Chapter 7

General discussion
INTRODUCTION

In this thesis, I aimed at analysing the EPODE approach at three levels in order to:

1. gain more insight into the implementation of the EPODE approach at the level of programmes;
2. explore, at the level of populations, the effects of EPODE-like programmes on improving behaviours and related determinants, especially in low socio-economic status groups;
3. assess, at the level of individuals, whether there is an association between parenting practices towards sugary beverages and the child’s water consumption.

The analyses were based on the four levels of action of the EPODE programme theory. These four levels, integrated into the EPODE logic model (Figure 1), are:

a. the central organisation (coordination at the regional or national level),
b. the local organisation (coordination at the municipal level),
c. the community (advocacy, capacity-building and setting of action) and
d. the child (child’s physical activity as well as dietary behaviour and BMI) [1, 2].

Three of the levels, namely central and local organisation and the community, were appraised, at the level of programmes (OPEN project). At the child level, energy-balance related behaviour change was assessed with a focus on low socio-economic status populations (EPHE project). In addition, at the level of the child, the association between parenting...
practices towards sugary beverages and the child’s water intake was also assessed.

Firstly, the main findings of the studies conducted for the purposes of this thesis are discussed, followed by reflection upon them. After that, the methodological strengths and weaknesses are presented. Finally, we discuss the research conducted in terms of its implications for future research, policy and practice.

**SUMMARY OF THE MAIN FINDINGS**

**EPODE at the level of programmes**

In chapter 2, we investigated whether it was possible to identify strengths and weaknesses of integrated community-based approaches (ICBAs, hereafter also referred to as 'programmes') targeting childhood obesity prevention, through systematic appraisal of these approaches. The systematic appraisal included specifically structured in-person interviews assessing elements of the EPODE pillars (OPEN tool) and an open-ended questionnaire, which assessed information related to the quality of the programmes in order to identify best practices (Good Practice Appraisal Tool or GPAT). Conducting a systematic appraisal through these tools enabled us to detect strong and weak elements related to the following components: political involvement and engagement; stakeholder involvement and public-private partnerships; implementation of interventions and campaigns; communication; scientific support, evaluation and dissemination. These components constitute key capacity-building factors for the implementation of ICBAs.

The assessed components and, accordingly, the programme’s strengths and weaknesses differed among all the ICBAs assessed, due to their variable context. Differences in context were noted even between
EPODE-like programmes, including some of the programmes which implemented the EPHE interventions. More specifically, differences were observed with regard to: i. the level of action (national, local, or both) and the actions themselves, ii. the number of settings in which the EPODE approach was implemented within a community (one setting VS multiple settings targeted), iii. the number of people targeted, iv. the number of communities involved and v. the level of these communities’ dependence on the central coordination in order to be able to run their actions. Most of these context elements (except for i., that is, the level of action) are related to the community level as integrated into the EPODE logic model (Figure 1).

Furthermore, in this thesis it was shown that the OPEN tool enabled identification of key information both on programme and intervention levels, compared to the GPAT which provided information regarding only the intervention level. In most cases the latter information set (from the GPAT) overlapped with or was complemented by the data yielded by the OPEN tool, which provided more detailed information. Nevertheless, it was shown that it is important to identify the strengths and weaknesses of the programme level in its specific context, in order to detect areas for improvement as regards the processes of the programme.
Figure 1. The EPODE logic model [2].
EPODE at the level of populations

The EPHE evaluation study included a 3-year longitudinal design (2013: pre-intervention; 2014: post-intervention; 2015: sustainability), as presented in chapter 3. In seven European countries, a medium-sized city (or municipality, in the case of big cities) with a wide range of socio-economic statuses was selected to recruit children in the age group of 6-8 years. Self-reported data, provided by the parents, was used for the assessment of four energy-balance related behaviours of children and associated family-environmental determinants (hereafter referred to as 'behaviours' and 'determinants'). The behaviours assessed were:

- fruit consumption
- vegetable consumption
- screen exposure (TV and PC separately)
- beverage consumption (water, fruit juices, soft drinks separately)
- sleep duration

Moreover, the determinants assessed were:

