Children's Lifestyles and Health-Related Behaviors in the City of Cologne

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Abstract

Growing up in a healthy way no longer seems to be a matter of course. Particularly, the prevalence of overweight and obesity in childhood has reached an alarming dimension. The research project entitled "Children Today – Couch Potatoes, Fast Food Junkies, Media Freaks? – A Lifestyle Analysis" examines overweight and obesity as well as physical activity, nutritional behavior and media consumption of children. The present article examines some aspects of health-related lifestyles and analysis context effects of the social environments of 10-year old children in Cologne. The results confirm the relationship between parental socio-economic status and overweight and health-related behavior of the children. Multivariate models of regression also show a stronger risk for developing an unhealthy lifestyle for children living in disadvantaged social environments. This result is independent of the individual socio-economic status and underlines the importance for preventative measures to consider the "obesogenic environment".

Keywords: Children's lifestyles, Health-related behaviors, Overweight, Obesogenic environment

1. Introduction

Growing up in a healthy way no longer seems to be a matter of course. In 1982, only 3 countries participated in the 'Health Behaviour in School-aged Children (HBSC)' study. Today, there are 41 participating countries, which suggests an increasing concern for the health of today's children and adolescents (see for instance Richter et al., 2008). The HBSC study takes into account a wide spectrum of health-related behaviors, such as dental health, nicotine, alcohol and cannabis consumption, sexual behavior, eating habits, physical activity and media consumption, as well as general well-being including self esteem, dietary habits and weight control. This last aspect emphasizes the importance of body weight to health-related well-being and has received special international attention in the last few years. More and more children and adolescents in Germany, Europe and in many parts of the world are either overweight or obese (see for instance Albrecht, 2008; Brettschneider & Naul, 2007; Robert Koch-Institute, 2006; WHO, 2007). Lifestyles that are characterized by inactivity or sitting activity along with an unhealthy diet, cause a misbalance between energy uptake and output, and are seen as responsible for this trend. The reasons for the development of such lifestyles, however, remain largely unexplained (see for instance Bünemann, 2008).

Research suggests that children and adolescents from poorer environments (see for instance Lampert & Richter, 2006) and with migration backgrounds (see for instance Robert Koch-Institute, 2006; Kriwy, 2008) are particularly prone to general health-related problems, and obesity in particular. Such information has recently encouraged researchers to go beyond individual dispositions and behaviors, and to focus on the relevance of social circumstances ('obesogenic environment'; see for instance WHO, 2003; Heseker, 2005) within different theoretical frameworks and in various preventative programs ('setting-approaches'). The relations between these factors (dispositions, behaviors, circumstances) have, however, received little empirical attention.

On the premise of existing findings, which illustrate a relation between social inequality and health status and health behaviors, this article concentrates on three central health-related lifestyle facets and aims to address this research deficit. The current study was conducted with 10-year old children in the German city of Cologne, and focused on their socio-geographic context and selected health-related aspects (physical activity, diet, media consumption). These three dimensions are relevant to the research questions posed in the study since the named

domains have a central influence on the health-related energy balance of adolescents and the emergence of obesity caused by a negative energy balance (energy input > energy output) (see for instance Bünemann, 2008).

With regard to health-related questions, particularly with a view to prevention, the developmental nature of lifestyles must be considered. In adolescence, lifestyles are not yet fixed. Rather, ways of life and their domains are shaped by changeable structural influences (Lüdtke, 1989, p. 63f.). During childhood, these influences can be described as prototypes and in adolescence as transitory configurations (see for instance the summary by Bünemann, 2008). With the aid of preventative measures, lifestyle formation may be directed towards healthier living. Such prevention and intervention can, however, only be successful if the complex interrelated structures, which contribute to the health and/or unhealthy lifestyles, are detected. With such a scientific basis, adequate and target-audience measures can be developed and implemented.

2. Theoretical references

This article's first analyses investigate the disparities between physical activity, diet and media consumption of the research population with a particular focus on horizontal and vertical inequalities. In the following sections, this examination is extended by a socio-geographic perspective, which assumes this segregation within the city as a basis for the children's divergent socialization contexts. Research into city dwelling takes 'segregation' to mean a 'disproportional distribution of population groups in urban regions' (Friedrichs, 1983, p. 217, personal translation). With regard to social segregation, this means that different social groups have differing chances and needs when settling in suburban areas. Sociological research into cities, for instance, examines how social inequality – income or ethnic household status – is connected to spatial inequality (Friedrichs, 1995, p. 79). This article discusses this aspect within the differing city regions of Cologne.

2.1 Effects of the living environment: Model of 'collective socialization'

It is a common assumption in research on urban areas that the living environment or the neighborhood influences the behaviors of its occupants (Friedrichs & Blasius, 2000, p. 17). In order to examine how contextual factors are influential, children with similar family backgrounds, but who grow up within differing living environments, can be compared (Jencks & Mayer, 1990, p. 111). Just as we can ask: 'Do poor living quarters make its occupants poorer?' (Friedrichs, 1998a; Friedrichs & Blasius, 2000, p. 19, personal translation) we can ask whether poor residential areas have detrimental effects on its children's health.

