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Original article

Social inequality, lifestyles and health – a non-linear canonical correlation analysis based on the approach of Pierre Bourdieu

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Abstract

Objectives: Based on the theoretical and empirical approach of Pierre Bourdieu, a multivariate non-linear method is introduced as an alternative way to analyse the complex relationships between social determinants and health.

Methods: The analysis is based on face-to-face interviews with 695 randomly selected respondents aged 30 to 59. Variables regarding socio-economic status, life circumstances, lifestyles, health-related behaviour and health were chosen for the analysis. In order to determine whether the respondents can be differentiated and described based on these variables, a non-linear canonical correlation analysis (OVERALS) was performed.

Results: The results can be described on three dimensions; Eigenvalues add up to the fit of 1.444, which can be interpreted as approximately 50 % of explained variance. The three-dimensional space illustrates correspondences between variables and provides a framework for interpretation based on latent dimensions, which can be described by age, education, income and gender.

Conclusion: Using non-linear canonical correlation analysis, health characteristics can be analysed in conjunction with socio-economic conditions and lifestyles. Based on Bourdieus theoretical approach, the complex correlations between these variables can be more substantially interpreted and presented.

Keywords: **Social inequality – Lifestyles – Bourdieu – Multivariate methods – Health – Health behaviour.**

Introduction

Many epidemiological studies demonstrate the impact of different social determinants on health and health related behaviour.[1–3] Most studies demonstrate a social gradient: socially deprived groups are disadvantaged in terms of morbidity and mortality. To explain and interpret the effects of social deprivation on health occasionally theoretical approaches are used that introduce explanatory variables on different levels.[3,4] These theoretical approaches show relationships between socioeconomic characteristics and health mediated characteristics by different explanatory factors. Among these often health relevant strains and resources, access to and quality of health care, health-related behaviour as well as biological and psychosocial explanatory factors are mentioned.

In order to empirically determine the impact of social characteristics on different aspects of health, linear or logistic regression methods are commonly used in social epidemiology. These focus on causal relationships between multiple independent and a single dependent variable. These methods are well established to predict single health related outcomes for different aspects of health. However, for the multivariate analysis of the complex relationships of corresponding variables, more complex methods seem to be better suited. The non-linear canonical correlation analysis offers the opportunity to map a wide range of explanatory factors in correlation to different social and health variables while reducing the complex relationships by computing latent dimensions.[5]

The aim of this analysis is to present the non-linear canonical correlation analysis as a potential method for research in social epidemiology, which is based on the theory of Pierre Bourdieu and provides the possibility to describe the complex links between social factors and health.

The sociological theory of Pierre Bourdieu offers the opportunity to examine interdependencies between socioeconomic structure and lifestyle components using the capital and lifestyle theory as well as the habitus construct. Bourdieus capital theory distinguishes between economic, cultural and social capital, which is distributed among society in varying forms.[6] In this theory, capital has specific possibilities of adaption and effectiveness. Moreover, social classes can be distinguished based on the complexity and composition of types of capital.
Bourdieu's lifestyle theory investigates the importance of characteristics, which can be interpreted as symbolic varieties of capital.[7] By means of distinction, these characteristics make it possible for individuals to determine their own and other peoples rank within social structures. Lifestyle is highly affected by social structure but on the other hand can also in a reciprocal way have substantial influence on it. Therefore, lifestyle should not be understood as completely determined. The concept of habitus establishes a connection between social structure and lifestyle and is an intrinsic immanent of the individual by means of birth and socialisation. The concept of habitus is a principle of activation of objectively classifiable forms and therefore also a classification system theory.[8]
Bourdieu's capital and lifestyle theory has already been adopted by other authors to examine inequalities in health.[9–16] However, only few analyses of health-related differences refer to Bourdieu's methodological and empirical work as described in his basic publication "Distinction: a social critique of the judgement of taste".[7] Approaches were made by Gatrell et al., Lengen and Blasiusand Veenstra.[16–19] Using multiple correspondence analysis, Veenstra identified health effects of social class in a Canadian province. Indicators of physical and mental health were situated in a social space defined by economic and cultural capital as well as social relations, personal history and family structure. To illustrate complex associations between health and society, correspondence analyses or other multivariate explorative methods such as non-linear correlation analyses were used.[5,16,18] These methods allow to introduce all interesting variables simultaneously. The variables define a certain space visualizing similarities and differences between persons. Results can be interpreted with the help of latent dimensions, to which the complex interdependencies between variables are reduced to. As opposed to using table formats, the possibility of presenting results in a graphical display makes it easier to explore coherences between the variables and to interprete their distribution patterns. The choice of the respective method is determined by the level of measurement of the variables. Correspondence analysis and multiple correspondence analysis can only examine categorical data whereas non-linear correlation analysis is suitable for categorical as well as numerical and ordinal data.