- parental facilitating (e.g. cutting up fruits for the child, serving vegetables during meals)
- parental allowance (e.g. allowing the child to eat fruit or to consume soft drinks whenever (s)he wants)
- parental monitoring (e.g. the time the child spends in screen activities, the amount of fruit juices consumed)
- child nagging (e.g. Watching TV anyway, when parent prohibits it)
- parental knowledge on recommendations regarding fruit and vegetable intake
- parents performing behaviour together with the child (e.g. playing console games, eating fruit)
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- parental demand (i.e. telling the child every day to consume fruit and vegetables)
- home availability (e.g. of vegetables, of soft drinks)
- parental encouragement (i.e. for consuming fruit and vegetables)
- negotiating with child (e.g. about the allowed time to spend on screen activities, the amount of fruit juices allowed to drink)
- parental self-efficacy (i.e. ease to retain the prohibition rules when child starts negotiating)
- rewarding and/or comforting (e.g. rewarding the child by offering soft drinks)
- communicating health belief (e.g. telling the child that soft drinks are not good for him/her)
- avoiding negative modelling (e.g. not watching TV when the child is present)

In chapter 4, the identified differences in behaviours and determinants (inequality gaps), between low and high socio-economic status groups per community site, are illustrated. We observed differences in favour of the high socio-economic status groups in fruit, vegetable and sugary beverages consumption as well as screen time, especially television viewing. Similarly, home availability and parenting practices favouring unhealthier lifestyle habits were more prevalent in the low than in the high socio-economic status groups, in most cases of all samples. However, though statistically significant, these differences in behaviours and determinants varied among the seven samples and they were rather small. These inequality gaps were recommended as targets for reducing the corresponding socio-economic differences.
Consequently, chapter 5 presents the changes in the inequality gaps (as identified at baseline), presented in chapter 4, after interventions aiming to reduce them. The results indicated improvement of three behaviours among the low, whereas none among the high, socio-economic status groups. These behavioural improvements were the increase of fruit consumption (JOGG, The Netherlands), the decrease in the amount of fruit juices consumed (SETS, Romania) and the decrease of TV time on weekdays (VIASANO, Belgium). The increased values, signifying the improved behaviours, were similar or changed towards the ones of the subjects of the corresponding high socio-economic status groups. Similar improvements within the low socio-economic status groups, and less within the high ones, were observed in parenting rules and practices related to soft drinks and/or fruit juices as well as TV exposure in almost all EPHE sites. However, only one of the decreased differences was sustained a year after the interventions, namely the half hour decrease of TV time on weekdays, in the Belgian low socio-economic status group.

**EPODE at the level of individuals**

The third research question of this thesis was whether there is an association between parenting practices towards fruit juices as well as soft drinks and the children’s water consumption. As demonstrated in chapter 6, the parenting practices towards soft drinks (for example, absence of strict rules and inadequate parenting practices) were strongly associated with a decreased frequency of the children’s water intake. The respective associations between parenting practices towards fruit juices and water consumption were fewer and weaker. Moreover, an inverse association between consumption of soft drinks – and not of fruit juices – and consumption of water was observed. Interestingly, the socio-economic status did not influence the aforementioned associations.
REFLECTION ON THE MAIN FINDINGS

In line with the aim of this thesis, three main themes were distinguished: i) at the level of programmes, the systematic assessment of ICBAs, ii) at the level of populations, the assessment of the EPODE effectiveness in reducing differences in behaviours and determinants among low and high socio-economic status groups and iii) at the level of individuals, the influence of parenting practices towards sugary beverages on children’s water consumption.

Analysis at the level of programmes: Assessment of ICBAs for preventing childhood obesity

In this thesis, we showed that it is possible to detect, through the use of a systematic appraisal, strong and weak elements of key components of ICBAs aimed at preventing childhood obesity. The following capacity-building factors and their specific elements were considered as key components: a) engagement and contribution of political and community stakeholders; b) creation of public-private partnerships; c) design, development and implementation of interventions; d) communication techniques to disseminate the health-promoting message; e) scientific support, monitoring and evaluation of the interventions and the programme itself; f) barriers and facilitating factors regarding the achievement of all the aforementioned. The monitoring of these key elements, through the use of the appraisal tools, combined with the subsequent reflection on the processes (weak and strong elements) can support further improvement of the ICBAs.