Individual and contextual effects at differing levels must be distinguished. According to Aber et al. (1997, p. 47) individual and contextual effects can be designated to the micro-level. They distinguish between contexts at various levels:

- Macro-systems: socio-cultural values and behavioral patterns of a nation, region or community, which influence the lives of children and families
- Meso-systems: this influence is indirect, through the effects of micro-systems (for instance parents, colleagues or neighbors)
- Micro-systems: contexts, which children come in direct contact with (family, teachers, peer-groups)

Aber et al. (1997) assume that neighborhoods can be influential at each of these levels. With regard to micro- and meso-systems, it should be remembered that children experience these in direct interaction, but may also experience them indirectly through observation (Friedrichs & Blasius, 2000, p. 23).

The assumption that living environments affect their occupants is based on socialization theory, and in particular, the theory of social learning developed by Bandura (see for instance Bandura, 1977). The concept of 'collective socialization' refers to a system of role models within residential regions (Bartelheimer, 2001, p. 192-102; Farwick, 2001, p. 164-168; Friedrichs, 1995, p. 81; Friedrichs & Blasius, 2000; Häussermann & Siebel, 2004, p. 166f.; Keller, 2007). The occupants of a suburb provide role models (Farwick, 2000, p. 165), which are potential socialization agents. The specific socialization conditions in disadvantaged neighborhoods are thereby of particular interest (Keller, 2007, p. 181). As poverty is often perceived as 'a place where improper patterns of behavior' are learned (Farwick, 2000, p. 164-168, personal translation), the question of which socialization-specific effects result within socio-spatially segregated or disadvantaged suburbs, must be raised (Keller, 2007, p. 181). Contemporary social scientific literature predominantly suggests that low socio-economic regions have negative effects on their occupants. It is widely assumed that these effects primarily emerge with the socialization of children (Friedrichs & Blasius, 2000, p. 17-31; Häussermann & Siebel, 2000, p. 133).

Through residential group structures that are relatively homogenous, living quarters and neighborhoods provide potential systems of social contact (Hoffmeyer-Zlotnik, 2000a, p. 142). How these areas socialize its inhabitants

depends significantly on whether and how their realms of experience and networks of contacts are limited to the living quarter (Bartelheimer, 2001, p. 197; Häussermann & Siebel, 2004, p. 167).

2.2 Activity spaces and networks

Small activity spaces and localized networks serve as conditions for the impact of contextual effects (Friedrichs, 1998a, p. 84f.): Network analyses indicate that systems of contacts of lower class population groups are greatly limited (Häussermann & Siebel, 2004, p. 167). The activity spaces of poor people are smaller and are mostly confined to their own suburbs. Consequently, their networks are smaller, both in number of contacts and geographical location (Friedrichs & Blasius, 2000, p. 29). Disadvantaged neighborhoods can therefore be considered 'anchored' (Farwick, 2001, p. 161).

It must also be assumed that contextual factors do not influence inhabitants equally. Rather, interactional effects may take place. For groups who spend large amounts of time in their living quarters and have few outside contacts, the influence of their contextual surroundings may need to be weighted more heavily. The influence of a neighborhood or a living environment must also be differentiated for differing social groups and with respect to the time the inhabitants spend in there: For children, this influence may be particularly great (Friedrichs, 1998a, p. 93).

3. Research questions

Individual effects, that is, effects relevant to individual social origins, may develop into unequal structures through socio-spatial segregation. Assuming that 'individual conduct is not only based on individual characteristics, but also on a complex context' (Hoffmeyer-Zlotnik, 2000a, p. 214, personal translation), this study incorporates contextual factors within which children live.

This article concentrates on differences in living environments and behavior within an inner-city area. It asks: 'Does the neighborhood, or the living environment, affect health-related lifestyles and health behavior in children?' 'Are there differences in socio-spatial and ethnic segregation transferred through living environments in the city or are there direct environmental effects (or both?)'

4. Method

The data are from a larger research project 'Children Today – Couch Potatoes, Fast Food Junkies, Media Freaks? – A Lifestyle Analysis' in cooperation with the research group led by W.-D. Brettschneider (University of Paderborn).

The project is financed by the Ministry of Internal Affairs of the state Nord-Rhein Westfahlen and aims to examine the complex interdependency of the development of lifestyles in the regions Höxter and the city of Cologne. In the present contribution the Cologne data are analyzed.

In this section, 1195 4th grade pupils (average age 9.7 years) completed a written questionnaire on their physical activity, dietary and media consumption habits. In addition, project staff weighed and measured the children in school, through which BMI values were calculated. According to the age- and gender-specific reference values set out by Kromeyer-Hauschild et al. (2001), the children were classified into underweight, normal and overweight, as well as obese groups. The questions regarding media consumption stem from the HBSC study in 2002 and from research by the Media-Pedagogical Research Cooperation South-West (MPFS) in 2007, which have been employed in numerous studies on children. The HBSC study takes media consumption as a key component of seated activity and is thus used as a measure for physical inactivity (Todd & Currie, 2004). The instrument questions focus on the number of hours spent watching television, using the computer and playing on play station. Weekdays and weekends are separated in the analysis. The questions concerning diet also stem from studies that have examined children - the KOPS study (Müller, 2000) along with an item cluster developed by the Federal Centre of Health Education contains questions regarding the frequency of eaten foods and the regularity of consumed meals (Gerhards & Rössels, 2003).