In the following, survey data including indicators of health, health behaviour, lifestyles and social economic variables, is analysed by using non-linear canonical correlation analysis. The chosen variables are presented in a constructed social space, which is presented in a visual map and can be interpreted according to Bourdieu's capital- and lifestyle theory.

Methods

The data for this analysis was collected in the year 2000 within a research project funded by the German Research Foundation.[20] The population of the study included all individuals resident in Cologne with German nationality, born between 1938 and 1969. Thus, at the time of the sampling procedure these persons were aged 30 to 59 years. 1,890 addresses from Cologne residents were randomly selected; the sample adjusted by neutral losses (e. g. address unknown, inadequate german language skills) included 1,613 addresses. The data set included information from face-to-face interviews of 695 persons, who were spread relatively equal across the age groups of 30–39, 40–49 and 50–59. The response rate of 43.1 % is in line with average values from current empirical social research.[20] The response rate was marginally higher among older people and women.
Several variables, relevant for an empirical examination of Bourdieu's capital- and lifestyle-theory, were selected and were supplemented by health indicators. The non-linear canonical correlation analysis allows to include different sets in the analysis, which should consist of variables selected by theoretical considerations. In this analysis we used five sets: set one includes indicators of the socioeconomic position, set two consists of socio-demographic variables, set three includes general lifestyle indicators, in set four lifestyle variables measuring health behaviour are included and set five consists of health indicators. Socioeconomic position was measured by income, education, occupation and subjective social class assessment of the respondents. The socio-demographic variables were age, gender, marital status, type of housing and residential area. Lifestyle was determined on the basis of variables regarding attitudes towards spending leisure time, taste of music, meaning of life, problem solving and health related locus of control. Indicators of health behaviour were nutrition, smoking, consumption of alcoholic drinks, physical activity and Body-Mass-Index. Health status was operationalized by health related quality of life, the Zerssen complaint list and the subjective health status measured with a single item.[21–23] A summary of variables used in the analysis is shown in table 1.

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Table 1. Summary of variables of the five sets, which are incorporated in the non-linear canonical correlation analysis: description of number of categories, level of measurement, missing values of variables and sets.