The components and elements appraised in our study are consistent with the international literature as regards tackling childhood obesity, where
the importance of “governmental commitment and leadership, long-term investment and engagement of the whole of society” has also been highlighted [3]. In addition, innovative techniques, such as social marketing, are increasingly used in obesity prevention efforts to trigger voluntary behavioural change [4-6]. Moreover, monitoring and evaluation of each step taken during the planning, design and implementation phases of a programme are well-known crucial factors. They particularly answer questions as to what has worked and what has not – and why – during the realisation of the programme [2, 7, 8]. To our knowledge, this is the first study that has carried out a systematic appraisal of elements embedded in key aspects of obesity prevention approaches.

Furthermore, it was shown that the assessed capacity-building factors differed from programme to programme, resulting in differences related to the community contexts, or the community level, as illustrated in the EPODE levels of action (figure 1). However, as depicted in figure 1, the EPODE levels of action are dynamically connected and the input of the previous levels is crucial for the subsequent ones. These findings are in line with the ones of Van Koperen et al. (2013) [2], and confirm that each level should be seen in relation to the previous ones. Interestingly, we found that this dynamic relationship among the processes of the programme applies also to other complex approaches.

Moreover, the specificities of the varying contexts of the programmes were detected, through the use of the OPEN tool. Insight into the context of programmes is essential for the right interpretation of the results concerning the key components. The OPEN tool is more flexible than the GPAT as regards acquiring detailed information on processes and on
contextual factors that influence the implementation of ICBA. Also, the OPEN tool has more flexible appraisal criteria than the GPAT, which are more sensitive to the diversity of the various ICBAs. More specifically, with regard to the GPAT tool, binary rating (i.e. a choice between 'yes' and 'no or not specified') does not give room to adapt the appraisal to the context situation in order to achieve a more comprehensive assessment. For example, the item 15 (of the GPAT) assesses whether “possible adverse effects of the intervention were considered and minimised” and the ratings possible are “yes” or “no or not specified”. The appraisal options provided do not distinguish between cases of minimising adverse effects in all interventions or in some interventions of the programme and, additionally, the significance of the effects considered cannot be assessed, because such significance cannot be expressed through plain “yes” or “no” answers. Moreover, many appraisal criteria (of the GPAT tool) have not been clearly specified, making it difficult to appraise the respective information through the binary scale. In contrast, the OPEN tool appraisal rating scales were further enriched during the analysis, resulting in a framework responding to the programmes' variability. Thus, the tool integrated more contextual information and allowed a more tailored appraisal. This does not imply necessarily that all other ICBAs can be appraised by adopting the same rating scales, but these scales may be adapted to suit different approaches. This first appraisal of EPODE-like programmes’ implementation processes, next to other ICBAs, was facilitated mainly by the OPEN tool. However, correcting the shortcomings of the GPAT would turn it into a useful tool providing an overview of an ICBA, to function as a preliminary assessment, prior to the main, in-depth assessment of the
formation and implementation of the different programme components within the specific context.

**Analysis at the level of populations: Effectiveness of EPODE approach to reduce differences in behaviours and determinants between low and high socio-economic groups**

*The design of the EPHE evaluation study*

The EPHE evaluation study used data acquired from populations of seven different European countries to assess the outcomes of the EPHE selected community-based programmes aiming at reducing differences in behaviours and determinants among low and high socio-economic status groups. The rationale was that by targeting the determinants of unhealthy behaviour in the low socio-economic status populations these health behaviours would improve as well – particularly in the groups with low socio-economic status – and, consequently, the inequality gaps related to behaviours would decrease. To assess the potential changes in behaviours and determinants and their sustainability, a prospective design was adopted, including a) baseline, b) post-interventional measurements (one year later) and c) sustainability measurements (after one more year).