Physical activity information was gathered through sport club memberships, the amount of sport (in hours per weekday), as well as free play in the outdoors. These instruments have also been tested in studies with children of similar age and have been validated (see for instance Brettschneider & Gerlach 2004a, 2004b).

The data was collected in the children's classroom settings. This assured that minimal socio-selective drop-outs occurred. It further meant that no class-specific sample falsification arose (Oberwittler & Naplava, 2002). A sample with a typical level of urbanization and centrality, as well as socio-economic characteristics representative of the diversity of the Cologne city regions was aimed for.

A proportionally stratified cluster sample of schools was developed from groups of city areas that reflected certain urbanization criteria and social indicators. At primary school level, this sample-reflected ministerial statistics, which were based on 85 groups of Cologne schools (Stadt Köln, 2006a, 2006b). For this typology of city regions (Böltken, 2005; Hoffmeyer-Zlotnik, 2005a), the city areas were grouped on two dimensions: (1) 'social indicators' (proportion of habitants with migration backgrounds, unemployment rate, social support quota, proportion of council housing, proportion of foreigners, living space per habitant) and (2) 'density/level of urbanization' (density of population, proportion of one- and double-family homes, vehicle per habitant).

Comparing the sample data with the structural data of the city confirmed that the sample population reflects the socio-spatial and ethnic segregation within in the city of Cologne. The proportion of the study's children from families with low social status and density of social support are as strongly correlated to the proportion of habitants with migration backgrounds as the structural data and the proportion and children with migration backgrounds in their respective city areas ($r = 0{,}66$ bzw. $0{,}78$; $p > 0{,}001$). The category 'children with migration background' were classified – as in the KiGGS study – as those who have at least one parent not born in Germany. The children themselves provided this information. The distribution of the sample was almost identical to that of the entire population with respect to factors considered by the Federal Regional Studies and Planning Research Institute (city outskirt location, inner-city outskirt location, inner-city location). The sample thus ideally represents the various location types.

At the time of enrolment, school catchment areas still existed. This means that the catchment areas corresponded with the regional council boundaries. The school principals confirmed this through a questionnaire. In most cases, the social composition of the primary schools mirrors the social structures of the neighborhood. In disadvantaged residential areas, this would need to be adjusted downwards, as 'ambitious' parents send their children to schools of other city regions (Keller, 2007, p. 194).

4.1 Regionalization of data

In order for contextual factors to be brought into the analyses, a regionalization of the data is necessary. Regionalization enables relevant context features to be captured. A description of the structures of an immediate living environment allows the possibility of using the neighborhoods as areas of action and socialization (Hoffmeyer-Zlotnik, 2000a, p. 1). This is done by combining individual data with aggregated structural information. In this study, personal information collected in the survey was extended with structural data. This data consisted of regional data, which served as background variables and were examined through the variable 'school suburb' as the connection variable. Through this procedure, each individual person is grounded within spatial characteristics that represent a context for their thinking and conduct (Hoffmeyer-Zlotnik, 2005b, p. 17). A regionalization of survey data requires that 'the space of examination is subdivided according to conduct-relevant standards' (Hoffmeyer-Zlotnik, 2000a, p. 2, personal translation). In this respect, an inner-city standardization, which contains location factors as well as social indicators, is necessary.

4.2 Types of city regions

Central to the study were types of living environments (Häussermann & Siebel, 2004, p. 176f.). These types of environments contained habitants, who were relatively homogenous. The habitants' social structures and living conditions, however, differed markedly. With these considerations in mind, the following characteristics of five types of city regions are relevant (see figure 2): the two regional types (1) 'inner-city proximity' and (2) 'peripheral single housing development'. The occupants of these two regions were of an above average socio-economic status. In contrast, there are two main types of 'disadvantaged neighborhoods' (Friedrichs & Blasius, 2000, p. 27; Keller, 2007, p. 183f.), which represent the lower classes to a great extent (Hoffmeyer-Zlotnik, 2000a, p. 138): On the one hand (3) 'old workers' suburbs on the inner-city outskirts' with housing from the establishment period, and (4) 'peripheral large suburban housing estates', which consisted of high-rise buildings at the city's outskirts, and were predominantly built in the 1970s. The last two categories differ minimally with regard to the social structures of its occupants, but differ strongly with regard to living environment, infrastructural facilities and city connection. The large suburban housing estates in particular show particularly deficient facilities (Farwick, 2001, p. 162) and thus possibly form a 'problematic suburb' (Häussermann & Siebel, 2000, p. 131, personal translation). Finally, (5) neighborhoods consisting of heavily mixed or heterogeneous social and building structures, must be added (for example, the inner city suburbs).

