Promoting physical activity in socially vulnerable groups

A mixed method evaluation in multiple community-based physical activity programs

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CHAPTER 1

Introduction
Setting the scene for evaluating community-based physical activity programs

Marion Herens

Introduction

Wealthy and well-educated people tend to live longer and healthier lives than less advantaged people. Over the past twenty-odd years, a vast body of literature has highlighted the scale, persistency, and severity of inequalities in health. Evidence shows that people with access to more (economic and social) resources are more likely to have better health outcomes than those with fewer resources. These socioeconomic inequalities in health, or health inequities, have been observed in various forms in many societies. They occur across a wide range of causes of death and types of illness, have been observed since accurate statistics were first available, and seem to have been increasing [1, 2].

This chapter introduces a brief overview of the policy developments and strategies employed to address socioeconomic inequalities in health in the Netherlands. The particular strategy of using community-based interventions to tackle inequalities in physical activity is highlighted. Then, the challenges for evaluation are described, followed by the presentation of the main objectives, research questions, and overarching methodological issues in the study. The chapter ends with a general outline of this thesis.

Dutch policy relating to socioeconomic inequalities in health

The issue of socioeconomic inequalities in health was placed on the public health policy agenda in the Netherlands in the mid-1980s (Figure 1.1). Looking back in time, the policy framework defined in the WHO global strategy for Health for All [3] served as a starting point. Initially, the Dutch ministry of Health, Welfare and Sport focused on a systematic approach towards evidence-based policy development to reduce socioeconomic inequalities in health by initiating and supporting research and evaluation studies [4, 5].

From the mid-1990s to the early 2000s, the national strategy was geared towards covering a range of measures and interventions targeting socioeconomic disadvantages on the one hand, and measures and interventions targeting accessibility and quality of healthcare services on the other [4]. Elements of this national strategy were 1) the definition of quantitative and intermediate targets, 2) the development of a package of policies and interventions targeting socioeconomic disadvantages (i.e. reduce differences in education, occupation, and income level), 3) the reduction of effects of health on socioeconomic disadvantage (i.e. prevent poor health leading to low education and income levels), and 4) targeting factors mediating the effect of socioeconomic disadvantage on health, specifically by lifestyle, and living and working conditions, or improving the accessibility and quality of healthcare services.

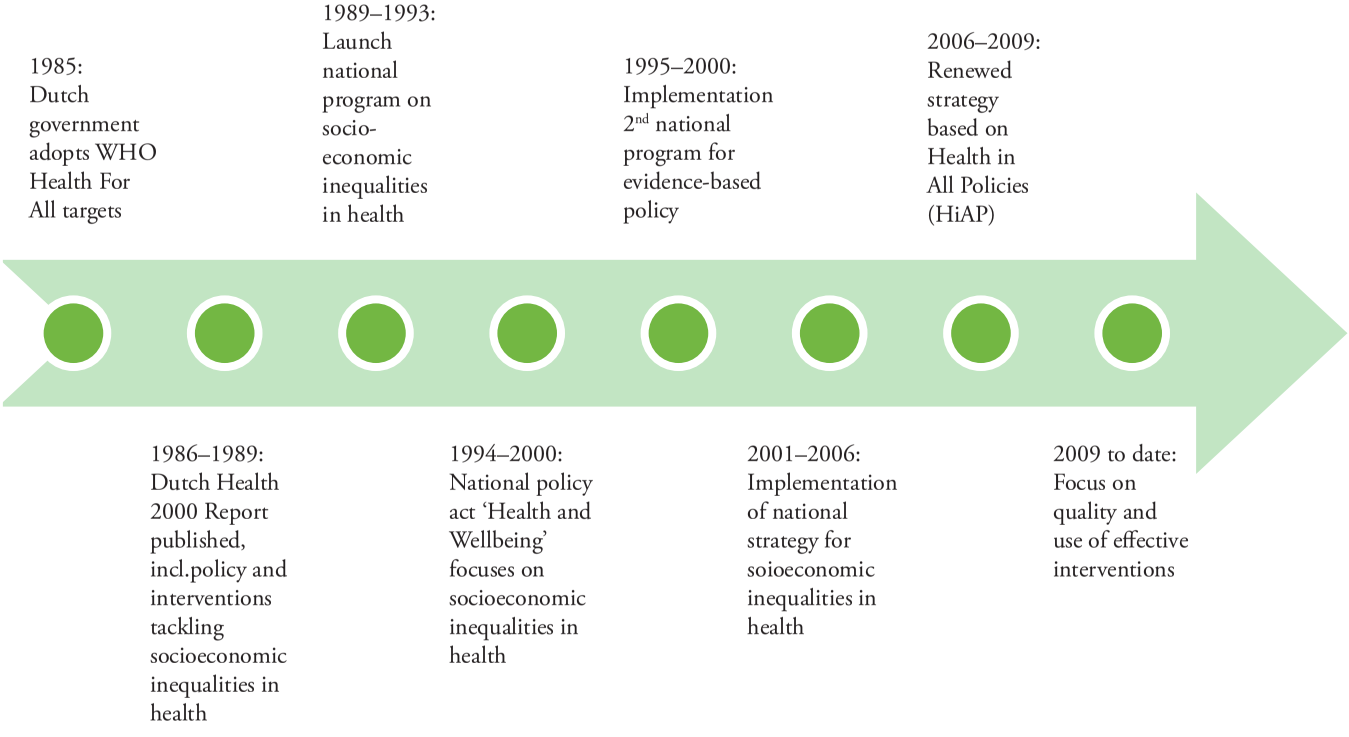

Figure 1.1 Summary of Dutch policy developments relating to socioeconomic health inequities since 1985. Based on [4-7].

Since the year 2006, the Health in All Policy (HiAP) strategy, in which policies from ministries inside and outside the public health domain are involved in public health problems, was advocated [6], because this was assumed to be more effective in addressing socioeconomic inequalities in health [8]. These inequalities have, however, shown to be persistent and seemingly unaffected by any Dutch policy measure [9]. On the one hand, the evidence-base on effective interventions to address inequalities in health demonstrates that effective interventions have been implemented on a larger scale in the Netherlands. On the other hand, at national level, little progress has been made in developing a comprehensive package of policy measures to reduce inequalities, mainly because political developments shape the contexts for policy and intervention developments [6]. To date, a formal HiAP strategy to address socioeconomic inequalities in health has not yet been established in the Netherlands [7], and it is an ongoing challenge to develop effective interventions to tackle this problem [2, 10].

Socioeconomic inequalities in physical activity behaviour

One of the more elaborated areas of the HiAP strategy focused on integrating sport and physical activity and health [11] through health-enhancing physical activity interventions. Physical inactivity seems to go hand in hand with socioeconomic inequalities in health. In fact, it is a major concern that the prevalence of physical inactivity differs across different societal strata. In the Netherlands, socially vulnerable groups, e.g., those with low socioeconomic status (SES) or of non-Dutch origin, are less engaged in sport and physical activity than high SES groups [12-14].

Today, physical inactivity is identified by the WHO as the fourth leading risk factor for global mortality [15, 16]. Health disorders associated with inactivity, including impaired health-related quality of life, as well as direct and indirect economic costs, impose a substantial burden on societies and health systems [17]. As part of a global action plan for the prevention and control of non-communicable diseases 2013–2020, the physical activity strategy of the World Health Organisation has set a global target to reduce the prevalence of physical inactivity by 10% by 2025 [18]. In the past years therefore, the Ministry of Health, Welfare, and Sport in the Netherlands initiated programs to promote physical activity in municipalities, with the aim of having better sports facilities in communities and more collaboration with primary healthcare [19, 20].

Community setting for reducing socioeconomic inequalities in physical activity

The indications are that, to effectively stimulate physical activity behaviour and promote physical activity equitably, multiple strategy interventions are needed [21]. Interventions across multiple levels include support for local governments to develop policies and practices for community-wide approaches, and neighbourhood designs that are conducive to physical activity. However, investment in early childhood interventions

and school programs, peer- or group-based programs, and targeted motivational, cognitive-behavioural, and/or mediated individual-level approaches are also needed [22]. Transforming settings – i.e. communities to make them more supportive of health-related behaviour such as (recreational) sport and physical activity – is described as an optimum way to improve population health and health equity [23].

Thus, the Dutch government's rationale for subsidising recreational or community-based sport and physical activity schemes at municipal level is based on the notion that participation in these programs supports the development of social capital and quality of life in a community by contributing to community bonding [24-27]. Additionally, it may improve the health and well-being of participants [21, 28]. The neighbourhood and communities are thus recognised as settings for health and physical activity promotion [19, 29].

Community-based interventions are also coherent with wider Dutch policy, which places societal participation high on the agenda. Municipalities are required to develop and implement local health policies [29, 30], and improve people's responsibility for their own health. The participation of all citizens in all facets of society is emphasised by the Social Support Act [31].

Need to invest in the evidence-base

Several developments call for a closer look at the evidence-base of community-based physical activity interventions. First, the many strategies that have been developed to increase physical activity levels [32-34] show relatively small to moderate effects [16, 21]. Most evidence for change in physical activity levels is built on correlational, cross-sectional studies at participant level, lacking insight into causal relationships and interaction patterns between factors influencing physical activity [16, 34]. Longitudinal designs including time-varying determinants of physical activity behaviour and maintenance are rare [35]. In addition, looking at the literature, a relatively small amount of evidence indicates that settings themselves are being changed in ways that address the social determinants of physical activity inequalities. Rather, many initiatives focus on individual behaviour change within settings [23].

Second, the increased policy support for community-based health-enhancing (physical activity) programs and the increased numbers of programs, people, and resources involved, create a further need for programs to be evaluated for impacts and (cost) effectiveness [23]. In the Netherlands, approximately €60m are spent on campaigns, research, and institutions to promote healthy and active lifestyles, and healthy social and physical environments [36, 37]. In 2010, (local) sports-related government expenditures were ca. €3.5bn, spent on exploitation costs, maintenance of sports facilities, and subsidy schemes enhancing sport and physical activity [38]. A substantial portion of each subsidy scheme is dedicated to enhancing physical activity behaviour in socially vulnerable groups, but, so far, information on their cost-effectiveness is lacking.

Third, encouraged by healthcare practices to underpin professional conduct with scientific research, a number of adjacent professional fields, among which the sport and physical activity sector, have been confronted since the 1990s with increasingly explicit demands for scientific assurance regarding the effects of their work. The debate on the relationship between research and practice in physical activity promotion follows the debates on evidence-based medicine in the healthcare domain and in social work, often carried out under the heading of evidence-based practice [39-41]. In the Netherlands, the Dutch Recognition system of the Centre for Healthy Living (CGL), put in place to promote quality assurance and control of lifestyle interventions, encourages scientific substantiation of the effectiveness, and feasibility of these interventions to support the delivery of evidence-based health and physical activity promotion locally [42]. Dutch reviews of interventions for physical activity promotion have shown, however, that only a few such interventions are evaluated as being (cost) effective [43].

The case of Communities on the Move

The main topic of this research is how to address and measure effectiveness of community-based health-enhancing physical activity (CBHEPA) interventions targeting socially vulnerable groups. We built our research on the case of Communities on the Move (CoM). Since 2003, the Netherlands Institute for Sports and Physical Activity (NISB)[1] has developed and disseminated, in line with national policy objectives, a community-based program enhancing physical activity in socially vulnerable groups: the Communities on the Move approach. CoM, described in detail in chapter two, is a multi-strategy intervention in which health promotion principles, like participation and collaboration, are applied at multiple levels. The aim of CoM is to enhance the physical activity levels of socially vulnerable and/or low SES groups, in order to contribute to individual participants' social participation, quality of life, and life satisfaction.

CoM targets socially vulnerable groups through a principle-based approach, enabling community-based physical activity interventions to be tailored to the needs and demands of such groups within specific local contexts. The objective is to identify, assess, and mobilise available resources for physical activity within the target groups and their communities. This requires a participatory approach in program development and implementation, involving different stakeholders – including the target population – in all stages of program planning, implementation, and evaluation [15, 44-46]. Since 2003, CoM has been carried out by a variety of user organisations covering 37 municipalities, reaching over 100 groups, each with around 15 participants.

In terms of its evidence-base, CoM qualifies as theoretically underpinned, according to the standards of the previously mentioned Dutch Recognition system, indicating that the intervention approach is grounded in accepted health promotion

1 As of January 2016, NISB operates under the name of Knowledge Centre for Sport Netherlands.

theories [42]. Its effectiveness and cost-effectiveness, however, have not been researched comprehensively. CoM uses health promotion principles that address changes at individual, program, and community level. Hence, CoM adopts an ecological perspective on human health [47, 48], supported by theories on social determinants for health [48-51], which emphasises the interaction between factors within and across different levels [52].

Research objective

This study aimed to gain more insight into the effectiveness of CBHEPA programs targeting socially vulnerable groups, by assessing the effectiveness and cost-effectiveness of the CoM case at different impact levels (individual, group, program, and community). Thus, this study aimed to contribute to the evidence-base of programs targeting socially vulnerable, low SES groups, and to generate recommendations for evaluation of physical activity promotion interventions targeting socioeconomic inequities in health and physical activity. In addition, our study aimed to contribute to a wider implementation of CoM through an action-oriented approach, taking into consideration the various perspectives of involved stakeholders.

Research questions

Through the development of a comprehensive evaluation approach, this thesis addressed the following key research questions[2]:

(1) At individual level, what effects can be documented with respect to physical activity behaviour, health, and perceived quality of life?

(2) At group and program level, what mechanisms explain the successes and failures of CoM for different socially vulnerable, low SES groups, and how can these be addressed?

(3) At individual, program, and community level, how can results be interpreted in terms of costs and benefits for CoM, and what combination of economic valuation methods and tools is most appropriate to evaluate a community program such as CoM on cost-effectiveness?

Methodological issues

Challenges for measurement and evaluation relate to the need to identify additional indicators alongside the individual level health-related outcomes usually measured. In the literature, some researchers highlight the need to include contextual and/or setting-specific indicators [53-57]. Others highlight the need clearly to identify and quantify policy targets in order to be able to monitor progress [6, 58]. Most authors, however, emphasise the need to use mixed approaches, combining process indicators (e.g., relating to intersectoral collaboration) with quantifiable outcome measures at multiple levels.

2 Due to changes in the research context, these initial research questions were adapted and supplemented, as discussed in depth in the Intermezzo (p. 49), and summarised in this chapter in Table 1.1 and Figure 1.2.

The study was built on a mixed methods design [59], using multiple cases [60]. Ongoing Dutch CBHEPA programs were involved between 2012 and 2014, summarised under the CoM denominator. At individual level, a sequential cohort design was used to acquire quantitative longitudinal data, gleaned from questionnaires, on developments in physical activity and health-related indicators [61]. At group and program levels, interviews and focus group techniques were used, to engage all stakeholders, and to enable linking the outcomes at the different impact levels over a period of time, adding contextual and time-related value to our findings. The overall evaluation design is presented in chapter two. The chapters on the empirical studies relating to the different research questions each elaborate in detail on the methods applied (Table 1.1). There are, however, some overarching issues regarding our methodological approaches.

Table 1.1 Chapters, methods, and data origin

Part	Chapter	Approach	Methods	Data origin
I Theoretical orientations	1. Introduction			
	2. Evaluation design for community-based physical activity programs for socially disadvantaged groups: Communities on the Move	Theoretical	Literature review Expert consolation	NISB CBHEPA program representatives
II Empirical findings	Intermezzo			
	3. Health-related quality of life, self-efficacy and enjoyment: keep the socially vulnerable physically active	Quantitative empirical	Repeated questionnaire -based measurements	Local CBHEPA groups
	4. Predictors of willingness to pay for physical activity of socially vulnerable groups in community-based programs	Quantitative empirical	Questionnaire -based measurements	Local CBHEPA groups
	5. Exploring participant appreciation of group-based principles for action in community-based physical activity programs for socially vulnerable groups in the Netherlands	Qualitative empirical	Literature review Focus groups	Local CBHEPA groups
	6. What factors influence physical activity maintenance in women of non-Western origin	Qualitative empirical	Literature review Interviews Focus groups	Local CBHEPA groups
	7. Contexts, mechanisms, and outcomes that matter in Dutch community-based physical activity programs targeting socially vulnerable groups	Qualitative empirical	Interviews Focus groups	Local CBHEPA program representatives
III Overall reflection	8. Integrated findings, discussion and conclusions			

Core concepts used

In the debate on socioeconomic inequalities in health and physical activity, different concepts are used. Therefore, it is useful to distinguish between the terms inequality and inequity. Whereas inequalities include differences in health outcomes that include those caused by natural biological variation, inequities relate to health differences that are socially produced. Health inequities relate to socioeconomic circumstances and social determinants of health, and therefore are considered unfair and avoidable [62, 63]. In this thesis, we focus on inequities, using the terminologies of socioeconomic inequalities in physical activity as well as physical activity inequities.

Similarly, in the debate on how to define the people affected by socioeconomic inequalities in health and physical activity, different terminologies are in use. Frequently, the term 'low SES' is used to refer to the indicators by which health and physical activity inequities are assessed. In the Netherlands, population-based health and physical activity inequities are assessed using educational level as primary indicator [64]. For the purpose of our study, we widened the definition of the intended target groups to socially disadvantaged or socially vulnerable groups, used synonymously, indicating that socioeconomic inequalities relate to a broader spectrum of indicators, such as income, living and health-related conditions, and ethnic or cultural background.

The concept of physical (in)activity also requires specification. Physical inactivity levels can be defined in relation to known population norms. Over the past years, many efforts have been made towards unifying measurements of physical activity outcomes in terms of time (behavioural) and intensity (physiological) [65-67]. In the Netherlands, the Dutch Healthy Physical Activity Guidelines (NNGB) are based on these international standards and have been in use as a standard for monitoring physical activity behaviour at population level since 1998. These guidelines set the norm for healthy daily physical activity for adults at a minimum of 30 minutes, and for children and adolescents at a minimum of 60 minutes of moderate activity at least five days a week [68]. Hence, in this study, we used behavioural physical activity outcomes, in compliance with population-wide data. Physical inactivity is defined as not meeting the NNGB. Because the norms for healthy physical activity behaviour differ between youth and adults, and physical activity behaviour is the prime outcome measure for assessing CoM effectiveness, we limited our study to adult participants only.

Finally, in the health promotion literature, community and community-based intervention are core concepts, but there is no agreement on what a community actually is [69]. The variation and the fuzziness of the community concept is an obstacle if one is aspiring to cumulative research [70]. In the literature, many definitions of community highlight the administrative, areal, and geographical characteristics of places in which people live. These usually find their way into (local) policy documents addressing neighbourhood targets. Other definitions of community highlight in addition non-geographical characteristics, reflecting a perspective on community which assumes that

people create communities with the expectation of realising some important well-being goals [70]. In this thesis, we used the following definition of community: 'A group of people who identify themselves by their group membership, sharing a common interest, common social institutions and common social control components' [69].

Monitoring real-world interventions

Evaluation of principle-based CBHEPA programs, geared towards reducing socioeconomic inequalities in physical activity, requires monitoring of real-world interventions [71]. It is acknowledged that the 'golden standard' for impact assessment, i.e. a randomised controlled trial, is not suitable for these kinds of studies [71-73]. Monitoring real-world interventions imposes challenges for evaluation because traditional scientific research criteria, such as the objectivity of the inquirer, attempting to minimise bias, data validity, systematic rigour of fieldwork procedures, and generalisability (external validity), are not simple to apply. In order to generate an evidence-base of what works and why, the different perspectives of all stakeholders involved have to be taken into consideration, using participatory, responsive, and action-oriented research techniques [74-76].

In order to reach socially vulnerable groups, we applied a personalised approach [77], using gatekeepers, such as the exercise trainers, to approach participants. We used constructivist evaluation criteria in developing our methods for quantitative as well as qualitative data collection, such as acknowledging subjectivity, capturing and respecting multiple perspectives, doing justice to the integrity of unique cases, contributing to deepening understanding and dialogue, and engaging socially vulnerable groups respectfully and collaboratively [78].

On the basis of the criteria explained above, an iterative approach was adopted. To get and keep stakeholders involved at the different levels, consultation rounds were organised prior to and during data collection. Indicators and measurement techniques were explored together with practice for each research question, in order to meet the criteria of involving the target group and stakeholders, supporting interaction, and enabling feedback to support learning experiences. Each time, scientific and practice-based evidence were combined to develop the techniques for measurement. Outcomes of the different studies were fed back into practice in interactive sessions throughout the study period.

All parts of the study were conducted in accordance with the general ethical guidelines for behavioural and social research in the Netherlands [79]. All respondents entered into the research voluntarily. They were provided with information about the purpose and contents of the study, and guarantees of confidentiality and anonymity were given prior to each interview and evaluation session. Moreover, respondents were able to withdraw from the study at any time for any reason.

General outline of the thesis

This thesis describes the evaluation pathway of a CBHEPA program from design to outcomes. Figure 1.2 summarises the connection between the chapters representing the different perspectives at different levels and the research questions. The figure also highlights the way in which we operationalised our multiple case, mixed method study, using the CoM principles for action as the denominator for Dutch CBHEPA programs. It includes the adjusted and new research questions, which emerged during the research, and which are further highlighted in an intermezzo chapter (p. 35). This thesis thus contributes to both evaluation theory and practice of community-based health and physical activity promotion focussing on socioeconomic inequalities, by making explicit process and outcome indicators at multiple levels.

In Part I – theoretical orientations – chapter two explains in detail the theoretical foundations underpinning each level of CoM and a logical framework for evaluation. It describes, for each level and phase, the methodologies of data collection and analysis. It reflects on the rationale of methodologies used in relation to the intended target group and the action-oriented approaches needed to get and keep all stakeholders on board.

In Part II – empirical findings – chapters three and four present findings on individual level outcomes, using a participant perspective. Chapter three describes the multilevel, longitudinal questionnaire-based approach used to assess the effectiveness of CBHEPA programs. Participants' developments at individual level are highlighted in terms of (leisure-time) physical activity behaviour in relation to personalised factors and co-variates such as health-related quality of life and others. Chapter four elaborates on known and unknown predictors of participants' willingness to pay for sport and physical activity. Willingness to pay is used as an indicator for the value attributed to interventions aimed at improving physical activity behaviour and health-related quality of life.

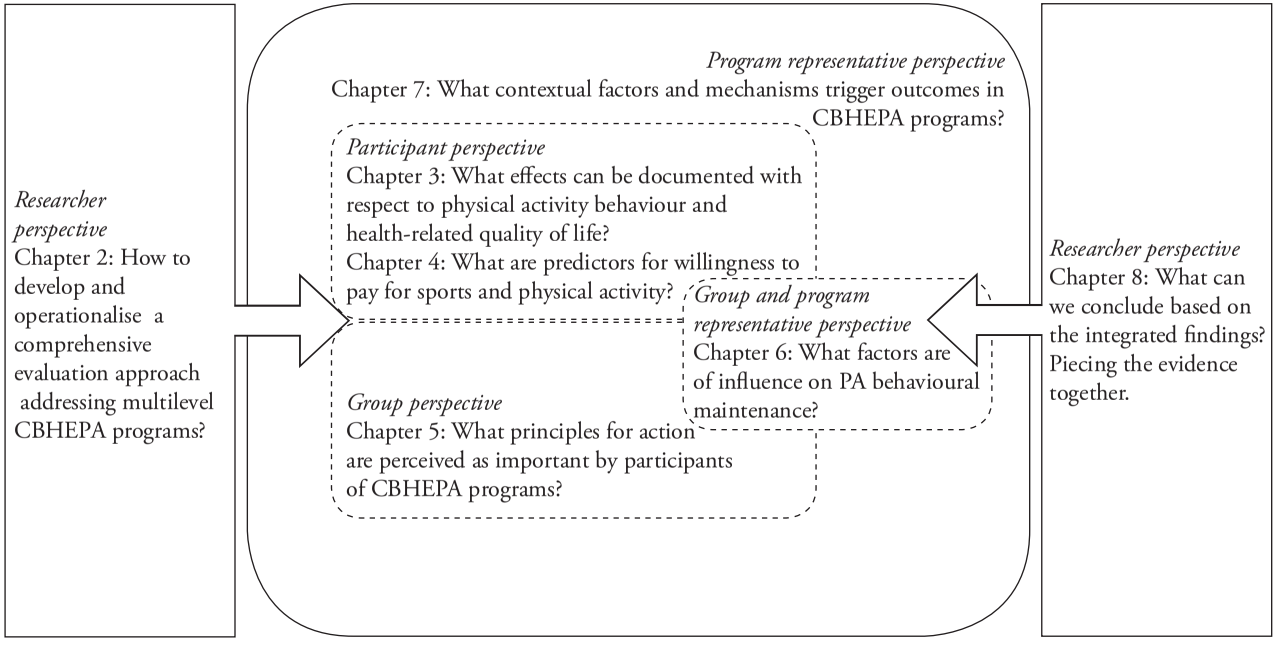

Figure 1.2 Research questions linked to chapters

Using a group perspective, chapter five presents findings on group level outcomes. It elaborates on the importance of group dynamics and related principles for action in CBHEPA programs. The methodological operationalisation of group-based principles for action is explained as well as participants' perceptions of these principles. Using a group and a program representative perspective in tandem, chapter six presents findings on group and program level outcomes. It addresses the issue of physical activity maintenance in the case of migrant women, who are more than averagely represented in the target groups addressed by CBHEPA programs.

Using the program representatives' perspective, chapter seven presents findings on program level outcomes. Acknowledging the importance of local conditions and contexts in the development and implementation of CBHEPA programs, we used a realist synthesis protocol to explore and define contextual factors and mechanisms in relation to outcomes of interest, identified by program representatives.

In Part III – the overall reflection – using a socio-ecological perspective, chapter eight pulls together the evidence drawn from the multiple levels investigated. The main findings, methodological considerations, and implications relating to our evaluation approach and outcomes are discussed. Finally, suggestions are made about future directions in evaluation research on community-based health and physical activity promotion, offering a deeper understanding of the indicators needed to assess (cost) effectiveness at individual, group, and program level comprehensively.

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CHAPTER 2

Evaluation design for community-based physical activity programs for socially disadvantaged groups – the case of Communities on the Move

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Abstract

Background: As interventions are not yet successful in substantially improving physical activity levels of low socioeconomic status groups in the Netherlands, it is a challenge to undertake more effective interventions. Participatory community-based physical activity interventions such as Communities on the Move (CoM) seem promising. Evaluating their effectiveness, however, calls for appropriate evaluation approaches.

Objective: This paper provides the conceptual model for the development of a context-sensitive monitoring and evaluation approach in order to (1) measure the effectiveness, including the cost-effectiveness, of CoM and (2) develop an evaluation design enabling the identification of underlying mechanisms which explain what works and why in community-based physical activity programs.

Methods: A cohort design is proposed, based on multiple cases, measuring impact, processes and changes at each of the distinguished levels. Methods will be developed to evaluate both short-run and long-run effects, costs and benefits of CoM.

Conclusions: The design offers a valid research strategy for evaluating the effectiveness of community-based physical activity programs. Internal validity is guaranteed by the use of several verification techniques such as triangulation. The multiple case studies at program and community level enhance external validity.

Introduction

Physical inactivity is one of the four core risk factors for non-communicable diseases such as diabetes type 2 and cardiovascular diseases. It has been identified by WHO as the fourth leading risk factor for global mortality, causing an estimated 3.2 million deaths globally [1].

In the Netherlands, the Dutch Healthy Physical Activity Guidelines (NNGB) have been in use as a standard for monitoring physical activity behaviour at population level since 1998. These guidelines set the norm for healthy daily physical activity for adults at a minimum of 30 minutes moderate activity at least five days a week [2]. Research shows that physical activity levels of the Dutch adult population are rising, from 44% in 2000 to 62% in 2009 meeting the guidelines for healthy physical activity [3]. Adults spend on average 178 minutes per day in physical activity. Work/school and domestic activities are the most important sources of physical activity.

Not all population strata, however, show this upward trend. The engagement of low SES (socio economic status) groups in sports and physical activity in the Netherlands remains lower than in high SES groups [4], despite various policies promoting community-based health and physical activity programs at the national, regional and local level [5]. The neighbourhood is recognised as a setting in which to promote health and physical activity and to strengthen people's responsibility for their own health and social participation [5,6,7].

As interventions have not yet been successful in substantially improving physical activity levels of low SES groups, it is a challenge to undertake more effective interventions [8]. In line with national policy objectives, the Netherlands Institute for Sports and Physical Activity (NISB) developed and disseminated a community-based program enhancing physical activity in inactive low SES target groups: the Communities on the Move (CoM) approach. The aim of CoM is to enhance physical activity levels of low SES groups, in order to contribute to social participation, quality of life and life satisfaction of individual participants. Since 2003, CoM has been carried out by a variety of (semi-) professional user organisations in 37 municipalities, reaching over 100 groups. Preliminary results of the program are promising. An expert panel of the Dutch Centre of Healthy Living has approved CoM as theoretically underpinned [9], but its effectiveness and cost-effectiveness have not yet been researched comprehensively.

Community-based interventions like CoM are grounded in both individual and community level theories [9, 10], calling for appropriate designs to evaluate them at different impact levels [11]. To our knowledge, community-based physical activity programs have not yet been assessed comprehensively on both process and indicators for effectiveness at multiple levels. The aim of this paper is to provide the conceptual model for the development of a context-sensitive monitoring and evaluation approach in order to (1) measure the effectiveness, including the cost-effectiveness, of CoM and (2) develop an evaluation design enabling the identification of underlying mechanisms

which explain what works and why in community-based physical activity programs. The proposed research design is based on insights derived from of the authors' experiences in community-based health promotion programs [12, 13, 14].

The Communities on the Move approach (CoM)

CoM targets inactive, low SES groups. CoM is a principle-based approach, enabling community-based physical activity interventions to be tailored to the needs and demands of target groups within specific local contexts. The objective is to identify, assess and mobilise available resources for physical activity within the target group and their community. This requires a participatory approach in program development and implementation, involving different stakeholders including the target population in all stages of program planning, implementation and evaluation [15, 16]. CoM is linked to the assets for health concept [17] – a health asset being any factor that enhances the ability of individuals, communities, populations and/or social systems to improve or maintain health and well-being. The concept includes a salutogenic perspective on health, focusing on positive health outcomes [18, 19].

The key principles of CoM, identified and used in a four-year pilot phase (2003–2007), at program and community level are: intersectoral collaboration, coordinated action for sustainability and active participation of local stakeholders (organisations and community representatives). The key principles at group and individual level are: a social network approach, active participation of participants in program development, enjoyment, group bonding and creating supportive environments. Phase 1 of a CoM program starts with problem definition, based on community assessments identifying stakeholders, physical activity needs and assets. Phase 2 is planning and development of program activities with local stakeholders, setting goals and defining actions within contextual boundaries. Phase 3, the actual implementation phase, is a stepwise approach, starting with activities for recruitment. Participants are recruited by accessing community groups and mobilising their social networks – a community group being a group of women visiting a mosque, for instance. The second step is defining and implementing the action program using group members' input to tailor physical activities to their needs. The third step is consolidation. Group members practice what they have learned and actively involve their social and physical environments in order to sustain their behaviour change. Phase 4 of CoM is program evaluation to document impact and lessons learned for further dissemination. Table 2.1 is a schematic representation of a local CoM program.

Table 2.1 Principle-based CoM approach in local practice

	Phase 1 Problem identification	**Phase 2** Program development	**Phase 3** Implementation			**Phase 4** Evaluation
			Recruitment	*Action*	*Consolidation*	
Program organisation						
Intersectoral collaboration	Assessment of community needs and assets	Setting goals	Program coordination and monitoring	Program coordination and monitoring	Program coordination and monitoring	Formation new groups
	Stakeholder involvement	Program development	Communication	Communication	Communication	
		Organising resources	Introduction activity program	Physical activities program		
Program sustainability	Assessment policy goals	Capacity building	Demonstration lessons	Theme sessions		
Community						
Active participation	Identification target groups	Identification key persons				Formation new groups
Social network			Mobilising participants			
Create supportive environments					Involving social and physical environment	
Group						
Group bonding			Getting acquainted	Social learning	Group cohesion	Sustained group activities
Active participation			Program adherence	Program adherence	Group initiative	
Create supportive environments					Involving social and physical environment	
Individual						
Social network			Participants acquainted		Involving social and physical environment	Sustained physical activity behaviour
Active participation			Assessment physical activity needs and ambitions	Competence development (attitude, knowledge, skills)	Competence development	
Enjoyment			Exploring preferred physical activities	Learning to enjoy physical activity	Competence and confidence development	

Theories to develop and implement CoM use an ecological perspective on human health. The ecological perspective emphasises the interaction between factors within and across the different levels [20]. To address the reciprocity of human interactions with their social and physical environment, CoM advocates actions at multiple levels, whereas each level builds on different theoretical frameworks (Figure 2.1). At the *individual* level, CoM aims to initiate and sustain change in physical activity behaviour, building on the concepts of the theory of planned behaviour (TPB): behavioural intention, attitude, subjective norms and social influence, and self-efficacy [21]. CoM stimulates adherence to physical exercise and the development of habitual behaviour through enjoyment [22, 23, 24]. At the *group* level, social learning processes and active participation, based on concepts of social cognitive theory (SCT), are used to support sustained behavioural change [20, 25]. At the *community* level, CoM is based on the social network approach, community participation and the notion of supportive environments. Social networks contribute to health [26] and effectively support physical activity behaviour [27]. Community participation fosters higher levels of motivation and determines effectiveness [12]. At the *program* level, CoM is underpinned by theories on intersectoral collaboration and coordinated action [13], addressing stakeholder involvement and community ownership. Intersectoral collaboration strengthens the development and contextualisation of the intervention by assessing assets and resources of various stakeholders and translates them into customised program activities. Intersectoral collaboration also contributes to the sustainable implementation of CoM.

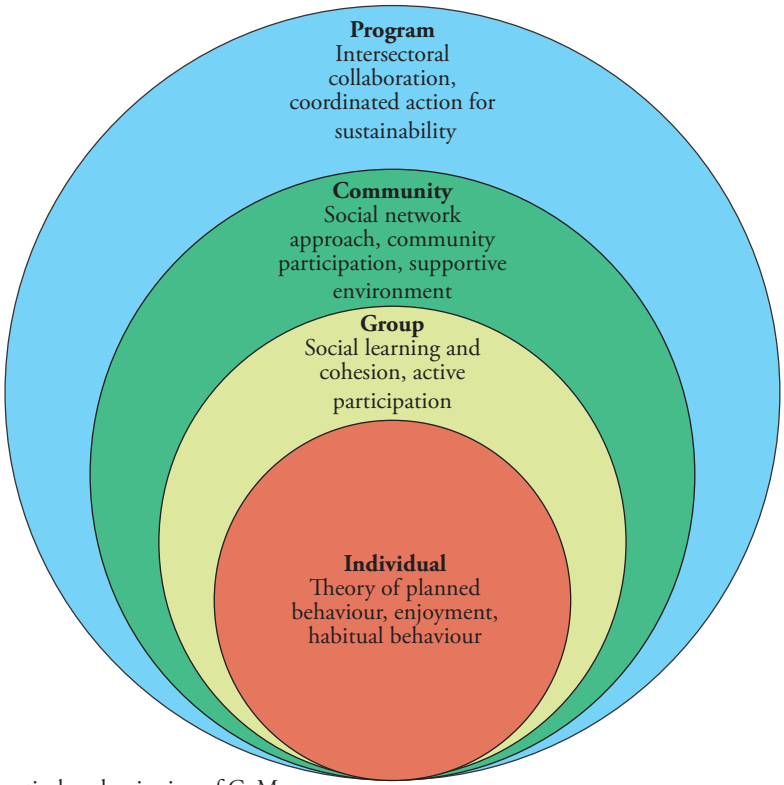

Figure 2.1 Theoretical underpinning of CoM

Evaluation objectives

CoM's evaluation approach aims to: assess the effectiveness of CoM at different impact levels (individual, group, program and community); identify underlying mechanisms to explain the context sensitivity of program development and implementation; assess the cost-effectiveness of CoM.

Research questions:

1. Which effects can be documented with respect to physical activity behaviour, health, quality of life and life satisfaction?
2. Which mechanisms explain the successes and failures of CoM in low SES groups and how can these be addressed?
3. How can results be interpreted in terms of costs and benefits and what combination of economic evaluation methods and tools is most appropriate to evaluate a community-based program on cost-effectiveness?

Methods

Study design

To measure the effectiveness and cost-effectiveness of CoM, our study combines a cohort analysis, based on multiple cases, and a process evaluation and action research, measuring processes and changes at each of the four defined impact levels at multiple points in time (Figure 2.2). The study includes 16 groups of CoM programs in different municipalities, in four cohorts of four groups. Data will be collected through standardised questionnaires, open interviews, document analysis, interactive procedures and focus groups. Four CoM programs (one case from each cohort) will be studied in depth.

The advantage of a cohort analysis – cohorts starting successively over a course of 2.5 years – is that simultaneously multiple (intermediate) outcomes can be studied over a period of time. It allows control for possible history and maturity effects, and as such it offers a valid alternative for a randomised controlled trial (RCT) design. RCT designs are considered less appropriate to assess the costs and effectiveness of CoM at multiple levels and to identify underlying mechanisms explaining success and failures for the following reasons [14, 28]:

(1) RCT designs focus on behaviour change at individual and community population level, not taking into consideration conditions for change related to social, cultural and organisational factors [14, 29];

(2) Applying the RCT design is difficult because of the absence of appropriate ways to define control groups in real life settings. Community-based physical activity promotion settings are generally open to the public at large, and people living in the control areas have access to the activities as well. Hence, participants cannot be assigned randomly. Initial physical activity motivations for members may also be different,

making randomisation difficult [14, 28];
(3) There are limitations in the ability of RCT designs to grasp the importance of interactions between the individual and his or her social and physical environment [30, 31].