The EPHE evaluation study aimed to explore inequalities in risky lifestyle behaviours and related determinants and to evaluate potential effects of the EPHE interventions on the inequalities identified, in line with recommendations of widely accepted protocols for developing theory-based as well as evidence-based health promotion programmes [9, 10]. The evaluation was carried out using a pre-post intervention design, as this is considered to be a suitable alternative to the “gold standard” design of the randomised control trials (RCTs), when evaluating
population-based interventions [11]. Besides, RCTs are considered unsuitable for evaluating community-based interventions in real-life settings, actually making such a task impossible because of: the numerous unintentional environmental and/or contextual influences (e.g. economic or political); the high potential for contamination between control and intervention groups; the high likelihood of multiple coexisting health issues; the complex nature of causality in lifestyle behaviours; the number of interventions implemented and their complex pathways in influencing behaviour [8, 11-15]. The EPHE evaluation study is the first one designed to provide evidence of the EPODE approach on behavioural change specifically targeting the socio-economic context, as previous studies evaluated the EPODE approach only in terms of overweight [16, 17].

*Socio-economic differences in behaviours and determinants between high and low socio-economic status groups: baseline, decrease and sustainability.*

The baseline results from the EPHE sites showed that children with mothers of relatively high socio-economic status consumed fruits and/or vegetables more frequently than their peers whose mothers were of relatively low socio-economic status. The latter group of children had a higher intake of fruit juices and/or soft drinks and higher screen time as well. In line with our findings, several European studies have demonstrated that children of lower socio-economic status have unhealthier dietary habits and exhibit increased sedentary behaviour compared to their high socio-economic status peers [18-26].

In addition, differences in determinants of health behaviour were observed between the two socio-economic groups in our study, in all
EPHE sites. Specifically, parents from the low socio-economic status groups were more likely to adopt inadequate parenting practices, characterised by absence of strict rules and favouring unhealthy lifestyles, such as allowing the children to frequently watch TV as well as increased availability of soft drinks at home. Interestingly, there is little evidence available with regard to socio-economic differences in family-environmental determinants of lifestyle behaviours. Parenting rules and practices, such as lack of restrictions on TV watching and consumption of soft drinks as well as presence of screens in the child’s bedroom and increased availability of soft drinks at home, have been statistically associated with high screen time and high intake of sugary drinks [22, 25].

Moreover, Van Ansem et al. (2014) found that high home availability and high parental consumption of sugary beverages mediated the association between maternal education level and the child’s consumption of sugary beverages [26]. Holubicikova et al. (2016) also reported a positive association between the absence of eating-related parental rules and low educational level of parents [27]. This body of evidence, in combination with our results, suggests that targeting parenting rules and practices might help us to achieve positive behavioural change in children. Nevertheless, reaching parents – especially of lower socio-economic statuses – is a challenge.

The post-intervention measurements showed some improvements in behaviours and determinants, mostly in the low socio-economic status groups. The EPHE operational board was instructed (by the EPHE scientific board) to design interventions tailored to respond to the baseline differences between the low and high socio-economic status groups, and to especially focus on the determinants. However, given that the time-frame was limited, tailoring the interventions by taking into
account all the identified determinants was not feasible. The interventions were rather focused on promoting the healthy behaviours through activities directed to the children and only a small number of programmes included some activities for the parents or the whole family. The interventional activities were open to all children, without regard to their socio-economic status, over the course of a school year. The majority of the evidence, concerning effective strategies aiming to reduce inequalities in childhood obesity, points to either universal interventions, lasting more than 6 months and combining diet and physical activity knowledge with related activities [28], or targeted interventions, focusing on the low socio-economic status populations, which are strategically designed and implemented [29]. Positive behavioural changes – such as increase of physical activity as well as fruit and vegetable intake and decrease of screen time and intake of sugary beverages – have been reported by intervention studies targeted at low socio-economic status populations and by one universal study only [28]. The EPHE interventions were strategically designed to target the low socioeconomic status populations (selective prevention). However, they were open, so all the children could participate regardless of their socioeconomic status. Understanding which types of interventions targeted on the whole population are likely to successfully reach the low socio-economic status groups is of great importance. The reason is the commonly observed preferential uptake of interventions by the most advantaged groups, known as intervention-generated inequality [30-37]. According to our results, it seems to be possible, through universal interventions, to reach the disadvantaged groups, and to improve and even sustain improvements of their lifestyle behaviours and parenting practices. This may support our finding regarding the sustained decrease
in TV time on weekdays (Belgium), which may accordingly be associated with the sustained increase in monitoring the child's exposure on TV. However, more intensive and longer-term interventions are likely to be more effective.