4.3 Analysis

Through bivariate and multivariate data analyses, differences in physical activity, dietary and media behavior between the children of different types of city districts can be shown. A following step examined how these differences are distributed according to socio-spatial segregation. Multiple regression models (Brüderl, 2000;

Chatterjee & Price, 1995) allow an estimation of whether the types of regions, under consideration of individual effects, can explain these behaviors. In order to prove this study's hypotheses, regression analyses capture the influence of independent and dependent variables (see for instance Brüderl, 2003, p. 589). In order to provide evidence on the relative impact of the individual parameters, multiple regression models were employed. These models contained multiple independent variables and simultaneously tested how the influence of regional factors changed when individual variables were controlled for. City district variables were added in the analyses as dummy variables (Hardy 1993), although the type 'inner-city' represents the reference category, since it was the most heterogenic socio-structural type and was valued mid-range with regard to most behavioral dimensions. With this procedure, the values of the other types of regions are interpreted relative to this type. From all regression models, missing values were excluded in pairs. For internal model comparisons, standardized beta-coefficients are indicated, for external model comparisons non-standardized b-values are applied. Through the amount of standard items, the standardized regression coefficients indicate how the dependent variable is changed, if the independent one is increased by a standard entity (see for instance Brüderl, 2003, p. 628). The explanatory power of the total model is determined according to the determination co-efficient R^2, which specifies the proportion of model variance. In case of the binary variable 'sport club membership', a binary logistic regression (Andreß et al., 1997, p. 183 ff.; Diaz-Bone, 2006, pp. 231-252) was calculated.

5. Empirical findings

5.1 Descriptive results

First, bivariate analyses examined the relations between behavioral dimensions, the socio-economic status of the family of origin (individual level), and the type of living environment, within which the child lived. The socio-economic status of the parents was captured through the 'Family Affluence Scale' (FAS). The FAS was developed to measure economic status of a family and is specifically designed for children, since they cannot be directly questioned regarding their parents' profession or income. Circumstances were thus chosen, on which children and adolescents can answer relatively unproblematically: car and computer assets, family holidays and the child's own room. On examination of external validity of the scale, it was shown that the FAS is an adequate proxy for acquisition status of the father (Boyce/Dallago, 2004, pp. 20-22). Boyce & Dallago (2004) report of maximally 3% item non-response within the HBSC-study, through which the FAS scale was employed in 22 countries. In our study, the non-response quota was 1,2%, which was even lower. For comparisons among groups, the trichotomized scale was used, for the multivariate analyses the 8-level scale.

5.2 Individual 'social origin'

Figure 3 illustrates that children's behavioral dimensions and obesity clearly differ depending on their social origin. Z-transformed values show whether and how the individual behaviors of each group are shaped over or under average: With regard to sport club membership, the analyses confirm the present findings on the relationship between participation in sport clubs and the social status of parents (see for instance, Brinkhoff, 1998; Brinkhoff & Mansel, 1998; Burrmann, 2006; Georg, Hasenberg & Zinnecker, 1998; Nagel, 2003; Leven & Schneekloth, 2007, p. 174f.; Schmidt, 2006, p. 110f.; Thiel & Cachay, 2003): of those children with parents from a low socio-economic status, only 30,2% are members, in contrast to parents of a high status, where 78,0% hold sport club memberships. This represents approximately the general tendency of membership in clubs, as was published in the recent study 'Children in Germany 2007' (Leven & Schneekloth, 2007, p. 168ff.).

Media consumption of children with low socio-economic status is considerably higher with regard to computer games and play station use, as well as television viewing: 24.5% of those children, for instance, watch television three and more hours per day; in contrast, only 5.7% of high socio-economic status children do this. These results reflect previous findings on social strata-specific media behavior of children (see for instance Kuchenbuch, 2003; Leven & Schneekloth, 2007, p. 179-191; Maaz, 2005). Comparative data from the World Vision Study 2007 are somewhat lower. In the category 'three hours and more', the information on television consumption is as follows: 14% (lower classes), 6% (lower middle-classes), 4% (middle-classes), 3% (upper middle-classes) and 4% (upper classes) (see for instance Leven & Schneekloth, 2007, p. 184). Similarly, previous research on social strata-specific dietary behaviors (see for instance Beckert-Zieglschmid, 2005, p. 143ff.; Gerhards & Rössel, 2003, pp. 85-96; Gerhards & Rössel, 2002, p. 267ff.; Hupkens, Knibbe & Drop, 1997; Klocke, 1997; Kolip, 2004) shows that low social status is often associated with unfavorable and unhealthy dietary practices. This is supported by our study, for instance in the 'index of dietary patterns' used as an indication of 'optimized mixed diet' (Baerlocher & Laimbacher, 2001, p. 30-33, personal translation). Children of low social status differ on a scale of 0-42 with a mean of only 208 points, in comparison to children with a high status, who achieve an average of 24,3 points (Eta=0,23***).