A mixed method design is therefore required to gain insight into the effectiveness of CoM programs at all four defined impact levels and to understand the process, the interactions and the quality of interactions needed for success [14, 30]. An action approach enables researchers and local CoM stakeholders, including CoM participants, to apply and benefit from loop learning [12, 32]. Learning loops are applicable to the CoM programs and to the overall learning processes of CoM and this research project. For local CoM programs, single-loop learning results in an

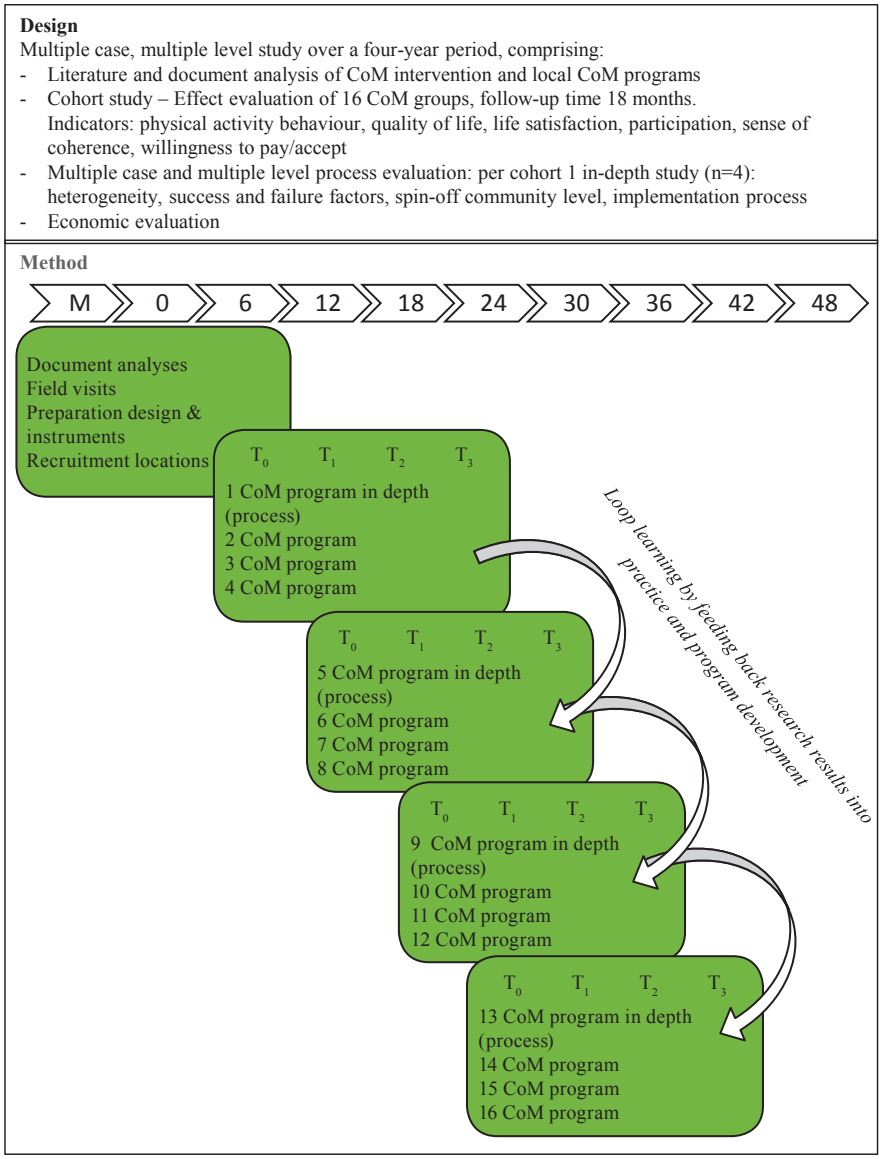

Figure 2.2 Evaluation design for CoM

improved local program. Double-loop learning results in adaptation of the organisation of the program. The learning outcomes in the first four CoM programs can be used in the next four CoM programs and so on. As a consequence, during the research, CoM quality will be improved.

Study population

To assess outcomes at *individual* and *group* level, inclusion criteria for the study population – participants in CoM programs - are inactivity, adults not meeting the NNGB, and low socio-economic status, (income, education, employment conditions). In each CoM program, one or more entire groups will be included in the study (convenience sampling). During the study, 16 groups will be studied, each group consisting on average of 15 participants. Consequently, a total of 240 participants will be included. Data will be collected at four points in time: T_0 at the start of a local program, T_1 six months later, T_2 at 12 months and T_3 at18 months after the start.

At *program* and *community* level, on-going CoM programs will be included, based on existing partnerships between NISB and implementing organisations (purposive sampling). The study population consists of local stakeholders, such as user organisations and networks in place, the disseminating organisation (NISB) and community representatives.

Logic model

Figure 2.3 illustrates the conceptual model for impact evaluation of CoM, based on the literature on community-based evaluation approaches [33] as well as dissemination studies of evidence-based interventions [34, 35]. The hypothesis is that a community-based participatory approach to developing and implementing physical activity programs is effective in enhancing physical activity levels in low SES target groups and results in increases in quality of life, life satisfaction and community participation.

The framework is developed based on two underlying perspectives: local program initiators seek the evidence base, developed in CoM and disseminated by NISB; community-based approaches are principle-based, following non-linear pathways of development and implementation [33]. This calls for process evaluation, addressing intersectoral collaboration, capacity building and network development, as well as identification of intermediate measures to be monitored at the different impact levels. *Short term output* is defined in terms of concrete activities, reach, and program satisfaction. *Short term outcome* indicators are defined in terms of measurable impact, such as increase in physical activity and knowledge, and the use of qualitative data (group learning) to understand outcomes. Long *term outcome* indicators are defined to measure broader outcomes and monitor local change.

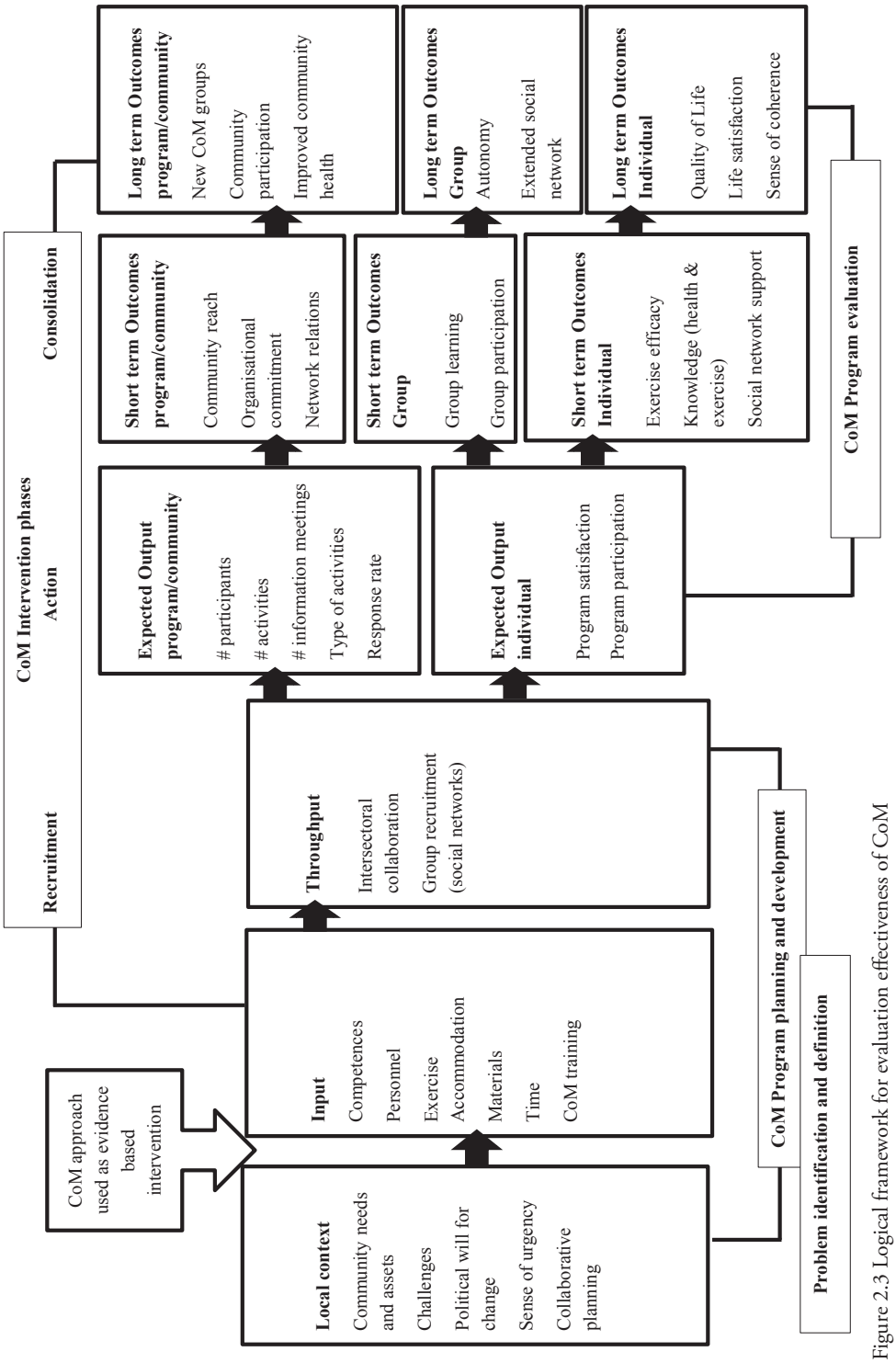

Figure 2.3 Logical framework for evaluation effectiveness of CoM

Impact assessment

To assess effects with respect to physical activity behaviour, quality of life and life satisfaction at *individual* level, a standardised questionnaire will be used to measure quantitative short- and long-term outcomes (Table 2.2). The questionnaire has been developed using concepts from the theories underlying the program (TPB), in addition to questions relating to sports and physical activity behaviour. Data on socio-economic indicators will be collected (age, income, education, employment, living conditions), in accordance with standardised questions in the Local and National Monitor Public Health in the Netherlands [36].

To measure physical activity, the validated Short QUestionnaire to ASses Health enhancing physical activity (SQUASH) will be used [37]. Correlations for reproducibility of the separate questions vary between 0.44 and 0.96. Spearman's correlation coefficient between the Computer Science Applications, Inc. Activity Monitor (CSA) readings, expressed as activity counts per minute, and the total activity score is 0.45 (95%-CI 0.17–0.66) [38]. The SQUASH questionnaire is used as it generates data which can be compared with national and regional data. The Dutch trend analyses for physical activity behaviour over the past 2 decades are based on the SQUASH, offering a vast body of reference data for our study [3].

In this study we will explore the use of objective measures for physical activity, such as walking tests or accelerometers [39, 40]. These objective measurements, however, generally require additional data such as generated by SQUASH, to be able to interpret outcomes on physical activity behaviours and the development of habitual physical activity behaviour. In addition, use of objective physical activity measures has some challenges to overcome. Firstly, validity and reliability are to be dealt with when using these measures in different circumstances and various user groups, in particular in groups of people suffering from chronic diseases [41]. Secondly, practical issues relating to implementation, such as required know-how, organisational effort and costs are to be dealt with [40].

To measure personal goals on health and physical activity behaviour, a number of personal features will be documented (demographics, BMI). To measure life satisfaction, Cantril's Self-Anchoring Ladder for Life Satisfaction will be used [42]. To measure the ability to cope with stressors, the validated 13-item Sense of Coherence (SOC) questionnaire will be used [43]. Cronbach's alpha values in 127 studies using SOC-13 range from 0.70 to 0.92 [44]. To measure enjoyment, the short version of Kendzierski and De Carlo's Physical Activity Enjoyment Scale (PACES) will be used (9 items) [45, 46].

To assess mechanisms explaining successes and failures of CoM in low SES groups and how these can be addressed, data will be collected at *group* and *program* level through interviews, focus groups and document analysis (Table 2.2). A combination of action research and realism evaluation will be used. Action research

is of importance because it has both an action function, which supports the progress of the intervention, and an evaluation function, which seeks to monitor and ascertain processes and outcomes of interventions [47]. Realism evaluation facilitates the study of the interactions between context and program mechanisms determining the outcomes [48]. To assess CoM's context-based information, in each of the CoM programs an interview with the program coordinator will be conducted as well as two focus groups, one with local stakeholders, one with CoM participants. To measure effectiveness at program level, factors for achieving and sustaining participation and collaboration [49], the coordinated action checklist [50] and Pretty's participation ladder will be used [25]. The RE-AIM dimensions – reach, effectiveness, adoption, implementation and maintenance – will serve as the framework to measure spin-offs and highlight areas that require special attention with respect to sustainability [51].

Table 2.2 Overview of variables and methods of data collection

Level	Variables	Questionnaires				Document analysis	Interview	Focus group	Instruments
		T_0	T_1	T_2	T_3				
Individual	Age, gender, income, education, ethnic background	x							Questionnaire
	Quality of life	x	x	x	x				EQ-VAS
	Life satisfaction	x	x	x	x				Cantril's ladder
	Physical activity and health behaviour	x	x	x	x			x	Questionnaire
	BMI	x	x	x	x				Questionnaire
	Sense of Coherence	x			x				SOC-13 scale
	Enjoyment	x	x	x	x			x	PACES scale
	Willingness to pay	x	x	x	x				Questionnaire
	Personal goals	x	x	x	x			x	Questionnaire
Group	Social support	x	x	x	x			x	Questionnaire
	Participation							x	Timeline Pretty's ladder
Program	Organisation and collaboration					x	x	x	Coordinated action checklist
	Program participation	x	x				x	x	Pretty's ladder
	Support and training					x	x	x	
	Competences						x	x	
	Diffusion		x			x	x	x	
	Cost per QALY	x	x	x					
	Cost-effectiveness		x			x			QALY
Community	Spin-off: new programs and community participation			x	x	x	x	x	RE-AIM framework

Economic evaluation of CoM

To assess how results can be interpreted in terms of costs and benefits and what combination of economic evaluation tools is most appropriate to evaluate a community-based program on cost effectiveness, results from the cohort analysis, process evaluation and action research at all levels discerned will be used (Table 2.2). The study perspective in evaluating CoM's cost-effectiveness will be the societal perspective. Data will be collected about health-related quality of life in relation to the physical activity program and its program costs over a time frame of 18 months. To measure health-related quality of life, the Dutch EuroQoL scale (EQ-5D-3L) and the EQ visual analogue scale will be used. The EuroQoL scale is standardised, measuring non-disease specific health – related quality of life, in use for economic evaluation [52, 53].

The methods used will include not only such traditional measures from cost utility and cost-benefit analysis as the Quality Adjusted Life Year (QALY) (expressed in euros per quality-adjusted life-year) gained, or willingness to pay/willingness to accept, but also instruments that measure changes in life satisfaction and sense of coherence.
At the *individual* level, compensation tests to measure changes in welfare are the most usual means. Compensation tests, such as willingness to pay, have money as their natural unit of value [45]. Willingness to pay questions (for sport and physical activity) will be asked at distinctive points in time during the CoM program. To measure health gain, the QALY will be calculated by multiplying the amount of time in a particular health state by the quality of life during that time, summing over all time periods and standardising to a year [54].

A cost-effectiveness analysis at the *program* level will be performed by computing cost per QALY gained. At program level, costs such as salaries, training costs and materials are summed up, and benefits are measured through the computation of QALY gained, at various points in time, as described above. The outcomes of these computations will be compared with other relevant interventions. In all methods applied, assumptions used in the economic calculations and evaluation will be made explicit.

Analysis

Qualitative analysis

Qualitative research data from interviews and focus group discussions will be audio taped (with the interviewees' permission), transcribed (intelligent verbatim style) and analysed using Atlas.ti (version 7.0) to manage the data and guarantee transparency. Top-down as well as bottom-up coding will be used to provide for the analysis of differences in perspective of CoM participants, professionals and scientists [55, 56]. Case study data will be used to describe general mechanisms of failures and successes of the CoM program for various low SES groups.

Quantitative analysis

Quantitative data will be analysed with multivariate analysis techniques using the SPSS program. The quantitative variables at the individual level (Table 2.2) are to be tested for four independent variables (gender, age, ethnicity and SES) using a multiple regression analysis with a significance level of 0.05 and a power of 0.80 for a medium effect size. For this, an overall research group of at least 84 is required [57]. If there are several different groups (e.g., for ethnicity, SES), with a number of eight independent variables, 107 participants are needed. Targeting 240 COM participants would satisfy these conditions.

Power calculation

As the study design lacks control groups and consequently limits randomisation, the assumption made in the power calculation is, that the CoM principles used are the same in each location. Effect sizes, therefore, can be calculated based on the overall population included in CoM programs.

The power calculation of the effectiveness of the CoM program is based on the variable *physical activity*, as the prime aim of the CoM program is to enhance physical activity in inactive, socially disadvantaged groups. Measures for change to be considered include: increase in the average number of minutes people are physically active, in the number of people meeting the Dutch Healthy Physical Activity Guidelines (NNGB) and in the number of people indicating that they are more physically active after participation in a CoM program.

Estimation of the effect size is based on an American systematic review study [27]. This review shows that the average time spent on physical activity increased by 35.4% (range 16.7–83.3%), based on 17 studies involving middle-aged adults. Dutch studies reviewing physical activity interventions give no numerical information about effect sizes [58, 59]. One intervention report shows an increase of 38% on average in the physical activity pattern. Based in these data, the estimated effect size for our study is set at an increase in physical activity of 35% in each group, roughly equivalent to 500 minutes a week.

A limitation of the proposed cohort design is the ability to correct for history or maturity effects, as the timeframe for data collection per cohort is restricted to 18 months with measurement intervals of only six months. To control for these effects, a comparison of cohorts will be conducted. Furthermore, comparisons will be made with existing population statistics for physical activity.

Management and governance

Research activities will be developed and implemented in close collaboration with NISB to stimulate active knowledge exchange and co-creation of new knowledge. In this way, so-called context-sensitive evidence will be generated, which by its nature is relevant for

(intended) users [60].

For the research project, a steering group consisting of representatives from Wageningen University and NISB will meet regularly. In addition, advisors from national and international organisations (e.g., the Dutch Centre of Healthy Living, other universities and community programs) will be involved for specific purposes, e.g., to review the developed questionnaires, to critically assess results of the interviews and focus groups, and to comment on drafts of scientific articles.

Intended outputs

This study will result in recommendations for improving the health of low SES groups through physical activity. Further research results include:

1. An elaborated monitoring and evaluation design for participatory community health and physical activity promotion;
2. Assessment of CoM (cost-) effectiveness at the individual, program and community level;
3. The facilitation of wider implementation of CoM at both national and local level.

Results

The study began in October 2012 with data collection at both the *individual* (T_0) and *program* level. Documentation is collected and interviews are being conducted with local stakeholders. The study is on-going and funded by ZonMw, the Netherlands Organisation for Health Research and Development (project number 50-51505-98-103).

Discussion

Need for an alternative evaluation approach

The need to elaborate an alternative evaluation approach to study the (cost-) effectiveness of a community-based physical activity program such as the CoM is evident. New indicators, methods and tools are required in a real-world setting, comprising multiple levels. The design described in this paper offers a valid research strategy for effectiveness, combining cohort analysis, process evaluation and action research within multiple cases (parallel investigations in different settings), addressing the different impact levels in a comprehensive way.

Credibility or internal validity is guaranteed by the use of several verification techniques such as triangulation, stakeholder checking, external auditing and peer review [31, 61]. Triangulation of data obtained by questionnaires, interviews and focus groups elucidates why effects have occurred.

The multiple cases carried out at the program and community level (four in-depth cases) enhance external validity. The findings of the study will be context specific and specific to different low SES groups, but will also reveal generic mechanisms of change.

Value for science, practice and society

Conducting comparable studies in different situations will make it possible to draw conclusions about the quality of achievements and the processes and mechanisms in force in community-based projects, but also about the usefulness of (new) research techniques [31, 47].

Practice will benefit from the research in various ways. Research activities will be part of the intervention, and stakeholders will participate in the development, implementation and evaluation of (research) activities. Results will be fed back into the program immediately in order to undertake subsequent action. In addition, this research project will facilitate wider implementation of CoM.

Information on the (cost-)effectiveness of community health promotion is highly relevant for policymakers to decide on the implementation of community-based approaches. In view of the increasing number of programs expected as a result of Dutch health policies aiming at self-mobilisation and organisation in neighbourhoods, this study will address the need to contribute to insight into context-sensitive intervention development targeting low SES people who are physically inactive, and how to monitor and evaluate these in a comprehensive way.

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Intermezzo

From design to responsible application

Marion Herens

Putting into practice the principles of context-sensitive science

As described in the previous two chapters, the evaluation approach adopted in this research was geared towards applying an action-oriented and a context-sensitive approach [1]. The notion of context-sensitive science is put forward by Gibbons [2] as 'a way to approach what might be meant by interactive social science. Universities are operating in a social environment which values research, but which also has the ability and in some cases the resources to play a greater role in influencing what research is carried out and how' (p. 159). In this approach, society is actively involved in the dialogue about what problems researchers work on, how they do so, and with whom. In epistemological terms, context-sensitive science produces socially robust knowledge, that is, knowledge likely to be reliable not only inside but also outside the laboratory [2].

In order to clarify how we[3] dealt with this notion over the course of this research project, this intermezzo connects Part I – theoretical orientations – and Part II – empirical findings – by highlighting the main issues leading to necessary adjustments in our evaluation approach. We first describe the issues relating to developments in the research context that we encountered during this research project, and the issues relating to the progressive insights into theory and practice. Next, we explain the consequences of these issues for the operationalisation of our evaluation design at the different impact levels. Finally, the implications for the research project are summarised.

Dynamics in the research context

The initial evaluation design built on the presence of a national Communities on the Move (CoM) program, developed and disseminated by the Netherlands Institute of Sports and Physical Activity (NISB) [1]. Over the course of the study, NISB reoriented its policy mission towards the development into a knowledge institute, in response to changes in national policy launched by the Ministry of Health, Sports, and Welfare. These contextual dynamics had an impact on the collaboration between the university and the national implementing agency. In concrete terms, NISB was to a lesser extent able to provide for implementation and support at local level, and limited its involvement to a few once-off training sessions on demand. Hence, the role of relationship management with the local programs involved in our study shifted to the researcher, as did the role of managing data collection and providing feedback on lessons learned locally. Also, the evaluation of NISB's implementation efforts at national level, based on the RE-AIM framework [1], and feeding lessons learned back into new CoM programs came to a standstill.

3 In this intermezzo, the personal pronoun 'we' refers to the project team of researchers that dealt with the developments calling for adjustments. Decisions for adjustments were taken on the basis of the mutual agreement of all project members.

The changes in the political and implementation context also had an impact on the local research settings. In order to monitor real-life interventions, we decided to pursue, with the assistance of NISB, with the recruitment of local community-based health-enhancing physical activity (CBHEPA) programs for the study, using the set of CoM principles for action as selection criteria. As a consequence, this thesis presents findings based on multiple cases of local CBHEPA programs.

Progressive insights into theory and practice

Over the course of the study, we recognised the need to translate two theoretical notions, not explicated before the start of the study, into two additional research questions. The first notion related to the group-based principles for action, defined in the theoretical underpinnings of CoM [1, 3]. Local program activities were organised group-wise and therefore revolved around group-based principles for action, focusing on group dynamics as one of the mechanisms explaining success or failure. Although principle-based approaches play a key role in health promotion [4], the use of principles for action is rarely made explicit, thus leaving room for different interpretations in their operationalisations and ways to measure outcomes resulting from principles for action. In CoM, this was aggravated by the fact that the advocated group-based principles for action varied in level and nature, and were often defined as a means and a goal in one, as is the case for, e.g., the principles of active participation and physical activity enjoyment. Since the use and outcomes of group-based principles for action are hardly made explicit, we addressed this issue by adding a new research question, addressed in chapter five: Which of the group-based principles for action, such as active participation, enjoyment, and fostering group processes, are perceived as important by participants? A particular method was developed to address this question across multiple groups, as is described in more detail in chapters five and six.

The second notion requiring attention related to the growing body of literature depicting a difference between factors of influence on initiating physical activity behaviour and factors of influence on physical activity maintenance [5-7]. A deeper understanding of factors relating to physical activity maintenance may contribute to enhancing the effectiveness of community-based physical activity programs for socially vulnerable groups. As little is known about factors associated with physical activity maintenance in relation to our target groups, we added a new research question, further addressed in chapter six: What factors influence physical activity maintenance in socially vulnerable groups in the Netherlands?

Consequences for the operationalisation of the evaluation design

Recruiting local programs and keeping them involved

The first challenge we faced in operationalising the evaluation design related to the recruitment of CBHEPA programs and their participants. The power calculations for our study indicated that we needed to include 240 participants. The initial strategy aimed at the inclusion of 16 groups, with an assumed average of 15 participants each, in 16 programs in different municipalities. These groups would enter the study in four cohorts of four groups over a period of 2.5 years. Four programs (one case from each cohort) would be studied in depth [1]. Our experiences, however, revealed that getting local programs actively involved in the study was time and labour intensive. It required a considerable amount of the researcher's time and effort to build the confidence needed to establish fruitful working relationships at local level. In addition, we found that the implementation of CBHEPA programs targeting socially vulnerable groups was functioning primarily on local efforts (elaborated in chapter seven), and the principles for action, as identified in CoM, were not always applied in the same way or with the same the intensity.

So, to be able to build an understanding of what was actually going on in each program, we made three adjustments in getting programs and participants involved. Firstly, we decided to consider each program involved as a case to be studied in-depth. Secondly, we reoriented our participant recruitment strategy towards including one or more groups within the different programs involved. Thirdly, we relabelled the programs involved as community-based health-enhancing physical activity programs (CBHEPA) instead of CoM, in order to recognise and acknowledge the local character of each program and to enforce local interaction about it.

Building on personalised data collection at individual level

The second challenge we faced in operationalising the evaluation design related to measuring outcomes at individual level in our target groups. Adjustments were necessary in the selected indicators and methods of data collection. The socio-cultural diversity of socially vulnerable groups involved in the CBHEPA programs was large. As described in our evaluation design [1], we initially aimed at collecting data relating to the principles for action relevant in CoM. Indicators were defined to measure (motivation for) physical activity behaviour, health-related quality of life, life satisfaction, coping ability, physical activity enjoyment, and the support from the social and physical environments.

Firstly, adjustments deemed necessary resulted from consultation rounds with CBHEPA program representatives. Outcome indicators of importance to practitioners were added, such as assessment of care consumption and physical activity self-efficacy.

Secondly, initial experiences with administering the questionnaire revealed that we were challenged to balance our information needs with the target groups'

responsive capacity and competences. As we anticipated, questionnaire use can be difficult in socially vulnerable groups. Lack of health literacy, lack of basic skills in reading and writing, and different beliefs about health concepts across cultures may lead to difficulties in understanding and interpreting the questions [8, 9], eventually leading to non-response [10]. Alternatives, however, such as translations or working with images or digital devices, suffer similar limitations [8]. Several actions were taken to deal with the response difficulties initially found. One action was to choose a restricted scale if available to measure a concept, such as the SoC three-item instead of the SoC thirteen-item instrument [11], and this limited the number of questions. A second action was to reduce the overall number of indicators, especially skipping the questions on supportive social and physical environments. These principles were not disregarded, but integrated for further exploration in the qualitative studies. A third action was to assess the face and the content validity of the standardised instruments included in our questionnaire with regard to our target groups. These instruments were the validated Short Questionnaire to Assess Health-enhancing physical activity (SQUASH), the Euro Quality of Life questionnaire (EuroQoL), and the physical activity enjoyment scale (PACES). Participants perceived the SQUASH instrument, in particular, as complicated, because of its number of items and the seven-day recall structure. Alternatives to the SQUASH, EuroQoL, and PACES instruments were explored and tested, but we did not identify better alternatives during our study [12]. Hence, despite these critical issues, we continued to use these selected standardised instruments.

In order to tackle the data collection issues, the best possible way was to use a highly personalised data collection strategy [8], in line with the recommendations of CBHEPA program representatives. This proved successful in reaching out to and involving a satisfactory number of participants. We also monitored the data collection procedure closely throughout our study by making observational notes and by reviewing each form for missing items, illegible handwriting, inadequate answers, and logical inconsistencies among responses after each data collection session. Errors thus identified were resolved by checking back with the participant, the trainer, or the assistant [13].

Finally, taking into consideration the various operational issues, we focused our individual-level evaluation primarily on physical activity behaviour and rephrased the research question, addressed in chapter three, as: Do CBHEPA programs contribute to an increase and maintenance of physical activity in socially vulnerable groups over time?

Experiences relating to the economic evaluation

The third challenge in operationalising the evaluation design related to the economic evaluation of CBHEPA programs. The evaluation design proposed an assessment of costs and benefits at different impact levels. The research question was: How can results be

interpreted in terms of costs and benefits and what combination of economic evaluation methods and tools is most appropriate to evaluate a community-based program on cost-effectiveness? [1].

At individual level, willingness to pay was used, as proposed, to assess individual participants' value attribution regarding the experienced benefits of CBHEPA programs. Data were also collected as planned on costs and perceived benefits at different impact levels. For both substantive and process related reasons, establishing an incremental cost-effectiveness ratio (CER) from a societal perspective was, however, not feasible. An incremental cost-effectiveness ratio can be used to compare the costs per unit of output (or effect) of a particular intervention at two distinct points of measurement (M_0 and M_1) [15]:

$$CER = (Costs\ M_1 - Costs\ M_0) / (Effect\ M_1 - Effect\ M_0) = \Delta C / \Delta E$$

We did encounter, however, two serious problems preventing us from calculating a CER. Firstly, on the side of measuring CBHEPA programs benefits, we did not find an increase in physical activity levels, nor in health-related quality of life outcomes in participants, thus reducing our ΔE to zero. Secondly, despite various efforts to collect data through interviews with local policy officials and program coordinators, and analysing program documentation [14], we did not arrive at establishing a clear picture of the costs of the CBHEPA programs included in our study. Many blanks in material and immaterial cost items were identified within and across the CBHEPA programs, leaving us with a highly varying, and possibly unreliable, ΔC.

As argued by Wolfenstetter et al [16], the main issues in costs assessments of CBHEPA programs targeting socially vulnerable groups relate to the asset-based, participatory, and collaborate approach towards program development and implementation, as advocated by the WHO [17]. The so-called 'investment for health model' [16] relies on the program actors' potential to identify and mobilise available resources for community-based physical activity promotion present in the target population and their settings [18, 19]. This bears implications for the related costing issues. Wolfenstetter et al. distinguished five main cost categories, relating to the different project phases faced by the collaborating actors (asset assessment, design of the intervention programs, program implementation and optimisation, and dissemination). Their findings indicated that the results of an economic evaluation of a physical activity program as part of health promotion efforts according to the WHO health asset approach, are highly sensitive to whether or not and to what extent program development costs, relying on intersectoral collaborative structures, are included in the cost calculations [16].

It was precisely at this point that we identified such extreme variation in the availability and quality of information on costs found in the CBHEPA programs,

that we arrived at a crossroads regarding the priorities set for the research project as a whole. The choice was made to proceed with building the evidence base on benefits of CBHEPA programs. As a consequence, the research aim to assess the cost-effectiveness of CBHEPA programs was abandoned.

In conclusion

On the positive side, from a context-sensitive science point of view, the redefining and adding of research questions deemed necessary, added value to our evaluation strategy. In practical terms, following the nature and pace of activities found in the local CBHEPA programs contributed to a fruitful collaboration with practice. In scientific terms, it enhanced the quality our mixed methods approach by ensuring access to and availability of quantitative and qualitative data representing the same cases.

On the downside, the time investments needed to gather data and maintain relationships during the research project necessitated a reconsideration of all research efforts proposed at the different impact levels, defined in terms of time and money. As a consequence, in-depth economic analyses of costs and benefits, and examination of outcomes at community level, are not further addressed in this thesis.

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CHAPTER 3

Health-related quality of life, self-efficacy and enjoyment keep the socially vulnerable physically active in community-based physical activity programs: a sequential cohort study

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Abstract

Purpose: Physical inactivity is most commonly found in socially vulnerable groups. Dutch policies target these groups through community-based health-enhancing physical activity (CBHEPA)programs. As robust evidence on the effectiveness of this approach is limited, this study investigated whether CBHEPA programs contribute to an increase in and the maintenance of physical activity in socially vulnerable groups.

Method: In four successive cohorts, starting at a six-month interval, 268 participants from 19 groups were monitored for twelve months in seven CBHEPA programs. Data collection was based on repeated questionnaires. Socio-economic indicators, program participation and coping ability were measured at baseline. Physical activity, health-related quality of life and on-going program participation were measured three times. Self-efficacy and enjoyment were measured at baseline and at twelve months. Statistical analyses were based on a quasi-RCT design (independent t-tests), a comparison of participants and dropouts (Mann-Whitney test), and multilevel modelling to assess change in individual physical activity, including group level characteristics.

Results: Participants of CBHEPA programs are socially vulnerable in terms of low education (48.6%), low income (52.4%), non-Dutch origin (64.6%) and health-related quality of life outcomes. Physical activity levels were not below the Dutch average. No increase in physical activity levels over time was observed. The multilevel models showed significant positive associations between health-related quality of life, self-efficacy and enjoyment, and leisure-time physical activity over time. Short CBHEPA programs (10-13 weeks) with multiple trainers and gender-homogeneous groups were associated with lower physical activity levels over time. At twelve months, dropouts' leisure-time physical activity levels were significantly lower compared to continuing participants, as were health-related quality of life, self-efficacy and enjoyment outcomes. BMI and care consumption scored significantly higher among dropouts.

Conclusion: Dutch CBHEPA programs reach socially vulnerable, but not necessarily inactive, groups in terms of socio-economic and health-related quality of life outcomes. Our findings suggest that CBHEPA programs particularly contribute to physical activity maintenance in socially vulnerable groups, rather than to an increase in physical activity behaviour over time.

Background

Physical inactivity has been identified by the WHO as the fourth leading risk factor for global mortality [1, 2]. Health disorders associated with inactivity, including impaired health-related quality of life, as well as direct and indirect economic costs, impose a substantial burden on societies and health systems [3]. In the Netherlands, socially vulnerable groups, e.g., those with low socio-economic status (SES) or of non-Dutch origin, are less engaged in sport and physical activity (PA) than high SES groups [4, 5]. Over the past decade, Dutch policy has been to promote community-based health-enhancing physical activity (CBHEPA) programs in order to improve physical activity behaviour and health-related quality of life, in particular targeting socially vulnerable groups [6, 7].

The relationship between PA behaviour and health-related quality of life is, however, a rather complex one. Demographic factors, as well as biological, psychosocial, behavioural, social and cultural factors, influence this relationship [2, 8, 9]. CBHEPA programs aim to change individual PA behaviour and to enhance PA maintenance and program adherence, using concepts such as attitude, subjective norms, self-efficacy [10, 11], social support [12, 13] and PA enjoyment [14, 15]. The need to address interpersonal aspects alongside individual approaches is widely recognised in PA promotion [16, 17]. Consequently, the theoretical grounds of CBHEPA programs are based on an ecological perspective on human health [18, 19]. The ecological perspective emphasises the need to take into consideration interaction between factors within and across different levels, such as individual, group and community level [20, 21].

Evaluating the effectiveness of CBHEPA programs

The ecological perspective used in CBHEPA programs, as well as differences described in the literature between PA initiation and PA maintenance [22], pose several challenges to evaluating the effectiveness of CBHEPA programs. Firstly, most research on the explanatory variables and correlates of PA behaviour has focused on individual level factors [2]. The multiple levels addressed by CBHEPA programs require a multilevel approach to hypothesis testing, taking into account the interdependencies within and between individuals, groups and communities [18, 19, 21, 23-25]. Secondly, Dutch CBHEPA programs often target specific societal groups within a community, such as the socially vulnerable. Identifying indicators and instruments suitable to measure PA behaviour and health-related quality of life in these groups is a challenge [26]. Thirdly, alongside measurement issues, recent literature indicates that factors predicting initial change in PA behaviour differ from those predicting PA maintenance [22, 27-30].

So far, no uniform standards are in use to define PA maintenance [31]. A commonly used definition is being physically active once a week for a period of at least six months [32]. Some studies indicate that factors relevant for PA behaviour initiation are best defined in terms of pre-motivational and motivation factors, such as awareness,

knowledge and (health) risk perception, attitude, self-efficacy and social influence [22]. In PA maintenance, post-motivational factors, i.e. psychological constructs bridging the gap between intention and behaviour, such as self-regulatory processes, the ability to cope with stressors in daily life [33, 34] and so-called maintenance self-efficacy, are factors of importance [22, 27, 35, 36]. In addition, PA enjoyment is found to be a moderator of self-efficacy in PA behaviour [17]. Studies indicate that not only self-control and discipline, but also enjoyment, pleasure and 'not worrying', are key values in maintaining an active and healthy lifestyle [14, 15, 37]. Fourthly, evaluating CBHEPA programs requires group effects to be taken into consideration. Several studies illustrate the importance of group support and group dynamics for the effectiveness of (CBHE) PA programs. Group dynamics in CBHEPA programs are, however, often implicit and not accounted for. CBHEPA programs are usually group-based for organisational reasons (cost-covering), rather than for behavioural change reasons [38]. Nevertheless, some studies indicate that group dynamics strategies, explicitly applied in group-based PA interventions, are more effective in establishing change in PA behaviour than individually targeted interventions with social support, which, in turn, are more effective than individual interventions without additional social support [39, 40].

Although many strategies have been developed to increase PA levels [41, 42], affect sizes are usually small to moderate [2]. Most evidence is built on correlational, cross-sectional studies at participant level, lacking insight into causal relationships between factors influencing PA [2, 41, 43]. Longitudinal designs including time varying determinants of PA behaviour and maintenance are rare [18]. In view of the aims of Dutch group-based CBHEPA programs, our study focuses on evaluating participants' PA behaviour and maintenance in relation to multilevel explanatory factors and time varying covariates. With a sequential cohort study, we aim to contribute to the evidence-base of CBHEPA programs and their potential to increase and sustain PA levels and health-related quality of life in inactive, socially vulnerable people. The advantage of a sequential cohort design, monitoring CBHEPA program participants for a specified period of time, is that simultaneously multiple (intermediate) outcomes can be studied over a period of time and can increase the power of the statistical procedures used to determine whether a change has taken place. It allows us to control for possible history and maturity effects [44]. Consequently, to measure effects, a sequential cohort design is a promising alternative to a randomised controlled trial (RCT) design, which is considered less appropriate to assess the effectiveness of CBHEPA programs [45, 46]. In this paper, we address the question: *Do CBHEPA programs contribute to an increase and maintenance of physical activity in socially vulnerable groups over time*?

Methods

To assess the outcomes of CBHEPA programs at participant level, we examined on-going Dutch CBHEPA programs, summarised under the denominator 'Communities on the Move' (CoM). CoM was developed and disseminated by the Netherlands Institute for Sports and PA (NISB) from 2003 to 2012. CoM targets inactive, socially vulnerable groups with the aim of enhancing PA levels, hence contributing to participants' health-related quality of life. Since 2012, CoM has been subject to a comprehensive evaluation study, including assessment of its effectiveness at participant level [21].

Study population

Participants from 19 groups (10–20 participants) were recruited in on-going CBHEPA programs targeting socially vulnerable groups in seven different municipalities. Local CBHEPA program representatives were approached through the NISB network, information meetings, training sessions, field visits and snowball procedures (Table 3.1). This resulted in access to one or more groups per CBHEPA program. Recruitment of participants within groups was based on a non-randomised, purposive sampling approach. Participation was on a voluntary basis.