Set	Name of variable	Number of categories	Level of measurement	Missing values	Missing values in the set
1	Equivalenced Income	4	Ordinal	3	22
	Occupational prestige	3	Ordinal	7	
	Education Index	3	Ordinal	6	
	Self-assessment above-below	10	Ordinal	13	
2	Grouped Age	3	Ordinal	0	0
	Gender	2	Single nominal	0	
	Marital status	5	Single nominal	0	
	Housing type	8	Single nominal	0	
	Residential district	9	Single nominal	0	
3	Leisure time: relax	5	Ordinal	1	32
	Leisure time: Driving a car just for fun	5	Ordinal	1	
	Leisure time: concerts classical music	5	Ordinal	1	
	Leisure time: go out for a meal	5	Ordinal	0	
	Leisure time: go to a disco	5	Ordinal	1	
	Leisure time: watch TV	5	Ordinal	2	
	Leisure time: parlour games	5	Ordinal	0	
	Control: self-control	5	Ordinal	1	
	Control: fate	5	Ordinal	5	
	Control: regular doctor's visits	5	Ordinal	3	
	Coping: talk to others	5	Ordinal	2	
	Coping: distraction	5	Ordinal	3	
	Coping: conflict	5	Ordinal	3	
	Life sense: God	5	Ordinal	7	
	Life sense: make the best of it	5	Ordinal	4	
	Life sense: little meaning	5	Ordinal	7	
	Music: Blues	5	Ordinal	7	
	Music: Schlager	5	Ordinal	3	
	Music: Pop	5	Ordinal	4	
	Music: Opera	5	Ordinal	2	
4	Exercise	5	Ordinal	0	10
	Hiking	5	Ordinal	0	
	Ride a bicycle	5	Ordinal	0	
	Groceries: ham, sausages, cold meat	6	Ordinal	1	
	Groceries:, wholemeal bread	6	Ordinal	0	
	Groceries: fresh vegetables	6	Ordinal	0	
	Groceries: Fast Food	6	Ordinal	0	
	Groceries: cakes, biscuits	6	Ordinal	0	
	Body-Mass-Index	5	Ordinal	7	
	Tobacco consumption	4	Ordinal	1	
	Cigarette Packet year	4	Ordinal	1	
	Alcohol consumption – typology	4	Ordinal	2	
	Glasses of wine, sparkling wine	5	Ordinal	0	
	Glasses of beer	5	Ordinal	0	
	Glasses of rum, liquor etc.	4	Ordinal	0	
5	Physical capability	2	Ordinal	2	15
	Physical role function	2	Ordinal	1	
	Physical pain	2	Ordinal	3	
	General sense of own state of health	2	Ordinal	1	
	Vitality	2	Ordinal	1	
	Social capability	2	Ordinal	0	
	Emotional capability	2	Ordinal	0	
	Mental well-being	2	Ordinal	1	
	Health status	5	Ordinal	0	
	Complaint categories	5	Ordinal	8	

Statistical analysis

The non-linear canonical correlation analysis (OVERALS) belongs to non-linear multivariate analytical methods of the so-called Gifi-System.[24] The specific advantage of OVERALS compared to other multivariate methods is that variables with different scaling levels such as numerical, ordinal and nominal level can be introduced in an integrative analysis of non-linear relations between variables. Furthermore, OVERALS accepts the use of more than two sets, which can accommodate different variables with varying scaling standards. The purpose is to determine how similar sets of variables are to each other. The aim is to account for as much of the variance in the relationships among the sets as possible, in a low-dimensional space, and to establish the similarities between the sets by simultaneously comparing linear combinations of the variables in each set to an unknown set.[25] The variables in each set are linearly combined so that the linear combinations have a maximal correlation. Given these combinations, subsequent linear combinations are determined, which are uncorrelated with the previous combinations and that have the largest possible correlation.[25] OVERALS searches for a subspace that several sets of variables, measured on the same objects, have in common. There are three modes: objects, variables and sets.[5] It is not necessary that variables for each set have the same level of measurement or that there is an equal number of variables for each set.

OVERALS uses the "Alternating least squares (ALS) Algorithm", which makes it possible to calculate the "fit function" and the "loss function". A perfect adaptation would comply with the number of chosen dimensions, where the maximum number of dimensions matches the sum of all linear combinations of variable characteristics from the sets. The loss function states the difference between the number of chosen dimensions to the best calculated adaptation. Moreover, Eigenvalues are calculated that can be determined by analysing data from the fit and loss function. These Eigenvalues indicate to what extent every single dimension accounts for the loss function compared to the calculated correlation, and can take on values between 0 and 1.[25]

The group of variables in a set should be based on theoretical considerations, as the combination of these variables is of higher importance in OVERALS than each variable itself. Single variables are only important when containing information independent from information of other variables of the same set.[25] In total, 55 variables with either nominal or ordinal scaling level are included in the analysis (Table 1). The interpretation for these coherences should be based on the chosen dimensions which represent a common level of analysis for all variables running along the respective dimension.