Regarding the overweight and obese categories, children of low socio-economic status, as in other studies, are over-represented: 12,7% of children are obese, while the proportion of children from a high status only lie at 3,8% (see for instance Robert Koch-Institut, 2006, p. 29; Kolip, 2004). Parents' socio-economic status is, as expected, an influential factor with regard to their children's health-related behaviors and the prevalence of overweight. Children's migration backgrounds[12] (see also Brinkhoff & Gogol, 1996; Schmidt, 2006, p. 111f.) were also influential. It is thus important to include socio-economic status as well as migration backgrounds in multivariate analyses.

5.3 Level of context: 'living environment'

Regarding all three examined lifestyle dimensions and obesity, clear and highly significant differences for the different city sections were found (see figure 4).

Disadvantaged living areas differ significantly to non-disadvantaged areas. In summary, the following results were found in disadvantaged regions:

- *Much lower proportion of sport club memberships:* only 42 and 43% respectively are members of a sports club in contrast to 71 and 73% respectively in regions of a higher social status.
- *Less healthy diet:* only approximately 75% of children, for instance, arrived at school having regularly eaten breakfast; in higher status areas this was 89%. When using the 'index of dietary patterns' as an indicator for 'optimal mixed diet' (Baerlocher & Laimbacher, 2001, p. 30-33, personal translation), these children only achieve 20.7 points, whereas higher status regions achieve an average of 24.2. The consumption of sweets and fast food products is particularly high in disadvantaged regions.
- *A considerably higher proportion of children who consume a large amount of media:* The proportion of children who watch 3 hours television per day lies in peripheral large suburban housing estates at 23%, in contrast to 4% in individual housing areas. Similar results were found concerning computer games and play station use.
- *A considerably higher proportion of overweight and obese children:* In addition, the bivariate examination showed that an above average number of children of the two disadvantaged types of living environments are overweight or obese. This is even more striking in high-rise building areas, where 12.8% of children are overweight and 14.5% are obese (see figure 5).

These spatial disparities can be seen a consequence of socio-spatial segregation. That would mean that the pivotal parameter is the children's individual social origin. Over a disparate distribution of residents within the city (according to social status) these individual differences would then become noticeable at the aggregate level, in particular spatial differences. On the other hand, following the theory of living environment effects, 'space' as a contextual effect, would pose an additional influence. The prevalence of obesity of the poor in disadvantaged living environments may thus be augmented in comparison to the poor in other neighborhoods. This question will be analyzed in the following multivariate analyses.

The split analysis according to social status provides an initial clue to the relevance of living context: When only those children with parents from a low socio-economic status are considered, 13% of the children outside of large suburban housing estates are overweight and 8.7% are obese. Compared to the overall value, these values are only slightly above average. Within large suburban housing estates however, 19% of children of the same socio-cultural characteristics are overweight and 20.5% obese.

5.4 Multivariate analyses

As the bivariate analysis showed clear differences between the types of environments, the following examples illustrate how these effects are dependent on contextual effects. Similarly, the categories 'overweight and obesity', 'media consumption', 'dietary habits' and 'sport club membership' will be used.

5.5 Overweight and obesity

With regard to being overweight and obese, we can see that, as in the previous analyses, those children from peripheral large suburban housing estates differ significantly from the children living in other types of environments. In the second model, where parents' gender, socio-economic status and migration backgrounds are controlled for, the influence of the type of environment is somewhat smaller, but still consistent (table 1). The above average proportion of overweight children in high-rise building estates can thus only be transferred partially through the general population structure. Analyses in a third model (no table), where dietary patterns and sport club membership is added, show that these trends remain similar. The explanatory results of the models are comparatively low.

5.6 Media consumption

With regard to media consumption, the children of the disadvantaged types of living environments prove to be above average. As above, the children from 'peripheral large suburban housing estates' also consume more media than those from close to inner-city 'old workers residential areas'.

The proportion of those children, who consume an average 3 and more hours of television per day is, at 20.8%, considerably higher than those in higher-status regions, where only 7.4% of children do the same. If the analyses only focus on the children of low socio-economic status, then these values are even higher – over 26% compared to 15% in the high status areas.

There are also clear differences between living areas for computer game and play station use (without table). Here, the number of children who spend 3 and more hours per day consuming media is three times as high in disadvantaged areas as in both high-status regions.

The multivariate analyses (here: television consumption) show a similar picture (table 2): controlling for parents' gender, social status and migration background, these differences remain the same. This picture can be seen in peripheral large suburban housing estates, as was previously discussed.

5.7 Dietary habits

Within the bivariate analyses, the children from 'inner-city individual housing suburbs' (index of dietary patterns = 26.1) differ considerably from the other, disadvantaged types (index of dietary patterns = both 21.6). Table 3 indicates that when parents' gender, socio-economic and migration background were controlled for, the category 'inner-city individual housing suburb', appears as the greatest influence at the context level. With regard to dietary behavior, not only negative effects were found in the disadvantaged living areas, but also positive effects in the privileged living areas.