**Analysis at the level of individuals: Associations between parenting practices towards sugary beverages and the child's water intake**

The analysis of the EPHE (baseline) data with respect to the individual level showed that inefficient parenting practices and absence of strict rules regarding the consumption of sugary beverages were strongly associated with a decreased frequency water consumption of the child. Furthermore, these associations were not influenced by parental education, a finding which contradicts results of other studies in which similar outcomes were assessed [22, 38-40]. Additionally, parenting practices towards sugary beverages have been consistently associated with the child's corresponding consumption. In particular, increased home availability, drinking sugary beverages together with the child, difficulty in limiting the child’s consumption, and negative parental modelling were found to be associated with increased consumption on the part of the child [22, 26, 38, 39]. In contrast, more strict food rules – as well as discouraging and not allowing the child to consume sugary beverages – were associated with lower consumption of sugary drinks [38, 40].

Furthermore, the influence of parenting practices towards fruit juices on children's water consumption was smaller than the one exerted by parenting practices towards soft drinks. Also, fruit juices were consumed more frequently than soft drinks. The difference between consumption patterns regarding the two types of drinks may demonstrate the
perception according to which fruit juices and/or drinks are healthier beverages compared to soft drinks, whereas, in fact, even 100% fruit juices should be consumed in moderation due to their high content in natural sugars [41, 42].

**METHODOLOGICAL CONSIDERATIONS**

**Strengths**

This thesis presented the results of the first analyses regarding the EPODE approach at the level of programmes (chapter 2). Specifically, six EPODE-like programmes were thoroughly assessed in an effort to gain insight into the central and local organisation and community inputs, processes, activities and influences. These three levels of assessment provided new knowledge about key elements of the EPODE pillars, as approached or implemented by EPODE-like programmes realised in six different European countries (Belgium, France, Greece, Portugal, Romania, The Netherlands). Two different methods and, accordingly, two different tools were used for the data collection, namely in-person interviews using a structured question list and a questionnaire. Conducting interviews enabled us to ask for clarifications and details, which shed light on the context of the programmes and the underlying processes. All interviews were held in private spaces within the workplace of the interviewees, allowing them to talk freely and, hence, improving the quality of the data. As a result, a rich dataset has been acquired, helpful in identifying areas for improvement of processes in order to implement the EPODE approach more effectively. Moreover, to facilitate the objective interpretation of the data, three researchers, separately and independently, appraised the information, on condition that, when
disagreements occurred, these had to be discussed until consensus was reached. Furthermore, the assessment tool (OPEN tool) used for the interviews was a topic list based on the EPODE logic model and developed by the research group of the study described in chapter 2. Interestingly, the OPEN tool successfully identified strengths and weaknesses of non-EPODE ICBA as well, thus providing evidence of its wider applicability, extending beyond the limits of EPODE-like programmes.

Another strength of this thesis relates to the EPHE evaluation study. This was the first study in which the effects of the EPODE approach were analysed in terms of behavioural outcomes. Other studies assessed the effectiveness by using the prevalence of obesity as an outcome [16, 17]. Apart from energy-balance related behaviours, we also explored determinants of these behaviours. The fact that these determinants were assessed with reference to the socio-economic status is another strength, as this has rarely been done before. Furthermore, the EPHE study demonstrated that inadequate parenting practices, associated with energy-balance related behaviours, were more prevalent in the low compared to the high socio-economic status groups from across a broad variety of European countries. The existing literature on these determinants is limited. Our study opened up an opportunity to look deeper into health inequalities, particularly in the European region where the socio-economic factors have been changing rapidly over the last years.