Table 3.1 Overview of CBHEPA programs included

CBHEPA program	Municipality	Target group	Program design	Group composition	# groups	# participants
1	Amsterdam	Socially vulnerable Non-Dutch origin	Fixed duration (10 weeks) Outdoor Walking/running Once a week multiple exercise trainers	Women	1	14
2	Den Haag	Socially vulnerable Non-Dutch origin	Continuing In-/outdoor Exercise to music/fall prevention/walking Once a week One known exercise trainer	Women	3	31
3	Enschede	Socially vulnerable Dutch and non-Dutch origin	Fixed duration (13 weeks + 18 months follow-up meetings every 6 weeks) In-/outdoor Mixed sports activities Once a week Multiple exercise trainers	Women Men	2 1	30
4	Helmond	Socially vulnerable Dutch and non-Dutch origin	Continuing Outdoor Outdoor fitness Multiple times a week One known exercise trainer	Mixed	2	39
5	Hengelo	Socially vulnerable elderly Dutch and non-Dutch origin	Fixed duration (12 weeks) In-/outdoor Mixed sports activities Once a week Multiple exercise trainers	Women Men	3 1	51
6	Rotterdam	Socially vulnerable and elderly Mostly non-Dutch, some Dutch origin	Continuing Indoor Exercise to music/fall prevention Multiple times a week One known exercise trainer	Women Men	3 1	73
7	Tilburg	Socially vulnerable, chronically ill elderly Dutch origin	Continuing Indoor Fall prevention exercises/mixed sports activities Once a week One known exercise trainer	Women Mixed	1 1	30

A total of 268 participants was included at baseline, mostly women (86.7%). Personal and socio-economic indicators showed that mainly middle-aged participants (mean age 58.6 years; *sd* 14.0) of non-Dutch origin (64.6%),were involved. Furthermore, participants were low (48.6%) to moderately (42.4%) educated and a substantial proportion (52.4.7%) had low incomes (<€1,350/month). A minority (11.6%) had a full- or part-time job, 16.9% lived on income support (social benefit), and one fifth (20.6%) were retired. Nearly one third (29.2%) were single households, one third (30.0%) lived with a partner and a little over one third (39.6%) with a partner and/or children (Table 3.2).

Table 3.2 Participants' personal and socio-economic characteristics

Variable		N	%	Mean (*sd*)
Personal characteristics				
Gender	Women	229	86.7	
	Men	35	13.3	
Age	< 50 years	78	31.2	
	50–64 years	92	36.8	
	65–74 years	52	20.8	
	> 75 years	28	11.2	
		250		58.6 *(14.0)*
Ethnic origin (n=263)	Dutch	93	35.4	
	Non-Dutch*	170	64.6	
Socio-economic characteristics				
Education (n=256)	No/primary education	124	48.6	
	Secondary education	109	42.4	
	College/university education	23	9.0	
Household income	< € 1,000	65	25.4	
	€1,001–€1,350	69	27.0	
	€1,351–€1,800	30	11.7	
	> €1,801	20	7.8	
	Income not specified	72	28.1	
Employment status	Working full-/part-time	31	11.6	
	Job seeking	32	12.0	
	Incapacity for work	18	6.7	
	Income support	45	16.9	
	Retired	55	20.6	
Household conditions	Single	76	29.2	
	With partner	78	30.0	
	With partner and/or child(ren)	103	39.6	
	other	3	1.2	

* Number of countries of origin: 29

Data collection

Our study was based on a sequential cohort design. Participants were recruited and monitored in four sequential cohorts. Data collection for cohort 1 started in autumn 2012, and for cohort 4 in spring 2014. In order to reach the generally hard-to-reach socially vulnerable groups [47], we applied a personalised approach, reaching out to gatekeepers, such as the exercise trainer, and making ourselves known to CBHEPA participants. Data were collected by a researcher (first author) and a group of trained assistants at three points in time: T_0, T_1 at six months and T_2 at twelve months (Figure 3.1).

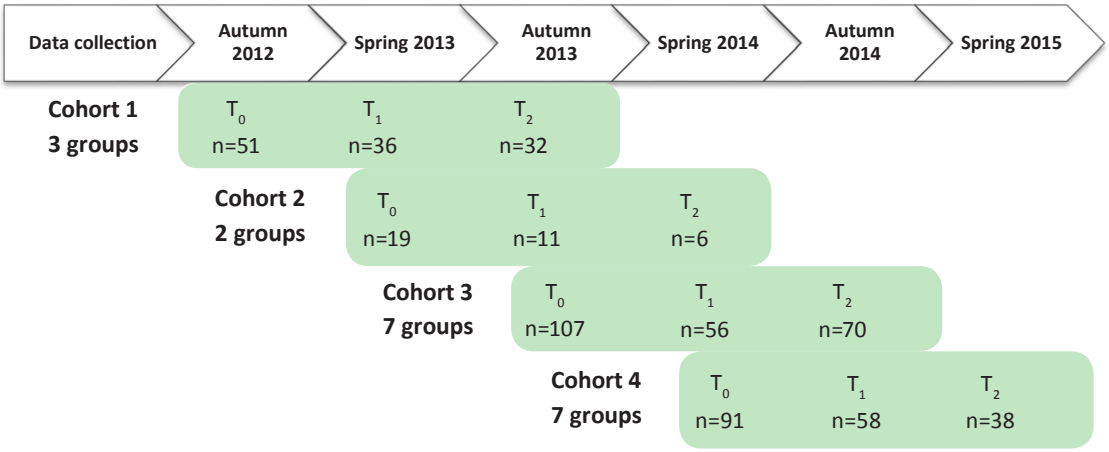

Figure 3.1 Data collection procedure

Questionnaires were developed based on validated survey instruments available for the Dutch population. Thus, we tried to select instruments most appropriate for the socially vulnerable target group. Socio-economic indicators, program participation and sense of coherence to assess coping ability were measured at baseline. Data on socio-economic indicators (age, income, education, employment status, living conditions) were collected in accordance with standardised questions of the Local and National Monitor Public Health in the Netherlands [48, 49]. Data on individual motivations to participate in the CBHEPA program were collected using an open-ended question. Data on past and present sport and PA behaviour were collected, assessing program participation time prior to baseline measurement and (former) sports club membership. People's ability to cope with stressors in daily life was measured using the SoC three-item, three-point scale for sense of coherence [50-53]. Questions were: *Do you usually see solutions to problems and difficulties that other people find hopeless* (manageability)? *Do you usually feel that your daily life is a source of personal satisfaction* (meaningfulness)? And: *Do you usually feel that the things that happen to you in your daily life are hard to understand* (comprehensibility)?

PA behaviour, health-related quality of life and on-going program participation were measured three times. PA and sport behaviour were measured using the validated Short Questionnaire for Sport and Physical Activity (SQUASH), measuring self-reported work-related, domestic, leisure-time and sport-related physical activities in minutes per week [54, 55]. The SQUASH generates data that can be compared with national and regional data, as Dutch trend analyses for PA behaviour over the past two decades are based on the SQUASH, offering a vast body of reference data for our study [5].

Health-related quality of life data were repeatedly measured at all three time points using two indicators: the five-dimension, three-level descriptive Euro Quality of Life questionnaire (EQ-5D-3L), assessing self-reported levels of complaints on 'mobility', 'self-care', daily activity', 'pain' and 'anxiety' [56, 57]. Based on the outcomes of the EQ-5D-3L, the EQ-Index (ranging from -1 to 1) was computed, defining a 'health state' using the Dutch time-trade-off value set [58, 59]. Perceived health was measured using a visual analogue scale (EQ-VAS), ranging from 0 to 100 [56]. EQ-VAS measures how participants perceive their health at a particular point in time [59].

PA self-efficacy and PA enjoyment were measured at baseline and at the last measurement (T_2). PA self-efficacy was measured using a five-item, five-point scale [60]. Statements were: *I am confident that I am able to continue to participate in the PA program during the coming months*, and *I am confident that I am able to continue to participate in the PA program when I am tired*. PA enjoyment was measured using a nine-item, five-point scale, translated and adapted from the Physical Activity Enjoyment Scale [61]. Statements were: *When I do exercise or sports, I enjoy it,* and *When I do exercise or sports, is it fun to do*, or *When I do exercise or sports , I feel bored*.
In the supporting information (S1, Table 1) an overview is presented of variables measured over time in relation to PA behaviour.

At each measurement, questionnaires were individually completed by participants during or after a group training session at the sports venue. Informed consent was arranged orally on the spot and confirmed in writing for each respondent. The researcher explained the purpose of the study at each session. Both the researcher and trained assistants helped respondents who had difficulty filling out the questionnaire by giving instructions or by adopting an interview style. The number of assistants varied with group composition: from one for groups with only Dutch native speakers to a maximum of five in groups with migrant respondents. Dutch was the working language, since ethnic diversity within groups was large (>10 countries of origin). Interpretation, if needed, was provided by an assistant or a Dutch speaking fellow group member from a similar background. Completion of the baseline questionnaire took on average 35–40 minutes, and of the follow-up questionnaires on average 20–25 minutes. After filling out the questionnaire, respondents were treated to fruit snacks and drinks.

Follow-up rate for all four cohorts at T_1 was 60% (n=161). In response to these

follow-up rates, additional data collection strategies were initiated during the third year (2014). Participants and ex-participants were contacted in places where they habitually assembled, usually a community centre. Follow-up questionnaires were sent to home addresses, accompanied if possible by a telephonic reminder after two weeks. Overall follow-up rate at T_2 was 55% (n=146), showing a 91 % recovery rate of T_1 participants.

Reasons for program dropout were either personal (health issues or life events) or program related (program activities ceased to exist). Reasons for not being willing to participate in follow- up measurements, given in 5% of cases, were: reluctance to fill out questionnaires in general, not being able to fill out the questionnaire by themselves, doubt about the relevance of the questions, and sometimes people told the researchers that there was no need, since 'nothing changes anyway'.

Information about the organisation of the CHEPA program and group composition was collected during each session by the researcher and assistants, reported in observational notes. Thus, information was gathered about the measurements, e.g., difficulties in understanding questions or concepts, as well as additional information on group developments and participants.

Data analysis

In order to investigate the effectiveness of CBHEPA programs comprehensively, addressing the question whether CBHEPA programs contribute to an increase in and maintenance of physical activity in socially vulnerable groups, we tested three hypotheses using a combination of statistical procedures (SPSS22). Alongside significance, effect sizes (Cohen's d and Pearson's *r*) were reported for the main outcomes of interest.

First, based on a rather traditional approach, we compared groups who participated for a year with groups which had just started. The hypothesis was: Participation in a CBHEPA program for one year leads to higher PA levels and health-related quality of life outcomes in its participants compared to starters (H1). A quasi-randomised control trial (RCT) design was used to measure change in PA behaviour and health-related quality of life outcomes between groups. The T_0 comparability of the different cohorts was first tested. Then baseline group means of cohort 4 (nine groups; n=91), treated as 'control group by proxy', were compared with T_2 group means after twelve months for cohorts 1 and 2 (four groups; n=38), using an independent *t*-test. It was decided to compare group means using independent t-tests to take into account the interdependency of observations within PA groups. Cohort 3 was not included in this analysis since the measurements overlapped with measurements in cohorts 1 and 2.

Second, we compared participants who remained active in the CBHEPA programs with those who were no longer active ('program dropouts'). The hypothesis was: CBHEPA participants perform better on physical activity and health-related quality of life outcomes than participants who dropped out of the CBHEPA program (H2). The Mann–Whitney U test was used to compare PA levels and health-related quality of life outcomes.

Third, since these types of analysis still did not provide for deeper insights in the main question whether CBHEPA programs contribute to an increase in and maintenance of physical activity in socially vulnerable groups over time, we developed an integrated multilevel model. The hypothesis was: Participation in a CBHEPA program leads to increase in and maintenance pf its participants' daily physical activity levels over time (H3). A longitudinal multilevel analysis was used to examine the growth model of PA levels over time. As a result of our data collection strategy, our dataset was characterised by intra-individual interdependencies in the repeated measurements, as well as inter-individual interdependencies in the group wise measurements. Therefore, multilevel modelling was used because it is less sensitive to absence of normality in the data and lack of independent sampling of participants and observations. It takes into account group interdependencies, which are considered of importance for effectiveness in CBHEPA programs [44, 62]. Another advantage of multilevel analysis of longitudinal data is its ability to handle missing data [63]. This includes the ability to handle models with varying measurement occasions [64, 65]. Unlike fixed occasion models, for example MANOVA, multilevel regression models do not assume equal numbers of observations, or fixed measurement occasions, so respondents with missing observations pose no special problems, and all cases can remain in the analysis. This is an advantage, because larger samples increase the precision of the estimates and the power of the statistical tests [44]. To deal with missingness, in our study we assumed data to be data missing at random (MAR), a indicating that the missingness may depend on other variables in the model, and through these be correlated with the unobserved values [44].

For our data, three levels were defined: intrapersonal, estimating variance of repeated measurements within individuals; interpersonal, estimating variance of fixed factors between individuals; and group level, estimating variance between groups (Table 3.3). Leisure-time physical activity (LTPA) was used as primary outcome indicator, since the CBHEPA programs included in our study offered leisure-time PA schemes. We therefore assumed that LTPA was a more sensitive indicator for change than overall PA behaviour. Since the outcome of LTPA was not normally distributed, we used a log transformed LTPA variable (LOG LTPA).

Table 3.3 Data definition for multilevel longitudinal analysis of PA behaviour

Variable	Level	Description	Values	Measurement
General				
Time of measurement	Within individual	Variable representing three linear occasions (at 6-month intervals) measuring PA and health-related quality of life variables	1= Measurement T_0; 2= Measurement T_1; 3= Measurement T_2	Scale
Participation in CBHEPA program	Between individual	Variable, identifying on-going CBHEPA participation or not	0= no; 1= yes	Nominal
Personal and socio-economic				
Resp	Between individual	A within group identifier representing each respondent (id, group, cohort)	11001 to 194010	Ordinal
Age	Between individual	Predictor variable, classifying age groups	1= < 50 years; 2= 50–64 years; 3= 65–74 years; 4= ≥75 years	Ordinal
Gender	Between individual	Predictor variable, identifying gender	0= women; 1= men	Nominal
Ethnic origin	Between individual	Predictor variable, identifying Dutch versus non-Dutch respondents	0= no; 1= yes	Nominal
Education low	Between individual	Predictor variable, identifying low versus not low educational level	0= no; 1= yes	Nominal
Health-related quality of life				
EQ index	Within individual	Predictor and outcome variable EuroQoL5D-3L, describing severity of complaints (mobility, pain, daily activities, anxiety)	-1–1	Scale
EQ-VAS	Within individual	Predictor and outcome variable, visual analogue scale representing perceived health	0–100	Scale
Tot. SoC	Between individual	Predictor variable, measuring sense of coherence (coping capacity)	3–9	Scale
Sport and physical activity				
LOG Tot LTPA	Within individual	Outcome variable (log transformed) measuring self-reported leisure-time PA behaviour, including sport and CBHEPA participation (minutes/week)	0.00–3.72	Scale
LOG Tot PA	Within individual	Outcome variable (Log Transformed) measuring total PA behaviour (minutes/week)	1.49–3.97	Scale
PA self-efficacy	Within individual	Predictor variable, 5-item scale measuring PA self-efficacy, using 5-point scale (fully disagree to fully agree)	5–25	Scale
PA enjoyment	Within individual	Predictor variable, 9-item scale measuring PA enjoyment, using 5-point scale (fully disagree to fully agree)	9–45	Scale
Group				
BG	Group	Group identifier variable	1-19	Ordinal
BG_type	Group	Variable identifying group characteristics in terms of program duration, trainer and group composition (men/women)	1= fixed, multiple trainers, homogeneous; 2= fixed, single trainer, homogeneous; 3= continuing, single trainer, homogeneous; 4= continuing, single trainer, heterogeneous	Nominal

Three-level regressions models were developed to assess change over time in LTPA (minutes/week) (Figure 3.2).

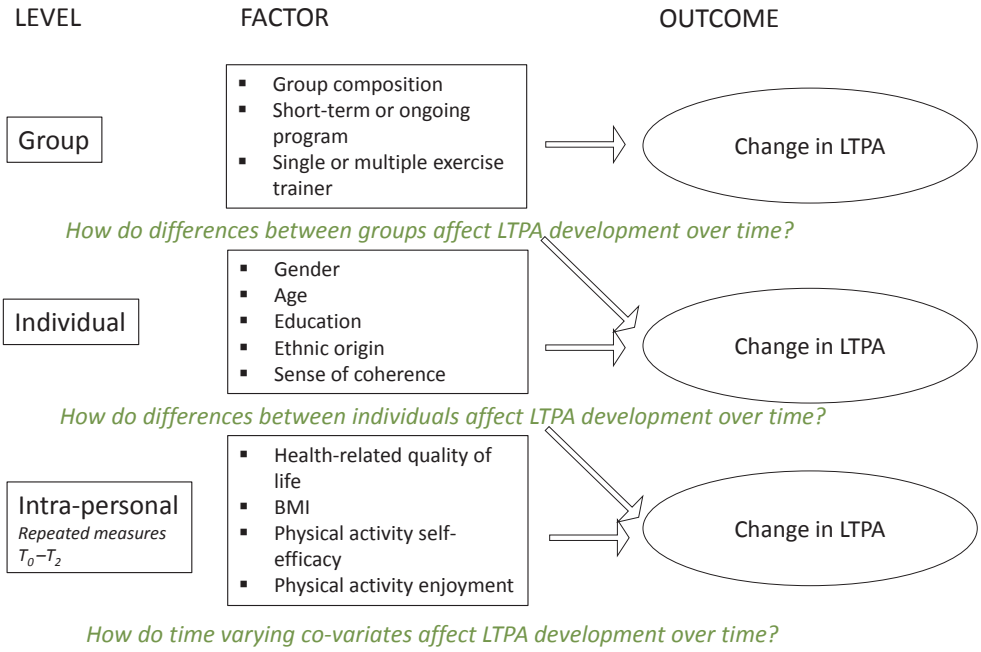

Figure 3.2 Multilevel perspective on change in LTPA through CBHEPA programs (after Heck et al. [66])

Forward multilevel modelling was used [62], starting with a null model based on LOG LTPA as outcome indicator, time (repeated measurements) and program participation. Interaction terms for time and program participation were included. Then stepwise fixed factors, such as gender, age, ethnic origin, educational level and program participation time were included, as well as SoC (coping ability), followed by time varying covariates for health-related quality of life, BMI, PA self-efficacy and PA enjoyment. Model estimation was based on the restricted maximum likelihood (REML). REML estimates the variance components after removing the fixed effects from the model. REML estimates have less bias than full maximum likelihood estimates, are more realistic and therefore thought to be more suitable when the number of groups is small [44]. As we were dealing with repeated measurements, we used the autoregressive structure (AR(1)) as first order covariance structure. For random effects, we used the scaled identity covariance structure [66]. The group level was defined as first level, since participants are nested within groups; the participants were defined as second level and the repeated measurements as third level. Parallel multilevel modelling procedures were conducted,

taking into consideration two different indicators for health-related quality of life: one for perceived health (EQ-VAS) and one for self-reported levels of health problems (EQ-Index). An example of the syntax developed for multilevel modelling in SPSS 22 is presented in the supporting information (S2).

The authors declare that the study was conducted in accordance with general ethical guidelines for behavioural and social research in the Netherlands, peer-reviewed and approved by the review board of the Wageningen School of Social Sciences. Guarantees of anonymity were given prior to each round of data collection. Participants were able to withdraw from the study at any time for any reason.

Results

Baseline health-related quality of life outcomes showed a mean EQ-Index score of 0.72 (*sd* 0.28). The majority of participants reported pain-related health complaints (69.2%). Mean perceived health (EQ-VAS) scored 70.24 (*sd* 15.74). Mean BMI scored 29.52 (*sd* 5.85). The majority (67.0%) had paid a visit to a care professional during the four weeks prior to the baseline measurement. Mean SoC (Cronbach's α=0.43) scored 6.98 (*sd* 1.33). Respondents' SoC-scores were categorised into people with a high SoC (14.3 %), a moderate SoC (51.2%) and a weak SoC (34.4 %).

Baseline sport and PA outcomes showed that mean overall PA level scored 1513 minutes/week (*sd* 1094). Most time was spent on household PA, on average 778.6 minutes/week (*sd* 848.3). Many participants (83.4%) were involved in LTPA (e.g., walking, cycling and gardening) at baseline, on average 355 minutes/week (*sd* 473). Fewer participants (43.3%) were involved in sports, on average 70.8 minutes/week (*sd* 140.4). The majority were not members of a sports club (75.9%). Prior to the baseline inquiry, over half of the participants (52.2%) had participated for less than three months in the CBHEPA program, 15.3% between three and six months, and 32.5% longer than six months. The majority (68.9%) participated once a week, 28.5% more than once a week and 2.6% less than once a week. Mean PA self-efficacy (scale 5–25; Cronbach's α=0.70) scored relatively highly: 20.12 (*sd* 3.97). Mean PA enjoyment (scale 9–45; Cronbach's α=0.73) scored also relatively highly: 39.9 (*sd* 6.1) (Table 3.4).

Table 3.4 Baseline health-related and PA outcomes for participants

Variable		N	%	Mean *(sd)*
Health-related Quality of Life				
EuroQoL 5D-3L *(% reporting complaints)*	Walking	101	38.5	
	Self-care	28	10.7	
	Daily activities	102	38.6	
	Pain	178	69.2	
	Anxiety	91	34.4	
EQ-Index (*scale -1–1*)		260		0.72 (*0.28)*
EQ-VAS (*scale 0–100*)		259		70.24 *(15.74)*
BMI (n=250)		250		29.52 *(5.85)*
Contact health professional *(past 4 weeks)*	Yes	179	67.0	
	No	88	33.0	
Sense of coherence *(scale 3–9)*	Strong SoC (score 9)	35	14.3	
	Moderate SoC (score 8–7)	125	51.2	
	Weak SoC (score 6–3)	84	34.4	
		244		6.98 *(1.33)*
Sport and physical activity				
Commuting PA *(min/week)*		268		40.2 (*125.3);* 0
Work-related PA *(min/week)*		268		181.5 *(483.9)*
Household-related PA *(min/week)*		268		778.6 *(848.3)*
Leisure-time PA (LTPA) *(min/week)*		268		355.1 *(472.5)*
Sport *(min/week)*		268		70.8 *(140.4)*
Total LTPA, incl. CBHEPA and sport *(min/week)*		268		507.8 *(517.6)*
Total PA *(min/week)*		268		1513.1*(1093.8)*
PA self-efficacy scale		242		20.12 *(3.97)*
PA enjoyment scale		239		39.9 *(6.1)*
Program participation at baseline	< 3 months	130	52.2	
	3–6 months	38	15.3	
	> 6 months	81	32.5	
Frequency program participation	< 1 x week	7	2.6	
	1 x week	184	68.9	
	2 x week	51	19.1	
	> 2 x week	25	9.4	
(Former) Sports club member	Yes	59	24.1	
	Former sport member	86	35.1	
	No, never	100	40.8	

Individual motivations to join a CBHEPA program were mostly health and physical fitness, followed by sociability, value attribution to physical activity, enjoying physical activity and weight loss. Participants often reported more than one motivation (Figure 3.3).

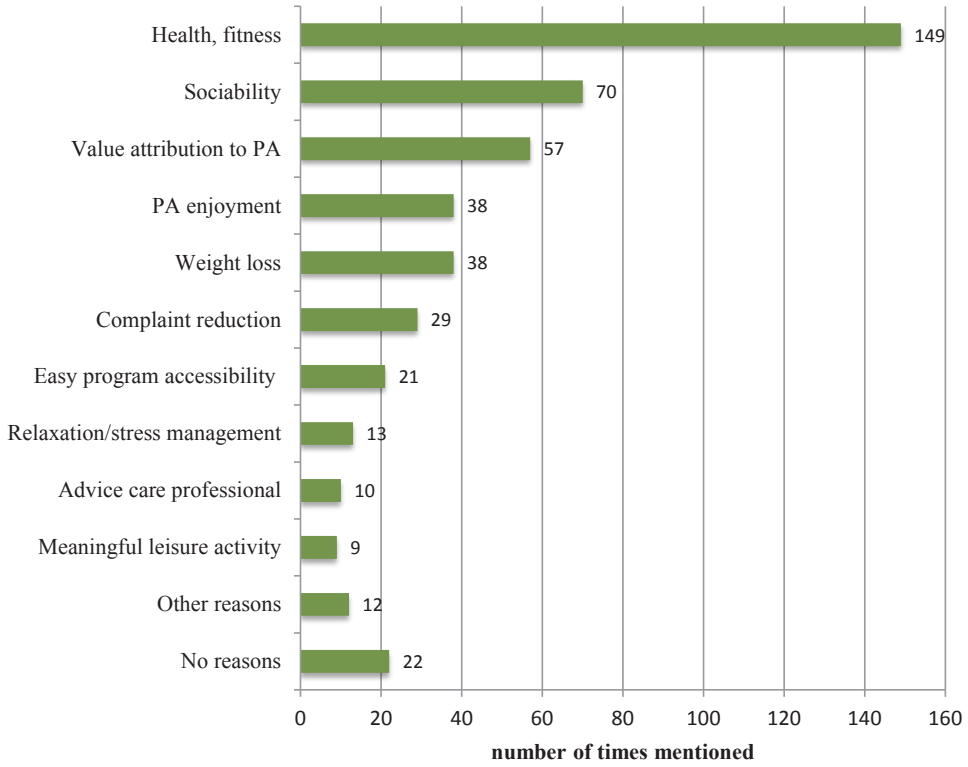

Figure 3.3 Self-reported participant motivations for joining CBHEPA programs (n=268)

Measuring effectiveness using a 'control group by proxy'

At baseline, no significant differences were found between cohorts 1, 2 (four groups; n=70) and cohort 4 (nine groups; n=91) for gender, age, income, and low and moderate educational levels (z-approximation of Mann–Whitney U test). High educational levels were significantly found more in groups of cohort 4 (z=2.27, p=0.024). For PA levels, no significant differences (t-test) were found between cohorts 1, 2 and 4 for baseline group means LOG LTPA (t(11): -0.04, p=0.97) and for group means (log transformed) total PA behaviour (t(11)-0.42, p=0.68) (Table 5). For health-related quality of life, no significant differences were found between cohorts 1, 2 and 4 in baseline group means for EQ-Index, EQ-VAS and BMI, indicating comparability in health-related conditions between the groups. Also, no significant differences were found between cohorts 1, 2 and 4 in baseline group means SoC scores and group means PA self-efficacy scores. For PA enjoyment, baseline group means scores were significantly lower in cohort 4 than in cohorts 1 and 2 (Table 3.5). The effect size (Cohen's d) was 1.5, indicating a large difference in self-reported PA enjoyment between the cohorts at baseline.

To measure the effectiveness of CBHEPA programs, the next step was to compare T_2 group means – measured after twelve months – of cohorts 1 and 2 (4 groups; n=38) with baseline group means of cohort 4 (9 groups; n=91) for PA and health-related quality of life outcomes (*t*-test). No significant differences were found between the 'active' and 'control group by proxy' for LOG LTPA ($t(11)$ 1.14, $p=0.28$) and (log transformed) total PA ($t(11)$ -0.57, $p=0.58$). Also, no significant differences were found for the health-related quality of life indicators EQ-Index, EQ-VAS, BMI and PA self-efficacy. For PA enjoyment, the T_2 group means scores were significantly higher after twelve months among the 'active' participants than in the groups just starting ($t(11)$ -4.85, $p=0.001$) (Table 3.5).The effect size (Cohen's d) was 2.9, nearly double the effect size at baseline, indicating a large effect.

We did not find evidence to support hypothesis (H1) that participation in a CBHEPA program for one year leads to higher physical activity levels and health-related quality of life among its participants compared to a starting control group. We did find, however, significant differences in PA enjoyment scores between groups in cohorts 1, 2 and 4 at baseline as well as at T_2.

Table 3.5 Group means comparison for cohorts 1, 2 and 4 at baseline (T_0) and at twelve months (T_2)

Variable	Cohort comparison	M	SE	t	df	p	Cohort comparison	M	SE	t	df	p
Health-related Quality of life												
EQ-Index	T_0 Cohort 1,2	0.75	0.04	-0.42	11	0.68	T_2 Cohort 1,2[c]	0.83	0.03	-1.31	11	0.22
	T_0 Cohort 4	0.71	0.06				T_0 Cohort 4	0.71	0.06			
EQ-VAS	T_0 Cohort 1,2	71.84	2.50	-0.54	11	0.60	T_2 Cohort 1,2	72.90	3.52	-0.71	11	0.49
	T_0 Cohort 4	68.99	3.29				T_0 Cohort 4	68.99	3.29			
BMI	T_0 Cohort 1,2	29.30	0.77	0.09	11	0.93	T_2 Cohort 1,2	27.68	0.54	1.62	11	0.13
	T_0 Cohort 4	29.40	0.66				T_0 Cohort 4	29.40	0.66			
Sport and physical activity												
Total leisure-time PA (LOG)	T_0 Cohort 1,2[a]	2.60	0.08	-0.04	11	0.97	T_2 Cohort 1,2	2.47	0.09	1.14	11	0.28
	T_0 Cohort 4[b]	2.60	0.07				T_0 Cohort 4	2.60	0.07			
Total PA (LOG)	T_0 Cohort 1,2	3.07	0.03	-0.42	11	0.68	T_2 Cohort 1,2	3.09	0.07	-0.57	11	0.58
	T_0 Cohort 4	3.03	0.07				T_0 Cohort 4	3.03	0.07			
PA self-efficacy	T_0 Cohort 1,2	20.58	2.58	-0.22	11	0.84	T_2 Cohort 1,2	18.94	1.29	0.77	11	0.46
	T_0 Cohort 4	20.13	0.86				T_0 Cohort 4	20.13	0.86			
PA enjoyment	T_0 Cohort 1,2	32.52	4.21	-2.50	11	0.03*	T_2 Cohort 1,2	37.69	3.00	-4.85	11	0.001***
	T_0 Cohort 4	24.19	1.34				T_0 Cohort 4	24.19	1.33			

[a] T_0 Cohort 1, 2 (4 groups, n=70); [b] T_0 Cohort 4 (9 groups; n=91); [c] T_2 Cohort 1, 2 (4 groups, n=38); *p<0.050; **p<0.010; ***p<0.001

CBHEPA participants versus program dropouts

Over the course of six months, between group comparisons showed that program dropouts scored significantly lower for LTPA in minutes/week (z=1.99, p=0.047) and perceived health status (EQ-VAS; z=2.88, p=0.004). No between group differences were found for overall PA, EQ–Index, BMI and contact with care professionals (Table 3.6).

Over the course of twelve months, between group comparisons showed that program dropouts continued to score significantly lower for LTPA (minutes/week) (z=2.94, p=0.003); for EQ-Index (z=2.07, p=0.039) – indicating that program dropouts more often reported (serious) complaints; for BMI (z=-2.17, p=0.030) – indicating higher BMI among dropouts; for PA self-efficacy (z=2.72, p<0.001); and PA enjoyment (z=3.71, p=0.007). Care consumption scored significantly higher among dropouts (z=-2.24, p=0.025). No between group differences were found for overall PA and EQ-VAS (Table 3.6).

We did find evidence to support the hypothesis (H2) that CBHEPA participants performed better on physical activity and health-related quality of life outcomes than participants who dropped out of the CBHEPA program. The hypothesis (H2) was confirmed at T_1 for perceived health and LTPA and at T_2 for LTPA, and for variables relating to self-reported health complaints, BMI and care consumption. At T_2 we also found significant differences for PA self-efficacy and PA enjoyment. For all but one indicators showing significant differences, effect sizes based on the z-scores (r) were small (r<0.20). PA enjoyment showed a medium effect size (r>0.30) (Table 3.6).

Table 3.6 Differences between participants (part) and program dropouts (pdo) in PA behaviour and health-related quality of life at T_1 and T_2 (*z*-approximation of Mann–Whitney U test)

	T_1							T_2						
Variable	**N total**	**N part**	**N pdo**	**Test stat**	***z***	***p***	**r[a]**	**N total**	**N part**	**N pdo**	**Test stat**	***z***	***p***	**r[a]**
Health-related quality of life														
EQ-Index	154	138	16	1261.5	0.95	0.343	0.08	141	117	24	1773.0	2.07	0.039*	0.17
EQ VAS	151	134	17	1620.5	2.88	0.004**	0.23	140	117	23	1683.5	1.93	0.053	0.16
BMI	142	128	14	782.0	-0.78	0.435	-0.70	135	113	22	879.0	-2.17	0.030*	-0.19
Contact care professional	156	139	17	910.0	-1.80	0.073	-0.15	144	120	24	1080.0	-2.24	0.025*	-0.19
Sport and physical activity														
Total leisure-time PA min/week	156	139	17	1531.0	1.99	0.047*	0.16	145	121	24	3004.5	2.94	0.003**	0.24
Total PA min/week	156	139	17	1231.0	0.28	0.778	0.02	145	121	24	1797.5	1.84	0.066	0.15
PA self-efficacy	-	-	-	-	-	-	-	135	114	21	1803.0	2.72	0.000***	0.23
PA enjoyment	-	-	-	-	-	-	-	140	117	23	1812.5	3.71	0.007**	0.31

- Not measured; r[a] effect size $r=z/\sqrt{N}$; *p<0.050; **p<0.010;***p<0.001

Increase in leisure-time physical activity over time

Tables 3.7 and 3.8 summarise the results of the three-level growth models for LTPA. Table 3.7 presents the results of the analysis of LOG LTPA as outcome variable with perceived health (EQ-VAS) as health-related quality of life indicator. Starting with the null model (M0), stepwise correction was made for gender, age, ethnic origin and low educational level. Age proved to be the only factor improving the fit of the model, based on a significant decrease in REML (not reported in the table), but this effect disappeared when the SES factors were clustered (M1). Participation time, i.e. how long people participated in the CBHEPA program prior to the evaluation study, significantly improved the fit of the model (M2).

Findings relating to the fixed effects at *intrapersonal* level in all models showed no significant within-subject differences in LOG LTPA at the three points of measurement. Time in interaction with program dropout in the full growth model (M8) showed a significant decrease in LOG LTPA among program dropouts compared to participants (E=-0.426, p< 0.050). After correction for SES variables, the change in LOG LTPA with perceived health showed a significant downward trend in the full growth model (M8) at T_1 and T_2 compared to baseline (F(2, 9.889, p<0.001). Differences between T_1 and T_2 were not significant.

Findings relating to the fixed effects at *interpersonal* level showed that women scored significantly lower at baseline on LOG LTPA (p<0.010) than men, but not in follow-up measurements. No significant differences were found between participants for age or ethnic origin. Findings relating to the full model (M8) for educational level suggested that LOG LTPA was significantly higher (p<0.050) among participants with higher educational levels, but that there was no significant difference in educational level between participants and program dropouts.

Table 3.7 Growth model for leisure-time physical activity (min/week) with perceived health (EQ-VAS)

Model	**M0**	**M1** **SES corrected**[a]	**M2** **Participation time**	**M3** **EQ-VAS**	**M4** **BMI**	**M5** **Total SoC3**	**M6** **PA self-efficacy**	**M7** **PA enjoyment**	**M8** **Group type**
	Estimate (s.e.)	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*
Fixed part									
Intercept	2.514 *(0.051)*	2.332 *(0.182)*	2.329 *(0.186)*	1.893 *(0.207)*	2.095 *(0.237)*	1.937 *(0.283)*	1.689 *(0.299)*	1.360 *(0.347)*	1.119 *(0.343)*
Level 1: Intrapersonal									
Time1	0.024 *(0.043)*	0.578 *(0.190)*	0.564 *(0.191)*	0.586 *(0.193)*	0.651 *(0.184)*	0.680 *(0.188)*	0.729 *(0.192)*	0.742 *(0.197)*	0.766 *(0.213)*
Time2	-0.032 *(0.046)*	-0.029 *(0.185)*	-0.051 *(0.186)*	0.017 *(0.184)*	0.130 *(0.177)*	0.127 *(0.180)*	0.133 *(0.183)*	0.134 *(0.183)*	0.142 *(0.201)*
Time3	*reference*								
Participation (no)	-0.460*** *(0.096)*	-1.330** *(0.464)*	-1.373** *(0.463)*	-1.391** *(0.459)*	-0.063 *(0.516)*	-0.201 *(0.534)*	-0.194 *(0.536)*	-0.093 *(0.543)*	-1.037 *(0.711)*
Time1*part.no	*All cases included*								
Time2*part.no	-0.015 *(0.136)*	-0.299* *(0.146)*	-0.362* *(0.152)*	-0.297* *(0.151)*	-0.107 *(0.143)*	-0.145 *(0.149)*	-0.143 *(0.150)*	-0.162 *(0.153)*	-0.426* *(0.194)*
Time3*part.no	*reference*								
Level 2: Interpersonal									
Gender (f)		0.099 *(0.146)*	0.083 *(0.149)*	0.086 *(0.144)*	0.052 *(0.143)*	0.061 *(0.145)*	0.040 *(0.146)*	0.056 *(0.149)*	0.041 *(0.148)*
Time1*Gend.(f)		-0.388** *(0.150)*	-0.373* *(0.151)*	-0364** *(0.151)*	-0.362* *(0.144)*	-0.374* (*0.146)*	-0.402** *(0.149)*	-0.410** *(0.152)*	-0.409** *(0.156)*
Time2*Gend.(f)		-0.194 (*0.142)*	-0.237 *(0.145)*	-0.213 *(0.143)*	-0.204 *(0.136)*	-0.207 *(0.138)*	-0.204 *(0.140)*	-0.194 *(0.140)*	-0.189 *(0.146)*
Time3*Gend (f)		reference							
Part.no*Gend (f)		-0.254 (*0.144)*	-0.220 *(0.273)*	-0.227 *(0.272)*	-0.218 *(0.252)*	-0.161 *(0.256)*	-0.176 *90.261)*	-0.232 *(0.263)*	-0.010 *(0.292)*

Table 3.7 - *Continued*

Model	**M0**	**M1** **SES corrected**[a]	**M2** **Participation time**	**M3** **EQ-VAS**	**M4** **BMI**	**M5** **Total SoC3**	**M6** **PA self-efficacy**	**M7** **PA enjoyment**	**M8** **Group type**
Ethnic origin		-0.050 *(0.098)*	-0.075 *(0.102)*	-0.046 *(0.099)*	-0.026 *(0.099)*	-0.011 *(0.102)*	-0.021 *(0.106)*	-0.012 *(0.110)*	0.002 *(0.119)*
Education low		0.162 *(0.085)*	0.162 *(0.086)*	0.171* *(0.086)*	0.163 *(0.083)*	0.156 *(0.084)*	0.179* *(0.086)*	0.198* *(0.089)*	0.215* *(0.091)*
Part.no* Educ. low (no)		0.130 *(0.203)*	0.108 *(0.202)*	0.122 *(0.205)*	-0.101 *(0.199)*	-0.018 *(0.216)*	-0.026 *(0.217)*	-0.051 *(0.230)*	0.040 *(0.244)*
Part.time < 3 months			0.087 *(0.067)*	0.081 *(0.061)*	0.126 *(0.064)*	0.120 *(0.066)*	0.075 *(0.070)*	0.102 *(0.074)*	0.192* *(0.082)*
Part.time 3–6 months			0.158 *(0.082)*	0.148 *(0.078)*	0.172* *(0.079)*	0.163* *(0.081)*	0.113 *(0.085)*	0.109 *(0.089)*	0.177 *(0.092)*
Part.time >3 months			*reference*						
Health-related									
EQ-VAS				0.005*** *(0.001)*	0.005*** *(0.001)*	0.004*** *(0.001)*	0.004** *(0.001)*	0.004** *(0.001)*	0.003* *(0.001)*
BMI					-0.007 *(0.004)*	-0.007 *(0.004)*	-0.005 *(0.004)*	-0.005 *(0.004)*	-0.004 *(0.004)*
Total SoC3						0.021 *(0.020)*	0.013 *(0.021)*	0.009 *(0.021)*	0.012 *(0.021)*
Sport and PA									
PA self-efficacy							0.014** *(0.005)*	0.010 *(0.005)*	0.013* *(0.005)*
PA enjoyment								0.011* *(0.004)*	0.011* *(0.004)*
Level 3: PA group									
PA group type 1									-0.433**(0.156)
PA group type 2									0.023 *(0.422)*
PA group type 3									-0.141 *(0.15)*
PA group type 4									reference
Random part									
Intercept (subj.= PA group)	0.016	0.007	0.012	0.006	0.012	0.013	0.014	0.019	0.011
Intercept (subj.=id*PA group)	0.057**	0.047	0.042	0.023	0.030	0.033	0.030	0.013	0.013
REML	676.78	595.70	570.85	554.27	512.99	510.88	501.41	484.33	483.53
ΔREML(df)[b]		81.08(24)	24.85(4)**	16.58(1)***	41.28(1)***	2.11(1)	9.47(1)**	17.08(1)***	0.8(11)

[a] SES successively corrected for gender, age, ethnic origin, low education; [b] Assessment model improvement using ΔREML(df) and χ^2-distribution; *p<0.050; **p<0.010; ***p<0.001

The time varying covariates in the successive models showed a significant improvement in the fit of the model at each step, except for SoC (M5), based on calculated differences in REML. This indicated that each covariate partly explained the variance in LOG LTPA. Perceived health (EQ-VAS) was significantly associated with higher levels of LOG LTPA in all models, whereas BMI and SoC were not. PA self-efficacy and PA enjoyment were also significantly associated with higher levels of LOG LTPA (p<0.050).