Results

For visual mapping of the constructed space by using the non-linear canonical correlation analysis with the described five sets and their variables, a three-dimensional solution was chosen. The three dimensions produce a fit of 1.444. The fit shows to what extent the non-linear canonical correlation analysis solution fits the optimally quantified data in regard to the association between the sets. This 3-dimensional solution seems to be justified as the Eigenvalues of the first three dimensions are quite high: the first dimension has an Eigenvalue of 0.567, the highest explanatory power to show the coherence of sets among each other; the second dimension with an Eigenvalue of 0.457 has little higher explanatory power than the third dimension with an Eigenvalue of 0.421. The Eigenvalues of the three dimensions add up to the fit of 1.444, they can be interpreted as a proportion of explained variance. Multiple fit of variables is presented in table 2; respective loadings of variables on each of the dimensions and the sum of the loadings for the three dimensions are also shown in table 2.

To illustrate the distribution of variables in a three-dimensional space, quantifications of multiple categories are used. These quantifications present the centre for all respondents belonging to one category and account for the importance of other variables from the set. Variables close to others have more similarities among interviewed persons than variables that are far apart. The space described in figures 1 and 2 is defined by all variables listed in table 1. Figure 1 shows the distribution of variables for the first and second dimension, figure 2 for the first and third dimension. For the sake of clarity, only those variables are presented in both figures which in sum show a multiple fit of more than 0.1 (printed bold in Table 2). Furthermore, only lowest and highest values of ordinal variables are displayed, as these usually run linear in the given space. Variables or variable values, which are not displayed, were mainly spread around the axis of coordinates. By neglecting this proportion of data none of the influential values are lost, but the readability of figures is improved. In the first and second dimension (Figure 1) the latent variables "CULTURAL CAPITAL" and "AGE" are important grouping characteristics, added by the latent variables "GENDER" and "ECONOMIC CAPITAL" when including the third dimension (Figure 2).

Based on the distribution of variables in the first (top left) and third (bottom right) quadrant in figure 1. and the multiple adjustments of variables (Table 2), the run of the curve could be interpreted with "CULTURAL CAPITAL". The first quadrant consists of respondents with low education, low occupational status and, who consider themselves being part of a lower social class, live in council houses or subtenancy in the

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Table 2. Multiple fit of variables.

Set	Name of variable	Multiple Fit			
		Dimension			Sum
		1	2	3	
1	Equivalent Income	.007	.070	**.261**	**.338**
	Occupational prestige	.011	**.123**	.032	**.167**
	Education Index	**.278**	.018	.052	**.349**
	Self-assessment above-below	.074	.026	.016	.117
2	Grouped Age	**.348**	**.219**	**.183**	**.750**
	Gender	.040	.072	**.389**	**.501**
	Marital status	.022	.006	.061	.089
	Housing type	.084	**.141**	.003	**.228**
	Residential district	**.129**	**.104**	.012	**.244**
3	Leisure time: relax	.003	.009	.042	.054
	Leisure time: Driving a car just for fun	.001	.010	.026	.037
	Leisure time: concerts classical music	.024	**.158**	.004	**.187**
	Leisure time: go out for a meal	.007	.011	**.094**	**.113**
	Leisure time: go to a disco	**.079**	**.074**	.009	**.162**
	Leisure time: watch TV	.014	.016	.029	.060
	Leisure time: parlour games	.005	.021	.062	.087
	Control: self-control	.010	.010	.020	.040
	Control: fate	.006	.005	.017	.028
	Control: regular doctor's visits	.022	.006	.033	.062
	Coping: talk to others	.002	.002	.057	.062
	Coping: distraction	.003	.030	.004	.037
	Coping: conflict	.010	.005	.018	.034
	Life sense: God	.012	.002	.046	.061
	Life sense: make the best of it	.018	.004	.015	.037
	Life sense: little meaning	.002	.017	.002	.021
	Music: Blues	.002	.003	.039	.044
	Music: Schlager	**.144**	.014	.008	**.166**
	Music: Pop	.047	.020	.022	.089
	Music: Opera	.001	.054	.012	.067
4	Exercise	**.096**	.012	.007	**.116**
	Hiking	.004	.001	.032	.037
	Ride a bicycle	.008	.008	**.104**	**.120**
	Groceries: ham, sausages, cold meat	.015	.011	.006	.032
	Groceries:, wholemeal bread	.002	.011	.006	.020
	Groceries: fresh vegetables	.025	.024	**.079**	**.127**
	Groceries: Fast Food	.077	**.167**	.014	**.258**
	Groceries: cakes, biscuits	.024	.005	.015	.043
	Body-Mass-Index	.035	.004	**.072**	**.110**
	Tobacco consumption	.063	**.323**	.035	**.421**
	Cigarette Packet year	**.160**	**.179**	**.130**	**.469**
	Alcohol consumption – typology	.020	.047	.002	.070
	Glasses of wine, sparkling wine, cider	**.114**	.059	.071	**.245**
	Glasses of beer	.012	.090	**.119**	**.221**
	Glasses of rum, liquor etc.	.018	.012	.001	.030
5	Physical capability	.006	.007	.012	.024
	Physical role function	.008	**.076**	.038	**.122**
	Physical pain	.001	.000	.007	.008
	General sense of own state of health	.033	**.108**	.006	**.147**
	Vitality	.049	.023	.003	.074
	Social capability	.028	.005	.045	.079
	Emotional capability	.005	.000	.012	.018
	Mental well-being	.023	.037	**.113**	**.173**
	Health status	**.215**	.049	.094	**.359**
	Complaint categories	**.205**	.007	.061	**.273**