An additional strength of the EPHE evaluation study is that the assessment tool that measured behaviours and determinants was constructed using validated items in European populations, which yielded moderate to good intraclass correlation coefficient [43, 44]. It is
also worth mentioning the high baseline response rates and the moderate loss-to follow-up in almost all EPHE sites (average loss-to follow-up (%): $T_1 = 30\%$; $T_2 = 34\%$), illustrating the satisfactory commitment of most target groups.

Furthermore, this thesis includes a study concerning the association between parenting practices related to common sugary beverages and the daily frequency of children’s water intake. To the best of our knowledge, this is the first study to do this. The methodological difficulties regarding the accurate measurement of actual water intake are numerous – e.g., high potential for report and recall bias when certain recording methods are used as well as overestimation or underestimation of parent-reported data – and, thus, it is rarely assessed in children. Although, through the assessment of the children's habitual daily consumption of water, these difficulties were not overcome, we were able, however, to explore the aforementioned associations. Moreover, we assessed fruit juices and soft drinks separately and distinguished between parenting practices into the ones which influence fruit juices' and the ones that have an impact on soft drinks' consumption. This assessment enabled us to detect the differing consumption patterns of children and possibly different parental perceptions regarding the two kinds of drinks.

**Weaknesses**

The studies of this thesis have some limitations as well. At the level of the analysis of programmes, the qualitative information, which depended on the context to a great extent, was quantified into scores. This quantification proved to be inadequate as it led to loss of information and made it difficult for the evaluators to interpret the programmes'
processes without additional context information. Furthermore, the (OPEN) tool had not undergone pilot testing and, thus, certain shortcomings became evident after the data collection and analysis. Hence, improvements are necessary in order to include assessment of more programme elements, so as to enhance the data quality and to reduce the burdens associated with the research and response processes. Moreover, there is a selection bias in this study, given that not all European ICBAWs were included. However, we included programmes participating in the largest networks of integrated community-based approaches (EPODE International Network and IDEFICS) in Europe. In addition, recall bias, selection bias and socially desirable answers cannot be ruled out, as a result of the respondents' comprehension and judgement of the information retrieved from their memory and the subsequent selection of an answer [46].

At the level of populations, the EPHE evaluation study intended to be the evaluation of the EPHE interventions' effects, measuring the reduction of inequality gaps. However, the limited time-frame of the project constrained the scientific board from developing a more inclusive socio-economic indicator for more sensitive detection of absolute inequalities. Therefore, we used the educational level of the mother as a proxy for the socio-economic status. This may be a weakness of the study, as, most of the time, a combination of education, income and occupation is used, although the parental education level is considered to represent an adequate socio-economic indicator in public health nutrition research [47-49]. Furthermore, the pre-post intervention design did not incorporate a control group, a fact which might have undermined, to some extent, the validity of our results. Although we included a high socio-economic status group – against which we compared results – in
all the EPHE sites, this, however, cannot substitute a control group. Nevertheless, it is particularly difficult to include control groups in real-life settings, due to the high potential for unintended intervention effects (contamination), which are likely to occur during the recruitment and the measurement periods [8, 11-15].

Moreover, sampling bias is possible at the levels of analysis regarding the population and the individuals, because: 1. the programmes participating were selected on an EPODE or EPODE-like approach implementation basis; 2. it was a prerequisite for the participant city to already have a structure engaged in an EPODE programme; 3. the schools from which the samples were recruited were selected on the basis of accessibility and convenience criteria. Additionally, information bias, such as recall bias and socially desirable answers, might arise from the parent-reported data. Unfortunately, there is no 'gold standard' for measuring behaviours and determinants of children, and it is exceedingly difficult to use more elaborative methods, i.e. qualitative methods, in large-scale studies. Bias arising from the few constructed items (i.e. water intake frequency, water intake amount and determinants of water consumption) is also possible, since they were not validated, in contrast to the majority of the items included in the EPHE questionnaire. Finally, the EPHE design did not include any collection of information regarding the planning, design and implementation of the interventions per site. Although we are aware of the importance of process evaluation in attributing pre-post changes to the interventions delivered [2, 7, 15, 50, 51], we were obliged to focus on the effects, due to resource and time constraints. Thus, the EPHE results cannot be exclusively attributed to the respective interventions, also because causality was not analysed in this study.
RECCOMENDATIONS CONCERNING PUBLIC HEALTH RESEARCH