5.8 Sport club memberships

When only those children with parents of low socio-economic status are analyzed, only 28.4% are members of a sports club in disadvantaged regions. In the other areas, it is 35.3%. For the binary variable 'sport club membership', a logistical regression was performed. A positive correlation (concerning the reference category), a $e^B > 1$ becomes apparent, a negative correlation in $e^B < 1$. As quality criterion, Nagelkerkes' model (Pseude-) R^2 was used.

Table 4 shows that as well as gender, the social status of parents does, as predicted, greatly influence whether an individual becomes a member of a sports club or not. Even when controlling for parents' social status, the opportunities in the disadvantaged areas is considerably lower (0.66 and. 0.62). That is, a contextual effect of the regions might be at work. In the higher-status regions, on the other hand, chances are not higher, even after controlling for parents' socio-economic status (in contrast, these are almost 1). That is, a selection effect is noticeable, in the sense that the level of participation is directly transferred through the higher social structure. The levels of physical activity of parents analyzed in an additional model (without table) appeared to have minimal influence. Models, which represent informal, non-sports club-related physical activity behavior, generated similar relations, although with a low of R^2=0,05***.

6. Conclusion and forecast

On the one hand, the central results of this study confirm existing sport scientific findings (see for instance Schmidt, 2008). On the other, they extend the knowledge regarding socio-spatial contextual effects on the health behavior of the examined 10-year old children in the city of Cologne. As expected, parents' social status was influential on all health-related behaviors. The extension of the socio-spatial inequalities perspective points to the fact that several residential areas had an above average amount of children leading unhealthy and passive lifestyles. This was particularly evident in peripheral large suburban housing estates of the city of Cologne, even when individuals' social origins were controlled for. In disadvantaged housing regions, it can be assumed that additional regional effects negatively influence behaviors related to physical activity, diet and media consumption, as well as the prevalence of obesity. Put differently: Life in disadvantaged residential areas may count as an additional risk effect and can lead to unhealthy lifestyles.

The findings of the present study suggest that for a health-political approach to be successful, targeting individual behavior as a general starting-point for increasing physical activity and improving health is not sufficient. Rather, the circumstances must increasingly become foci. This research has made a theoretical distinction between life expectations or chances and lifestyle. Politicians and sports providers must ensure that policies shape individuals' life chances in such a way that healthy and active lifestyles can be achieved. When it

concerns physical activity, play, and sport 'the point is to change individual physical activity behavior through a change in the circumstances and opportunities' (Riepl & Blum, 2008, p. 137, personal translation).

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Table 1. BMI-groups (multiple regression)

	Model 1				Model 2			
	B	**ß**	**p**		**B**	**ß**	**p**	
Type of city district								
Reference: others								
Old workers' suburbs	-,006	-,004	,936	n.s.	-,078	-,046	,316	n.s.
Peripheral large suburban housing estates	,243	,144	,001	***	,177	,105	,021	*
Close to inner-city individual housing estates	-,156	-,071	,083	+	-,080	-,036	,376	n.s.
Peripheral individual housing estates	-,112	-,071	,128	n.s.	-,057	-,036	,435	n.s.
Gender					,112	,079	,015	*
Reference: girls								
Socio-economic: parents' status					-,047	-,105	,004	**
Migration backgrounds					,145	,102	,005	**
	$R^2 = 0{,}039$***				$R^2 = 0{,}066$***			

n.s.: not significant; +: p ≤ ,10; *: p≤ ,05; **: p≤ ,01; ***: p≤ ,001

Table 2. Media consumption (television use) in hours per week (multiple regression)

	Model 1				Model 2			
	B	**ß**	**p**		**B**	**ß**	**p**	
Type of city district								
Reference: others								
Old workers' suburbs	3,216	,144	,000	***	2,071	,093	,019	*
Peripheral large suburban housing estates	4,227	,191	,000	***	3,200	,145	,000	***
Close to inner-city individual housing estates	-1,483	-,051	,151	n.s.	-,286	-,010	,780	n.s.
Peripheral individual housing estates	-,103	-,005	,903	n.s.	,672	,032	,422	n.s.
Gender					2,171	,117	,000	***
Reference: girls								
Socio-economic: parents' status					-,950	-,162	,000	***
Migration backgrounds					1,462	,079	,012	*
	$R^2 = 0,052$***				$R^2 = 0,094$***			

n.s.: not significant; +: p ≤ ,10; *: p≤ ,05; **: ≤ ,01; ***: p≤ ,001

Table 3. Index of dietary patterns (multiple regression)

	Model 1				Model 2			
	B	**ß**	**p**		**B**	**ß**	**p**	
Type of city district								
Reference: others								
Old workers' suburbs	-1,352	-,096	,025	*	-,603	-,043	,311	n.s.
Peripheral large suburban housing estates	-1,403	-,101	,020	*	-,712	-,051	,227	n.s.
Close to inner-city individual housing estates	3,140	,172	,000	***	2,275	,125	,001	***
Peripheral individual housing estates	,065	,005	,911	n.s.	-,432	-,033	,446	n.s.
Gender					-2,364	-,202	,000	***
Reference: girls								
Socio-economic: parents' status					,633	,172	,000	***
Migration backgrounds					-1,021	-,087	,009	**
	$R^2 = 0,057$***				$R^2 = 0,130$***			

n.s.: not significant; +: p ≤ ,10; *: p≤ ,05; **: p≤ ,01; ***: p≤,001

Table 4. Sport club membership (logistical regression)