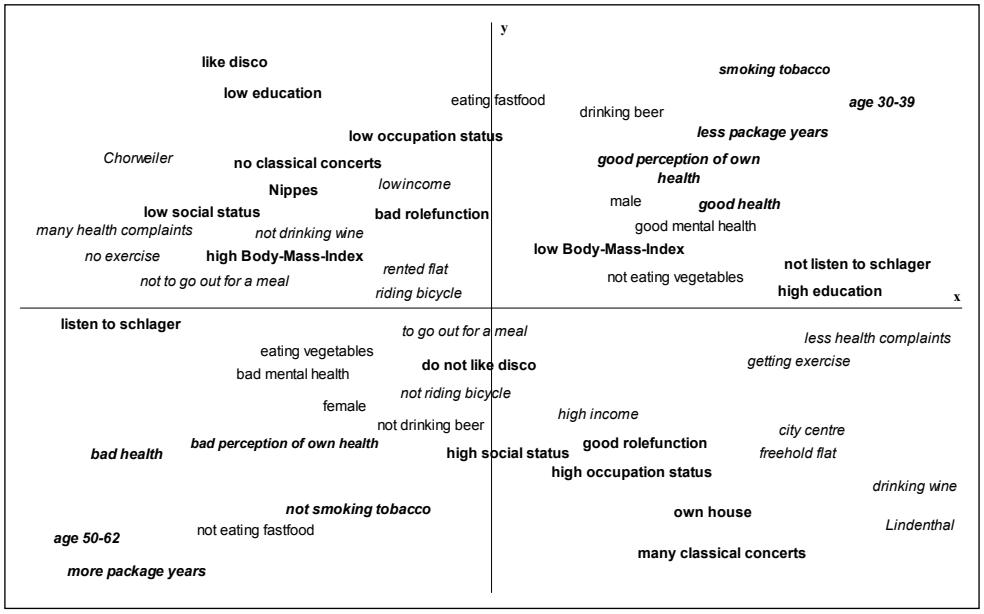

Figure 1. Space of first and second dimension of a non-linear canonical correlation analysis based on the lifestyle approach of Bourdieu. Variables close to each other have more similarities than variables that are far apart. The distribution of variables can be interpreted by latent dimensions in the three dimensional space, i. e. by CULTURAL CAPITAL (**bold**), AGE (***italic and bold***), ECONOMIC CAPITAL (*italic*) and GENDER (normal).

socially deprived areas of Cologne such as Chorweiler and Nippes. These respondents do not go to classical concerts, exercise less, more often ride a bike and rarely go out for a meal; they drink less wine and have more health problems as well as a poor physical role function. The respondents, which can be found in the opposite third quadrant were highly educated with high professional prestige and high income; they own their own flats or houses in sought-after districts such as Lindenthal or the centre, often visit classical concerts, work out often and drink a lot of wine; they have little health problems and a good physical role function.