In this thesis, it was shown that differences in energy-balance related behaviours between low and high socio-economic status groups exist in various European communities (chapter 4). These differences can be addressed by EPODE-like programmes. However, further research is recommended on identifying absolute inequalities by using a country-specific socio-economic index, which will include multiple socio-economic indicators instead of mothers' educational level alone. In addition, the EPHE parental questionnaire is a frequency questionnaire mostly containing categorical (ordinal) data. These data posed difficulties in identifying and especially in reporting differences between the socio-economic status groups, since differences in spread were not “visible” in medians and quartile ranges. Therefore, we recommend that future studies use as many quantifiable variables as possible so as to be able to measure lifestyle behaviours. Furthermore, qualitative research would be more insightful, especially in identifying socio-economic differences regarding family-environmental determinants.

In addition, as discussed in chapter 5, process indicators are necessary for the interpretation of the observed effects of interventions. This is especially applicable to complex interventions or programmes implemented in the context of ICBAs, which incorporate more components than simple interventions. Process evaluations will determine the usefulness of the programme or intervention, in order for the goals to be reached, by answering questions as to who was involved, what and when has been done and how many of the intended activities and outputs were, respectively, implemented and achieved. Answers to
these questions enable reflection upon the methods used and they
determine whether the programme or intervention should continue,
expand, adapt or cease. A process evaluation is particularly
recommended for the programmes using the EPODE approach,
considering that insights in processes of such programmes are scarce, as
also seen in the study presented in chapter 2 (results not discussed). For
that reason, we recommend that evaluation studies of complex
interventions and/or programmes integrate process evaluations into
their evaluation plans. Moreover, as each of the EPODE pillars requires
different capacity-building factors, programmes using the EPODE
approach should integrate four different process evaluations, one for
each pillar. It should be noted that these recommendations are relevant
to practice as well, as programme evaluation is meant to “improve and
not to prove” [50].

Although one should be cautious in interpreting them, the EPHE results
indicate that interventions aimed at reducing inequalities in lifestyle
behaviours of children might include targeting parenting practices and
should be long-term as well. There were no common patterns observed
among the different communities, regarding differences in parenting
practices between low and high socio-economic status groups. Hence,
we recommend that the relation between parenting practices and their
influence on the child’s behaviour be assessed in terms of the specific
target population of the community, prior to deciding which of the
parental behaviours and practices will be addressed by the interventions.
Qualitative research, through participatory methods or by carrying out
needs assessment, would provide additional insights to such an
assessment.
Additionally, more research in order to better understand the targeted parents and/or children, socio-economically disadvantaged or not, can yield further insight about obstacles regarding their reach, engagement and behavioural change. In chapter 5, we observed higher drop-out rates among the low socio-economic status groups, in both measurement periods. Besides that, the study presented in chapter 2 revealed that the vast majority of the assessed programmes had not conducted any target group analysis (results not discussed). Recently collected data from those programmes (not presented in this thesis) showed that the use of target group analysis led to increased engagement of the corresponding groups. A target group analysis provides insights into the needs, wishes, strengths and talents of the target group. When these elements are taken into consideration, the chances to reach, engage and achieve behavioural change of the groups in question are increased and thus a target group analysis is highly recommended.

Moreover, the results presented in chapter 6 indicate that parenting practices towards sugary drinks should be targeted irrespective of socio-economic status. To prove this, however, experimental studies are needed.