Findings relating to the fixed effects in the full model (M8) at *group* level showed that short CBHEPA programs (10–13 weeks) with multiple trainers, addressing gender homogeneous groups, were significantly associated with lower LOG LTPA levels whereas continuous CBHEPA programs with a single, known trainer, addressing gender-heterogeneous groups were not. Calculated effect sizes (Cohen's d) for the different group types at the three points in times showed a medium effect at T_0 (d=0.51), and small effects at T_1 (d=-0.12) and T_2 (d=0.07).

The variance of the intercepts between CBHEPA groups across the eight models was not significant, indicating that groups did not vary significantly in LTPA. The intercepts of participants (id) nested in PA groups, significant in the null model (M0), showed a gradual decline across the eight models. None of the included factors or covariates, however, significantly explained individual variance within groups (Table 3.7).

Table 3.8 presents the results of the parallel modelling of LOG LTPA as outcome variable with self-reported health complaints (EQ-Index) as health-related quality of life indicator. The estimation results for the models M0 to M2 were the same as reported in Table 3.7. Findings for modelling LOG LTPA and self-reported health complaints (EQ-Index) were similar to those for modelling LOG LTPA and perceived health (EQ-VAS). The full growth model (M8) for LOG LTPA with self-reported health complaints showed a significant downward trend at T_1 and T_2 compared to baseline (F(2,11.206), p<0.001). Differences between T_1 and T_2 were not significant.

Table 3.8 Growth model for leisure-time physical activity (min/week) with self-reported levels of health problems (EQ-Index)

Model	**M0**	**M1** **SES corrected**[a]	**M2** **Participation time**	**M3** **EQ-Index**	**M4** **BMI**	**M5** **Total SoC3**	**M6** **PA self-efficacy**	**M7** **PA enjoyment**	**M8** **Group type**
	Estimate (s.e.)	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*	*Estimate (s.e.)*
Fixed part									
Intercept	2.514 *(0.051)*	2.332 *(0.182)*	2.329 *(0.186)*	2.127 *(0.198)*	2.222 *(0.229)*	2.089 *(0.273)*	1.818 *(0.293)*	1.1449 *(0.344)*	1.511 *(0.336)*
Level 1: Intrapersonal									
Time1	0.024 *(0.043)*	0.578 *(0.190)*	0.564 *(0.191)*	0.545 *(0.192)*	0.611 *(0.134)*	0.638 *(0.187)*	0.698 *(0.192)*	0.714 *(0.167)*	0.761 *(0.212)*
Time2	-0.032 *(0.046)*	-0.029 *(0.185)*	-0.051 *(0.186)*	-0.067 *(0.189)*	0.053 *(0.182)*	0.068 *(0.184)*	0.070 *(0.186)*	0.078 *(0.186)*	0.084 *(0.202)*
Time 3	*reference*								
Participation (no) Time1*part.no	-0.460*** *(0.096)*	-1.330** *(0.464)*	-1.373** *(0.463)*	-1.447** *(0.461)*	-0.141 *(0.518)*	-0.227 *(0.532)*	-0.210 *(0.534)*	-0.113 *(0.542)*	-1.082 *(0.705)*
Time2*part.no	-0.015 *(0.136)*	-0.299* *(0.146)*	-0.362* *(0.152)*	-0.369* *(0.153)*	-0.159 *(0.146)*	-0.180 *(0.150)*	-0.169 *(0.151)*	-0.171 *(0.154)*	-0.482* *(0.195)*
Time3*part.no	*reference*								
Level 2: Interpersonal									
Gender (f)		0.099 *(0.146)*	0.083 *(0.149)*	0.095 *(0.147)*	0.058 *(0.144)*	0.063 *(0.146)*	0.048 *(0.147)*	0.067 *(0.150)*	0.036 *(0.148)*
Time1*Gend(f)		-0.388** *(0.150)*	-0.373* *(0.151)*	-0.397** *(0.150)*	-0.392** *(0.144)*	-0.397** *(0.145)*	-0.431** *(0.148)*	-0.439** *(0.152)*	-0.423** *(0.155)*
Time2*Gend(f)		-0.194 *(0.142)*	-0.237 *(0.145)*	-0.250 *(0.147)*	-0.238 *(0.140)*	-0.228 *(0.141)*	-0.226 *(0.142)*	-0.215 *(0.142)*	-0.191 *(0.148)*
Time3*Gend(f)		reference							
Part. no*Gend(f)		-0.254 *(0.144)*	-0.220 *(0.273)*	-0.176 *(0.271)*	-0.159 (*0.252*)	-0.126 *(0.258)*	-0.152 *(0.260)*	-0.209 *(0.263)*	0.038 *(0.290)*

Table 3.8 - *Continued*

Model	**M0**	**M1 SES corrected[a]**	**M2 Participation time**	**M3 EQ-Index**	**M4 BMI**	**M5 Total SoC3**	**M6 PA self-efficacy**	**M7 PA enjoyment**	**M8 Group type**
Ethnic origin		-0.050 *(0.098)*	-0.075 *(0.102)*	-0.072 *(0.101)*	-0.049 *(0.100)*	-0.036 *(0.102)*	-0.041 *(0.106)*	-0.031 *(0.111)*	-0.032 *(0.119)*
Education low		0.162 *(0.085)*	0.162 *(0.086)*	0.153 *(0.086)*	0.148 *(0.083)*	0.138 *(0.084)*	0.161 *(0.085)*	0.185* *(0.089)*	0.218* *(0.090)*
Part. no* Educ. low (no)		0.130 *(0.203)*	0.108 *(0.202)*	0.129 *(0.200)*	-0.091 *(0.195)*	-0.047 *(0.211)*	-0.054 *(0.212)*	-0.055 *(0.224)*	0.054 *(0.237)*
Part.time <3 months			0.087 *(0.067)*	0.106 *(0.065)*	0.149* *(0.065)*	0.141* *(0.067)*	0.093 *(0.071)*	0.112 *(0.075)*	0.208* *(0.082)*
Part.time 3–6 months			0.158 *(0.082)*	0.179* *(0.080)*	0.202* *(0.079)*	0.187* *(0.081)*	0.130 *(0.086)*	0.124 *(0.090)*	0.198 *(0.093)*
Part.time >3 months			reference						
Health-related									
EQ-Index				0.276** *(0.083)*	0.288**(0.082)	0.287** *(0.084)*	0.250** *(0.087)*	0.207* *(0.092)*	0.216* *(0.091)*
BMI					-0.006 (0.004)	-0.005 (0.004)	-0.004 (0.004)	-0.003 (0.004)	-0.002 (0.004)
Total SoC3						0.016 *(0.020)*	0.009 *(0.021)*	0.008 *(0.021)*	0.009 *(0.021)*
Sport and PA									
PA self-efficacy							0.014** *(0.006)*	0.012* *(0.005)*	0.014* *(0.005)*
PA enjoyment								0.011* *(0.004)*	0.010* *(0.004)*
Level 3: PA group									
PA group type 1									-0.461** *(0.154)*
PA group type 2									-0.031 *(0.419)*
PA group type 3									-0.105 *(0.154)*
PA group type 4									reference
Random part									
Intercept (subj.= PA group)	0.016	0.007	0.012	0.010	0.014	0.016	0.016	0.021	0.011
Intercept (subj.=id*PA group)	0.057**	0.047	0.042	0.041	0.041	0.040	0.038	0.023	0.022
REML	676.78	595.70	570.85	556.95	512.28	506.16	497.01	479.16	475.34
ΔREML(df)[b]		81.08(24)	24.85(4)**	13.9(1)**	44.67(1)***	6.12(1)*	9.15(1)**	17.85(1)***	3.82(11)

[a] SES successively corrected for gender, age, ethnic origin, low education; [b] Assessment model improvement using ΔREML(df) and χ^2-distribution ; *p<0.050; **p<0.010; ***p<0.001

Findings relating to the fixed effects at *intrapersonal* level in all models showed no significant within-subject differences in LOG LTPA at the three points of measurement. Time in interaction with program dropout in the full model (M8) showed a significant decrease in LOG LTPA in program dropouts compared to participants (E= -0.42, p< 0.050).

Findings relating to the fixed effects at *interpersonal* level showed that women scored significantly lower at baseline on LOG LTPA (p<0.010) than men, but not in follow-up measurements. No significant differences were found between participants for age or ethnic origin. Findings relating to the full model (M8) for differences in educational level suggested that LOG LTPA was significantly higher (p<0.050) among participants with higher educational levels, but that there was no significant difference in educational level between participants and program dropouts.

The time varying covariates in the successive models showed that lower scores on self-reported health complaints were significantly associated (p<0.050) with higher levels of LOG LTPA in all models, whereas BMI and SoC were not. PA self-efficacy and PA enjoyment were both significantly associated (p<0.050) with higher levels of LOG LTPA. SoC did, however, improve the fit of the model significantly (M5), indicating that SoC explained part of the variance in this model.

Findings relating to the fixed effects in the full model (M8) at *group* level were similar to those for the model LOG LTPA with perceived health: short CBHEPA programs (10–13 weeks) with multiple trainers, addressing gender homogeneous groups, significantly associated with lower LOG LTPA levels whereas continuous CBHEPA programs with a single, known trainer, addressing gender-heterogeneous groups were not. The development of the intercepts of CBHEPA groups across the eight models was similar to the pattern reported for the modelling of LOG LTPA and perceived health described above, as were the values for effect sizes (Cohen's d) for the different group types at the three points in time.

In relation to the REML values in the parallel growth models for the two health-related quality of life indicators, the growth model for LOG LTPA with EQ-Index (REML=475.34) showed a slightly better fit of model than the LOG LTPA with EQ-VAS (REML=483.53). It is possible that perceived health is more strongly correlated with the other factors and covariates included in the model, such as BMI, SoC, PA self-efficacy and PA enjoyment, than EQ-Index.

We did not find evidence to confirm the hypothesis (H3) that participation in a CBHEPA program leads to an increase in its participants' leisure-time physical activity levels over time. The positive association over time between health-related quality of life outcomes, physical activity self-efficacy and enjoyment, and leisure-time physical activity is, however, supported in the multilevel regression model.

Discussion

In order to evaluate the effectiveness of group-based CBHEPA programs, the aim of this study was to assess whether or not CBHEPA programs contribute to increasing and maintaining physical activity in socially vulnerable groups over time. Based on a combination of statistical analyses, our findings do not univocally support the proposition that participation in a CBHEPA program leads to an increase in overall PA levels (quasi-RCT) or an increase in leisure-time PA at participant level after twelve months, as was hypothesised. The multilevel models showed significant positive associations between individual factors, such as higher education and being female, and leisure-time PA. Women scored significantly lower at baseline than men, but the gender-related difference in PA was not found in follow-up measurements. No significant differences were found between participants for age or, somewhat surprisingly, for ethnic origin. Health-related quality of life, PA self-efficacy and PA enjoyment were intrapersonal time varying covariates, significantly associated with higher levels of physical activity. Short CBHEPA programs (10–13 weeks) with multiple trainers were group-related factors associated with lower leisure-time PA over time compared to participants in on-going CBHEPA programs with a known, single trainer.

At twelve months, leisure-time PA levels of program dropouts were significantly lower compared to continuing participants, as were health-related quality of life, PA self-efficacy, and PA enjoyment outcomes. BMI and care consumption also scored significantly higher among dropouts. On the basis of our findings, it seems that intrapersonal time varying covariates are more relevant in explaining PA maintenance than interpersonal characteristics (e.g., gender, age or ethnic origin) or group level characteristics.

Population reached

A first aspect relating to CBHEPA program effectiveness is whether or not the intended target population is reached. Socio-economic baseline data show that a majority of CBHEPA program participants have low educational levels (48.6%), low income (52.4%) and low employment rates (11%), compared to Dutch population data. Statistics Netherlands shows that 27% of the general population is lowly educated (no, or only primary, school), 10% have low income, and over 90% are employed [67-69]. Likewise, health-related quality of life indicators at baseline are lower than comparative research outcomes in Dutch population groups [58], and participants show a weaker SoC compared to other Dutch studies [70]. With an average BMI of 29.5 found in CBHEPA participants, the majority of the target group are overweight or obese. BMI data for the general population show 30% overweight (BMI 25–30) and 14% (BMI>30) obesity for women, and 47% overweight and 13% obesity for men [71]. BMI values require, however, a nuanced perspective since 32% of the CBHEPA participants are older than 65 years and over 60% are of non-Dutch origin, including a substantial

number of participants from Asiatic backgrounds. The literature indicates that BMI is less appropriate as a measure for overweight in older and/or Asian population groups [72-74]. In terms of socio-economic and health-related quality of life outcomes at baseline, CBHEPA programs reach the intended target group (Table 3.9).

Table 3.9 Comparison of CBHEPA participants at baseline with Dutch population data

Variable	CBHEPA participants	Dutch population	Source
Socio-economic			
Low education (%)	48.6	27	[67]
Low Income (%)	52.4	10	[68]
Employment %)	11.6	92	[69]
Health-related Quality of Life			
EQ index (-1–1) (mean)	0.72	0.89 (55–65 years)	[58]
EQ-VAS (0–100) (mean)	70.2	80.7 (55–65 years)	[58]
BMI >25 (%)			[71]
women	75	44	
men	82	60	
Sense of Coherence (%)	Strong: 14.3 Moderate: 51.4 Weak: 34.3	Strong: 18.6 Moderate: 60.3 Weak: 21.1	[70]
Sport and physical activity			
PA (*minutes/day*)	216	18–65 years: 202 ≥65 years: 130	[5]

Overall PA levels, at an average of 216 minutes per day, are not low compared to Dutch trend analyses on sport and PA (Table 3.9). The latest trend report describes an increase from 169 to 202 minutes for Dutch adults (age 15–64) spent in PA during 2000–2011, mainly resulting from an increase in light and moderate intensity activities (in particular activities at work/school and at home). For older people (age 65 plus), there was an increase in PA from 100 to 130 minutes [5]. Our findings indicate that more than half of younger CBHEPA participants (< 65 years) were less active compared to the age-specific Dutch reference value (202 min/day) at all measurement points, whereas a majority of older CBHEPA participants (≥ 65 years) were more active compared to the age-specific Dutch reference value (130 min/day). These results suggest that CBHEPA programs reach both relatively inactive and active people. In terms of physical activity,

it seems that, compared to the reference physical activity levels for adults, CBHEPA programs reach more inactive younger people (< 65 years) than inactive older people (≥ 65 years).

Increase in PA levels over time?

A second aspect regarding CBHEPA program effectiveness is whether or not CBHEPA programs contribute to increasing and maintaining physical activity in socially vulnerable groups over time. Our findings do not show an increase over time. What is more, a significant decrease compared to baseline was observed. An American longitudinal multilevel study on community-based PA (neighbourhood walking) similarly reported a downward trend in PA over time [75]. There are several possible explanations for our findings.

First, for practical reasons of recruitment, participants were included at baseline only after the start of a CBHEPA program. Some programs had already existed for a number of years. At baseline, half of the participants had been active in the program for three months or more, resulting in the absence of genuine baseline data for PA and health-related quality of life.

Second, all data were assessed with self-report measures. For measuring PA, this is considered less reliable than an objective measure like an accelerometer [76]. We did not find, however, validated objective measurement instruments suitable for our target group, interpretable without additional self-report measures such as those collected with SQUASH. Self-report measures may also induce a question–behaviour effect: asking questions about a behaviour may change the behaviour in question [77, 78]. This usually leads to bias in a socially normative direction. During the repeated measurements, participants may have become also more experienced in answering the questions and at the same time may have developed a more realistic perspective on their own PA behaviour and health-related quality of life. A meta-analysis, though, found the question–behaviour effect on health-related behaviour to be rather small [79].

Third, the absence of an expected increase in leisure-time PA can be explained from a time allocation perspective. People tend to allocate only a certain amount of time daily to leisure time activities in general, and to PA or sport more particularly. This perspective is elaborated in the SLOTH model —a time-budget model incorporating Sleep, Leisure, Occupation, Transportation and Home-based activities— identifying possible economic factors of influence on individuals' choices about utilisation of time in relation to PA behaviour and maintenance [80, 81].

PA maintenance in participants and program dropouts

Comparison of the multilevel models for the two health-related quality of life indicators reveals that perceived health (EQ-VAS) is possibly stronger correlated with other factors explaining leisure-time PA, such as BMI, SoC, PA self-efficacy and PA enjoyment,

than self-reported health complaints (EQ-Index). Both models, however, offer solid indications that PA maintenance is strongly related to health-related quality of life on the one hand, and PA self-efficacy and PA enjoyment on the other. These findings are in line with other studies showing evidence for the interrelatedness of health and PA behaviour [8] and the role of (post) motivational factors in PA maintenance [29, 35, 36].

Our findings indicate that leisure-time PA, health-related quality of life indicators, BMI, PA self-efficacy, and PA enjoyment score worse among program dropouts. One explanation is that health impairments are the main reason given for participants to quit the program. Dutch CBHEPA programs targeting socially vulnerable groups may, therefore, need to focus on actions to prevent lapses resulting from health complaints, and help people cope with risk situations for lapses, thus enforcing program adherence and PA maintenance [27, 82].

Group level characteristics

Our findings show that group effects do have an impact on (leisure-time) PA behaviour and maintenance. Short CBHEPA programs (10–13 weeks) with multiple trainers, addressing gender-homogeneous groups, were significantly associated with lower leisure-time PA levels than on-going CBHEPA programs with a single, known trainer, addressing gender-heterogeneous groups. The observed decline in effect sizes over time may be a result of the fact that participants of short-term programs may have been less represented in the follow up measurements. The findings from this quantitative multilevel study are, however, supported by several qualitative studies on group effects, indicating that group dynamics, group composition and social support, and exercise trainer characteristics contribute substantially to effective PA programs [38, 39, 83, 84].

Methodological issues

Our findings should be interpreted in the context of several strengths and limitations. A first strength of our study is that we evaluated on-going field practice, rather than conducting an experimental setup, to investigate the determinants of PA behaviour and maintenance in socially vulnerable groups. Creating controlled experimental conditions are of limited value to contribute substantially to a (practice based) body of evidence needed to understand what works for whom in CBHEPA programs [45, 85, 86]. For example, the use of adequate control groups can be problematic, since matching for non-observable differences such as initial motivation, is not easily done. Therefore, our study locked onto natural experiments —the CBHEPA programs— by design. Natural experiments have an important contribution to make to the health and PA inequalities agenda, including assessment of effective interventions, an area which is acknowledged as lacking an evidence-base [87]. In our experience, the sequential cohort design, in which the intervention effects are measured repeatedly using the T_0 measurements as point of reference, proves a feasible approach. In addition, it offers the possibility to

compare between cohorts, i.e. in our case between program adherents and starters [44].

A second strength is the use of multilevel modelling in this study to monitor physical activity development over time in socially vulnerable groups. Multilevel analysis and repeated measurements are not often used to assess CBHEPA program effectiveness, and our use of these techniques adds to the commonly used individual-level research design paradigm [25, 75]. The inclusion of intra-individual factors (covariates), as well as inter-individual and group-level factors contributes to the strength of the study.

A third strength is the longitudinal nature of the study, addressing a critical need for data on patterns of PA behaviour and maintenance and how these may change over time. As some researchers indicate, a multilevel perspective allows researchers to identify significant and potentially modifiable factors, and this in turn can inform policy changes and facilitate the design of interventions to change health and PA behaviour at societal level [25, 88].

Limitations to our study relate first to the limited number of determinants of potential influences on PA behaviour in socially vulnerable groups, included in our data collection. Given our target group, we were challenged to balance our information needs and the target group's responsive capacity and competences. Questionnaire use can be difficult in socially vulnerable groups. Lack of health literacy, lack of basic skills in reading and writing and different beliefs about health concepts across cultures may lead to difficulties in understanding and interpreting the questions [47, 89], eventually leading to non-response [88]. Alternatives, however, such as translations, working with images or digital devices, suffer similar limitations [90, 91]. During our study, we did experience a number of these barriers in data collection. Steps were taken to deal with response difficulties by limiting the number of questions reducing the number of indicators, or by choosing restricted scales, such as the SoC three-item instead of the SoC thirteen-item instrument [51]. It thus forced us to limit ourselves to collect information about the most important explanatory factors for PA behaviour and maintenance found in CBHEPA programs, such as health-related quality of life, PA self-efficacy and PA enjoyment. Using a personalised data collection strategy [47], advocated by CBHEPA professionals and practitioners, was successful in reaching out to and inclusion of a satisfactory number of participants. We cannot, however, rule out the fact that other contextual influences (e.g., family situation, community or neighbourhood), not included in our study, may also have been important in explaining PA behaviour and maintenance. In particular, neighbourhood factors have been found to play a significant role in PA and other health behaviours [92].

A second limitation relates to the validity of the standardised instruments compiled in our questionnaire, when using them in our target group. The SQUASH instrument in particular was perceived as complicated by participants, because of its number of items and the seven-day recall structure. Moreover, participants had (to be able) to reflect on their PA behaviour and make time calculations. To tackle this

issue, we monitored the data collection procedure closely throughout our study by making observational notes, and by reviewing the forms for missing items, illegible handwriting, inadequate answers and logical inconsistencies among responses after each data collection session. Errors thus identified were resolved by checking back with the participant, the trainer or the assistant [93].

A third limitation of our study relates to potential sources for bias. Recruitment of participants, done in collaboration with practice and on voluntary basis, may have suffered from a selection bias. Only people willing to participate were included. It also resulted in a lack of genuine baseline data, since the researcher could not contact participants before PA groups had started. Similarly, in comparing participants and program dropouts, a selection bias may have plaid a role, as we relied on people willing to fill out questionnaires after having quit the CBHEPA program.

The survey settings, usually the PA group setting at the sports venue, may have influenced people's responses. Using the sport venue, however, as communal factor throughout the study has contributed to minimising this bias. In addition, using the multilevel analysis helped to correct for possible interdependencies in responses within groups.

Future research

Over the past decade, the ecological perspective has gained ground as a new paradigm in research on PA behaviour and maintenance [19, 94-96]. It is to be expected that this will lead to more transdisciplinary research [97] and the use of hierarchical data structures and multilevel statistical procedures [25, 75, 88]. What our study shows is that studying socially vulnerable groups from the perspective of PA and health inequalities, applying multilevel modelling, still suffers from highly abstracted social concepts to make them measurable and interpretable. Concise, interpretative mixed-method research, combining quantitative and qualitative research data in one study, could help identify the contextualised explanatory factors for particular groups in more detail, hence improving the accuracy of statistical procedures [98].

Conclusion

Dutch CBHEPA programs reach relatively socially vulnerable, but not necessarily inactive, groups, in terms of socio-economic and health–related quality of life outcomes. No increase in leisure-time physical activity behaviour could be observed over time, but health-related quality of life, self-efficacy and enjoyment were found to contribute to physical activity maintenance. A decrease became manifest in physical activity as well as in health-related quality of life-related outcomes among dropouts. Our findings suggest that CBHEPA programs contribute to physical activity maintenance in socially vulnerable groups. These programs should, therefore, be valued for their potential in encouraging program adherence, rather than being made accountable for increasing physical activity.

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S1: Table 1 Overview of variables measured over time in relation to PA behaviour

Variable	Mode of measurement	# Items	Scale	Reference	T_0	T_1	T_2
Personal							
Sex	What is your gender?	1	2-point scale: 0= female; 1=male	[48]	x		
Age	What is your birth year?	1	continuous	[48]	x		
Ethnic origin	What is your country of birth? If not born in the Netherlands, how long do you live in the Netherlands (years)?	1 1	Open ended continuous	[48]	x		
Socio-economic							
Income	What is your net monthly household income?	1	5-point scale: =1000 euro or less…5=I don't know/not willing to say	[48]	x		
Education	What is your highest certified educational level?	1	3-point scale: 1=no/primary; 2=secondary; 3=higher/ university	[48]	x		
Health-related quality of life							
Personal motivation	What was your main reason to join the CBHEPA program?	1	open-ended		x		
Health related Quality of Life	EuroQoL 5D-3L	5	3-point scale: 1=no complaints; 2= moderate complaints; 3= severe complaints	[56]	x	x	x
	EQ-Index, computed based on EuroQoL 5D-3L	1	Continuous, ranging from -1 to 1	[58]	x	x	x
	Visual analogue scale (EQ-VAS)	1	0 - 100 rating scale	[56]	x	x	x
Sense of Coherence (SoC3)	'Do you usually see solutions to problems and difficulties that other people find hopeless?' (*manageability*) 'Do you usually feel that your daily life is a source of personal satisfaction?' (*meaningfulness*) 'Do you usually feel that the things that happen to you in your daily life are hard to understand?'(*comprehensibility*).	3	3-point scale:3=yes, usually; 2= yes sometimes; 1=no *Cronbach;'s α:0.43*	[51, 52, 53]	x		
Physical activity							
SQUASH modified	Work related physical activity	2	Continuous (minutes/week)	[54, 55]	x	x	x
	Work related commuting	3	Continuous (minutes/week)		x	x	x
	Household related physical activity	2	Continuous (minutes/week)		x	x	x
	Leisure time physical activity (walking, cycling, gardening, do-it-yourself activity)	4	Continuous (minutes/week)		x	x	x
	Do you do any additional sport?	4	Continuous (minutes/week)		x	x	x
Sport participation	Are you a (former) member of a sport club?	1	3-point scale, 1=yes; 2= no, but I used to; 3= No, never		x		
CBHEPA Program participation	Since when do you participate?	1	3-pointscale: 1=less than 3 months; 2=3-6 months;3=longer than 6 months		x		
	How many times a week do you participate?	1	4-pointscale: 1=less than 1x week; 2=1xweek …; 3=over 2xweek		x		
PA self-efficacy	"I am confident that I am able to participate in the PA program during the coming months." (…when I am tired …: when I have pain/complaints..; when I return holiday; … when the program stops…).	5	5-point scale: 5=strongly agree; … 1= strongly disagree *Cronbach;'s α:0.70*	[60]	x		x
PA Enjoyment	Short Physical Activity Enjoyment Scale (PACES) "when I exercise or sport, I enjoy it/I feel bored/ hate it/is it fun/feel good physically while doing it."	9	5-point scale: 5=strongly agree; … 1= strongly disagree *Cronbach;'s α:0.73*	[61]	x		x

S2: Multilevel analysis using SPSS 22 Mixed Model: examples of the syntax

NULL MODEL (M0)

```
MIXED LOG_Tot_LTPA BY Time Participation
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1)
SINGULAR(0.000000000001) HCONVERGE(0,
ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001,
ABSOLUTE)
/FIXED= Time Participation Time * Participation | SSTYPE(3)
/METHOD=REML
/PRINT=G SOLUTION TESTCOV
/RANDOM=INTERCEPT | SUBJECT(BG) COVTYPE(ID)
/RANDOM=INTERCEPT | SUBJECT(BG*id) COVTYPE(ID)
/REPEATED= Time | SUBJECT(BG*id) COVTYPE(AR1)
/EMMEANS=TABLES(Time) COMPARE ADJ(LSD)
/EMMEANS=TABLES(Participation) COMPARE ADJ(LSD).
```

FULL MODEL (M8)

```
MIXED LOG_Tot_LTPA BY Time Participation Gender Age_CAT Dutch_Origin
Low_Educ DuurRC PA_Group WITH
EQ_Index BMI Tot_SoC3RC SETOTR Tot_PA_Enjoy
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1)
SINGULAR(0.000000000001) HCONVERGE(0,
ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001,
ABSOLUTE)
/FIXED= Time Participation Time*Participation Gender Time*Gender Participation
* Gender
Age_CAT Time * Age_CAT Participation * Age_CAT Dutch_Origin Time * Dutch_
Origin Participation * Dutch_Origin Low_Educ Time * Low_Educ
Participation * Low_Educ DuurRC EQ_Index BMI Tot_SoC3RC SETOTR Tot_PA_
Enjoy PA_Group Time * PA_Group
Participation * PA_Group | SSTYPE(3)
/METHOD=REML
/PRINT=G SOLUTION TESTCOV
/RANDOM=INTERCEPT | SUBJECT(BG) COVTYPE(ID)
/RANDOM=INTERCEPT | SUBJECT(BG*id) COVTYPE(ID)
/REPEATED=Time | SUBJECT(BG*id) COVTYPE(AR1)
/EMMEANS=TABLES(Time) COMPARE ADJ(LSD)
/EMMEANS=TABLES(Participation ) COMPARE ADJ(LSD)
/EMMEANS=TABLES(Time * Gender )
```

CHAPTER 4

Predictors of willingness to pay for physical activity of socially vulnerable groups in community-based programs

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Abstract

Background: Willingness to pay (WTP) is used to assess individuals' value attribution to health-related quality of life interventions. Little is known about predictors of WTP for sport and physical activity in socially vulnerable groups in community-based physical activity (CBHEPA) programs. This study addresses the questions: What is the WTP for sport and physical activity of participants in CBHEPA programs, expressed in WTP_{money} and WTP_{time}? Which factors predict WTP_{money} and WTP_{time}?

Method: From the literature, predictors for WTP for sport and physical activity were identified: 1) personal and socio-economic predictors: income, education, age, and ethnic origin, 2) health-related predictors: perceived health, life satisfaction, sense of coherence, self-efficacy, 3) sport and physical activity-related predictors: duration and frequency of participation, leisure-time sport or physical activity, sport club membership, enjoyment, and membership fee. Data were gathered for WTP_{money} and WTP_{time} (n=268) in 19 groups in an evaluation study of CBHEPA programs. Ordered probit was used for analyses.

Results: WTP_{money} was a monthly average of €9.6. WTP_{time} was on average 17.6 minutes travel time. Income was found as predictor for both WTP_{money} and WTP_{time}. Other predictors for WTP_{money} were: duration and frequency of program participation, enjoyment, and (former) sport club membership. Low income and younger age were found as predictors for WTP_{time}.

Conclusions: Predictors for WTP_{money} are related to income and sport and physical activity experiences, for WTP_{time} to income and age. Short-term program satisfaction is probably more decisive for WTP_{money} than long-term perspectives of improving health-related quality of life.

Background

Physical inactivity has been identified by the World Health Organisation as the fourth leading risk factor for global mortality, causing globally an estimated 3.2 million deaths per year [1, 2]. Health disorders associated with inactivity, including impaired health-related quality of life as well as direct and indirect economic costs, exert a substantial burden on societies and health systems [3]. In the Netherland, socially vulnerable groups, e.g., those with low socio-economic status (SES), unemployed or of non-Dutch origin, are less engaged in sport and physical activity than higher SES groups [4, 5]. In response to the observed inequalities, Dutch policy has been to promote community-based health-enhancing physical activity (CBHEPA) programs in order to improve the health and wellbeing of socially vulnerable groups [6, 7]. Approximately €60m are spent on campaigns, research, and institutions to promote healthy and active lifestyles, and healthy social and physical environments [8, 9]. In 2010, (local) sports-related government expenditures were ca. €3.5bn, spent on exploitation costs, maintenance of sports facilities and subsidy schemes enhancing sport and physical activity [10]. A substantial portion of the subsidy schemes is dedicated to enhancing physical activity behaviour in socially vulnerable groups. Not much is known, however, about the extent to which socially vulnerable groups are able and willing to invest in sport or physical activity by themselves in order to achieve active and heathy lifestyles.

Over the past two decades, the contingent valuation method (CVM), asking people's stated preferences for a good or a health service [11], is being used more often in health economics research to assess value attribution at individual level to health-related quality of life interventions [12-18]. CVM assumes a direct relationship between the amount of money or time invested and the health benefits experienced [19]. Assessment of willingness to pay (WTP) is a relatively easy CVM to study perceived benefits at individual level of CBHEPA programs. WTP reflects the extent to which people are willing to pay for positive health improvements [14, 20]. Usually, WTP is expressed in monetary terms (WTP_{money}). Willingness to spend time travelling to sport and physical activity (WTP_{time}) – which in transportation models is seen as a disutility that should be minimised – should be regarded as an additional estimator of positive value attribution [21], since it expresses willingness to make an effort to participate.

Relevant literature on WTP for recreational sport and physical activity is, however, fairly limited. Johnson et al. (2007) argued that published CVM studies of sports public goods have mostly focused on WTP for professional or spectator sports [22]. The fact that governments also subsidise other sport and physical activities, such as amateur and recreational sport or CBHEPA programs, is usually not taken into account. The underlying idea of these subsidy schemes is that participation in sport and recreational physical activities is supportive to the development of social capital by contributing to community bonding, hence enhancing quality of life in a community [23-25]. It may also improve the health and well-being of participants and reduce health-care costs [22, 26].

In view of these expected societal benefits, it is unclear whether predictors for WTP for health improvements also predict WTP for sport and physical activity in CBHEPA programs. In this study we use WTP as a particular measure to assess value attribution to the experienced benefits of CBHEPA programs by individual participants, in addition to physical activity and health-related outcome measures, in order to contribute to a broader recognition of the (non)sense of government investments in CBHEPA programs. In order to assess the capacity and willingness to invest in sport and physical activity of socially vulnerable groups, our study addresses the following questions: What is the WTP for sport and physical activity of participants in CBHEPA programs in terms of money and time (WTP_{money} and WTP_{time})? Which factors predict WTP_{money} and WTP_{time}?

Predictive factors for WTP for sport and physical activity

Little is known about predictors for WTP for sport and physical activity. WTP values drawn from a CVM survey are determined by personal and behavioural characteristics of the respondent and characteristics of the service specified [27]. Regarding personal and behavioural characteristics, studies on WTP for health improvements indicate that personal and socio-economic factors as well as health-related quality of life factors are relevant predictors [28-30]. Regarding service characteristics, sport and physical activity behaviour and program-related factors may be relevant predictors. For our study, we assume that factors predicting health-related quality of life may be relevant for predicting WTP for health improvements, and factors predicting WTP for health improvements may be relevant for WTP for sport and physical activity.

1) *Personal and socio-economic predictors* relate to an individual's non-behavioural conditions, setting the boundaries for individual demand. Some studies suggest that WTP is positively related to *income* [31, 32], others report no significant relationships [33, 34]. In line with a utilitarian perspective, WTP for sport and physical activity is expected to increase with increasing income. Some studies also suggest that WTP is positively related to *educational level* [32]. More highly educated people are generally more *health literate*, i.e. more knowledgeable on healthy lifestyles and potential risk factors [35]. Some studies suggest that WTP is negatively related to *age*, indicating that older people are less willing to pay for health improvements than younger people [32, 33, 36]. In addition, socially vulnerable groups tend to become less healthy and active with increasing age [37, 38]. Studies on the relation between WTP and *ethnic origin* seem scarce. A negative relationship between WTP and ethnic origin can be assumed, since ethnic origin is related to impaired health [39, 40] and higher levels of physical inactivity [5, 41].

2) *Health-related quality of life predictors* relate to an individual's behaviour and perceived health benefits. Although many instruments, consisting of different components, have been developed to measure health-related quality of life [42], less

is known about the relation of each component to WTP for health improvements or sport and physical activity. Components of health-related quality of life that may be relevant for WTP for sport and physical activity are perceived health status [43, 44], life satisfaction [45, 46], the ability to cope with life stressors [44, 47], and self-efficacy relating to physical activity behaviour [48-50]. Several studies suggest a positive relationship between WTP for health improvements and *perceived health* status [13, 19, 51, 52], whereas others report no significant relationships [53]. A positive relationship between WTP for health improvements and *life satisfaction* can be exepcted, since life satisfaction is positively related to health-related quality of life and physical activity. Furthermore, we expect a positive relationship between WTP for health improvements and the ability to cope, or *sense of coherence* (SoC). SoC relates to the way people cope with life stressors and is highly correlated with health-related quality of life [54]. Similarly, we expect a positive relationship between WTP and *self-efficacy*, i.e. one's confidence in one's ability to manage and succeed in specific situations [55], since previous studies show that self-efficacy is positively related to health-related quality of life and physical activity [28, 29, 44, 48, 49]. To our knowledge, however, no previous studies include life satisfaction, sense of coherence, or self-efficacy in WTP research.

3) *Sport and physical activity-related predictors* relate to individual behaviour in relation to CBHEPA program characteristics. Recreational literature based on experience use theory suggests that WTP is positively related to *duration and frequency of participation* in a certain activity or program [56, 57]. Some studies suggest that WTP is positively related to experiences in *leisure-time sport* and *(former) sports club membership* [48, 58, 59]. People who are or were member of a sport club are more willing to pay for leisure-time sport and physical activity than people with no history in sports [28], and are good estimators of the costs. McCarville et al. [60] indicate that the level of membership fee can be regarded as the reference fee. In our study, we also include *enjoyment* as a variable, since some studies suggest that people engage in sport and physical activity for pleasure rather than for health benefits [61, 62]. Therefore, we expect a positive relation between enjoyment and WTP. To our knowledge, no previous studies include enjoyment in WTP research.

Based on this overview, the expected relations between the main predictive factors and WTP for sport and physical activity are summarised in Table 4.1.