The direction of the second (top right) to the fourth (bottom left) quadrant shows variables that can be differentiated by the latent variable "AGE". The second quadrant consists of younger interviewees, who rarely listen to German so-called "Schlager" music, smoke a lot and drink a lot of beer whereas they have (until now) few packet years (of cigarettes). They eat little vegetables and have an excellent subjective state of health and a positive feeling of mental well-being. The fourth quadrant describes the group of respondents in the highest age category. These have a poor subjective state of health, enjoy listening to German Schlager music, do not go to discos, they eat fresh vegetables and little fast food. The respondents in this quadrant are marked by a high number of packet years, however, currently do not smoke and drink less beer. Furthermore, they have poor mental well-being.

Figure 2 shows that some of the variables, which has already been analysed with CULTURAL CAPITAL and AGE in figure 1, now run between the first (top left) and the third quadrant (bottom right), while following the second and fourth quadrant a new layer of interpretation can be established, which is described by ECONOMIC CAPITAL and GENDER. Now the second quadrant consists of respondents, who in general earn a higher income, are male, drink large amounts of beer and wine, eat few vegetables, go out for a meal more often, rarely cycle, exercise a lot and have a good status of mental well-being. While the fourth quadrant consists of respondents, who in general earn a lower income, are female, drink less beer and wine, eat fresh vegetables, do not go out for meal, have a bad mental health status and many health complaints.

Discussion

In the following it is outlined, in which way the results of the non-linear canonical correlation analysis regarding Bourdieus capital and lifestyle theory can be interpreted. The interpretation of CULTURAL CAPITAL (latent variables are written in capitals) and ECONOMIC CAPITAL can be directly adopted from Bourdieus analysis. AGE and GENDER were not considered in Bourdieus analysis; they therefore form a specific level of interpretation in this analysis. AGE and GENDER can be understood as latent dimensions, which capture the biological as well as the socio-cultural dimension of gender and age. These dimensions are associated with socio-economic, lifestyle and health-related variables. Lifestyle variables such as preference for music can be interpreted according to Bourdieus analysis: social groups with high economic and cultural capital prefer, for instance, classical music, which serves as a distinctive value. These social groups, according

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Figure 2. Space of first and third dimension of a non-linear canonical correlation analysis based on the lifestyle approach of Bourdieu. Variables close to each other have more similarities than variables that are far apart. The distribution of variables can be interpreted by latent dimensions in the three dimensional space, i. e. by CULTURAL CAPITAL (bold), AGE (italic and bold), ECONOMIC CAPITAL (italic) and GENDER (normal).

to their lifestyle, which among other things includes this specific taste in music, differ from other groups and symbolize their cultural and economic capital. As for health and health-related aspects of lifestyle, one can use the same approach when interpreting the results: people with high CULTURAL CAPITAL not only live in privileged residential neighbourhoods and exercise more; they also have a better perception of health and a better physical role function.

AGE and CULTURAL CAPITAL as well as GENDER and ECONOMIC CAPITAL influence the preference for drinking wine or beer. On the first three dimensions (Figures 1 and 2) "drinking wine and beer" indicates different levels of interpretation: men and older people prefer beer whilst people with higher education and high income tend to prefer wine. Distinguishing between different types of alcoholic drinks shows that apart from the actual consumption various explanatory factors are possible; these do not become clear by just looking at the quantity of alcohol consumption. As wine is not only more expensive than beer but also suggests that the consumer has special knowledge about wine, drinking wine acts as distinctive characteristic. For example, the preference for wine allows symbolising high CULTURAL CAPITAL by extensive knowledge about grape varieties, winemakers or vintages; or high ECONOMIC CAPITAL by buying especially expensive wine. Additionally, categorising activities such as exercising, hiking and cycling, which are here presented by different latent dimensions, show that not only the quantity of activity is important but also the quality of the chosen activity. The more qualitative differentiation of health behaviour variables helps to understand the social differentiation of health behaviour and health. Even a healthy lifestyle has not only in common to improve health.