	Model 1				Model 2			
	ß	**e ß**	**p**		**ß**	**e ß**	**p**	
Type of city district								
Reference: others								
Old workers' suburbs	-, 804	,448	,000	***	-,410	,664	,055	+
Peripheral large suburban housing estates	-, 760	,468	,000	***	-,473	,623	,026	*
Close to inner-city individual housing estates	,620	1,858	,019	*	,123	1,131	,624	n.s.
Peripheral individual housing estates	,336	1,400	,097	+	,065	1,067	,758	n.s.
Gender	,630	1,878	,000	***	,585	1,796	,000	***
Reference: girls								
Socio-economic: parents' status					,459	1,583	,000	***
Migration backgrounds					-,242	,785	,090	+
	$R^2 = 0{,}120$***				$R^2 = 0{,}234$***			

n.s.: not significant; +: p ≤ ,10; *: p≤ ,05; **: p≤ ,01; ***: p≤ ,001

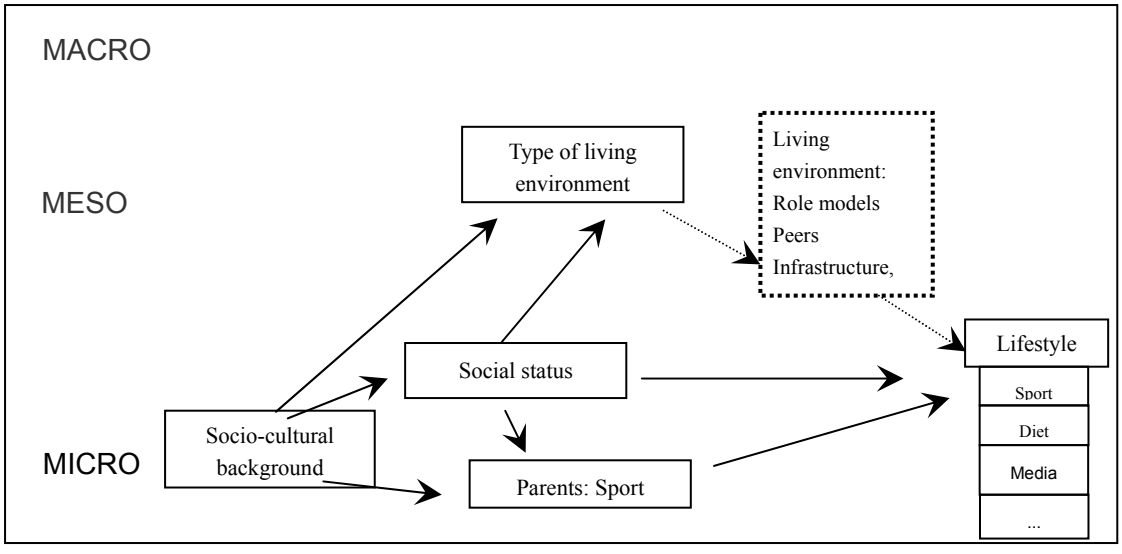

Figure 1. Contextual levels (personal illustration)

Figure 2. Distribution of schools in the city regions according to types of living environments (own depiction)

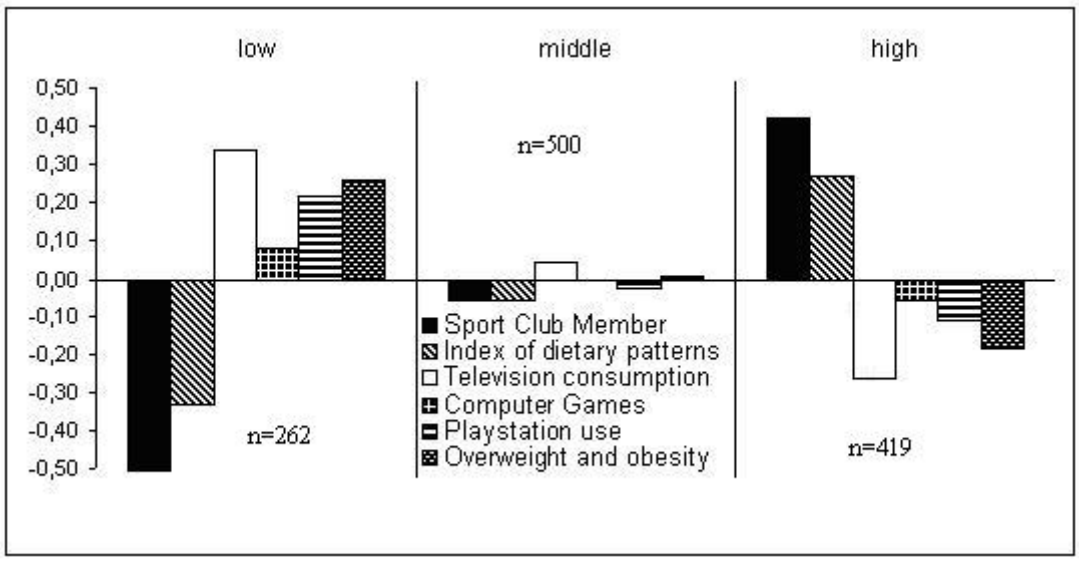

Figure 3. Lifestyle dimensions according to socio-economic status (z-values)