Method

Participants

We studied respondents' WTP_{money} and WTP_{time} in on-going Dutch CBHEPA programs, summarised under the denominator 'Communities on the Move' (CoM). CoM was developed and disseminated by the Netherlands Institute for Sports and Physical Activity (NISB) from 2003 to 2012. Since 2012, there has been an on-going

evaluation study of CoM (Herens et al. 2013). CBHEPA groups were recruited to participate in the evaluation study in collaboration with NISB and local CBHEPA program representatives (purposive sampling). CBHEPA groups were selected on the basis of their participants' socio-economic criteria (income, education, employment status). A total of 268 respondents were included, active in 19 CBHEPA groups (10–20 participants) distributed over seven Dutch municipalities. Assuming an average group size of 15, the estimated response rate was 94%.

Table 4.1 Summary of expectations for WTP for sport and physical activity

Cluster	Predicting factor	Known predictor for health-related quality of life and physical activity	Known predictor WTP health improvements	Expectation
Personal and socio-economic	Income	+	+/-	Income is positively related to WTP_{money} and WTP_{time}
	Educational level	+	+	Educational level is positively related to WTP_{money} and WTP_{time}
	Age	+	+/-	Age is negatively related to WTP_{money} and WTP_{time}
	Ethnic origin	+	?	Non-Dutch origin is negatively related to WTP_{money} and WTP_{time}
Health-related quality of life	Perceived health status	+	+	Individual perceived health status is positively related to WTP_{money} and WTP_{time}
	Life satisfaction	+	?	Life satisfaction is positively related to WTP_{money} and WTP_{time}
	Sense of coherence	+	?	Sense of coherence is positively related to WTP_{money} and WTP_{time}
	Self-efficacy	+	?	Self-efficacy is positively related to WTP_{money} and WTP_{time}
Sport and physical activity	Duration	+	?	Duration of participation in the CBHEPA program is positively related to WTP_{money} and WTP_{time}
	Frequency	+	?	Frequency of participation is positively related to WTP_{money} and WTP_{time}
	Physical activity enjoyment	+	?	Physical activity enjoyment is positively related to WTP_{money} and WTP_{time}
	Leisure-time physical activity	+	?	Additional leisure-time physical activity is positively related to WTP_{money} and WTP_{time}
	Leisure time sport	+	?	Additional leisure-time sport is positively related to WTP_{money} and WTP_{time}
	Sports club membership	+	+	(Former) Sports club membership is positively related to WTP_{money} and WTP_{time}
	Membership fee	?	?	Paying membership fee is positively related to WTP_{money}

+: known relation; -: known lack of relation; ?: unknown relation

Data collection

Standardised paper-and-pencil questionnaires were developed for evaluating CoM. Data collection for WTP_{money} and WTP_{time} formed an integral part of the standardised questionnaire. WTP_{money} and WTP_{time} were measured using ordinal closed-ended questions. WTP_{money} was measured as the maximum amount (in whole euro's) people were willing to spend monthly on sport and physical activity (nine-point scale: (1) 0 euro; (2) 1-5 euro; (3) 6-10 euro; … (9) more than 35 euro, namely ….). WTP_{time} was measured as the maximum time (in minutes) people were willing to spend on travel time to the sport venue (Pawlowski et al. 2009) (nine-point scale: (1) 0 minutes; (2) 1-5 minutes; (3) 6-10 minutes; … (9) more than 35 minutes, namely ….). The closed-ended data collection was chosen based on the assumption that it provided for simplicity and uniformity, suitable for use in the diversity of socially vulnerable groups in CBHEPA programs.

Data on socio-economic indicators (age, income, education, employment status, living conditions) were measured in accordance with standardised questions of the Local and National Monitor Public Health in the Netherlands [64].

Health-related quality of life data were measured using: a visual analogue scale for perceived health (EQ-VAS), ranging from 0 to 100 [65]; Cantril's ladder for life satisfaction, ranging from 0 to 10 [66, 67]; and the SoC three-item, three-point scale for sense of coherence [68, 69]. Questions were: *Do you usually see solutions to problems and difficulties that other people find hopeless?* (manageability), *Do you usually feel that your daily life is a source of personal satisfaction*? (meaningfulness) and *Do you usually feel that the things that happen to you in your daily life are hard to understand?* (comprehensibility).

Sport and physical activity behaviour were measured using the validated Short Questionnaire for Sport and Physical Activity (SQUASH), measuring self-reported work-related, domestic, leisure-time and sport-related physical activities in minutes per week [70, 71]. Physical activity enjoyment was measured using a nine-item, five-point scale, translated and adapted from the Physical Activity Enjoyment Scale [62]. Statements were for example: *When I do exercise or sports, I enjoy it*, or *When I do exercise or sports, I feel bored*. Self-efficacy for physical activity behaviour was measured using a six-item, five-point scale [72]. Statements were for example: *I am confident that I am able to continue to participate in the physical activity program during the coming months*, and *I am confident that I am able to continue to participate in the physical activity program when I am tired*.

Questionnaires were individually filled in during or after a group training session at the sports venue. Informed consent was arranged orally on the spot and confirmed in writing. The researcher explained the purpose of the study at each session. Both the researcher and trained assistants helped respondents who had difficulty filling out the questionnaire by giving instructions or by adopting an interview style. The number of assistants varied with group composition: from one for groups with only

Dutch native speakers to a maximum of five in groups with migrant respondents. Dutch was the working language, since ethnic diversity within groups was large (>10 countries of origin). Interpretation, if needed, was provided by an assistant or a fellow group member from a similar background, sufficiently proficient in Dutch. Completion of the questionnaire took on average 30–35 minutes. After filling out the questionnaire, respondents received a small treat.

Data analysis

The dependent variables WTP_{money} and WTP_{time} were recoded into seven categories. Assumptions for normality were explored. The income variable was recoded and tested with a Pearson chi-square test to check for the assumption that it could be used as independent test variable, despite the fact that 28.1% of the respondents did not specify income (not knowing, not wanting to). There was no significant association between WTP_{money} categories and whether or not respondents had specified their income (χ^2 = 6.208; p>0.05); this led to the conclusion that income could be used in the model.
The variables for age and education were recoded into categories, and assumptions for normality were checked. The scale variables Physical Activity Enjoyment Scale (Cronbach's α=0.87) and self-efficacy (Cronbach's α=0.69) were calculated, recoding each item into the same direction, and excluding system missing values. An ordered probit analysis was used (SPSS22) to assess factors predicting WTP_{money} and WTP_{time}. The different expectations for WTP_{money} and WTP_{time} were tested, using p< 0.10 as the upper limit for statistical significance [73, 74].

The authors declare that the study was conducted in accordance with general ethical guidelines for behavioural and social research in the Netherlands. Participation was on a voluntary basis and guarantees of anonymity were given prior to each data collection session.

Results

Descriptive statistics

A total of 268 respondents were included, 86.6% women and 13.4% men, with a mean age of 58.6 years old (*sd* 14.0). One third of the respondents (35.4%) were of Dutch origin, 64.6 % of non-Dutch origin, living on average 25.5 years in the Netherlands (*sd* 11.4). About 25% had a household income less than €1,000/month, and 26.6% had a household income less than €1,350/month. Nearly half had low educational levels (48.6%). The majority were not professionally employed (88.1%).

Mean score on the health-related visual analogue scale (EQ-VAS scale: 0–100) was 70.2 (*sd* 15.7), indicating reasonably good perceived health. Mean score for life satisfaction (scale: 0–10) was 7.8 (*sd* 1.5). Most participants had a weak (34.3%) or moderate (51.4%) SoC, and 14.3% had a strong SoC. Mean score on the scale for

self-efficacy (scale: 6–30) was 22.6 (*sd* 5.9), indicating fairly high levels of self-efficacy. Mean score on the Physical Activity Enjoyment Scale (scale 9–45) was 14.0 (*sd* 6.0), indicating high levels of physical activity enjoyment. About half of the respondents (52.8%) participated less than three months in the CBHEPA programs, 47.2% participated more than three months. The majority (68.9%) exercised once a week, 28.5% exercised more frequently. Fifty percent of the respondents paid a membership fee for the CBHEPA program, 50% participated for free (Table 4.2). Membership fees ranged from €2.50 to €15.40, with an average of €6.95 (*sd* €4.64).

Table 4.2 Characteristics of WTP respondents

Variable		Value
Predictors relating to personal conditions		
Gender (n=268)		
	Women	86.6%
	Men	13.4%
Age (n=253)		
	Mean *(sd)*	58.6 *(14.0)*
	Range	26.64 – 90.64
Ethnic origin (n=268)		
	Dutch	35.4%
	Non-Dutch*	64.6%
Predictors relating to socio-economic conditions		
Income (n=256)		
	< € 1,000	25.4%
	€1,001 - €1,350	26.6%
	€1,351 - €1,800	12.1%
	> €1,800	7.8 %
	income not specified	28.1%
Education (n=256)		
	No/primary education	48.6%
	Secondary education	42.4%
	College/university education	9.0 %
Predictors relating to health-related quality of life conditions		
EQ-VAS (0–100) (n=259)		
	Mean *(sd)*	70.24 *(15.74)*
	Range	0–100
Life satisfaction (0–10) (n=262)		
	Mean *(sd)*	7.78 *(1.49)*
	Range	1–10
Sense of coherence (SoC3) (n=245)		
	Strong SoC (3)	14.3%
	Moderate SoC (4–5)	51.4%
	Weak SoC (6–9)	34.3%
Self-efficacy scale (n=242)		
	Mean *(sd)*	22.56 *(5.85)*
	Range	8–30
Predictors relating to sport and physical activity		
Participation duration in CBHEPA program (n= 254)		
	< 3 months	52.8%
	3–6 months	15.4%
	> 6 months	31.9%
Frequency (n=267)		
	< 1 x week	2.6 %
	1 x week	68.9%
	2 x week	19.1%
	> 2 x week	9.4 %
Physical Activity Enjoyment Scale (n=250) *(Low score = high level of enjoyment)*		
	Mean *(sd)*	14.04 *(5.98)*
	Range	9–44
(Former) Sports Club member (n=245)		
	Yes	59.2%
	No	40.8%
Leisure-time physical activity yes/no/ (n=265)		
	Yes	85.3%
	No	14.7%
Leisure-time sport yes/no (n= 264)		
	Yes	42.8%
	No	57.2%
Membership fee yes/no (n=267)		
	Yes	50.2%
	No	49.8%

* Number of countries of origin: 29

Willingness to pay for sport and physical activity

The average monthly WTP_{money} was €9.6 (*sd* 10.6) (Table 4.3). Variation in responses was fairly large. Over 16% of the respondents were not willing to pay at all for sport and physical activity, mostly respondents in free CBHEPA programs. A little over 25% were willing to pay to a maximum of €5 per month, 45.5% between €6 and €20; 13.0% were willing to pay more than €20. The maximum WTP_{money} reported was €80 (n=1). The average WTP_{time} was 17.6 minutes (*sd* 15.1) single journey travel time (Table 4.3). Two thirds reported a maximum willingness to travel of between 5 and 20 minutes. The maximum WTP_{time} reported was 120 minutes (n=1) to attend competition matches.

Table 4.3 WTP for sport and physical activity across groups

Variable	Amount	Respondents (%)
WTP_{money} (€/month) (n=261)	€ 0	16.4
	€ 0–1	3.1
	€ 2–5	22.1
	€ 6–10	19.5
	€ 11–15	16.8
	€ 16–20	9.2
	> € 20	13.0
	Mean	9.6 (*sd* 10.6)
	Median	7.5
WTP_{time} (minutes/single-journey) (n=246)	0–1	2.0
	2–5	6.4
	6–10	16.9
	11–15	27.7
	16–20	17.3
	21–25	7.2
	> 25	22.5
	Mean	17.6 (*sd* 15.1)
	Median	12.5

Factors predicting willingness to pay for sport and physical activity

The dependent ordinal variables WTP_{money} and WTP_{time} were entered in an ordered probit model in SPSS22. Predictors measured as ordinal or categorical variables were entered as factors, predictors measured as scale variables were entered as covariates. Cases with missing values were excluded from analysis.

As expected for WTP_{money} (n=176), our findings showed that low income (< €1,000) was negatively related to WTP_{money}, whereas perceived health (EQ-VAS) was positively related to WTP_{money}. We also found that duration (> 3 months) and frequency

of participation (1x week or more), actual or former leisure-time sport participation, and physical activity enjoyment were positively related to WTP_{money} (Table 4.4). Contrary to our expectations, we found no relationships between educational level or ethnic origin and WTP_{money}, between life satisfaction, self-efficacy or SoC and WTP_{money}, and no relationship between leisure-time physical activity and WTP_{money} (Table 4.4).

As expected for WTP_{time} (n=172), our findings showed that low income (< €1, 000) was negatively related to WTP_{time}. Contrary to our expectations, age was positively related to WTP_{time}. People younger than 50 years of age were less willing to travel for a longer time than people over 50 years of age. Contrary to our expectations, other personal and socio-economic predictors, the health-related and the sport and physical activity-related predictors did not seem relevant for predicting WTP_{time} (Table 4.4).

Table 4.4 Ordered probit estimates of predictors for WTP for sport and physical activity

Variable		WTP_{money}	(N=176)	WTP_{time}	(N=172)
Personal and socio-economic		**Estimate**	***sd***	**Estimate**	***sd***
Income					
	< € 1,000	-0.750	*0.434**	1.154	0.424***
	€1,001 - €1,350	-0.027	*0.413*	0.374	*0.404*
	€1,351 - €1,800	0.302	*0.499*	0.100	*0.496*
	> € 1,800	0.381	*0.665*	0.197	*0.656*
	not specified	*reference group*		*reference group*	
Educational level (low)		0.040	*0.315*	-0.442	*0.314*
Age					
	< 50 years	-0.805	*0.550*	-0.935	*0.549**
	50–64 years	-0.508	*0.521*	0.064	*0.518*
	65–75 years	-0.0131	*0.543*	0.317	*0.547*
	>75 years	*reference group*		*reference group*	
Ethnic origin (Dutch or Non-Dutch)		-0.621	*0.426*	0.401	*0.413*
Health-related quality of life					
EQ-VAS		0.016	*0.010**	0.013	*0.010*
Life satisfaction		0.004	*0.099*	0.128	*0.096*
Sense of coherence (SoC3)					
	Weak SoC	0.325	*0.511)*	-0.222	*0.500*
	Moderate SoC	0.250	*0.478*	-0.302	*0.457*
	Strong SoC	*reference group*		*reference group*	
Self-efficacy scale		-0.032	*0.030*	0.006	*0.031*
Sport and physical activity					
Duration of participation					
	< 3 months	-0.849	*0.435**	-0.181	*0.391*
	3–6 months	-0.684	*0.516*	0.046	*0.496*
	6–12 months	0.337	*0.539*	-0.851	*0.560*
	> 1 year	*reference group*		*reference group*	
Physical Activity Enjoyment Scale		-0.048	*0.026**	0.035	*0.026*
Frequency					
	< 1 x week	-2.920	*1.152***	-0.199	*0.892*
	1 x week	-0.297	*0.518*	-0.650	*0.525*
	2 x week	-0.351	*0.546*	-0.458	*0.538*
	> 2 x week	*reference group*		*reference group*	
Leisure-time physical activity (no)		-0.098	*0.478*	-0.713	*0.475*
Leisure-time sport (no)		-0.604	*0.315**	-0.419	*0.317*
Sports club membership					
	(Former) member	-0.801	*0.344***	-0.361	*0.339*
	Never	*reference group*		*reference group*	
Membership fee (no)		-0.064	*0.362*	--	--
-2Log Likelihood		548.914		558.589	
Nagelkerke's pseudo R^2		0.393		0.199	

*p<0.10; **p<0.05; ***p<0.01

In sum, sport and physical activity program-related predictors were more relevant for predicting WTP_{money} than socio-economic or health predictors. Also, leisure-time physical activity did not seem relevant. For WTP_{time}, only two of the socio-economic predictors, income and age, seemed to be relevant. Young age is related to lower WTP_{time}. The expectation is confirmed for the lowest income level (<€1,000) that income predicts WTP in terms of time and money. Educational level and ethnic origin seem unrelated to WTP, as well as sense of coherence, leisure-time physical activity, and paying membership fee (Table 4.5).

Table 4.5 Summary of results for WTP for sport and physical activity

Cluster	Predicting factor	**Expectation**	**Who will be more likely to spend money on sport and physical activity?**	**Who will be more likely to spend travel time on sport and physical activity?**	**Expectation WTP accepted**
Personal and socio-economic	Income	Income is positively related to WTP	**Those with household incomes higher than €1,000/month**	**Those with household incomes higher than €1,000/month**	Yes $WTP_{money/time}$
	Educational level	Educational level is positively related to WTP	No difference between no, low, or high educational levels	No difference between no, low, or high educational levels	No
	Age	Age is negatively related to WTP	No difference between younger and older age	**Those who are over 50 years of age**	No, significant in opposite direction WTP_{time}
	Ethnic origin	Non-Dutch origin is negatively related to WTP	No difference between those of Dutch and non-Dutch origin	No difference between those of Dutch and non-Dutch origin	No
Health and wellbeing	Perceived health status	Individual perceived health status is positively related to WTP	**Those who score higher on perceived health status**	No difference between those who score low or high on perceived health status	Yes WTP_{money}
	Life satisfaction	Life satisfaction is positively related to WTP	No difference between those who score low or high on life satisfaction	No difference between those who score low or high on life satisfaction	No
	Sense of coherence	Sense of Coherence is positively related to WTP	No difference between those who score low or high on SoC	No difference between those who score low or high on SoC	No
	Self-efficacy	Self-efficacy is positively related to WTP	No difference between those who score low or high on self-efficacy	No difference between those who score low or high on self-efficacy	No
Sport and physical activity program	Duration	Duration of participation in the CBHEPA program is positively related to WTP	**Those who participate more than three months**	No difference between those who participate a shorter or longer period	Yes WTP_{money}
	Frequency	Frequency of participation is positively related to WTP	**Those who participate once a week or more**	No difference between those who participated less or more frequently	Yes WTP_{money}
	Physical activity enjoyment	Physical activity enjoyment is positively related to WTP	**Those who score higher on physical activity enjoyment**	No difference between those who score low or high on physical activity enjoyment	Yes WTP_{money}
	Leisure-time physical activity	Additional leisure-time physical activity is positively related to WTP	No difference between those who are or are not additionally physically active in leisure time	No difference between those who are or are not additionally physically active in leisure time	No
	Leisure-time sport	Additional sport in leisure-time is positively related to WTP	Those who do additional sport in leisure time	No difference between those who do or do not do additional sport in leisure time	Yes WTP_{money}
	Sports club membership	(Former) Sport membership is positively related to WTP	**Those who are or used to be engaged in sport**	No difference between those who are or did not used to be engaged in sport	Yes WTP_{money}
	Membership fee	Paying membership fee is positively related to WTP	No difference between those who are or are not paying a membership fee for the CBHEPA program	*No expectation tested*	No

Discussion

We conducted this study to assess the WTP for sport and physical activity of participants in CBHEPA programs targeting socially vulnerable groups, expressed in money and time. Furthermore, we explored which factors predict WTP for sport and physical activity. We found relatively low WTP_{money} values, with a monthly average of less than €10. This can be explained by the fact that around half of our study population represent, as intended, the lowest income levels in the Netherlands [75]. WTP research indicates that WTP is associated with a person's ability to pay, in other words, person's income [20, 32, 53]. The fact that particularly the lowest income category (< €1,000) relates negatively to WTP suggests that the association between WTP for sports and physical activity in higher income groups might be more strongly related to other factors.

Respondents' average WTP_{time} is around 17 minutes of single journey travel time. Our findings are consistent with other studies. A Dutch study reported a value for willingness to travel to sport facilities of 15 minutes [59]. A German study reported values for willingness to travel ranging from 16 to 35 minutes among adult sports consumers [58]. This same study suggests that willingness to travel is related to type of sport and competition enrolment, and to how people prioritise their sport and physical activities.

In selecting variables to include in this study, we expected that predictors of health-related quality of life and physical activity behaviour would also predict WTP for sport and physical activity. However, we found several differences. As expected, the *personal and socio-economic predictors,* income and age, are related to WTP_{money}. Low income (<€1,000) is significantly negatively related to both WTP_{money} and WTP_{time}. However, contrary to our expectations and findings of other studies [36], age (<50 years) is negatively related to WTP_{time}. Probably, younger people face higher opportunity costs, i.e. benefits that could have been gained from an alternative use of the same resources (time and money) [40], having to balance their time between household obligations, work, and leisure time. We did not find a relationship with other personal and socio-economic predictors, educational level or ethnic origin.

Of the *health-related quality of life* predictors, we found that perceived health is positively related to WTP_{money}. This is consistent with other studies [13, 19]. We did not, however, find a relationship between WTP and life satisfaction, self-efficacy, and coping abilities (SoC). As mentioned before, we included these factors because they are well-known predictors of health-related quality of life and physical activity behaviour [28, 29]. Possibly, the reciprocal relationships between these factors have clouded our analysis used to study their relation to WTP for sport and physical activity.

Sport and physical activity-related predictors are most strongly related to WTP_{money} – in particular how long and how often people participate in the program – and leisure-time sport experiences. On the basis of social cognitive theory, it can be argued that people who are or were members of a sports club have the knowledge and

positive experience with sport. They might have more positive attributions to sport [50, 76] and are used to paying for sport [77].

Our findings also indicate that respondents' WTP_{money} exceeds the actual membership fee by approximately one third (€2.64). This suggests that socially vulnerable groups attribute positive value to sport and physical activity in CBHEPA programs [11]. On the other hand, we found a substantial percentage (16%) of participants not willing to pay at all for sport and physical activity, in particular those enrolled in free CBHEPA programs. Future research could explore further whether or not respondents' characteristics differ between those who were willing to pay and those who were not.

It may be argued that short-term program satisfaction is probably more decisive for WTP_{money} than long-term perspectives of improved health. Our findings indicate a possible time preference effect, i.e. an individual's preference balancing between direct satisfaction from certain behaviour versus possible negative health consequences in the future [78]. Socially vulnerable groups generally show higher time preferences, focusing substantially on their wellbeing in the present, than high SES groups who place more emphasis on their wellbeing in the future [79]. In this respect, our findings suggest that sport and physical activity program-related predictors best explain WTP for sport and physical activity, since these relate to actual physical activity experiences and short-term benefits. Physical activity enjoyment is an example of such a short-term benefit, as opposed to other positive health benefits (i.e. weight loss), which are future gains and therefore hard to predict [61, 62, 80]. Our findings are consistent with research by Romé et al. [32], who concluded that people report the highest WTP for immediate health improvements.

Assessment of WTP is presented in the health economics literature as a relatively easy method to study perceived benefits at individual level of health-related quality of life interventions in different communities and different contextual settings [51]. Compared to assessing quality-adjusted life years (QALYs), estimating individual WTP has indeed some advantages, as stated in the literature: 1) WTP is theoretically grounded in welfare economics, 2) WTP does not need specification of which parts of the intervention need to be valued by respondents, and 3) WTP values express benefits in monetary terms [31, 34, 81]. We faced, however, some methodological challenges in assessing WTP in socially vulnerable groups. First, about 16% of our respondents are not willing to pay for sport and physical activity, and the lowest income level is negatively related to WTP, indicating that answers are probably more reflective of people's actual income positions than of their willingness to pay [82]. As a result, our study might underestimate rather than overestimate WTP_{money} values. Second, Hagberg and Lindholm [82] state that less educated respondents may show less understanding of the real and hypothetical situations as examined in WTP. This is consistent with our observations during the study, in which respondents occasionally seemed unable to distinguish between what they could afford and what they were willing to pay for

sport and physical activity. It is also consistent with the negative relationship we found between WTP and low income. Third, respondents may have responded strategically in the hope that their answers would influence the actual pricing of their CBHEPA programs, as has been found in other studies [11, 27].

We addressed the methodological challenges by using closed-ended WTP questions. As the WTP data collection was integrated in a more comprehensive questionnaire to evaluate CBHEPA program outcomes, we tried to keep questions concerning different topics as concise and clear as possible, in view of our target group. Questionnaire use can be difficult in socially vulnerable groups. Lack of health literacy, lack of basic skills in reading and writing, and different beliefs about (health) concepts across cultures may lead to difficulties in understanding and interpreting the questions [83], eventually leading to non-response [84]. This approach contributed to clarity and uniformity of data collection procedures within and between groups. On the other hand, our predefined WTP response categories may have limited people's choice. Group-wise data collection may also have had an impact on individual WTP responses. In line with recommended procedures for WTP data collection, suggested by Smith [27, offering the necessary specifications of the context and the service that people are valuing, our data collection in context, i.e. during the exercise class, contributes to the methodological robustness of our WTP study.

Conclusion

Our assumptions that factors predicting health-related quality of life and WTP for health improvements may be relevant for predicting WTP for sport and physical activity are not unequivocally supported in this study. People from socially vulnerable groups, active in CBHEPA programs, are willing to pay for sport and physical activity, albeit low amounts. WTP in terms of money is significantly related to income and (former) experiences in sport and physical activity. WTP in terms of travel time is significantly related to income and age. Our findings for WTP for sport and physical activity are in line with studies reporting that WTP is not responsive to changes in health over time, indicating that health improvements over time do not simply result in a positive change in WTP (Harris et al. 2013). Income and short-term program satisfaction are probably more decisive for WTP_{money} than long-term perspectives of improving health-related quality of life. Awareness of these factors predicting WTP could contribute to future policy and development of CBHEPA programs, focusing on service provision to enhance people's behavioural competences for physical activity maintenance and program satisfaction rather than aiming at long-term health improvements.

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CHAPTER 5

Exploring participant appreciation of group-based principles for action in community-based physical activity programs for socially vulnerable groups in the Netherlands

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Abstract

Background: Physical inactivity is a core risk factor for non-communicable diseases. In the Netherlands, socially vulnerable groups are relatively less active than groups with higher socio-economic status. Community-based health-enhancing physical activity (CBHEPA) programs aim to empower socially vulnerable groups by improving participants' health and wellbeing through physical activity. CBHEPA programs often revolve around group-based principles for action, such as active participation, enjoyment, and fostering group processes. As such principles are rarely made explicit, our study aims to identify which of the group-based principles for action are perceived as important by participants.

Methods: Respondents (n=76) from ten focus groups scored their individual appreciation of group-based principles for action – active participation, enjoyment, and fostering group processes – on a three-point, statement-based scale. Opinions were further discussed in the focus group. Focus group discussions were transcribed and analysed by a team of investigators. The coding procedures, identifying elements appreciated in group-based principles for action, were thematic and data driven.

Results: Statements about participatory programming generated much less consensus in appreciation among respondents than statements about enjoyment and fostering group processes. To some extent, group members participated in the development of program content. Participation in group formation or community initiatives was less frequently perceived as something within group members' control. Enjoyment, expressed as physical and emotional experiences, was found to be an individual driver of group exercise. Fostering group processes, expressed as social support, was found to contribute to enjoyment and learning achievements. Responsive leadership, ensuring responsive guidance, and the role of an enthusiastic exercise trainer acting as role model, were identified as additional necessary principles for action.

Conclusions: Group-based principles for action in CBHEPA programs are not clearly demarcated. Fostering group processes is an overarching principle, conditional for the spin-off in terms of enjoyment and active participation. This, in turn, leads to a sense of ownership among participants, who take up responsibility for the exercise group as well as their individual activity behaviour. CBHEPA programs thrive on participants having fun together and exercise trainers' leadership skills. A professional, competent, responsive exercise trainer plays a key role in the organisation and maintenance of CBHEPA programs.

Background

Worldwide, physical inactivity is one of the core risk factors for non-communicable diseases such as diabetes type II and cardiovascular disease [1, 2]. In the Netherlands, sports and physical activity engagement is lower in socially vulnerable groups than in wealthier groups [3, 4]. The Dutch Healthy Physical Activity Guidelines (NNGB) set the norm for healthy daily physical activity for adults at a minimum of 30 minutes moderate activity at least five days a week [5]. Socially vulnerable people most at risk of not meeting the NNGB are those of low socio-economic status (SES), or who are unemployed, or of non-Dutch origin, or with chronic disease(s) [4]. To reduce these inequalities in physical activity behaviour, Dutch health policy focuses on the implementation of community-based health enhancing physical activity (CBHEPA) programs [6, 7] in order to improve individual health and wellbeing, to reduce inequalities in health and PA behaviour across population subgroups, and to realise public gains in terms of reduced healthcare expenses [6].

Current theories on enhancing physical activity behaviour and maintenance suggest that physical activity interventions function through individual psychosocial processes (goal-setting, motivation, self-efficacy, and coping with stressors) [8-12], through interactions and group dynamics in exercise groups, and through interactions with the social environment and community [13-19]. Therefore, CBHEPA programs are grounded in individual, group, and community-based theories [20-22].

Dutch CBHEPA programs are built on principles for action for health promotion interventions [7, 23], as advocated by the WHO and others [24, 25]. Since the publication of the Ottawa Charter for Health Promotion [24], professionals are challenged to work explicitly with principles for action important to modern health promotion [25]. A principle describes the code of conduct or a rule of action and is generally action oriented [26]. Principles for action encompass a continuum of values emerging from health promotion research and practice. At one end of the continuum, more conventional health and physical activity promotion principles are found, reflecting traditional health education based on biomedical, behaviourist, and reductionist approaches to health. Usually, these programs address a specific topic or lifestyle, with an emphasis on targeting at-risk people with behaviour change strategies [25]. At the other end of the continuum, health promotion is guided by principles for action based on an ecological perspective on human health [27, 28]. This perspective on health and physical activity promotion emphasises the need for actions that are empowering [29], participatory [30-32], intersectoral, equitable, and sustainable, and that use multiple strategies [33]. The focus is on health as a resource for meaningful living [34-37].

From this latter perspective, it is expected that using principles for action contributes to the effectiveness of CBHEPA programs. Principles for action leave scope for adjustment to contextual needs on the one hand, and are the program's constituents which can be implemented in different contexts and settings on the other hand [38].

Usually, the effectiveness of CBHEPA programs is based on measuring physical activity outcomes at individual level, using standardised self-report instruments [39], but how defined or ideal principles for action emerge in practice is largely dependent on contextual factors, knowledge, or the skills of the local professionals involved. Whether or not principles for action are recognised and valued by participants in exercise groups in on-going CBHEPA programs, and how they contribute to effectiveness, is rarely investigated.

As part of an on-going evaluation study of a Dutch CBHEPA program, Communities on the Move (CoM) [21], we wanted to explore particularly group-based principles for action, since CBHEPA programs in the Netherlands are generally group-based. CoM was developed and disseminated (2003–2012) by the Netherlands Institute for Sports and Physical Activity (NISB) and targets socially vulnerable groups. CoM defined a set of principles for action at individual, group and program level. This current study aims to evaluate CoM's group-based principles for action in group settings. It addresses the question which of the identified group-based principles for action are perceived as important by CoM participants. We thereby hope to contribute to the knowledge base on the use and impact of principles for action in group-based physical activity programs, through a practice-based evaluation approach.

Methods

We studied how participants appreciated the group-based principles for action applied in CoM: active participation, enjoyment, and fostering group processes. An exploratory evaluation design was used. The principles for action were operationalised on the basis of the literature on social cognitive theory (SCT) [40-42], social learning theory [43], and social capital and participation [30, 31, 44], alongside interviews (n=11) and expert consultation (n=2). Scientific [45-49] and grey literature [50, 51].was explored to identify data collection techniques suitable for low literate and culturally diverse, socially vulnerable groups. Focus group techniques were identified, alongside cultural sensitive techniques actively engaging the target group, facilitating dialogue and providing immediate feedback. The principles for action were operationalised as follows:

- *Active participation* as: 1) participation in group formation [19, 52, 53], 2) participation in physical activity program content decision making [54, 55], and 3) participation in community initiatives [54, 56, 57].
- *Enjoyment of physical activity* as: 1) expressions of enjoyment (physical, verbal and nonverbal) [58-60] and 2) safe and supportive environments [27, 52, 61, 62].
- *Fostering group processes* as: 1) social support, looking at *group composition* (size, [cultural] diversity, boundaries, phase) and *group structure* (roles, norms, social support, and cohesion) [13, 63], 2) role of the exercise trainer [17, 62, 64], and 3) learning achievements [40, 43].

Based on these operationalisations, a semi-structured interview protocol was developed: the active participation, enjoyment, and fostering group processes (APEF) tool, to assess participant appreciation for each of the group-based principles for action (Table 5.1). For each principle, two or three statements were formulated, allowing data to be collected on individual points of view, as well as probing theme-driven dialogue between researcher and respondents and dialogue among respondents. The development of the APEF tool for group-based principles for action is described in detail elsewhere (Herens, Wagemakers, Vaandrager, Van Ophem, Koelen, in preparation).

Table 5.1 Outline of the APEF tool

Principle	**Variable**	**Statement**	**Examples of in-depth questions**
Active participation	Group formation	1. We, as exercise group, choose who participates in the exercise group.	Since when have you been exercising together? How are participants recruited? Do you ever bring a friend or a neighbour?
	Content activity class	2. We, as exercise group, choose the activities for the exercise class	What does your physical activity program look like? Were you involved in the choice of activities, and if so, how did that work? How important is that for you?
	Community initiative	3. Some participants within the exercise group take the initiative to exercise together elsewhere	Can you give an example of somebody taking the initiative?
Enjoyment	Enjoyment of physical activity	4. Exercising in the exercise group ensures that I like being physically active	What physical activity do you like most? Is the program consistent with your preferences? How do you ensure that everybody can enjoy the physical activity class?
	Feelings of safety	5. The exercise group offers me safety to be physically active	What comes to your mind if we talk about safety? How does the group support safety?
Fostering group processes	Social support	6. Exercising in the exercise group offers me support to be physically active	What comes to your mind if we talk about group support? In what way does the group offer support to physical activity behaviour? How do you deal with factors that make physical activity difficult?
	Role exercise trainer	7. Within the exercise group, the exercise trainer is an example for me to be physically active	In what way is the exercise trainer an example?
	Learning achievements	8. By exercising in the exercise group, I learn how to be more physically active in my daily life	Can you give examples of what you learned in the exercise group? What have you discovered since you joined the exercise group? What is your benefit or achievement?

Data collection

From May 2013 to May 2014, ten focus groups were conducted in Dutch CBHEPA programs, including exercise groups participating in the CoM evaluation study (convenience sampling). The APEF tool was used in ongoing exercise groups, except for two. In these latter groups, participants still came together as part of an educational scheme (groups 1 and 2, Table 5.2). Group members were asked to participate in a focus group. In all ten groups, a number (range 6 to 11) of group members were willing to participate (n=76).

The focus groups were conducted in rather open settings, using the sports venue (a community centre, sports club canteen, or class room) as meeting place. In four focus groups, outside listeners were present, who were told not contribute to the discussions since they were not participating in the CBHEPA program.

Prior to each focus group, members gave oral consent for their participation and for the proceedings to be audio recorded. The aim and procedure was explained by the researcher (first author). Dutch was the language of conversation in all groups.

Statements were presented during the focus groups, written on flipcharts. Each statement was read out aloud. Respondents were asked to individually score each statement with coloured voting cards carrying both text and symbols: 'agree' (green card with ☺); 'neither agree nor disagree' (yellow card with 😐) or 'disagree' (red card with ☹). Group scores were reported on the flipcharts during the focus group and further discussed in-depth. The researcher acted as facilitator to generate the free flow of information among respondents. Assistance was provided by one or two junior researchers. The duration of each focus group ranged from 50 to 70 minutes. Some women left before the end of one focus group because they had to collect their children or grandchildren from school.

Ethical considerations

The authors declare that the study was conducted in accordance with general ethical guidelines for behavioural and social research in the Netherlands, stipulating that behavioural research falls outside the scope of the Act on review of medical research involving human subjects (WMO) when a study is not of a medical nature, and subjects do not receive a particular treatment or are asked to behave in a particular way [65]. Furthermore, the study design was peer-reviewed and approved by the review board of the Wageningen School of Social Sciences. All participants entered into the research with voluntary consent. They were provided with information about the purpose and contents of the study. Guarantees of confidentiality and anonymity were given prior to each focus group. Moreover, participants were able to withdraw from the study at any time for any reason.

Table 5.2 Characteristics of CBHEPA programs

Focus group	Respondents	Municipality	CBHEPA program					
	N = 76			Duration	Sports venue	Frequency	Main activities	Target group
1.	Women* (n=6)	Amsterdam	1	Fixed (10 weeks)	Community centre	Weekly (1.5 hr)	Walking/running (Embedded in language class)	Socially vulnerable women (non-Dutch)
2.	Women (n=6)	Enschede	2	Fixed (13 weeks)	Sports club canteen	2 x week (3 hrs)	Introduction to various sports activities (Embedded in education trajectory, including follow-up meetings once every 6 weeks for 18 months)	Socially vulnerable women (non-Dutch and Dutch)
3.	Women (n=8) Men (n=1)	Helmond	3	Continuous	Playground outdoor fitness	Weekly (1 hr)	Outdoor group fitness	Socially vulnerable groups (non-Dutch and Dutch)
4.	Women (n=6) Men (n=2)		3	Continuous	Playground outdoor fitness	Weekly (1 hr)	Outdoor group fitness	Socially vulnerable groups (non-Dutch and Dutch)
5.	Women (n=6)	Rotterdam	4	Continuous	Community centre	Weekly (1 hr)	Group exercise to music	Socially vulnerable women (non-Dutch)
6.	Women (n=10)		4	Continuous	Community centre	Weekly (1 hr)	Group exercise to music, incl. fall prevention	Socially vulnerable women (non-Dutch and Dutch)
7.	Women** (n=11)		4	Continuous	Community centre	Weekly (1 hr)	Group exercise to music	Socially vulnerable women (non-Dutch)
8.	Men (n=7)		4	Continuous	Residential care home	Weekly (1 hr)	Group fitness class	Socially vulnerable men (non-Dutch)
9.	Women (n=4) Men (n=3)	Tilburg	5	Continuous	Community centre	Weekly (1 hr)	Group exercise class, incl. fall prevention	Socially vulnerable elderly women and men with a chronic condition (Dutch)
10.	Women (n=6)		5	Continuous	Community centre	Weekly (1 hr)	Group exercise class	Socially vulnerable elderly women, some with a chronic condition (Dutch)

*Focus group 1 was conducted during language class in a community centre, in the presence of four migrant women not participating in the physical activity group.
**In focus group 7, five respondents were not participating in the CoM evaluation study [21]. As a consequence no background details of these respondents were available, except gender and ethnic origin

Data analysis

Our analytical strategy to identify respondents' appreciation of group-based principles for action was thematic and data driven [66]. We followed a stepwise procedure [67]. 1) To assess respondents' individual appreciation, the scores for each statement were counted (one vote, one point) and added up. For final analysis, all scores were added up across the ten groups. 2) All focus group discussions were transcribed ad verbatim. 3) Respondents were de-identified in the transcript. 4) Transcripts were read by at least two researchers. 5) Top-down coding was developed, based on elements identified in the literature, for each group-based principle for action. For example, codes used for a group dialogue on social support were: (group) commitment or engagement, ownership, motivation, task orientation, and collective faith. 6) Coding was extended with codes for 'responsive leadership', an additional theme emerging from our data [64, 68].
7) All transcripts were coded by at least two researchers using Atlas.ti 7.0. Codification differences between researchers were discussed until consensus was reached. 8) For each statement, codes, e.g., size, culture, closed/open groups, were clustered into themes (group composition). Duplicate coding across statements, indicating interrelatedness, was regrouped under one statement. For example, respondents' views on social support, which were expressed in discussions following the statements both on safety (statement 5) and on social support (statement 6), were regrouped under the statement on social support.

