York: Harper Perennial.

McGowan, M.P. and Chopra, J.M. (2002). *50 Ways to Lower Your Cholesterol*. Chicago: Contemporary Books.

Ornish, D. (1996 [1990]). *Dr. Dean Ornish's Program for Reversing Heart Disease*. New York: Ivy Books.

Sinatra, S.T. and Roberts, J.C. with Zucker, M. (2007). *Reverse Heart Disease Now: Stop Deadly Cardiovascular Plaque before it's too Late*. Hoboken, NJ: John Wiley and Sons.

Spence, J.D. (2006). *How to Prevent Your Stroke*. Nashville: Vanderbilt UP.

Stein, R.A. (2006). *Outliving Heart Disease: The 10 New Rules for Prevention and Treatment*. New York: New Market Press.

Superko, H.R. with Tucker, L. (2003). *Before the Heart Attacks: A Revolutionary Approach to Detecting, Preventing, and even Reversing Heart Disease*. Emmaus, PA: Rodale.

Whitaker, J. (2002). Reversing Heart Disease: A Vital New Program to Help Prevent, Treat, and Eliminate Cardiac Problems without Surgery. New York: Wagner.