**IMPLICATIONS FOR PUBLIC HEALTH POLICY AND PRACTICE**

Obesity is a complex issue and, therefore, requires integrated approaches. ICBAs, such as EPODE, seem promising as regards to preventing childhood obesity and decreasing related socio-economic inequalities. The reason is that engagement of the whole society is needed in order to deal with upstream environmental and behavioural drivers of the obesity epidemic [52-56]. Therefore, collaboration among community stakeholders is necessary, ranging from the local, regional
and national governments (e.g. municipal services, education) as well as the non-governmental and non-for-profit organisations and associations (e.g. sports associations, hospitals) to the private sector (especially, food-related retailers and companies). The qualitative data from the research, presented in chapter 2, showed that such collaboration was often missing due to conflicts of interests among the community stakeholders (results not discussed). Engagement and contributions at the political level were usually moderate, the backing of non-governmental and/or non-for-profit organisations and associations was often limited to moral support and private partnerships were restricted to monetary funding. Thus, fostering strong political commitment by stirring advocacy for the obesity-related issues and engaging all the municipal sectors in health-related policies is greatly needed. Furthermore, the integration of activities, material resources and the expertise of non-governmental and/or non-for-profit organisations as well as the exchange of experience on practices reaching and motivating the target group(s) would strengthen the implementation of the prevention activities all over the community. Moreover, collaboration with private partners is important not only because of its potential to increase a programme's capacities through funding; but especially for gaining more insight into the target group and possibilities to influence their behaviours and, most importantly, for changing the environment. Granted that the involvement of the private sector in ICBAs is criticized by many academics, public health professionals and the general public, the transparency of such agreements is of crucial importance as regards ensuring the integrity of the programmes.

Taking into account that few effects were sustained a year after the EPHE interventions (chapter 5), another issue to consider in public health
practice is how we can attain sustainable effects. One way to do this is to engage the stakeholders and the target population on the interventions and/or programmes in ways that develop a genuine sense of ownership. This can be attained through the involvement of these groups in the planning, design and implementation phases of the integrated approach in a way that their needs and wishes are met, making good use of their strengths and talents. Target group analysis is a method that can play a key role in achieving a strong engagement, which is likely to lead to sustainable effects.

The future of an ICBA depends crucially on its effects. Considering that, in most cases, these can be clearly distinguished in the long run, it does not seem prudent to measure effects only in terms of the post-programme outcomes. It is therefore vital to systematically monitor and evaluate a programme’s processes and gradual effects, which are equally important in order that decisions are made regarding the future of the programme. Systematic programme evaluation can lead to the improvement of the programme’s quality and outcomes, through frequent assessments, monitoring and surveillance. Given the practical barriers (e.g. budget, time, personnel etc.), such systematic evaluation approach is very often not followed. Therefore, before all else, policy makers should demand and facilitate the means for systematic evaluations. In addition to this, it is equally important that policy makers advocate and/or provide the required resources and guidance for such comprehensive evaluation approaches.

CONCLUSIONS

The EPODE analysis at the level of programmes yielded useful information that can lead to further improvement of each specific
programme that was assessed. The analysis at the level of populations showed that the EPODE approach might be particularly successful in reaching populations of relatively low socio-economic status and subsequently reducing social inequalities in health-related behaviours. The analysis at the level of individuals illustrated the importance of parenting rules and practices regarding the children's behaviour. Thus, identifying family-environmental determinants of risk behaviours is important in order to better understand the mechanisms that shape such behaviours in the target population.

ICBAs seem to be suitable for the prevention of the obesity epidemic. EPODE is one of these promising approaches, although there is a clear need to optimise its implementation so as to respond to the local context. Adapting the EPODE approach according to each country's and community's specific contexts is a great challenge. The EPODE-like programmes run into numerous difficulties regarding: a. fostering political engagement and advocacy; b. establishing partnerships among and with stakeholders from various sectors; c. implementing interventions in multiple settings and performing target group analyses; d. carrying out thorough evaluations of their interventions and the programme itself. Thus, we still need to learn a lot about the best way to adapt the approach according to the local level. First, the difficulties encountered should be dealt with through a circular process of monitoring, reflecting and improving the methods used. Secondly, multi-stakeholder engagement and collaboration should be fostered in order to both create sustainable synergies in the community and more effectively trigger environmental change. Thirdly, the target groups should be involved in a way that develops a sense of ownership, in order for more sustainable effects to be achieved. This is particularly important
for the hard-to-reach populations, namely those with a low socio-economic background. These three elements seem to increase the chances to tackle not only childhood overweight and obesity, but also the related socio-economic inequalities.
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General Discussion