For consistency, the order of statements presented in the results was rearranged compared to the order during interviewing, clustering our findings for each principle. Citations were used to carefully reflect respondents' language and meanings. Finally, respondents' views on principles for action in CBHEPA programs were summarised in terms of group-based driving and restraining forces, following Lewin's group dynamic theory on force fields, to identify what forces matter most in group-based principles for action [69, 70].

Results

CBHEPA program characteristics

The content and composition of the ten groups in the CBHEPA programs involved in our study varied (Table 5.2). Two programs (groups 1 and 2) had a fixed duration (10–13 weeks) and were embedded in educational schemes. Physical activities were intertwined with other (educational) activities in community centres, leading to cross-fertilisation of ideas and activities, e.g., conducting physical activity exercises during language courses. The other eight on-going programs offered exercise classes once or more frequently every week.

In three groups (groups 1, 3, and 4), outdoor activities were organised, such as walking, running, and outdoor fitness in combination with (fall prevention)

exercises. In six groups (groups 5 to 10), indoor activities were organised, usually in a community centre, such as endurance training, fall prevention exercises, (folk) dance, aerobics, or zumba. In one group (group 2), a mix of indoor and outdoor activities was organised. The CBHEPA programs predominantly targeted socially vulnerable groups in underprivileged neighbourhoods, e.g., migrant women and men, the unemployed, or elderly people with a chronic condition (Table 5.2).

Respondents

A total of 76 respondents participated in the focus groups, 84% women, 16% men. Sixty-five percent of them participated for more than six months in the CBHEPA program, whereas others participated for a shorter period (< 3 months). Half of the respondents were Dutch, and the other half of non-Dutch origin, representing 15 different countries of origin (e.g., Morocco, Turkey, Syria, Surinam, China, Cape Verde), showing a great ethnic and cultural diversity between and within groups. Household incomes were relatively low, 48.5% less than €1,350 a month, as were educational levels, with 42.2% having no, or only primary, education. Additional file 1 summarises respondents' characteristics.

Exercise groups were rather homogeneous in terms of age. The majority were middle aged, with a mean age of 61.6 years (*sd* 13.2). Groups were also rather homogenous in terms of gender: six groups contained women, one contained men, and three contained men and women. Gender diversity within exercise groups seemed to be linked to homogeneity in origin: participants in the mixed groups were of Dutch origin, usually consisting of (married) couples. Gender homogeneous groups with participants of non-Dutch origin usually represented a heterogeneous mixture of ethnic and cultural origins, challenging both exercise trainers and participants to use Dutch as their common language.

Respondents indicated that group composition varied during each session and over time. Composition and size differed, because 'There is always someone not able to come' due to illness, weather conditions, work, appointments, family obligations, or holidays.

Drivers to participate

Respondents' individual drivers to participate were to (re)gain health, lose weight, meet people and sociability. Respondents often referred to positive physical activity experiences earlier in life in relation to their drivers to participate, some of whom reported up to 60 years of experience. Additional drivers were accessibility and program diversity (educational and social activities). Unsatisfactory experiences elsewhere, such as program or staffing irregularities or lack of variety in activities, were also mentioned as motives to participate in the current CBHEPA programs.

Respondents' appreciation of group-based principles for action

Overall scores on the eight statements across the ten focus groups show that statements about active participation generated much less agreement among respondents than statements about enjoyment. The greatest consensus was reached for statements about fostering group processes, in particular regarding the role of the exercise trainer (Figure 5.1).

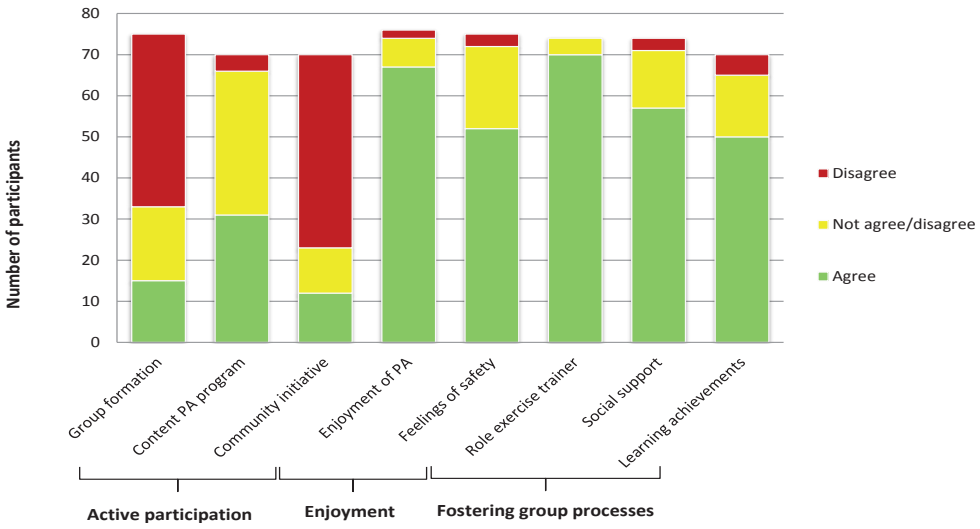

Figure 5.1 Overall scores per statement for group-based principles for action (n=76)

Active participation as a principle

Participation in group formation

Statement 1: 'We, as exercise group, choose who participates in the exercise group' was scored by 75 respondents. Over half of them, 56% (n=42), disagreed, and 24% (n=18) neither agreed nor disagreed. Most respondents were of the opinion that they did not choose who participated in the exercise group, nor were they in control of group formation, since *'everyone decides for him/herself'*. Some indicated that, particularly at the start of a program, the exercise trainer played a crucial role in recruiting participants. Exercise trainers took care of publicity (leaflets, face book, newspaper) and word-of-mouth advertising, or mobilisation of local key persons to advocate the program, for example in a community centre, church, or mosque.

R: She first started in the mosque, the Turkish mosque. That's how I heard about it, from the people who were going to the mosque. We'd go to the mosque first, we'd exercise there. <FG7>

Other methods of group formation were referral by a GP, social worker, or work coach as part of – sometimes obligatory – social activation schemes.

In long-standing exercise groups, respondents indicated that there was a regular influx of new participants. Open boundaries and willingness to accept differences were mentioned as relevant factors for the maintenance of exercise groups. Group members' participation in group formation increased when group maintenance became a shared interest of members and the exercise trainer. A combination of strategies, in which both exercise trainer and group members recruited new people, was then used. Respondents mobilised their social networks, using personal beneficial experiences as motivating messages.

R: And the strange thing is, when someone new joins, there's this "click". None of us has any problem with it at all. <FG3>

Sometimes, new participants as well as irregular attendance were mentioned as causes for dissatisfaction within the group because of differences in physical activity skills between beginners and advanced participants.

Participation in content development of the CBHEPA program

Statement 2: *'We, as exercise group, choose the activities for the exercise class'* was scored by 70 respondents. Forty-four percent (n=31) agreed with this statement, and 50% (n=35) neither agreed nor disagreed. Most respondents held the opinion that they did not choose the program activities, although opinions also differed. Some felt free to make suggestions about the physical activity program, whereas others felt it was generally the exercise trainer who planned and decided upon program activities. Respondents

attributed their program satisfaction to the exercise trainer and his/her sensitivity to participants' needs.

R: Well, maybe we have something to say about it, but we just leave that job to the exercise trainer. <FG10>

Participation in the content of the physical activity program was linked to everyone's individual responsibility for healthy exercising, their own awareness of (physical) limitations, and their ability to communicate this to the exercise trainer.

Community initiative and sport participation

Statement 3: *'Some participants within the exercise group take the initiative to exercise together elsewhere'* was scored by 70 respondents. Sixty-seven percent (n=47) disagreed. Participation in community initiatives or exercising together elsewhere, in addition to the CBHEPA program, was not perceived as a result of the exercise group. Some respondents reported additional sports participation, e.g., a fitness club, mostly in groups where CBHEPA program activities had stopped. This was perceived as a result of individual rather than group-based actions. Others – mostly respondents of Dutch origin – indicated that they were habitually engaged in leisure-time sport (e.g., swimming, badminton), in addition to the CBHEPA program. As they explained, they were 'used to doing sport in leisure time since childhood'.

Respondents indicated that occasionally they became involved in organising a community initiative, such as physical activity events or other kinds of activities (shopping, city trips). The exercise trainer often acted as an initiator.

R: Some of us go in that 24-hour charity run against cancer. The exercise trainer puts the idea on the table and says this or that about it. Then some of us take it up and talk about it a bit more. That's how it goes. <FG3>

Enjoyment as a principle

Enjoyment experienced in physical activity

Statement 4: *'Exercising in the exercise group ensures that I like being physically active'* was scored by 76 respondents. The majority, 88% (n=67), agreed. Enjoyment was unanimously perceived as a result of the exercise group. Respondents mentioned mostly examples of physical and nonverbal experiences of enjoyment, such as 'feel the energy', 'feel your body move', laughter, sense of freedom, but also enjoying relaxation after physical exertion, e.g., while taking a shower. Respondents indicated that enjoyment was closely related to program satisfaction, e.g., the nature of activities and the ease with which they could incorporate physical activity in their daily routine. In addition, the exercise group offered an environment for self-expression and escape from daily duties, thereby contributing to enjoyment.

R: Well, the dancing just makes you happy. Because the energy inside you gets out, so all the emotion comes out too. <FG2>

Feelings of safety

Statement 5: *'The exercise group offers me safety to be physical active'* was scored by 75 respondents. Sixty-nine percent (n=52) agreed, and 27% neither agreed nor disagreed. The safety offered by the exercise group was not unanimously perceived as a result of group activities. Discussions about the statement revealed that some respondents defined safety as environmental safety, highlighting security of materials, sports venues, and protection against loss or theft. Others defined safety as emotional safety, highlighting mutual care and respect, e.g., no prying eyes, dress codes, or being ridiculed or criticised.

R: I had a different kind of safety in mind <...> I thought to myself, here I am dancing with my fat ass and I'm doing everything wrong and I just don't care. That was what I was thinking. <FG4>

Feelings of safety during the exercise class seemed a prerequisite for enjoyment, contributing to individual program adherence, group cohesion, and group maintenance. Group members encouraged feelings of safety by being sensitive, refraining from judgements, and looking out for one another's (physical) safety.

Fostering group processes as a principle

Social support in the exercise group

Statement 6: *'Exercising in the exercise group offers me support to be physically active' was* scored by 74 respondents. Seventy-seven percent (n=57) agreed, and 19% neither agreed nor disagreed. The social support offered by the exercise group was unanimously perceived as a result of group activities. Social support contributed to enjoyment and feelings of safety during exercise class. Forming partnerships was given as an example: duos of participants helping each other throughout the exercise class. Complimenting and helping one another, and enthusiasm, strengthened respondents' program adherence and physical activity maintenance.

R: And sure, the enthusiasm of the group and every time it's like "oh!" then you get another compliment <…> At a certain moment it gives you wings and then. Now I'm beginning to like this [physical activity]. <FG4>

Social support appeared to go beyond the exercise group in reaching out to non-attending group members (making inquiries, telephone calls, home visits). Respondents indicated that they were closely involved in one another's lives. In some exercise groups, a group leader was assigned to this particular role, assisting the exercise trainer in organising and motivating fellow group members. In other groups, group roles were less personalised and varied

over time in relation to the goal or task achievement of the exercise group. Examples of group roles encouraging social support were: the achiever, the initiator, the joker (fun), and the helper. The social support offered by the exercise group was enforced by the shared group norm that physical activity is healthy and fun to do.

R: I just like it, for my health. Physical activity is good for you, everyone knows that. <FG7>

Other enforcing group norms were acceptance of diversity (e.g., in culture, opinions, health status, literacy rate, or physical activity skills), encouraging one another during and outside the physical activity classes, and sharing knowledge about a healthy and active lifestyle. Respondents of non-Dutch origin (both men and women) specified tolerance of dress codes and a need for secure sport environments. Social support was also enforced by organised time and opportunity for socialising as part of group activities.

The role of the exercise trainer

Statement 7: *'Within the exercise group, the exercise trainer is an example for me to be physically active'* was scored by 74 respondents. Ninety-five percent (n=70) agreed. The exercise trainer was perceived as a role model to be physically active by nearly all respondents, in terms of personality (being open and kind) and physical appearance (being slender, fast, agile). Respondents expressed great confidence in their exercise trainer to guide and support them during the exercise classes. They were of the view that a professionally trained exercise trainer contributed to confidence building, and that a well-organised exercise trainer, taking care of planning, time management, group continuity, and maintenance, also contributed to personal confidence and belief in task performance. Respondents trusted the exercise trainer in selecting activities tailored to their needs.

Alongside professionalism, a positive disposition (e.g., optimism, cheerfulness, witty, putting things in perspective) was mentioned as a key quality of an exercise trainer, as well as the willingness to share personal experiences (e.g., dealing with pain or discomfort while exercising).

R: He [exercise trainer] is always cheerful, always optimistic. He presents it really well, with jokes and all that. He's just great. <FG4>

Relationship development was fuelled by the exercise trainer's responsive guidance: attentiveness to program adherence and sensitivity to each participant's individual conditions.

R: The exercise trainer watches to see whether you are doing it right for your own body or not. He knows about my pain complaints and he'll tell you; you're doing it wrong, you have to do it like this. <FG3>

In long-standing exercise groups, bonding between exercise trainer and group members was reported. The exercise trainer was considered a friend as well as an expert. Examples were given of how respondents followed their trainer in different activities at various locations. Other examples illustrated how classes failed as soon as the exercise trainer was absent. Attendance rates dropped or activities were not conducted, despite the fact that group members knew their exercises quite well.

R: If we have to do it ourselves, we don't get very far <…> We try to start by ourselves, but it lasts for about three counts, and then it just blocks <laughs>. <FG10>

Learning achievements

Statement 8: *'By exercising in the exercise group, I learn how to be more physically active in my daily life'* was scored by 70 respondents. Seventy-one percent (n=50) agreed, and 21% (n=15) neither agreed nor disagreed. Most respondents perceived physical activity learning achievements as a result of exercise group activities. Respondents who agreed referred to personal learning achievements relating to perceived benefits, awareness, and the ability to integrate physical activity in daily life. Respondents differentiated between perceived direct benefits and long-term returns. Direct benefits were mostly experienced wellbeing, feeling more energetic and fitter, and sense of accomplishment. Long-term returns were mostly better posture and limberness, keeping balance, and weight loss.

Respondents mentioned increased organisational ability to integrate physical activity into their daily life. For some, weekly participation in the CBHEPA program was helpful in planning and structuring their physical activity behaviour. Practical instructions about how to practice exercises in daily life helped to increase both awareness and actions outside the lessons. All agreed that self-management and self-organisation, by scheduling physical activity in daily activities, e.g., exercises at home, while cooking, washing the dishes, or walking the dog, were most important for physical activity maintenance. Respondents mentioned increased physical abilities through observational learning, imitating the exercise trainer's movements. They were also role models for one another when trying to keep up with the exercise, or when not catching instructions (e.g., as a result of deafness).

R: You imitate a thing or two. The exercise trainer joins in too [in the exercises]. <FG3>

Respondents repeatedly mentioned regaining physical abilities, lost due to chronic illness or aging. Concrete examples were: learning to walk without a stick, moving around without a rollator, riding a bicycle, regaining balance. As a result, respondents indicated that they felt more confident, self-reliant, and better able to manage physical activity in daily life, thereby contributing to their wellbeing.

Driving and restraining forces for group-based principles for action

During the focus groups, respondents mentioned various positive and negative aspects of group-based principles for action, thereby defining the driving and restraining forces relating to the processes and group dynamics in their exercise groups. Summarising these views revealed an interplay between the efforts put into the process of group development on the one hand, and group members' efforts put into personal goal attainment on the other. Respondents indicated that they started the program for personal, usually health-related, reasons or as a meaningful leisure-time activity. Initially driven by individual needs and goals for physical activity behaviour, respondents shared experiences about their development as group members, taking responsibility for group atmosphere, task achievement, and group maintenance. The longer the group was in existence, the more the participants' boundaries opened up within the (safe) context of the group, enabling enjoyment, experiential learning, and group development. Also, the personal boundaries of the exercise trainer opened up, and hence he/she became a friend as well as an expert.

Key drivers at individual level in this process can be summarised as self-awareness and sense of interdependency. Key drivers at group level can be summarised as social support (among group members) and responsive leadership, mostly acted out by all parties as communicative skills. Restraining forces can be summarised as too many or hard-to-manage differences within a group, e.g., in performance (physical activity skills and aims), in age, or in personalities, and lack of time or opportunity to organise dialogue (Table 5.3).

Table 5.3 Driving and restraining forces for principles for action in exercise groups

Principle for action	Driving forces (+)	Restraining forces (-)
Active participation		
Group formation	using personal beneficial experiences as motivating messages in social network	irregular attendance
	tolerance of newcomers, open group boundaries	too much difference in physical activity skills between beginners and advanced participants
	exercise trainers seeking publicity and mobilising key persons	
	acceptance of group maintenance as a mutual group interest	lack of ownership and/or interest in group maintenance
Content activity class	taking responsibility for oneself in communication and action	lack of time/opportunity for dialogue
	awareness of personal limitations in practicing physical activity	poor language skills or health literacy
	exercise trainer's sensitivity to personal needs	change in exercise trainer
Community initiative	exercise trainer acting as initiator	lack of participants' interest or support
	shared responsibility for group activity	lack of (additional) leisure time
Enjoyment		
Enjoyment	exercises aimed at cooperation and nonverbal communication	lack of physical activity skills
	providing for energising experiences, relaxation exercises, and playfulness	lack of variety in activities
	interpersonal attractiveness	lack of sensitivity to individual needs
	use of music of participants' past or country of origin	lack of sensitivity to individual backgrounds
Feelings of safety	minding one another's (physical) safety	lack of sensitivity to one another
	secure physical activity environments	lack of (perceived) safety of physical activity material or sports venue
	being sensitive to one another	judging one another
	helping one another, giving assistance	
	trust and mutual respect	lack of mutual trust and respect

Table 5.3 - *Continued*

Principle for action	Driving forces (+)	Restraining forces (-)
Fostering group processes		
Social support	care for non-attenders (reaching out, visit)	lack of time or opportunity to socialise during exercise class
	encouraging one another during and outside the physical activity classes	
	sharing knowledge about a healthy and active lifestyle	
	making group roles explicit during classes (group leader, helper, partner)	
	shared norms about group behaviour, e.g., timeliness	
	shared norms about physical activity (healthy)	
	tolerance of dress codes	lack of tolerance
	acceptance of diversity (e.g., in culture, opinions, health status, literacy rate, or physical activity skills)	
Learning achievements	in culturally diverse groups, use of Dutch as common language	use of native language among one another
	practical instructions about how to practice exercises in daily life	lack of group support too much involvement in day-to-day concerns
	learning by imitating exercise trainer or fellow participant	too much difference between trainer and participants (e.g., age or phase of life, attitude, outfit)
Role exercise trainer	organising time and opportunity for socialising	program or staffing irregularities
	sensitivity to individual needs, selecting activities tailored to personal needs	lack of target group involvement
	well-prepared (good planning and time management)	
	managing differences and group maintenance	lack of sensitivity to group dynamics
	taking the initiative	lack of physical activity knowledge or initiative
	professionally trained in physical activity and healthy lifestyle	
	acting as a personal coach	
	enthusiasm, positive disposition	
	willingness to share personal experiences	frequent staff changes
	responsive guidance	too much difference/distance between trainer and participants (e.g., age, phase of life, attitude)
	being a friend as well as an expert	expert instead of egalitarian perspective

Discussion

Our study on respondents' appreciation of group-based principles for action in Dutch CBHEPA programs – active participation, enjoyment, and fostering group processes – revealed some interesting new insights. Relating to the principle of active participation, our findings indicate that group members' active participation in group formation occurs only after they have participated for some time and happens primarily through sharing beneficial experiences in personal social networks. Initial group member recruitment is perceived as a task for the exercise trainer, through seeking publicity and mobilising key persons.

According to respondents, active participation in the development of content for the CBHEPA program is mostly directed at tailoring activities to individual needs. Tailored programming is highly appreciated; this is in line with other studies [52, 55], endorsing its importance for on-going engagement of socially vulnerable groups in physical activity programs. In addition, our findings make explicit that tailored programming happens provided the exercise trainer knows the sort of participants with whom he/she is dealing and takes the initiative to act on that. This emphasis on the need for exercise trainers to be responsive in physical activity programs has also been found in other studies [62, 64].

Dutch CBHEPA programs aim to empower socially vulnerable groups by improving participants' health and wellbeing through physical activity. They are developed on the assumption that socially vulnerable groups will become more self-reliant in organising their physical activity behaviour and participate more often in community initiatives. According to our findings, joining a CBHEPA program is respondents' distinct way of becoming engaged in community initiatives. Only a few of them are engaged in additional sports or community-related activities. One explanation might be that people take part in a CBHEPA program primarily for individual satisfaction, e.g., enjoyment and relaxation, without a desire to pursue collective goals [71, 72]. Another explanation might be that, in practice, Dutch CBHEPA programs use rather conventional health education principles for action, targeting at-risk groups and using a behaviourist and reductionist approach to health, rather than health promotion principles for action, based on an ecological perspective on health [25, 27, 28].

Relating to the principle of *enjoyment of physical activity*, our findings indicate that having fun together is perceived as an important principle for action for program adherence in socially vulnerable groups. The relationship between leisure-time activity and health is a growing area of research, with a particular focus on affective responses, mood and emotions. Experiencing positive affective states through leisure-time (physical) activities is one of the important factors that maintain and promote individuals' psychological, social, and physical health and wellbeing, by direct strengthening of their health and wellbeing, and as a means of moderating stress or stress effects [73]. In physical activity interventions, enjoyment is found to be a moderator of efficacy [74].

Studies indicate that not only self-control and discipline, but also enjoyment, pleasure and 'not worrying', are key values in maintaining an active and healthy lifestyle [58, 75, 76]. In discussing enjoyment, respondents mentioned predominantly individual experiences, described by Jallinoja et al. as 'negotiated pleasure', referring to the process of balancing between health-seeking and pleasure-seeking behaviour. Because of a potential discrepancy between these two aims, pleasure is constructed not simply as a spontaneous experience, but often as a planned and disciplined event [46]. 'Negotiated pleasure' regarding physical activity, as found in our study, evolves around: 1) pushing oneself, or using someone else as an external push, to overcome the temptations of remaining inactive; 2) the instrumental values of physical activity, such as health or psychological benefits; 3) the satisfaction of physical activity goal achievement; and 4) the physical sensation that is felt during and after being active [46].

Our findings relating to group experiences of enjoyment, expressed as feelings of safety, safe environments, and social support, show that (changes in) affective responses at individual level are strongly linked to group-based experiences, which can be facilitated [77]. This is consistent with self-determination theory, indicating that, alongside perceived autonomy and competence, relatedness (with fellow participants as well as with the exercise trainer) is an important medium for change and internalisation of physical activity behaviour [8, 9, 78].

Our findings relating to fostering group processes illustrate the importance of group support. In discussions on the statements on safety and social support, very similar views emerged, showing an interrelatedness of (emotional) safety and social support. This highlights the important role of interpersonal factors in group-based CBHEPA programs, such as mutual trust, interdependency, respect, attractiveness, integration and sense of belonging. Our findings are supported by other studies on group dynamics in physical activity programs [13, 19, 79]. Group dynamics in CBHEPA programs are, however, often implicit and left unaccounted for. CBHEPA programs are usually group-based for organisational reasons (cost-covering), rather than for behavioural change reasons. Nevertheless, some studies indicate that group dynamics strategies, explicitly applied in group-based physical activity interventions, are more effective in establishing physical activity behaviour change than individually targeted interventions with social support, which, in turn, are more effective than individual interventions without additional social support [16, 22]. At the same time, a lack of standardisation across the literature in relation to how group dynamics strategies are applied in physical activity programs is also reported [16, 18].

Our findings indicate that an exercise trainer acts as a role model in being fit and healthy, as well as in being kind and responsive. Respondents attribute great value to the fact that the exercise trainer is an expert as well as a friend, facilitating learning processes in various domains. Exercise trainers use the exercise group as a relatively convenient environment to bridge (cultural) diversity, using exercises to enhance both verbal and nonverbal communication and cooperation.

Responsive leadership thus emerges as an additional principle for action in group-based CBHEPA programs. Alongside the role model aspect, exercise trainers' responsive leadership skills are emphasised by respondents. Our study illustrates the need for 'enabling' professionals in exercise groups targeting socially vulnerable people [80]. Based on the literature, three areas of expertise can be defined for responsive leadership to facilitate learning processes for behavioural outcomes in such groups: first, the responsibility to ensure that the demands of the organisation are satisfied (satisfactory group size, cost-covering level), and that group members' needs and aspirations are satisfied [17, 64]; second, the leadership skills to manage resources (ensuring secure physical activity environments, monitoring adherence, fostering group processes), personal reputation and image (being a qualified and enthusiastic role model), and development of relationships (based on [cultural] knowledge, prior experiences, and responsiveness to participants' performance styles) [68]; third, teaching skills to adapt exercise classes to participants' knowledge, skills, and (cultural) dispositions: this is probably best described as 'culturally responsive teaching' [81].

There is need to further explore the reciprocal relationship between experiential learning within groups (who learns what, when, and from whom), the development of group norms, group cohesion, skills and collective efficacy, and individual behavioural outcomes, such as increased physical activity behaviour and maintenance [16, 82]. This calls for a more systematic approach to determine underlying causal mechanisms of group-based CBHEPA programs [83, 84], to determine how to measure important variables consistently, such as group environment in terms of process and structure, and to compare and contrast across studies [16].

Our study reveals that the group-based principles for action, as defined in CoM, are not demarcated entities, but rather represent a range of intertwined values and principles to organise (group) processes [25, 37]. Fostering group processes seems an overarching principle, conditional for the spin-off in terms of enjoyment and active participation, which, in turn, leads to (the development of) perceived sense of ownership and to participants taking responsibility for the exercise group's as well as their own physical activity behaviour. Scientific literature on the use and appreciation of group-based principles for action in CBHEPA programs seems fairly limited [25, 33]. Also, in practice, the use of group-based principles for action is rarely made explicit within and across CBHEPA programs, seemingly driven by tacit knowledge and common sense [13, 79]. With our study, using a practice-based evaluation approach, we aim to contribute to the knowledge base on the use of group-based principles for action in CBHEPA activity programs. Our study thus contributes to the on-going discourse on how to improve health-enhancing physical activity interventions [39, 83].

Implications for future research are that proxy indicators or indirect measures need to be identified to assess transformative changes within the group or community [85, 86], and that responsive evaluation strategies should be used, e.g., two-way methods

(including group discussions and face-to-face engagement) in order to pick up differing kinds of views, including the use of peer-led questioning [87]. The strength of our study is that we have developed a systematic way of assessing participant appreciation of group-based principles for action. This adds to existing methods of measurement, e.g., individual questionnaires, which are most commonly used to assess outcomes of group dynamics in exercise groups [18, 88, 89].

Methodological considerations

Some comments on this research relate to data collection and processing. Focus groups varied in composition and size. In some groups, all members were of Dutch origin; in others, a large ethnic and cultural diversity was found. The fact that it was necessary to use Dutch as the common language hindered some respondents from expressing themselves freely in their mother tongue, but challenged others to practice their skills in the Dutch language. Occasionally, those who spoke Dutch fluently translated for others. Therefore, we cannot rule out the possibility that socially desirable responses entered our data set, also because the focus groups were held in existing group settings.

Furthermore, literature on culturally appropriate health and physical activity promotion offers several strategies to address socio-cultural differences within and between groups [90], such as soliciting input from population members, linking intervention content with values, addressing language and literacy challenges, incorporating population media figures, using culturally relevant forms of physical activity, and addressing specific population linked barriers to activity [91]. Our findings reflect examples of these strategies being used, except the use of media figures. Nevertheless, we cannot rule out possible influences of different beliefs about health concepts across cultures, lack of health literacy or skills in reading, leading to differences in understanding and interpreting the statements [92, 93], despite our positive experience of getting respondents engaged in a meaningful dialogue about group-based principles for action in CBHEPA programs in all focus groups.

The APEF tool, based on statements and subsequent group discussions, proved useful for engaging respondents in a meaningful dialogue. On the positive side, it allowed all respondents to participate. It enabled the researcher/facilitator to reach out to those who kept silent. It also kept respondents alert throughout the focus group. The voting procedure itself was, however, sometimes hard to manage as respondents started discussing as soon as they heard the statement, without using their vote cards and casting their votes only after discussion. Two statements, those addressing social support and group safety, generated considerable debate. It might be that the concepts were too generic and abstract for this target group. In future use, safety should be addressed more explicitly in two statements: one addressing environmental safety and the other addressing emotional safety.

Our findings are based on a volume of ten focus groups, including 76 respondents, generating a fairly solid basis for interpretation of our data. The APEF tool also generated data for comparison between groups; this is an indication of its generalisability (external validity).

Conclusions

In the participants' eyes, group-based principles for action in CBHEPA programs are not clearly demarcated. Fostering group processes is an overarching principle, generating feelings of safety and social support, which are conditional for the spin-off in terms of physical activity enjoyment and active participation. This, in turn, leads to (the development of) perceived sense of ownership, with participants taking responsibility for the exercise group as well as their own physical activity behaviour. Participants identified responsive leadership as the most important principle for action. A professional, competent, responsive exercise trainer plays a key role in the organisation and maintenance of CBHEPA programs.

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Appendix

Table A1 Descriptives of focus group respondents

Variable	Value
Socio economic conditions	
Gender (n=76)	%
Women	84.0
Men	16.0
Age (n=71)	
Mean *(sd)*	61.6 *(13.24)*
Income (n=66)	%
< € 1,000	22.7
€1,001 – €1,350	25.8
€1,351 – €1,800	16.7
> €1,800	10.6
Income not specified	24.2
Education (n=71)	%
No/Primary education	42.2
Secondary education	46.5
College/University education	9.8
Other	1.5
Living conditions (n=71)	%
Single household	35.8
2-person household	29.9
> 2-person household	34.3
Working conditions (n=71)	%
Work (full-/part-time)	8.5
Unfit for work/Retired	33.8
Unemployed/Social benefit	15.5
Housekeeper	57.7
Ethnic origin (n=76)	%
Dutch	50.7
Non-Dutch**	49.3
(If of non-Dutch origin) Years in the Netherlands (n=35)	
Mean *(sd)*	27.3 *(12.55)*
Quality of Life	
Overall score Health-related Quality of Life*	
Mean *(sd)*	6.5 *(1.47)*
EQ VAS (0–100)*	
Mean *(sd)*	74.2 *(15.25)*
Life satisfaction (0–10)	
Mean *(sd)*	8.0 *(1.47)*
Sense of coherence (SoC3) (n=71)	%
Strong SoC	18.5
Moderate SoC	58.5
Weak SoC	23.0
BMI (n=65)	
Mean *(sd)*	29.3 *(4.85)*

Variable	Value
Physical Activity	
Participation duration in PA program (n= 69)	%
< 3 months	26.1
3–6 months	8.7
> 6 months	65.2
Member sports club (n=63)	%
Yes	20.6
No	79.4
Total PA minutes/day	
Mean *(sd)*	210.1 *(147.15)*

* Health-related QoL was measured with EuroQoL 5D-3L; overall score 5 = no problems/complaints; score 15 = severe problems/complaints; EQ-VAS (EuroQoL visual analogue scale scores today's self-perceived health, scale 0–100).

** Among n=76, 15 different countries of origin were identified.

CHAPTER 6

What factors influence physical activity maintenance in women of non-Western origin?

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Abstract

Background: Community-based health-enhancing physical activity (CBHEPA) programs often target women of non-Western origin because they are relatively less active. The factors that influence physical activity initiation are widely studied. Less is known about the factors that influence physical activity maintenance. More knowledge of these factors may enhance CBHEPA program effectiveness. The aim of this study was to gain insight into the factors that influence physical activity maintenance in women of non-Western origin.
Methods: Based on literature, factors were mapped at individual, group, and program level, and for the social and physical environment. Four semi-structured interviews were conducted with group leaders and exercise trainers (n=6). Three focus group discussions were conducted with women of physical activity groups, active during at least one year, at least once a week (n=25).
Conclusions: The factors that influence physical activity maintenance at individual level were: perceived (health)benefits, self-regulation and learning outcomes regarding physical activity and social participation. At group level mutual support, security, sharing stories and trust are important factors. At program level program quality, staff responsiveness, continuity, and accessibility are important factors. Conclusion: individual perceived benefits and factors at group and program level, aimed at an appropriate mix of exercise and social activities, contribute significantly to physical activity maintenance of women of non-Western origin.

Introduction

The Netherlands Institute for Social Research's 2006 survey on the integration of minorities shows that there are differences in the physical activity of native and non-native Dutch adults: 18% of Turkish migrants and 31% of Moroccan migrants take adequate physical exercise, as opposed to 40% of the native Dutch [1]. The difference in physical activity behaviour is associated with differences in origin and socioeconomic status (SES) [2]. Consequently, many community-based sports and physical activity programs focus on low SES groups [3], and especially on women of non-Western origin [4]. An example is the Communities on the Move (CoM) program (Box 6.1). Known success factors for the initiation of physical activity behaviour in such programs are: referral by a general practitioner (GP) or care provider, cooperation with key figures, word-of-mouth advertising, and the target group's involvement in the development of the program [4]. However, studies on the effectiveness of these interventions are scarce [3-6], and insight into the success factors for continued physical activity behaviour, also referred to as physical activity maintenance, is lacking.

Box 6.1 Communities on the Move (CoM)

CoM is a program developed by the Netherlands Institute for Sport and Physical Activity (NISB). The program aims to enhance the physical activity behaviour of inactive, low SES groups that do not meet the Dutch standard for healthy physical exercise (NGGB). The CoM program is based on seven key principles: a social network approach, active participation, enjoyment, attention to the group process, involvement of the social and physical environment, intersectoral collaboration, and embedding [7]. Local organisations have been implementing the CoM program to over 100 groups in 35 municipalities since 2007. A comprehensive evaluation study of the (cost) effectiveness of the CoM program was started in 2012 [8].

Definitions of physical activity maintenance differ [9, 10]. It is usually defined as physical activity behaviour that takes place once a week for at least six months [11]. The determinants for physical activity maintenance are not the same as the determinants for behavioural initiation (i.e. starting physical exercise) [10, 12, 13]. According to Van Stralen et al. [10], the determinants for behavioural initiation may, at the individual level, be described on the basis of *pre-motivational* factors, such as awareness, knowledge, and risk perception, as well as *motivational* factors, such as attitude, personal effectiveness, and social influence. For physical activity maintenance, *post-motivational* factors, psychological constructs that bridge the gap between intention and actual behaviour, e.g., self-regulation, are deemed more important than the determinants from traditional theories of behavioural change [14-17]. Physical activity maintenance is also associated with habituation [18, 19] and enjoyment [9, 20, 21].

Apart from individual behavioural factors, social and physical environmental factors also appear of influence [22-32]. Various studies emphasise active participation as an influential factor in physical activity programs for women of non-Western origin [4, 29, 33]. At program level, mention is made of collaboration, appropriate facilities, and the available sports arrangements [7, 9, 34-36].

This study aimed to find empirical evidence for factors that influence physical activity maintenance in women of non-Western origin. Earlier studies provide little to no insight into either the individual or the group, environmental, and program-based determinants for physical activity maintenance, whereas such insight is needed to be able to assess and increase the effectiveness of such programs [11]. Therefore, the question central to this study is: What factors, at what level, positively influence physical activity maintenance in women of non-Western origin who participate in community-based health-enhancing (CBHEPA) physical activity programs?

Methods

On the basis of a literature review [7, 10-12, 14, 16-20, 26, 28-30, 32-35, 37-55], we devised a framework for an explorative study on the factors that affect physical activity maintenance. The ecological perspective on physical activity behaviour [56] was chosen as the point of departure for a categorisation over four levels: the individual, group, environmental, and program levels (Figure 6.1), albeit that the categories cannot be clearly delimited as some factors may be at play at multiple levels. Four semi-structured interviews were held with group leaders and exercise trainers (n=6), and three focus group discussions were conducted with women (n=25) who had been long-term participants in CBHEPA programs. For physical activity maintenance, we assumed active involvement in a physical activity program of once a week for at least six months, in accordance with Marcus et al.'s definition [11].

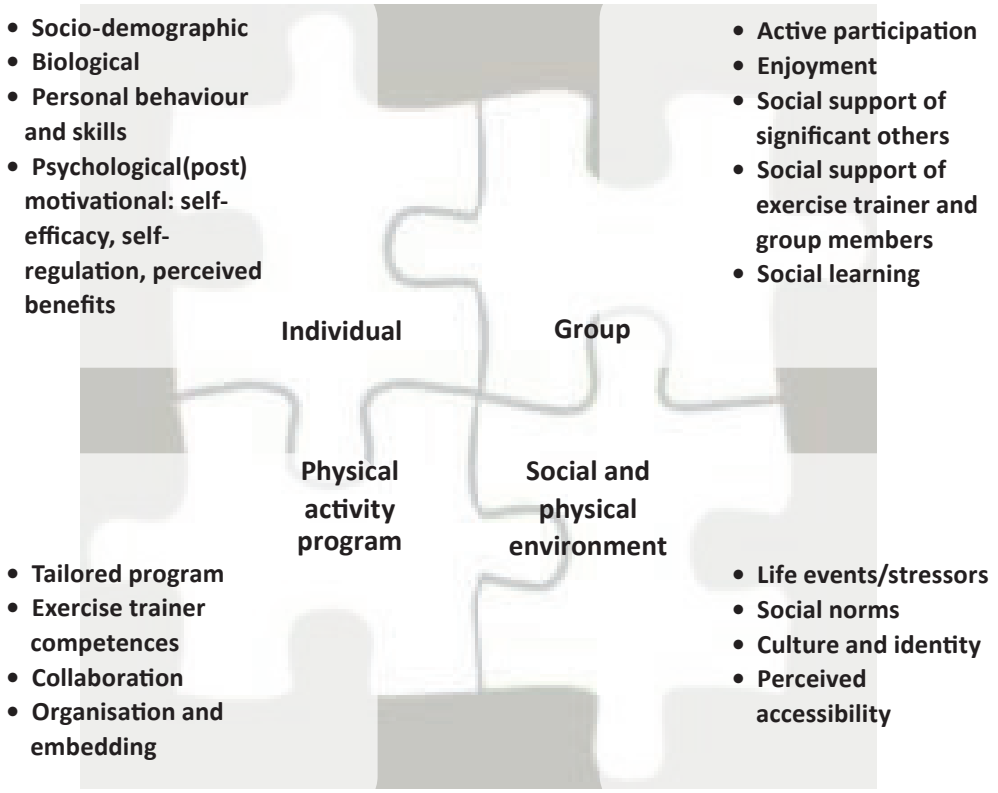

Figure 6.1 Framework for the factors that influence physical activity maintenance

Respondents

The study population comprised women of non-Western origin who actively participated in CBHEPA programs, and their group leaders or trainers. The overall evaluation study of the (cost) effectiveness of the CoM program was used to recruit the respondents for the interviews and focus group discussion (convenience sampling). In 2013, we interviewed six group leaders at three locations (A, B, C). These included two paid group leaders, one of whom was a coordinator and the other an exercise trainer, and four volunteer group leaders. At locations A and C, the group leaders were interviewed individually; at location B, both group leaders were interviewed together. Five of the six interviewees were of non-Western origin. The interviews lasted 45 minutes on average.