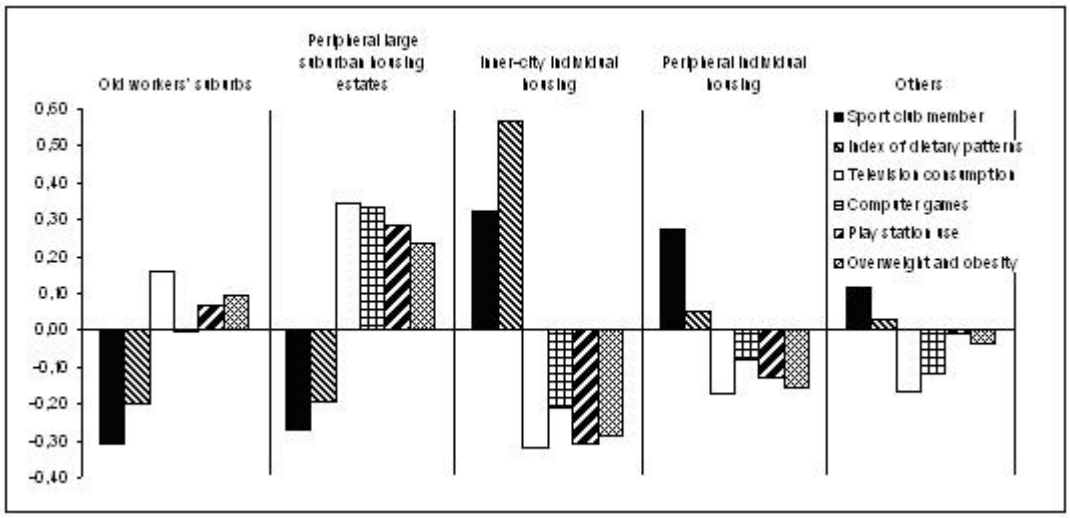

Figure 4. Lifestyle dimensions according to type of living environment (z-values)

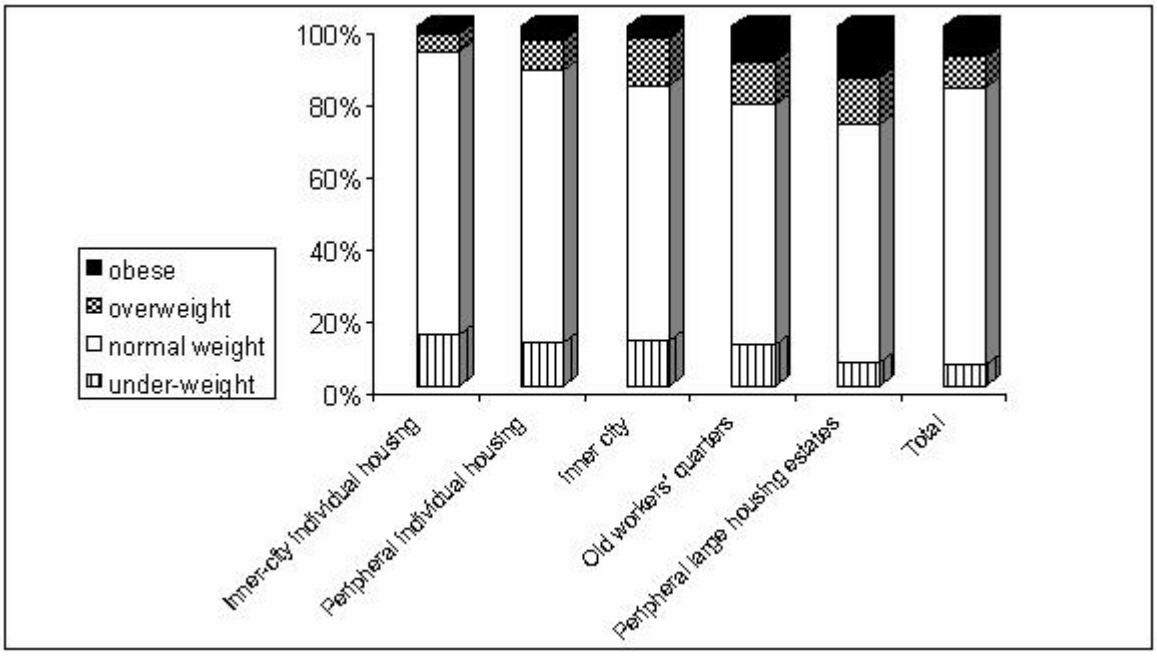

Figure 5. Overweight and obesity of 10-year old (n=1107)
according to types of living envi-ronments