Categorising health by using different health indicators shows that also „health" is not a unidimensional construct and that different aspects of health have varying explanatory dimensions, respectively. This points to the necessity of differentiating health indicators for the analysis of health inequalities, in order to identify the mechanisms and the effect of structural factors on specific health dimensions. Additionally, Lengen & Blasius constructed a two-dimensional "health space" by using the categorical principal component analysis.[18] Their dimensions reflected the "level of general health" as well as the "composition of physical and mental health symptoms". This was interpreted as a reflection of cultural structures like the categorical differentiation of "good versus bad" and "body versus mind", as stated by the authors.

The use of a multivariate analysis method presents an opportunity to integrate different variables, without taking causal influences from one variable to another for granted. Variables of socio-economic status, socio demographic variables, lifestyle variables, variables of health behaviour as well as variables of health status are simultaneously integrated in the analysis. Cockerham elaborates the importance of a theoretical and a methodological approach for analysing health lifestyles in the context of agency and structure.[26] He points out to the difficulty of constructing perfectly independent variables, which is a problem for most methods, but this is not the case for the presented statistical procedure. The ad-

vantage of the presented analysis is the possibility to analyse different variables from different levels, for example micro-, meso- and macrolevel, without getting lost in complexity and without having the problem of multicollinearity. The graphical visualisation of all correlations between different variables demonstrates similarities and differences. It is therefore easier, compared to tables, to identify dependencies between the classifications of the respondents. The graphical visualisation helps to explore latent structures. For practical use a more differentiated analysis of social patterns can help to improve prevention campaigns because it gives the opportunity for a differentiated analysis of target groups and shows the interrelations of circumstances and attitudes. Furthermore, the illustration of relationships between variables makes the results more comprehensible, also for readers who are not familiar with statistical analysis.

However, the analysis has some limitations. The non-linear canonical correlation analysis is explorative and does not take advantage of the randomness inherent to the survey sample and there is no test of the statistical significance. Depending on the research questions determining levels of significance are more informative than showing spatial distances. In these cases, non-linear canonical correlation analysis is not better suited.

Also, restrictions due to insufficient data material apply to this analysis. The data used for this analysis did not satisfy the requirements for the analysis of perceptions that reproduce social distances in everyday life. This means that health relevant characteristics of lifestyles were not sufficiently differentiated regarding their symbolic and distinctive nature. This data was used because, besides socio-economic and health variables, it contained some lifestyle variables, which are classified by Bourdieu as being distinctive. The separation of health related lifestyle variables from other lifestyle variables can also be a matter of discussion. On the one hand Bourdieu tends to give more weight to structure than agency in routine behaviours, which means that there should be no differentiation between lifestyle in general and health related lifestyle.[8] By differentiating between general lifestyle and health behaviour, we do not want to neglect that health behaviour is also a pattern of general lifestyle. But with the focus on health inequalities we do believe that health related lifestyle variables should be separated from variables like music preferences as they have a more direct influence on health.

In general, there has been only little research done to analyse distinctive lifestyles and their relation to different kinds of capital. Veenstra studied the cultural knowledge and distinction symbols in the Canadian population following Bourdieu`s work and demonstrated education is rather more important than economic conditions and that a cultural variety is more distinct than a high-brow culture.[7,27] Hence, investigation in this kind of research area can be fruitful for the sociological as well as the socio-epidemiological debate on inequalities.

Finally, the future prospect of research activities is outlined here. According to Bourdieu`s theoretical approach and with the use of non-linear canonical correlation analysis not only health relevant aspects of distinctive lifestyle characteristics can be examined, but also the distinctive character of health relevant behaviour. Keeping in mind the progress in the field of medical science, health and illness are more and more not a biological destiny, but a characteristic for individual's abilities and with this health and illness can act as a symbol for cultural and economic capital. A healthy lifestyle is more likely to show cultural capital, but when investing in medical benefits, economic capital can be more important. Unmistakable socially distinct associations of being healthy, healthy behaviour and leading a healthy lifestyle make it possible for social groups to perceive one another according to these characteristics as well as to distinguish themselves from other social groups. The hypothesis is that the more health is disconnected from biological influence, the more cultural and especially economic capital can be invested in health and therefore health could increasingly serve as a distinctive characteristic. Health, interpreted as symbolic value, will for this reason not only be distinguished by social class, but by being a distinctive characteristic in its own right, and will add to reproduce old or to produce new social classes.

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