Subsequently, three focus group discussions were conducted by multilingual discussion leaders attached to ERC Research, an independent research bureau specialising in multicultural research. Each focus group discussion lasted on average 90 minutes. In two of these focus group discussions, a group leader participated.

Twenty-five women of non-Western origin participated in the focus groups (Table 6.1). They were on average 52.4 years old (*sd* 9.9) and had been living in the Netherlands for an average of 28.4 years (*sd* 10.6). Seventeen of them had no education or merely finished primary school, and five of them were employed. Because of the diversity in origin, the focus group discussions were conducted in Dutch. If necessary, the questions and statements were translated.

Table 6.1 Characteristics of the physical activity programs and the respondents per location

Location	Program provider	Sports venue	Focus group participants	Program characteristics	Program run-time
A	Social service provider	Community centre	9 women (4 Turkish and 5 Moroccan)	Weekly exercise class (1 hour); 30 min. socialising; monthly education session; occasional activities	Since 1999
B	Mother care centre (personal initiative)	Open air	10 women (6 Turkish, 3 Moroccan, 1 Indonesian)	Weekly group walk (approx. 2 hours); 30 min. socialising; occasional education session or other activities	Since 2012
C	Local sport stimulation provider	Various community centres	6 women (2 Turkish, 1 Iranian, 1 Surinamese, 1 Cape Verdean, 1 Chinese)	Multiple times per week exercise to music (1 hour); occasional education session or other activities	Since 2005

Data collection

The guidelines for the interviews and the focus group discussions were based on the framework for the factors that influence physical activity maintenance (Figure 1). The design of the questions was reviewed by ERC Research. One of the interview questions about the physical activity program was, for example: 'Which prerequisites do you believe to be important in order to make the program a success?' One of the focus group questions about active participation in the group was, for example: 'Were you involved in the design of the activity program?' In order to encourage all the women to participate actively in the focus group discussions, the questions about individual factors were supplemented by eight discussion statements on (potentially) influential factors at group level (Table 6.2).

Table 6.2 Statements pertaining to group factors for physical activity maintenance

#	Factor	Statement
1	Participation in group formation	We, as exercise group, choose who participates in the exercise group.
2	Participation in community initiatives	Some participants within the exercise group take the initiative to exercise together elsewhere.
3	Participation in the content of the class	We, as exercise group, choose the activities for the exercise class.
4	Enjoyment in physical activity	Exercising in the exercise group ensures that I like being physically active.
5	Feelings of safety	The exercise group offers me safety to be physically active.
6	Role group leader /exercise trainer	Within the exercise group, the exercise trainer is an example for me to be physically active.
7	Social support	Exercising in the exercise group offers me support to be physically active.
8	Learning achievements	By exercising in the exercise group, I learn how to be more physically active in my daily life.

The participants could indicate whether they agreed (score 3), neither agreed nor disagreed (score 2), or disagreed (score 1), using voting cards (Figure 6.2). The outcome of each poll served as a starting point for further dialogue. The cobweb diagram used to present the statements and scores was inspired by Laverack's and Rifkin et al.'s methods for evaluation studies at group level [57, 58].

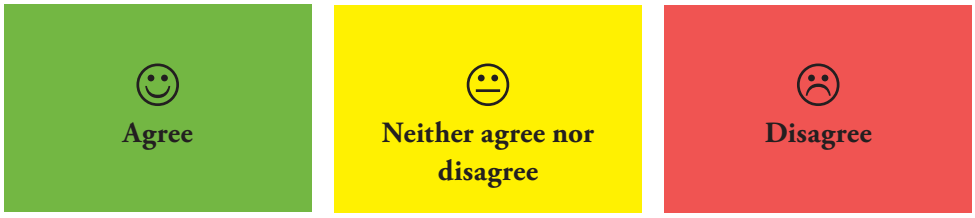

Figure 6.2 Voting cards for scoring the statements in the focus group discussions

Analysis

The data from the interviews and the focus group discussions were processed in accordance with the step-by-step plan designed by Creswell and Clark [59]. Step one was the recording and ad verbatim transcription of the interviews and the focus group discussions. Step two comprised the reading and ordering of the data by at least two researchers (authors involved) as well as the development of a single coding system for the data analysis. Step three was the subsequent coding of the data using Atlas.ti 7.0. Coding differences between the authors involved were discussed. If no code could be allocated, new codes were added. This was the case for learning achievements at

individual level and for leader responsiveness at program level. The codes were clustered into themes, which were selected on the basis of the research question and the framework (Figure 6.1). Step four concerned the reporting of the findings. Based on the coding frequency, the results showed the factors that were mentioned the most and at least 10 times at a minimum of two locations. The results from the interviews were compared with the results from the focus group interviews. Quotes were included in order to stay as close to the participants' wording as possible. Step five was the interpretation of the data through triangulation by all the authors [60, 61].

Results

All the women had been actively participating in a physical activity program once a week for over one year. At location A, some women had been attending for more than 15 years; the others joined later. A number of women at location B had started a walking group in 2012 in order to increase their weekly exercise. At location C, women had been attending organised physical activity classes between twice and four times a week. Together, they mentioned many factors that influenced their physical activity maintenance (Table 6.3).

Individual factors

For almost all the women, health complaints were the main reason for their decision to start taking physical exercise. The physical benefits (Table 6.3) mentioned in the focus group discussions included: feeling 'more fit, more energetic, or younger', a 'better figure', or a 'better physical condition'. One woman said: *'I feel I am more active, like in years past, when I was in my teens. I am now turning 59. So I am more or less middle-aged, but I don't notice it at all.'*

Mental benefits were also mentioned: 'taking time for yourself', social contacts, nice get-together, fun, or: *'When you are exercising, you don't have any worries.'*

Physical activity maintenance can be achieved by organising time and opportunities for yourself: *'Yes, just make a program for your day: now it is time for me. Then I simply go and exercise.'* According to some, it is primarily a question of will and setting your own goals: *'I have my own goals to lose weight.'*

The women described the learning achievements of the physical activities as: better motor skills both during and after the lesson, relaxation, and knowledge of their own body. In an interview, a trainer underlined the importance of learning: *'And each time I say: to learn to read your body, to learn to read fatigue.'*

Regarding the social aspects, the women learned to plan and organise in their daily lives, as well the Dutch language.

Table 6.3 Summary per level of the reported factors in physical activity maintenance*

Individual	Factors		
Individual	**Perceived physical and mental benefits** Decrease in pain complaints and/or medicine use Physical fitness Enjoyment Better body shape/weight loss	**Self-regulation** Designing a daily program Setting one's own goals Time for yourself	**Learning achievements of physical activity** Motor skills Relaxation Body awareness Applying taught physical activity behaviour at home **Learning achievements for social participation** Language skills Planning and organising
Group	**Fostering group processes** Social learning Interaction between cultures Safe environment/atmosphere Dealing with life events Care in the case of absence	**Enjoyment** Fun and social get-together Social support Mutual care and concern	**Participation** Initiatives outside the lessons Content of the activities Group formation Initiatives within the lessons
Social and physical environment	**Social standards** Roles of husbands and family members Culture	**Social network** Social activities outside the lessons Making friends Communication between cultures	**Perceived accessibility of physical activities** Affordable Safe environment Findable Open air
Physical activity program	**Quality of the physical activity program** Low-threshold and continuous Satisfaction with the content of the lessons Frequency and time schedule Membership fee Location Resources (funding, time)	**Leaders' competences** Responsiveness Managing group differences Encouraging and organising Role model	**Collaboration** Professionals and volunteers Educational activities

*Summary on the basis of the factors reported at a minimum of two locations, ordered by coding frequency (the first factor in each cell is the most frequently stated).

The women unanimously stated that they took their physical exercise in the community centre because other sports facilities were too expensive. The leaders' personal approach was also essential in encouraging them to continue to take physical exercise when they were ill, around life events (death or divorce in the family), or after a stay in their home country.

Group factors

The results at group level, based on the average scores for the statements in the focus group discussions, are represented in Figure 6.3. Fun, safety, social support, and

learning achievements scored the maximum score of 3 at all the locations. Participation in group formation and lesson content scored the lowest. Nevertheless, the women at all the locations indicated that they mobilised other women to join the physical activity group. They used their own experiences to persuade other women: 'it is not difficult', 'you can do it at your own speed', 'it is fun and sociable', and 'it is good for your body'. The women did not regard this as a form of participation. *'In the end, it is up to them whether they join or not,'* as one woman said.

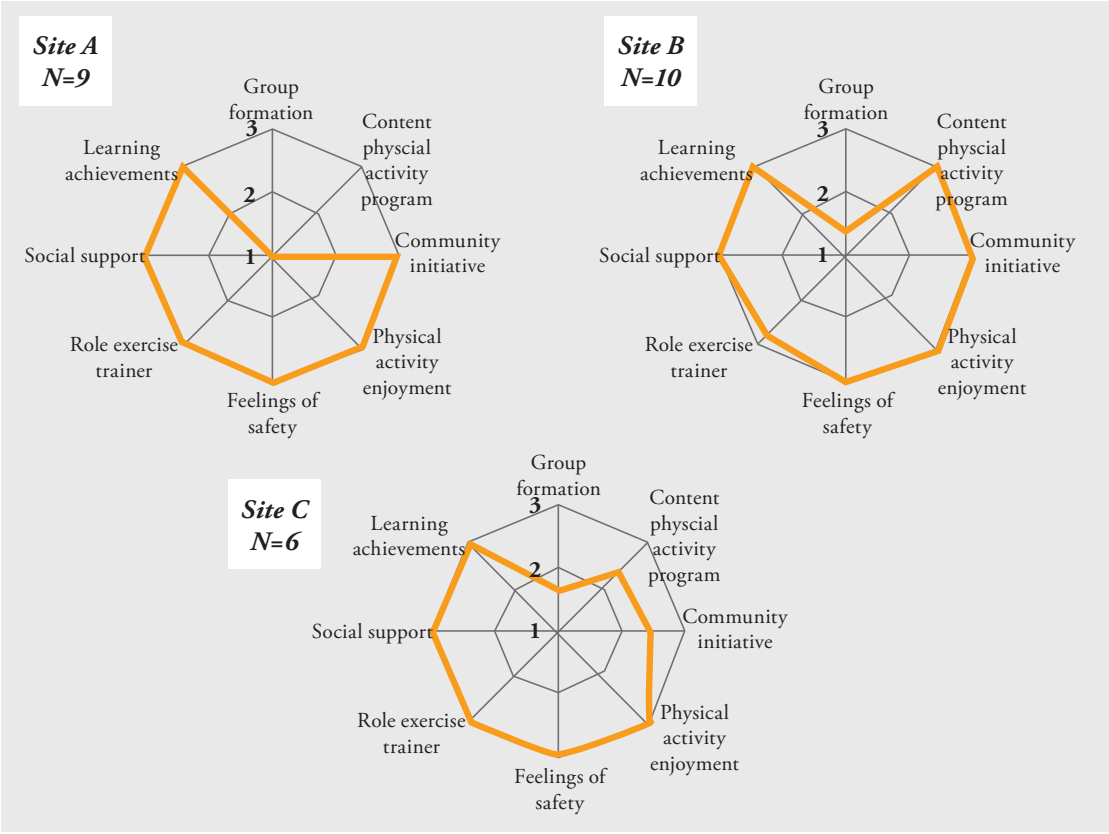

Figure 6.3 Average scores per focus group to the eight statements

At location B, the walking group was a classic example of personal initiative. *'We have no one as a teacher or something like that,'* said one of the respondents. At the other two locations, the women did not actively participate in the lesson content. They did, however, have a say in the choice of music, the time schedule (preferably during the day), and the type of exercises.

Their joy in physical activity arose through exercising together, laughing together, supporting one another, and starting new friendships. They connected physical

activity enjoyment with the nature of an activity, for instance the play element or being outdoors. One woman said: *'If I am at home, yes, I am not going to jump. That is also not playing with a ball. So I really enjoy it.'*

To these women, safety meant 'safe and responsible exercises', but also 'the prevention of theft', 'being able to exercise without others watching', 'being allowed to make mistakes', and an 'atmosphere where all respect one another'. A group leader confirmed the importance of safety in an interview: *'There are no fixed rules like you must wear shorts. That does provide security.'*

Social support emerged through mutual involvement in the case of events or problems at home, by travelling to the lessons together or by jointly undertaking other activities outside the lessons.

To these women, learning achievements related to following the example of others. By sharing their knowledge and experiences, they helped other women on their way. Trainers and group leaders were role models because they actively participated. One woman stated about the exercise trainer: *'Since she suffers from rheumatism, she is an example to us all. We have to exercise every day. That is why I go. I want to do the same for my health as the trainer does for hers.'*

Factors in the social and physical environment

The women revealed that their learning to make social standards and cultures a subject for discussion as part of the activity program supported their physical activity maintenance (Table 3). In an interview, a leader underlined: *'The Moroccan culture is not a culture where a woman can just say: now I am taking a moment for myself. You are raised to put energy into running the household and the children. (…) So you should actually educate that man.'*

The women indicated that their participation in the physical activity group strengthened their social network because, apart from the lessons, they also learned how to undertake other activities, such as sewing classes, Dutch language classes, a discussion group, or cooking together. This was confirmed by a coordinator: *'When I think back to that group that never went outside, the Arab group of women. They work everywhere now, do the shopping themselves, visit the doctor themselves, learn to speak Dutch, and what have you.'*

Factors at program level

Regarding the physical activity program's quality characteristics, the women mentioned their easy access and continuity. Easy access means being affordable, fitting in with their daily routines and obligations, findable, and safe. Learning to pay for it was an integral element of the physical activity programs. *'You must be able to scrape it off your family budget,'* a group leader clarified. Regular sports facilities, such as the swimming pool or the gym, have their drawbacks, the women said. They are too expensive, there is

no possibility of exercising separately, and there is little (attention to) personal support.

In the interviews, the group leaders emphasised two continuity characteristics. Firstly, an ongoing effort is required to continually motivate the women, as a long stay in their country of birth, family obligations, sickness, or finances impede physical activity maintenance in women of non-Western origin. Secondly, the resources and funding that are necessary to continue with the activities demand their continual attention. *'You cannot let it slip, and you need a professional. You cannot think: let's leave it to a volunteer and, hey presto, the lessons continue. That is simply not true.'*

During the interviews, it also emerged that responsive leadership, the backwards and forwards communication about the things that are going on within the group in order to learn from one another, is a key competence if the program is to meet the participants' needs, abilities, and development. One exercise trainer described it as: '*Daring to make yourself vulnerable in class, daring to acknowledge that things can, or cannot, be done. To sympathise with them. And to show that you respect them, even in their impossibilities.'*

In their joint interview, the group leader and exercise trainer were unanimous in saying that they worked together in translating any signals received from the group into activities. The group leader acted as a link in mobilising the women. One woman said: *'If it wasn't for her, we would never have come together here every week to exercise.'*

One of the exercise trainers summarised her efforts as: *'What we want with this group is to use physical exercise as a means to allow these women to develop a positive self-image. You can see them as flowers that have not opened up yet. We try to open them through physical exercise.'*

Discussion

This study aimed to find empirical evidence for factors that influence physical activity maintenance in women of non-Western origin. We were able to reach primarily older women, who had been actively exercising within a group on a weekly basis for between one and 15 years, in long-running physical activity programs. This and the methods used in our study, which were in their turn aimed at mapping out the individual as well as the group, environmental, and program-based determinants for physical activity maintenance, distinguish this study from many other studies on physical activity maintenance.

Perceived physical and mental benefits and post-motivational factors, such as self-regulation, planning, and setting personal goals, were all found to be of importance at the individual level. These findings correspond to other research among adults, where perceived benefits, self-regulating mechanisms, and learning to cope with life events [39, 62] were reported as factors that influence physical activity maintenance [10, 17, 20, 63-65]. In that sense, our target group of women of non-Western origin does not differ from other adults. In our target group, the learning achievements in terms of

physical exercise and social participation also play an important role in physical activity maintenance.

Social support and social learning in the group through, among other things, modelling, safety, enjoyment, and responsive leadership have a positive influence on the women's physical activity maintenance, and especially on their learning to cope with any relapse in their physical activity behaviour, as described in the Relapse Model [30, 66, 67]. A fragile balance between the various interests with which women of non-Western origin have to deal in daily life is illustrated by the positive exercise experiences that women describe, on the one hand, and the leaders' necessary focus on the prevention of drop-outs or relapses, on the other. Responsive leadership can make a considerable contribution here. An 'enabling professional' [68], who has an eye for the balance between personal attention to each and every individual, for self-fulfilment, and someone who is able to manage group processes, can provide a physical activity program that meets these women's desires, needs, and personal development. Our findings correspond to the model of social self-interaction in achievement settings, which describes the factors that help lead to a joint achievement, such as group dynamics, (role) models, instruction, and feedback [31, 32, 69].

Our results demonstrate that women will continue their physical exercise, provided the conditions meet their needs. Active participation in program development, as may be presupposed on the basis of the literature [4, 9, 29], is possibly of less overriding importance to physical activity maintenance than responsive leadership and continuity in easily accessible activities. Potential risks to physical activity maintenance may be inherent in cutbacks in the welfare and healthcare sectors, the closing down of community facilities, or the loss of leaders, as also described by Flink et al. [70].

The strengths and limitations of this study concern the research population, data collection, and processing. We included only active, older women of non-Western origin. The results cannot simply be extrapolated to other target groups of the same origin. The results from the interviews and the focus group discussions corresponded between and within each location, thereby confirming the internal reliability of our investigation. The focus groups were led by Turkish and Moroccan interviewers who were able to translate any questions. Because of the ethnic diversity in the groups, the focus group discussions had to be conducted in Dutch. When the women indicated that they did not understand a question, it was explained and, where possible, translated. Some terms did raise questions, for instance a term like 'safety', which proved to have multiple meanings. On the other hand, such terms also sparked interesting discussions that, as the women themselves declared, allowed the group to learn from one another's insights. It cannot be ruled out, though, that in some cases the women did not always declare that they did not understand the question.

The great turnout of women at the focus group discussions (two groups had more than eight participants) was a success, but it sometimes made it difficult to work

with open questions – partly because it was sometimes necessary to translate them. The women may also have given socially desirable answers, as the discussions were held in the existing, familiar group.

Peer pressure and the influence of the group leaders might have affected the women's responses, for instance when they scored the statements. On the other hand, the group leaders made sure that all the women had their say. The women sometimes found it difficult to accept the differences in the answers between them. This means that the scores for the statements cannot be interpreted as 'hard' quantitative data. Working with statements as a research method did prove to be valuable however, as all the focus group members were (persuaded to be) actively involved, and the subjects could be discussed in a similar way in the different groups. It is recommended to use the same method in more groups, with an eye to its further development towards an instrument that helps map out any correspondences and differences between groups.

The step-by-step processing of the data and the triangulation of the results from the interviews and the focus group discussions focused on the categorisations and interpretation of the factors in mutual connection. Here, some factors, such as 'safety', 'social support', and 'enjoyment', were found to be relevant at all levels and also closely intertwined. This affirms the need to consider also interaction patterns for physical activity maintenance.

Conclusion and recommendations

Physical activity maintenance by women of non-Western origin is highly dependent on an interaction between individually perceived benefits and group-based learning achievements, on the one hand, and leaders' responsiveness and group management, on the other. Attention to program-based factors, such as an affordable, safe, and – if desired – shielded exercise environment and social activities, contributes to physical activity maintenance. This may increase the effectiveness of CBHEPA programs.

Follow-up research, geared towards using theories on relapse prevention and group learning to identify the factors for physical activity maintenance for women of non-Western origin at group and program level may contribute to further theorising and insight into the relevant mechanisms at play in physical activity maintenance.

Practical recommendations for CBHEPA programs for women of non-Western origin are responsive leadership and continuity in easily accessible physical activity programs. It seems that the target group would benefit less from activities leading them to regular sports and exercise facilities, unless these provided the possibilities and professionals for responsive leadership, as described in this study, as well as low prices, shielded sports venues, and the fostering of group processes in combination with the participants' individual development.

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CHAPTER 7

Contexts, mechanisms and outcomes that matter in Dutch community-based physical activity programs targeting socially vulnerable groups

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This chapter is accepted for publication by Evaluation and the Health Professions as: Contexts, mechanisms and outcomes that matter in Dutch community-based physical activity programs targeting socially vulnerable groups.

Abstract

Background: This article presents a practitioner-based approach to identify key combinations of contextual factors (C) and mechanisms (M) that trigger outcomes (O) in Dutch CBHEPA programs targeting socially vulnerable groups.

Methods: Data were collected in six programs using semi-structured interviews and focus groups using a timeline technique. Sessions were recorded, anonymised and transcribed. A realist synthesis protocol was used for data-driven and thematic analysis of CMO configurations.

Results: CMO configurations related to community outreach, program sustainability, intersectoral collaboration, and enhancing participants' active lifestyles. We have refined the CBHEPA program theory by showing that actors' passion for, and past experiences with, physical activity programs trigger outcomes, alongside their commitment to socially vulnerable target groups. Project discontinuity, limited access to resources and a trainer's stand-alone position were negative configurations.

Conclusion: The authors conclude that local governance structures appear often to lack adaptive capacity to accommodate multilevel processes to sustain programs.

Background

Health disorders associated with inactivity, including impaired health-related quality of life as well as direct and indirect economic costs, exert a substantial burden on societies and health systems [1]. In the Netherlands, socially vulnerable groups, e.g., those with low socio-economic status (SES) or of non-Dutch origin, are generally less healthy than higher SES groups [2] and are less engaged in sport and physical activity [3, 4]. In response to the observed inequities, it has been Dutch policy to promote community-based health-enhancing physical activity (CBHEPA) programs in order to improve the health and wellbeing of socially vulnerable groups [5-7]. The rationale for the Dutch government subsidising recreational sport and physical activities schemes such as CBHEPA programs is based on the notion that participation in these programs supports the development of social capital and quality of life in a community by contributing to community bonding [8-11]. Additionally, it may improve the health and well-being of participants [12, 13].

CBHEPA programs targeting socially vulnerable groups are usually so-called natural experiments by design, embedded in on-going field practice rather than in an experimental setup. Consequently, they have an important contribution to make to the health inequities agenda, as they can play a role in investigating the determinants of health inequities and in identifying effective interventions [14]. This, however, requires evaluation approaches that are sensitive to the operational conditions of CBHEPA programs as part of larger complex systems [15]. This study aims to identify key combinations of contextual factors and mechanisms that trigger outcomes of interest in Dutch CBHEPA programs from a practitioner perspective.

Evaluation in the context of an ecological perspective on human health

Theories to develop and implement CBHEPA programs are based on an ecological perspective on human health, emphasising the interaction between actors and factors within and across the different levels [16-19]. CBHEPA program theory is based on individual [20-23] and group-related behavioural theories [24-27], and they build on concepts such as social cohesion, supportive environments and community participation [11, 12, 17, 28-30]. Furthermore, CBHEPA programs are underpinned by theories on intersectoral collaboration and coordinated action, addressing stakeholder involvement and community ownership [17, 30-33].

Collecting practice-based evidence on CBHEPA programs should, therefore, build on the knowledge of different stakeholders. In the course of program delivery, practitioners generate knowledge and create hypotheses about what works for whom in what circumstances [15, 34]. Dealing with such real-life complexity issues require efforts to understand better contextual and historical influences, mechanisms and the impact of unexpected events or factors in relation to (intended) outcomes [15, 35-42].

Using a realist perspective

To identify key combinations of contextual factors and mechanisms that trigger outcomes of interest in Dutch CBHEPA programs, our study builds on a realist evaluation perspective. Pawson and Tilley [34] developed realist evaluation, arguing that, in order to be useful for decision makers, evaluations need to indicate what works, how, in which conditions and for whom, rather than to answer the question, does it work? [43]. Realist evaluations start with an account of the processes that explain how an intervention leads to a particular outcome, initially formulated as a middle range or program theory based on existing theories, past experience and previous evaluations or research studies. The final research product from realist evaluation is not a statement of effect size, as the same program will have different effects in different contexts, but a refinement of the program theory [34, 40].

Realist evaluation is presented by Pawson as an additional model in systematic research on evidence-based policy and practice, alongside meta-analysis and narrative reviews, by comparing program mechanisms. According to this perspective, it is not programs that work, but rather the underlying reasons or resources that they offer actors to generate change. Whether the choices or capacities available in an initiative are acted upon depends on the nature of the actors and the circumstances of the initiative [40]. It is for this reason that realist evaluation seems promising for evaluating multilevel CBHEPA programs [38].

Methods

The study followed a multiple case study design [44]. To identify mechanisms relating to outcomes of CBHEPA programs and contextual influences, we examined six on-going Dutch CBHEPA programs between 2012 and 2014, summarised under the denominator: Communities on the Move (CoM). CoM was developed and disseminated in line with national policy objectives by the Netherlands Institute for Sports and Physical Activity (NISB) (2003–2012) targeting inactive, socially vulnerable groups. Its overall aim was to enhance physical activity levels in socially vulnerable groups, in order to improve participants' quality of life and societal participation. Since 2012, CoM has been subject to a comprehensive evaluation study [19].

A longitudinal action research approach was adopted. At the start of each collaboration with a CBHEPA program, an exploratory interview was conducted, followed after 12 to 18 months by a focus group using a narrative timeline technique [45]. The timeline technique was chosen as it is designed to respect contextual and historical influences, generating data based on stakeholders' individual and collective perceptions, thus reflecting CBHEPA program dynamics over time [46]. In addition, the timeline technique visualises actor perceptions of what matters most, offering both the researcher and participating practitioners a way to gather data on program progress [47, 48]. Realism synthesis was used in the data analysis, facilitating the identification of the contextual factors and program mechanisms determining outcomes in each of the CBHEPA programs [40].

Study setting and population

Six CBHEPA programs were selected (purposive sampling). The objective of using multiple cases was to achieve conceptual power rather than population representativeness. For each case, relevant stakeholders for interviews and timeline sessions were recruited by local project coordinators in collaboration with the researcher (first author). The study population consisted of local stakeholders, primarily representatives of implementing organisations (project coordinator, exercise trainer), municipal or welfare organisations' community workers and other actors from local networks (Table 7.1).

The CBHEPA programs involved in our study did not start from scratch; rather, they were generally embedded in on-going national and local (policy) developments and existing collaborative structures. They were initiated by different types of actors, namely, representatives of two welfare organisations, two local sports promotion organisations and a regional education centre (ROC) covering two municipalities. The initiative to start a CBHEPA program usually came from individuals, driven by an inner motivation to use physical activity as a means to improve the lives of socially vulnerable target groups.

The CBHEPA programs could be distinguished into two types. Two programs used a project-based intervention design, building on a predefined framework or format, usually organising activities for a fixed period of time (12–13 weeks). In these programs, we could connect to start-ups of new physical activity groups. Four CBHEPA programs used a continuing, service-oriented design, driven by the aim to provide for sustained sport and physical activity schemes tailored to the needs of the target group. In these programs we could connect to on-going activities in existing groups (Table 7.1).

Table 7.1 CBHEPA program characteristics

CBHEPA program	Municipality	Implementing organisation	Network actors	Target group	Program design	Active since
A	Den Haag	Welfare organisation Freelance exercise trainer	Municipal community team (incl. pharmacist, physiotherapist, homecare service, neighbourhood sport coach) Moroccan women's self-organisation Badminton club	Women Socially vulnerable Non-Dutch origin	Continuing In-/outdoor Exercise to music/fall prevention/walking 1x/week Single exercise trainer	2014
B	Helmond	Freelance exercise trainer	Municipality (commissioner) Playground management Welfare organisation Municipal community team	Women and men Socially vulnerable Dutch and non-Dutch origin	Continuing Outdoor fitness Multiple times/week Single known exercise trainer	2010
C	Enschede	Regional vocational training centre (ROC) Project staff/students	Municipality (commissioner) Municipal community team Local sports clubs Corporate social responsibility foundation professional football club University Incidental collaboration: municipal social and health services and health insurance	Women and men Socially vulnerable Dutch and non-Dutch origin	Fixed duration (13 weeks+18 months follow-up meeting every 6 weeks) In-/outdoor Mixed sport activities 1x/week Multiple exercise trainers/students	2009
D	Hengelo	Regional vocational training centre (ROC) Project staff/students	Local football club Welfare organisation Other local sports clubs and providers Corporate social responsibility foundation professional football club	Women and men Socially vulnerable elderly (55+) Dutch and non-Dutch origin	Fixed duration (12 weeks) In-/outdoor Mixed sport activities 1x/week Multiple exercise trainers/ students	2013
E	Rotterdam Delfshaven	Communal sports foundation Freelance exercise trainers	Borough council (commissioner) Welfare organisation Women's empowerment centre Incidental collaboration: general practitioner , physiotherapist, mental health care and municipal health service	Women and men Socially vulnerable elderly Mostly non-Dutch, some Dutch origin	Continuing Indoor Exercise to music/fall prevention Multiple times/week Single exercise trainer	2005
F	Tilburg	Municipal sport company Freelance exercise trainer	Municipal network sport and exercise for the elderly (commissioner) Welfare organisation Provincial Sport Service Incidental collaboration: general practitioner, physiotherapist, mental health care service	Women and men Socially vulnerable/ or chronically ill elderly Dutch origin	Continuing Indoor Fall prevention exercises/mixed sport activities 1x/week Single exercise trainer	2012

Data collection

Data were collected between 2012 and 2014. In a semi-structured interview, data were collected for each CBHEPA program in relation to intended outcomes of interest, the mechanisms associated therewith and contextual factors (e.g., organisational issues, networks involved or funding). Five semi-structured interviews were conducted with program coordinators and exercise trainers (n=9), covering six different CBHEPA programs (Table 7.2).

After 12 to 18 months, for each CBHEPA program, a focus group using the narrative timeline technique was organised. Timeline participants were identified by local project coordinators and jointly invited by the local project coordinator and researcher (first author), thus reaching a total of 39 participants (Table 7.2).

Table 7.2 Data collection scheme CBHEPA programs

CBHEPA program	**Implementing organisation**	**Initial interview**	**Resp.**	**Timeline session**	**Resp.**
		Date	N	Date	N
A	Welfare organisation Freelance exercise trainer	Mar 2014	2	Dec 2014	8
B	Welfare organisation Freelance exercise trainer	Oct 2012	2	Nov 2013	5
C	Regional vocational training centre (ROC)	Sept 2013	1[a]	Sept 2014	6
D	Regional vocational training centre (ROC)	-	-[b]	June 2014	9
E	Communal sports foundation Freelance exercise trainer	Dec 2012	2	Dec 2013	7
F	Municipal sport company Freelance exercise trainer	Oct 2012	2	May 2014	4
		Total	9		39

[a]At the time of the interview, one respondent was ill and therefore did not attend. [b]The Regional vocational training centre (ROC) had initiated two different CBHEPA programs in two municipalises, acting as overall implementing agency. The two initiatives were discussed in one interview.

Each timeline session was conducted on site, following a stepwise procedure. Each session was facilitated by the researcher (first author). Firstly, once the purpose and procedures of the timeline session were explained, a prepared timeline, drawn on flipcharts and divided into three rows, was put up on the wall. The top row was intended to reflect on occasions of positive energy during the process, the middle on occasions that took energy away, and the bottom on breakthrough occasions (new insights, opportunities). Milestones in the process (e.g., critical incidents or meetings, months or years) were marked by the researcher, dividing the timeline with vertical

lines. Secondly, individual perceptions were collected. All participants were asked to recall occasions that mattered most in the process, which then were marked by the facilitator on the prepared timeline. Then, the participants were asked to write down in brief statements how these occasions mattered to them individually. Each participant was provided with a marker and self-adhesive sheets (post-its) in three colours: green for energising (☺) or inspiring events or occasions, red for energy draining events (☹), and yellow for occasions of insight or breakthrough (💡). The statement, for example, "When we actually started the first group, it gave me a thrill", would be written on a green sheet. Each participant placed his/her statements on the corresponding milestone on the timeline. Thirdly, a plenary dialogue was facilitated, using the visualisations on the timeline. Clusters of coloured post-its on the timeline usually indicated periods in which significant changes had taken place. Then the group discussed what had been written in order to come to a mutual understanding of what had happened. Finally, conclusions and action points were noted. Each timeline session took around one and a half hours.

In between the two points of data collection, each field visit, telephone call or e-mail contact was documented for all CBHEPA locations. These notes proved valuable data sources to track program progress and sudden incidents or changes; for example, changes in program fees, staff turnover, or even transfer of the program from one organisation to another. The information was used in the preparation of the timeline sessions to identify milestones in retrospect for each CBHEPA program.

Data analysis

Initial interviews and timeline sessions were all anonymised and transcribed ad verbatim. A longitudinal perspective was used, considering the initial interviews as the baseline data and the retrospective timelines as follow-up measurements. Our analysis was stepwise, data driven and thematic [49], using Atlas.ti (7.5.9). Coding was developed based on a realist synthesis protocol. In realist evaluation, the focus is on context–mechanism–outcome (CMO) configurations. Data extraction takes the form of an interrogation of the baseline inquiries for information on what works for whom in what circumstances. The analysis of qualitative data from interview transcripts is then based on coding in terms of outcomes as observed by respondents, context conditions and description of underlying mechanisms in the actual intervention [38].

Step 1: All transcripts were coded by the first author in discrete terms of contexts (C), mechanisms (M) and outcomes (O).

Step 2: Quotes coded as 'context' were further thematised into historical-, organisational-, programmatic-, and participant-related codes. Quotes coded as 'mechanism' were also further thematised into organisational-, programmatic-, and participant-related codes, as were quotes coded as 'outcome' (Table 7.3).

Each theme was further refined into subthemes, i.e. organisational policy, program

resources, or participant attitudes, and labelled as supportive (+) or restraining (-), thus addressing the aim of differentiating and accumulating evidence on positive and negative CMO configurations [40].

Table 7.3 Operationalisation of context–mechanism–outcomes concepts in CBHEPA programs

Concept	Theoretical definition[a]	Operational description[b]	Thematic elaboration[c]
Context	Refers to the fact that a relationship between causal mechanisms and their effects is not fixed, but contingent	Something (situation or condition) that existed prior to the introduction of the CBHEPA program, or something happening outside control of the program	Historical factors Organisational factors implementing agency Organisational factors CBHEPA program Participant-related factors
Mechanisms	Responsible for the relationship between context and outcome; not a variable but an account of the make-up, behaviour and interrelationships of those processes that are responsible for the regularities	Activities or actions taken by actors in the CBHEPA programs.	Activities and actions taken by: Actors implementing agency Actors CBHEPA program, incl. exercise trainer Participants
Outcomes	Result from different layers of reality in social explanation. Thus, when we explain regularity generatively, we are not coming up with variables or correlates that associate one with another; rather we are trying to explain how the association itself comes about	Results of the CBHEPA program (activities), as perceived by CBHEPA program respondents	Results at the level of the: Implementing agency CBHEPA program Participants

[a]Based on [36, 39, 40, 50]; [b]Based on [51]; [c]Based on [19, 52].

All coding procedures were done independently by two researchers (first author and a junior researcher). We found that the same phenomenon could be coded as outcome or context, or as context or mechanism, as was also found by Byng et al. (2005). This was mainly attributable to different underlying researchers' perspectives. For example, the first author would label a subsidy scheme for physical activity promotion as a condition, enabling the implementing agency to initiate a CBHEPA program. Therefore, this was coded as a supportive contextual factor, whereas the second researcher would label this as a supportive financial mechanism. The final

argument to label this example as context was that, although the subsidy scheme in itself is a governmental mechanism to enhance physical activity promotion, it is beyond the control of a CBHEPA program. This and other differences in coding were discussed until consensus was reached, thus making explicit that all coding was based on the perspective of the actual CBHEPA program implementation activities.

Step 3: Following procedures for data reduction as suggested by Byng et al [39] and Jackson and Kolla [51], for each case, outcomes of interest in relation to contextual factors were identified based on the initial interviews, depicting the historical and organisational setup of each CBHEPA initiative.

Step 4: Then the outcomes of interest were pooled from all cases. At organisation level, the main domain of outcomes of interest related to community reach; at program level to program sustainability and intersectoral collaboration; and at participant level, to enhanced active lifestyles and societal participation (Table 7.4). On pragmatic grounds, we restricted our further in-depth analysis of CMO configurations relating to outcomes of interest identified in at least five programs.

Table 7.4 Synthesis of intended outcomes of interest of six CBHEPA programs

Level	Intended outcome of interest	Number of programs
Implementing organisation	*Community outreach*	
	Reach of community target groups (migrant groups, elderly, chronically ill)	6
	Becoming visible in and familiar with the communities	6
	Spin-off to more (varied) community initiatives	2
CBHEPA program	*Program sustainability*	
	Set-up of ownership of the CBHEPA program in community-based organisation	6
	Expand number of groups and/or group size	6
	Participants get their own community members involved	4
	Intersectoral collaboration	
	Sustained enthusiasm of actors involved	6
	Learning experiences in different neighbourhoods	5
	Formation of new (local) networks	4
	Liaison development with primary care	4
	Create supportive environment for target groups to facilitate regular sport participation	3
Participant	*Enhanced active lifestyle*	
	Increase and maintenance of daily physical activity	6
	Program adherence	6
	Enhance sport behaviour independence	4
	Increased frequency of attendance in PA classes	2
	Societal participation	
	Overcome social isolation by exercising together	6
	Start with educational trajectories	1

Step 5: For each case, timeline narratives were analysed for CMO configurations. Through linked coding procedures, mechanisms–outcomes dyads were formed in relation to contextual factors, using the Atlas.ti (7.5.9) program to link codes and define relationships [53].

Step 6: In a second level analysis across cases, CMO configurations were further elaborated. To facilitate data interpretation, the coded data were reduced, via reference to the CMO configurations in the case studies, to a tabular form for each outcome of interest under consideration. This matrix allowed a visual overview of cases, mechanism, outcomes and contexts. Symbols such as + and - were used to track supportive and restraining contextual factors and mechanisms. Contextual factors were labelled as generic if they related to all outcomes of interest covered by each outcome domain. They were labelled as specific when they related to a particular mechanisms–outcome dyad.

In the findings presented below, the clearest quotations illustrating respondents' views in relation to CMO-configuration are included.

Ethical considerations

The authors declare that the study was conducted in accordance with the general ethical guidelines for behavioural and social research in the Netherlands [54]. All respondents entered into the research with voluntary consent. They were provided with information about the purpose and contents of the study, and guarantees of confidentiality and anonymity were given prior to each interview and evaluation session. Moreover, participants were able to withdraw from the study at any time for any reason.

Results

Reasons for launching a CBHEPA initiative were mainly historically rooted: past (success) experiences at organisational level with physical activity projects and longstanding working relationships within the target communities (trust/enthusiasm). Furthermore, the presence of related health and welfare projects and established community networks were factors of importance.

CMO configurations that matter in community outreach

Community outreach, highlighting reach to vulnerable target groups and visibility as main outcomes, was identified as a main outcome domain for organisations involved in CBHEPA programs. Generic contextual factors supporting community outreach related to the personal passion for sport and physical activity of all actors involved, who identified a strong belief in the benefits of sport and physical activity for empowering vulnerable target groups as relevant. Furthermore, established, sometimes formalised, collaborative structures at municipality level reinforced by integral community-oriented policies, were identified as supportive factors indicating longstanding trustful

relationships among involved community-based actors. Generic contextual factors restraining community outreach related to organisational dynamics, for example organisational restructuring, policy changes, such as national policies reshaping local social welfare policies, staff turnover resulting in loss of qualified personnel, or lack of continuity and involvement of network representatives. Another generic contextual restraining factor related to a lack of policy interest to reach out to socially vulnerable target groups (Figure 7.1).

Reaching the vulnerable target groups (O_1). Respondents perceived CBHEPA programs as a good strategy to reach out and stay close to practice, e.g., community stakeholders and target groups. Key supportive mechanisms at organisational level to reach the target population related to professional freedom of action for initiators or project coordinators. This involved collaboration with key actors in the community to bring together necessary resources and skills, and a flexible application of project terms of reference such as expanding the recruitment area or diversification of groups. Supportive mechanisms at the exercise trainer level were securing the use of qualified trainers familiar with the target groups, the organisation and management of group-based physical activity activities so as to ensure social support, and the use of highly personalised approaches to reach out to individual participants and their social networks. Contextual factors in support of these mechanisms were past experiences and lessons learned from different projects over the years, suggesting the presence of a body of knowledge on how to act and highly committed professionals and actors eager to make a difference for the target population.

Restraining mechanisms were predominantly mentioned in relation to loss of the most vulnerable individuals and non-attendance; these were perceived as persistent and highly time-consuming problems. Restraining contextual factors were changes or increases in program fees resulting in loss of the most vulnerable participants, and poor exercise trainer employment conditions, usually freelance, whereby additional tasks in support of the target group were excluded from payment. In some cases, legal contracts and organisational support were lacking. Additional restraining contextual factors were participant related, such as cultural dispositions and habits and lack of sport or physical activity experiences over the life span. Diversification of groups in terms of age and ethnic or cultural background was, interestingly enough, identified as a supportive as well as restraining mechanism. Group contexts, such as cultural habits or sense of community, may be decisive for the effectiveness of this mechanism (Figure 7.1).

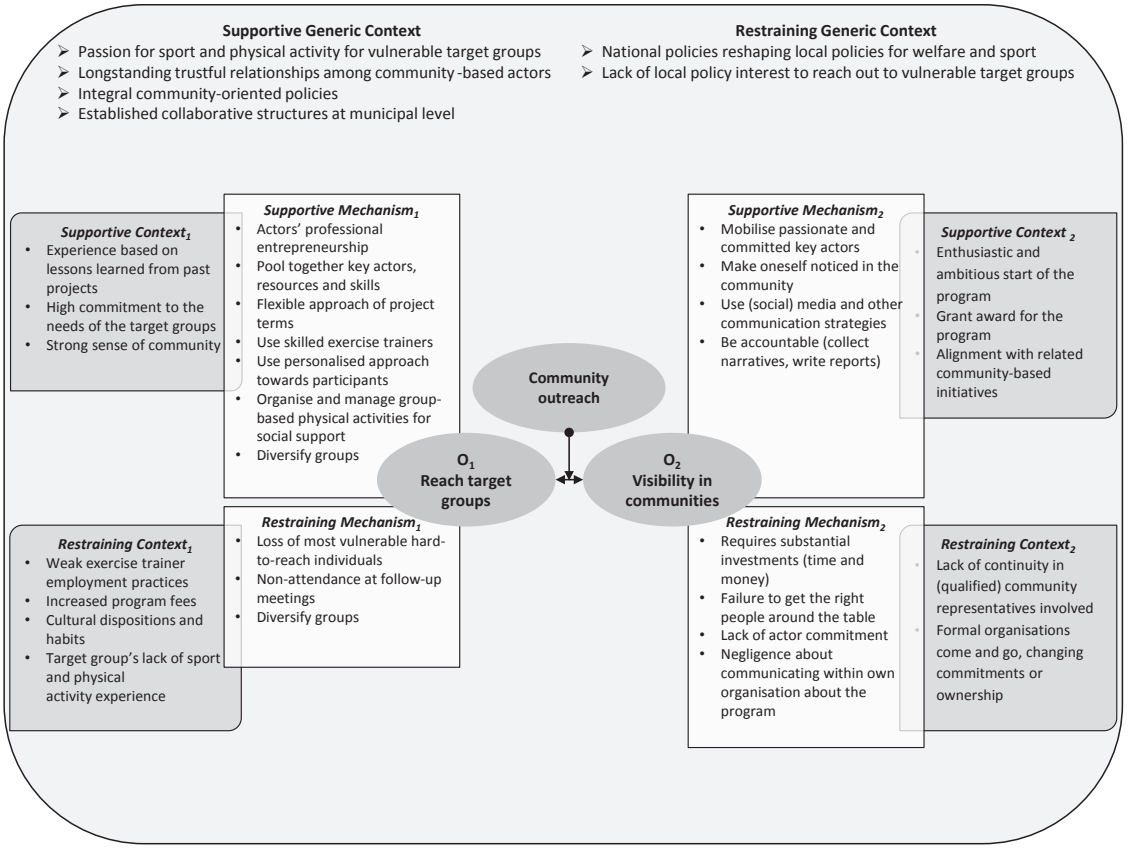

Figure 7.1 CMO configurations on community outreach: reach target groups (O_1) and organisational visibility (O_2)

Becoming visible in, and familiar with, the communities (O_2). Respondents identified CBHEPA programs as a strategy for organisational visibility within communities and neighbourhoods. Key supportive mechanisms were the mobilisation of passionate and committed actors and making oneself noticed in the community, for example by attending community meetings or activities. Use of (social) media and other communication strategies was also mentioned, as well as accountability efforts (writing reports). Contextual factors in support of these mechanisms were actors' enthusiasm and shared ambition at the start of the program, reinforced by access to funding. Being part of, or aligned with, related community-based initiatives contributed to organisational visibility at community level, indicating a joint impact of the different initiatives.

Restraining mechanisms were discontinuity of actor commitment and involvement, not being able to get the right people around the table, and negligence about communicating about the program within one's own organisation. Restraining contextual

factors were poor operational conditions, such as the time needed to mobilise relevant actors and discontinuity in representation of formal organisations in the community, resulting in change or abandonment of commitments and ownership (Figure 7.1).

CMO configurations that matter in program sustainability

Program sustainability was identified as a main outcome domain at program level, pursued by setting up ownership in established community-based organisations and by making efforts to meet contingent conditions regarding group size or number of groups. Generic contextual factors in support of program sustainability were past experiences, based on lessons learned from different projects, and alignment with related community-based initiatives in the area.

Generic contextual factors restraining program sustainability related to the lack of a shared belief in the added value of CBHEPA programs for organisational objectives, for example because physical activity programs did not fit into core businesses. Furthermore, restrictions of subsidy schemes in place (in terms of goals, time frame or content), lack of clarity on budgets available and poor exercise trainer employment conditions were restraining factors. In particular, municipal or organisational policies focusing on pilot projects were found to restrain program sustainability. It was difficult to consolidate the activities developed in the pilot project, because in most cases the expertise built up during the pilot phase (personnel, knowledge, funds) moved away to a new area, leaving the pilot area empty (Figure 7.2). The need to be able to respond to contextual dynamics, in particular with reference to local and national policy developments and legislation on sport and physical activity promotion, was generally underlined.

CBHEPA program F – Program coordinator:*"[Local] sports policy is very much financed in bits and pieces from different schemes. [...] This runs from one scheme to the next. [This requires] connecting things and linking the dots, and becoming skilful in writing successful grant applications."*

Setup of ownership in community-based organisations (O_3). Key supportive mechanisms for setting up ownership were a strong personal engagement and determination of the initiator (generally a project coordinator or exercise trainer), advocating for ownership in community-based organisations, someone who is active and resourceful and involved in related community-based initiatives. Contextual factors in support of setting up ownership were national and/or local polices and arrangements for sport and physical activity promotion, justifying advocacy strategies used, and established collaborative structures at municipal level underpinning trustful relationships among community-based actors involved.

Restraining mechanisms for setting up ownership were lack of arrangements for structural financing, withdrawal of available expertise and funding once a pilot had stopped, and policy uncertainties regarding the future for the programs.

CBHEPA program F – Exercise trainer*: "So they went to another area. They said like, okay, over there they need it more than over here […]. That is just a top-down decision that they made [...] and I took it from there of my own accord and that all went well. But you should further build on at that point, really. But no, then it goes to someplace else and there it starts again."*

Lack of knowledge on persuasive advocacy actions, absence of good communication between the implementing organisation, program and exercise trainer, and exercise trainers' stand-alone position were also found as restraining mechanisms. Restraining contextual factors related mainly to the termination of subsidy schemes and discontinuity in representation of formal organisations in the community, resulting in change or abandonment of ownership (Figure 7.2).

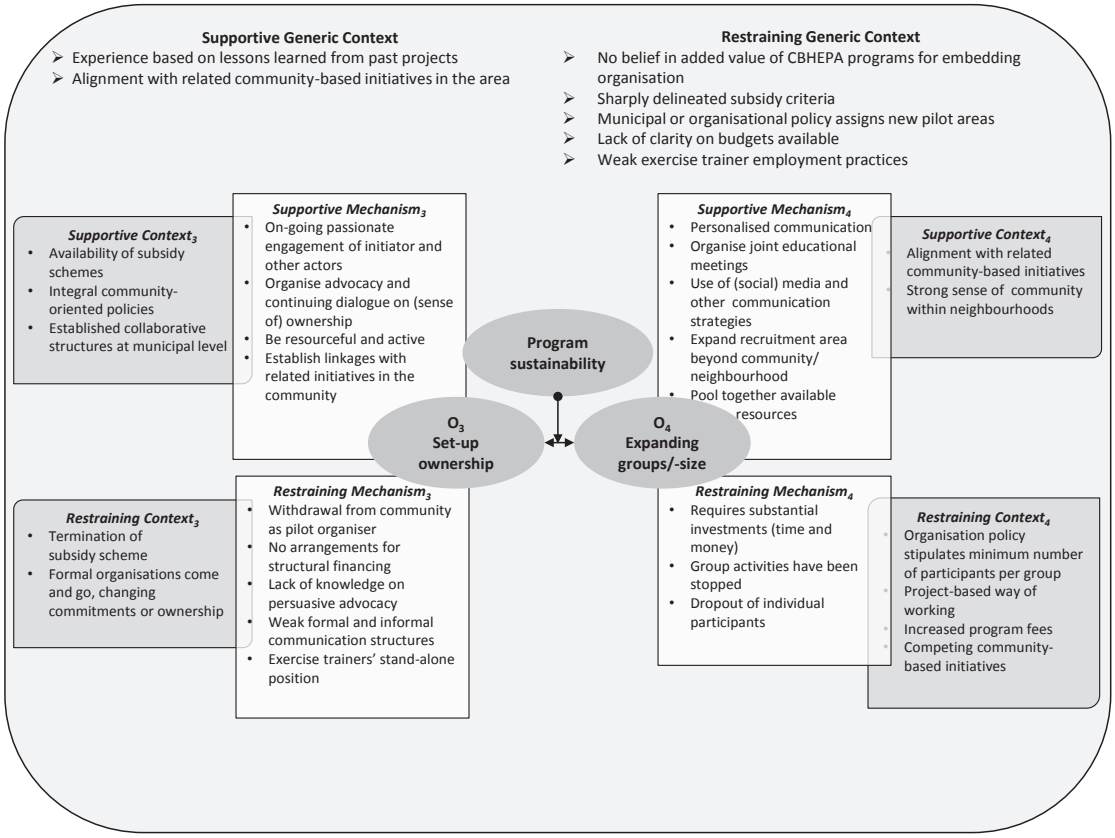

Figure 7.2 CMO configurations on program sustainability: Set-up ownership (O_3) and expanding group(size)s (O_4)

Expanding group size or number of groups (O_4). Key mechanisms in support of expanding groups or group sizes were mainly personal communication (word-of-mouth spreading among participants' social networks) and organising joint activities with related community-based initiatives so as to link education or health themes with exercise classes. Other supportive mechanisms were the use of regular communication means and (social) media, extension of the area of recruitment beyond the original neighbourhood or community targeted, and smart use of available funding and other resources. Supportive contextual factors were alignment with related community-based initiatives and a strong sense of community within neighbourhoods, usually based on socio-cultural or ethnic background, family relations or sport clubs connections.

Restraining mechanisms were the time and money required for on-going recruitment actions and dropout of (groups of) participants for personal, programmatic or financial reasons. Restraining contextual factors were organisational policies, stipulating a minimum number of participants per group for cost-recovery reasons, project-based way of working at the municipal level, implementing organisation requiring on-going efforts to raise funds, increase of program fees or competing sport and physical activity initiatives in the area (Figure 7.2).

CMO configurations that matter in intersectoral collaboration

Intersectoral collaboration was found as a common denominator across CBHEPA programs and turned out to be a fluid concept in terms of CMO configurations. In all programs, intersectoral collaboration was identified as an overall mechanism to reach socially vulnerable groups of interest, to unite skills and resources to tailor programs to their needs, and as a strategy to actually find and bind participants. At the same time, intersectoral collaboration was identified as a time-related outcome, primarily in support of program sustainability. So, intersectoral collaboration is needed to get started, but is perceived over time as a prominent outcome of a collective effort. We focused in our description of CMO configurations on the latter interpretation of intersectoral collaboration.

Generic contextual factors in support of intersectoral collaboration were integral community-oriented policy frameworks at municipal level to trigger and legitimise community-based action. In addition, longstanding trustful relationships among community-based actors/professionals were found as supportive factors.

CBHEPA program D – Community actor*: "Why are we actually in this group together? That all has to do with the fact that we are involved in project X in H. For if we say: how do you rally these partners? Well, they have signed an agreement to develop activities in this neighbourhood, also with a view to exercise and healthy behaviour. So this has not just miraculously come about all by itself."*

Generic contextual factors restraining intersectoral collaboration related mostly to national policies reshaping social welfare policies locally during the period of our investigation. The project-based approach to CBHEPA initiatives – found in most municipalities and implementing organisations – was mentioned as a restraining factor. This generated persistent program uncertainties and on-going fund-raising efforts. These dynamic and uncertain conditions resulted in a lack of continuity in organisational representatives, a loss of qualified personnel and poor exercise trainer employment conditions (Figure 7.3).

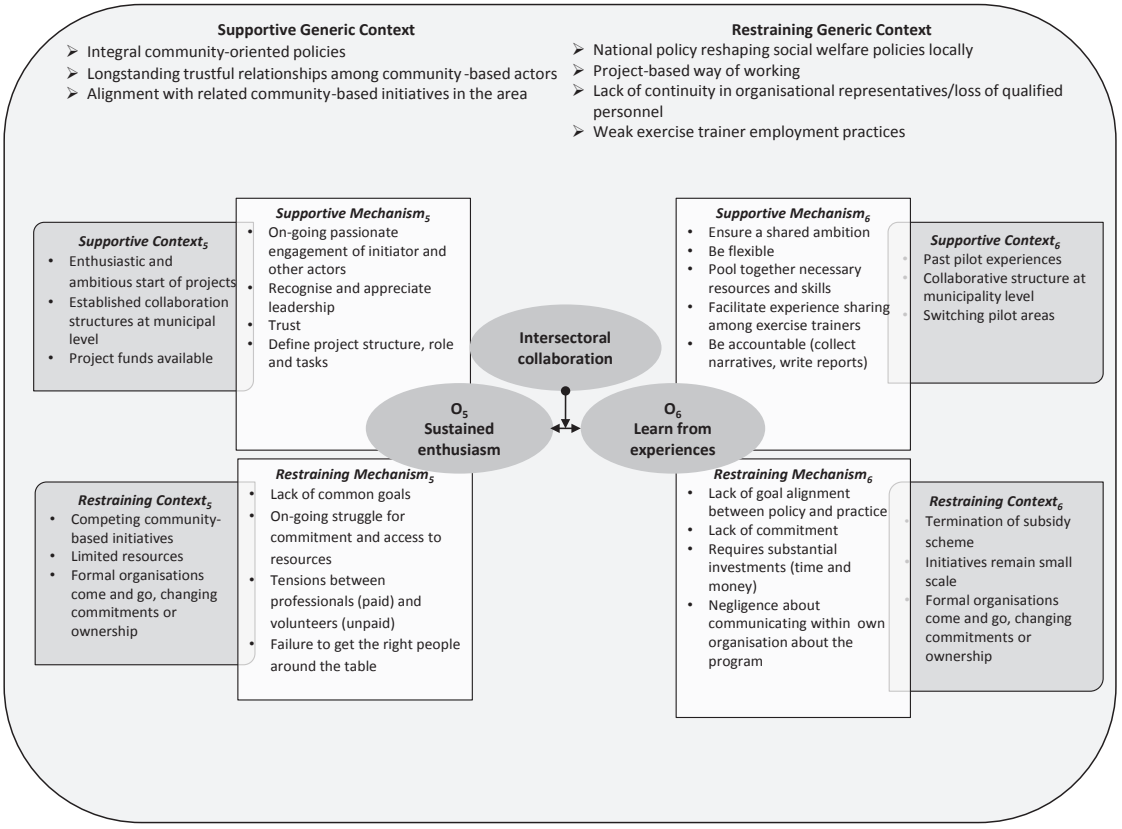

Figure 7.3 CMO configuration on intersectoral collaboration: sustained enthusiasm (O_5) and learn from experiences (O_6)

Sustained enthusiasm of actors involved (O_5). Key supportive mechanisms to keep all actors enthusiastically involved were leadership – demonstrated by a respected and trusted enthusiastic and determined project coordinator or exercise trainer (or both) – and (taking) time to mobilise different parties in informal networks. Another supportive mechanism for the sustained enthusiasm of involved actors was defining together a more formalised project structure acknowledging different roles and tasks within the CBHEPA program. Supportive contextual factors related predominantly to the initial enthusiasm and ambition about the CBHEPA initiative, to existing and formalised collaborative structures (covenants), and to access to project funding.

Mechanisms restraining sustained enthusiasm were withdrawal of supporting actors (e.g., municipality, welfare organisation), lack of collaboration due to lack of shared ambition or tensions about payments for time invested, running out of steam struggling for commitment, access to facilities and funding, and a failure to get the right people around the table. Restraining contextual factors were the limited resources available for community-based activities and the presence of many community-based initiatives in the area, creating the risk of competing over resources rather than reinforcing one another (Figure 7.3).

CBHEPA program A – Community actor*: "And that you actually find out then, that there is no clear structural pot of money available to draw from. So, in other words: you share the responsibilities, you share the worries, also regarding the target group here in district L. But, oh, the feeling of powerlessness that you get… Yes, okay, so I can stay involved, so I can advise, I can act as a consultant, I can help think about things, but I do not really have any resources that I can pull or that I can open."*

Learn from experiences to apply them elsewhere (O_6). Key supportive mechanisms for learning from experiences in order to apply them elsewhere were flexibility, ensuring a shared ambition by bringing together necessary resources and skills, and facilitating sharing of lessons learned among actors and exercise trainers. Furthermore, generating accountability on learning experiences by collecting narratives of individual success stories and/or writing accountability reports was found as a supportive mechanism. Supportive contextual factors for learning from experiences were existing collaborative structures at municipal level, past pilot experiences and switching pilot areas.

The main restraining mechanism in most programs was the stand-alone position of most exercise trainers, executing their tasks autonomously at community-based sports venues. Other restraining mechanisms were a perceived lack of goal alignment between policy and practice, organisations withdrawing their staff and other resources (e.g., municipality or welfare organisation) whenever new policies came into force, lack of commitment, negligence about communicating about the program within one's own organisation and a failure to get the right people around

the table. Restraining contextual factors were termination of subsidy schemes, resulting in program uncertainties, and the relatively small scale of most CBHEPA initiatives (Figure 7.3).

CMO configurations that matter in enhancing active lifestyles

Enhancing participants' active lifestyles was identified as the main outcome domain across all CBHEPA programs. All CBHEPA programs defined the aim of improving their participants' daily physical activity levels and program adherence (retaining participants in their groups and preventing dropout). Generic contextual factors in support of enhancing participants' healthy and active lifestyles were a personal drive/ enthusiasm for, and a strong personal belief in, the benefits and power of physical activity and sport as a means to improve health and personal development. Additional supportive contextual factors were related community-based initiatives and longstanding trustful relationships among community-based actors/professionals, a strong sense of community within neighbourhoods (based on socio-cultural or ethnic background, or sport clubs), and past experience with sport and physical activity projects.

Generic contextual factors restraining enhancing participants' healthy and active lifestyles, at organisational level, were a lack or loss of qualified personnel (e.g., resulting from organisational restructuring), poor exercise trainer employment conditions and project-based approaches to CBHEPA programs. At participant level, cultural dispositions and habits played a role, for example in migrant women's groups, where male exercise trainers and/or professionals were not accepted (Figure 7.4).

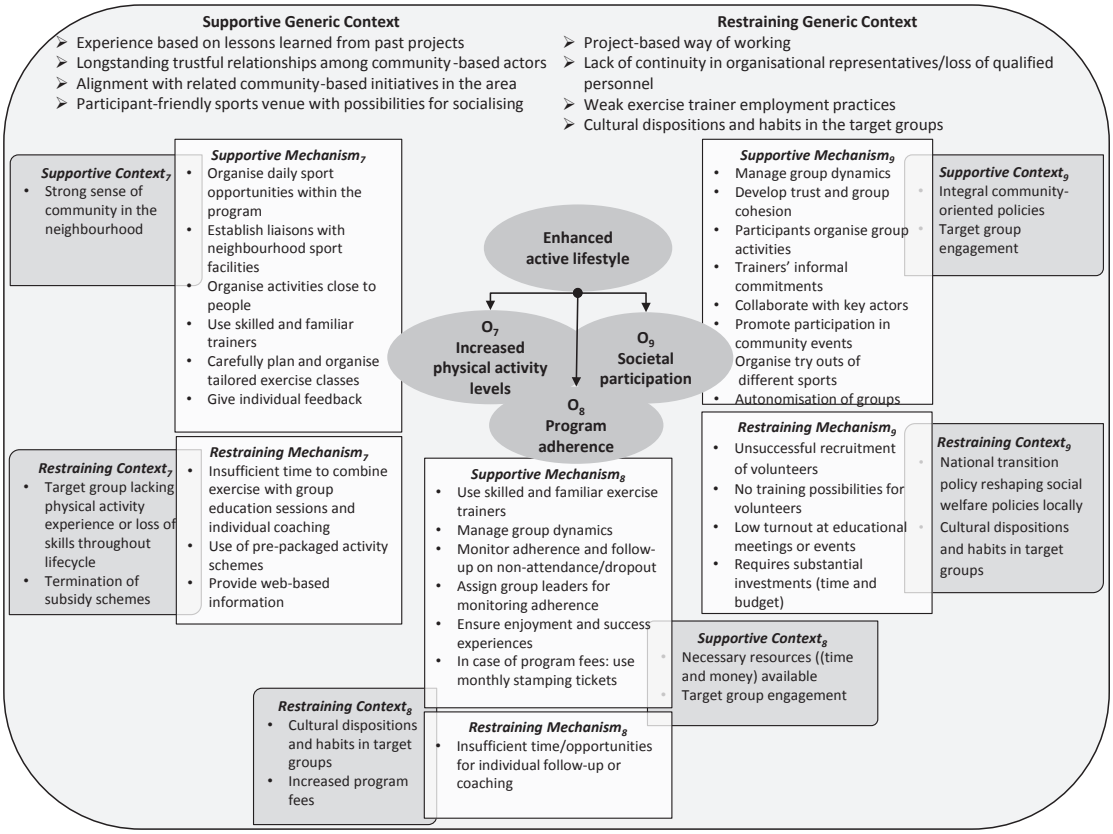

Figure 7.4 CMO configuration on enhanced active lifestyles: increase physical activity (O_7), program adherence (O_8) and societal participation (O_9)

Participants increase and maintain their daily physical activity levels (O_7). Key mechanisms supportive of participants' increased and maintained daily physical activity level related to organisational aspects, such as organising activities close to people, establishing liaisons with sport activities and facilities in the neighbourhood, and providing for daily opportunities for sport and physical activity in the CBHEPA program. Other supportive mechanisms related to exercise trainer skills, such as use of experienced, professionally trained exercise trainers familiar with, and responsive to, the target groups' vulnerabilities, able to carefully plan and organise tailored exercise classes with a focus on enjoyment and individual feedback. Supportive contextual factors were a strong sense of community among participants and a participant-friendly sports venue with possibilities for socialising.

Mechanisms at program level restraining the increase and maintenance of daily physical activity levels were insufficient time to combine exercise with group education

sessions and individual coaching, the use of pre-packaged activity schemes and the use of web-based information, which was perceived as expensive and not suited to the target group. Restraining contextual factors related to participant backgrounds, i.e. lack of sport or physical activity experiences over their life span (e.g., in migrant groups) or loss of physical activity skills (e.g., the chronically ill or the elderly). Other restraining contextual factors related to sustainability issues, such as the termination of subsidy schemes causing insecurities for future program activities (Figure 7.4).

Program adherence (O_8). Key mechanisms in support of program adherence were found mainly at the exercise trainer level. These involved actively monitoring adherence and undertaking actions in the event of non-attendance or dropout (e.g., phone call, home visit). Other supportive mechanisms were the assignment of group leaders in exercise groups to monitor adherence, active management of group dynamics (e.g., splitting groups according to physical activity skills) and ensuring enjoyment in physical activity and participants' success experiences by supporting personal performance and body awareness in class. Use of a familiar, experienced and professionally trained exercise trainer supports program adherence. In case of payment of membership fees, educating people to pay for sport and exercise and to use monthly stamping tickets to facilitate increased attendance were identified as supportive mechanisms.

CBHEPA program E – Exercise trainer: *"I think that [the reason] why people come to us is, that we are not really a gym, but rather a bit of welfare. We have combined things. The women are noted, we know them by name. You give them a ring if someone has not attended for a while, there is a great deal of care and attention around it all. More than, I do believe, at a usual, average gym".*

Contextual factors in support of program adherence were a participant-friendly sports venue with possibilities for socialising and a strong sense of community among the participants.

Restraining mechanisms were insufficient time and opportunities for personal follow-up or coaching and lack of qualified personnel. Restraining contextual factors were increases in program fees and participants' cultural dispositions and habits (Figure 7.4).

Societal participation through group exercise (O_9). Key mechanisms in support of societal participation through group exercise were also found mainly at the exercise trainer level. These involved actions at group level, such as managing group dynamics in order to develop trust and group cohesion and giving (moral) support to participation in community-based activities (e.g., neighbourhood walks or sports events). Exercise trainers were also actively seeking collaboration with key actors in the community,

organising try outs of different sports and helping groups to organise more autonomous group activities on their own initiative. Last but not least, exercise trainers often provided individual advice and material support. Supportive contextual factors were a participant-friendly sports venue with possibilities for socialising, integral community-oriented policies, and the exercise trainer's commitment to, and engagement with, the target group.

Restraining mechanisms were a lack of volunteers and of possibilities for training volunteers on the one hand, and a low turnout at community (educational) meetings or events on the other, resulting in a loss of interest in investing in these trajectories. Contextual factors restraining societal participation, at participant level, were differences in cultural dispositions and habits within groups and communities. At program level, competing interests between community-based organisations were mentioned, at times aggravated by policies reshaping local social welfare policies (Figure 7.4).

Discussion

In this study, we used realist synthesis to explore key combinations of contextual factors and mechanisms triggering outcomes of interest identified by CBHEPA program representatives. Using a realist protocol contributes to the clarification and elucidation of the multilevel nature of CBHEPA programs dealing with the everyday complexities of physical activity behaviour within its socio-ecological contexts. Our findings indicate that outcomes of interest reach beyond enhancing participants' active lifestyles; they also encompass a range of organisational and programmatic aims, such as improved community outreach, intersectoral collaboration and program sustainability.

CBHEPA initiatives do not start from scratch; rather, they are generally entangled with related projects or collaborative structures. The key CMO configurations identified indicate that past experiences with sport and physical activity projects and commitment to the target group are strong supportive contextual factors, alongside the drive and responsiveness of competent exercise trainers as dominant mechanisms in sustained programs. Restraining factors relate mainly to lack of actor involvement, lack of project continuity and trainers' stand-alone position. On the basis of our findings, the program theory of CBHEPA programs is advanced by showing how passion for, and past experiences with, sport and physical activity as well as commitment to the target group are key contextualised factors triggering outcomes.

Our findings support the notion of contextual interdependencies. While developing our CMO configurations,we identified generic contextual factors of influence on main outcome domains alongside specific contextual factors generating specific mechanisms in relation to specific outcomes of interest. In pooling these contextual factors together, our findings suggest a strong influence of national policies shaping local policy contexts for CBHEPA programs. We also found that, generally, program

implementation was weakly tied to local policy and hardly embedded in established organisations (Figure 7.5). From an ecological perspective, there is an apparent need for a more systemic and systematic approach to making (planning) processes explicit. Planning and organising CBHEPA programs call for specifying and matching of interventions at multiple levels, using theories to map specific interventions from prior research and practice, and pooling together experiences from prior projects and community-preferred interventions so as to patch theory-based best practices and fill gaps in the evidence base with practice-informed insights on what works best, and how, in a particular community [16].

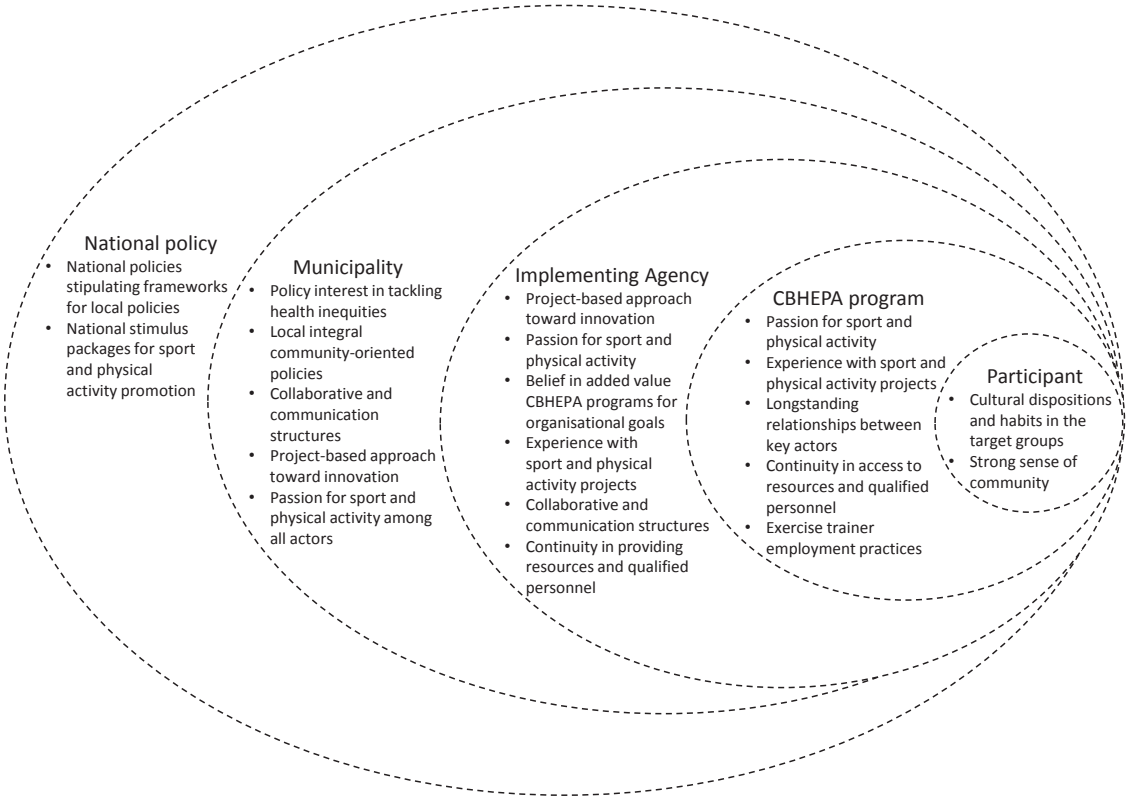

Figure 7.5 Contextual spheres of influence on CBHEPA programs

In open systems such as CBHEPA programs tackling physical activity inquities, the issue of context should not be interpreted as a purely external factor [37]. Context is both shaped by actors involved as much as it constrains their activities, and refers to a "complex set of social actors intersect with socio-political structures to dynamically co-create contextual

influences" [55], p.43. George et al. (2015) indicate that contextual elements are dynamic and porous in nature, influencing programs as much as being influenced by programs (outcomes) because of the permeability of system boundaries [56]. Therefore, in line with other studies, we found that there are multiple ways to define contexts, hence multiple ways of constructing CMO configurations [39]. In addition, defining context in dialogue using narrative techniques contributed to a richness in retrospective and contextual understanding of developments in CBHEPA programs, highlighting how contextual factors have had an impact on program outcomes [16, 57].

Our findings link up with ecological considerations in the scientific literature on the implementation of programs tackling health inequities. This literature highlights the importance of relationship development, collaborative problem solving, local knowledge and experience, and making community capacity development a goal [58]. From an ecological perspective, implementation reflects a paradigm in which problem definition, intervention development and implementation are viewed as emergent processes developed collaboratively and drawing on local history, culture and resources. Consequently, program activities designed to affect specific health inequities are part of a broader, local, collaborative intervention process, rather than merely putting an efficacious, predeveloped program into practice [58].

The outcomes of interest, identified by CBHEPA program representatives, reflect to a large extent the ecologic implementation paradigm. CBHEPA programs are generally profiled as a springboard to various neighbourhoods and communities. Community outreach, in terms of reaching the target groups and organisational visibility, is usually perceived as an organisational responsibility legitimising time, effort and money spent on the program. According to a multilevel ecological rationale that underpins programs dealing with health inequities however, community outreach as an outcome is about more than professional accountability only. It is a first indicator of developments in trust building and collaboration at community level. *Intersectoral collaboration,* defined as an outcome in terms of sustained enthusiasm and lessons learned, can also be viewed as a primary community-level outcome [59]. In dealing with health inequities, Trickett and Bheeler (2013) point out the importance of developing collaborative and empowering partnerships with relevant sectors of the community in intervention planning and implementation. This means including sectors not typically associated with health promotion but whose activities and policies may affect health inequities. They also point out the importance of setting community-level goals for capacity building as well as individual level goals and highlight the value of making a long-term time commitment to local projects and communities involved [58].

Building and maintaining trustful relations were also key mechanisms in increasing output and anchoring *program sustainability*, in partnership longevity, in aligning with related projects or the launch of spin-off projects. This is in line with recent literature on realist synthesis in community-based participatory research [50]. In conjunction with CMO configurations, Jagosh et al. (2015) show that spin-off projects, or ripple effects [58], serve

as a framework to better understand how partnership activities accrue in stages, with the outcomes of one stage of the partnership life course informing or transforming the context for subsequent stages. The ripple effect concept is premised on the idea that community-based participatory (research) activity is a series of "events in the history of a system, leading to the evolution of new structures of interaction and new shared meanings" [59] (p.267).

Our findings also indicate that there is ample support for program sustainability from formal policy or funding arrangements, aggravated by local policy preferring project-based approaches. There appears to be a tension between, on the one hand, municipal policies and administrative and/or legislative measures in place and, on the other, the ecological rationale of multilevel interventions necessary to tackle health inequities. In Dutch local politics and policies, the drive for accountability on expenditures becomes manifest in the preference for project-based approaches, suggesting well-defined value-for-money trajectories. Multilevel interventions addressing health inequity, however, require allowable resources for activities such as partnership and relationship building, and plans for sustaining long-term support within communities [58], often not covered and hardly studied in the culture of local governance [60].

Enhancing participants' active lifestyles, defined in terms of increased physical activity levels, program adherence and societal participation, is the ultimate outcome that CBHEPA programs seek to achieve. Serving socially vulnerable groups with physical activity programs tailored to their needs is perceived as their *raison d'être*. Our findings indicate that programs predominantly thrive on highly dedicated individuals. A key factor triggering outcomes is the crucial role and responsive leadership of the exercise trainer. This is in line with other studies indicating that professional qualifications, bonding with participants and managing group dynamics to demonstrate collective accomplishments extend leadership requirements beyond the traditional technical performance and individual feedback in physical activity classes, and include activities of social integration and societal participation [61, 62].

Methodological reflections

Methodological issues in our study relate to data collection and analysis. Use of narrative techniques, in particular the timeline technique, generated actor-driven data. The timeline technique was particularly appreciated by participants – 'much better than just talk' – and generated fruitful discussions on identifying what actually happened over time. The timeline technique builds on techniques for organisational and intercultural learning [63-66]. Participants often photographed the outcomes so as to take home a message, indicating that they valued the outcomes of the session. Conducting timeline sessions does, however, require good facilitating skills to manage the group dynamics and watch over the process of sense making of the actor-driven retrospective recollection of events and the determination of their significance. We cannot rule out the possibility that decisive events went unnoticed because of lack of knowledge or awareness, or because of power imbalances within the focus groups.

Our study indicates that realist synthesis contributes to evidence-informed theorising about how and in what circumstances CBHEPA programs work. The body of literature on the application of realist evaluation principles in health-related research is still relatively small and shows considerable diversity in its use [38, 67]. We found that using a realist protocol in a longitudinal design was challenging for several reasons. In line with other authors [38, 39, 50, 51, 67, 68], we found that time, place and actor perspective define CMO configurations, and therefore are dynamic by nature. The question of what constitutes a mechanism was also a challenge [38, 68]. Our findings suggest that a mechanism can mutate over time and become a contextual factor. For example, enthusiasm and shared ambition were found as driving mechanisms to mobilise the necessary people, skills and resources at the start of each CBHEPA program, whereas after some time the efforts put into the maintenance of enthusiasm and involvement became the dominant mechanism. Jagosh et al describe similar findings relating to the phenomenon of trust development [50, 69].

In the literature, some argue that realist evaluation is useful for dealing with complexity issues in multilevel programs. Others believe that it is less suitable for evaluation of multi-site programs made up of different interventions aiming at multiple outcomes, because of the underlying reasoning of realist evaluation in which contexts shape the conditions for mechanisms and outcomes to occur [38, 41]. We acknowledge that our approach of synthesising findings across multiple cases in favour of building conceptual robustness, ties in with this dilemma. Nevertheless, we believe that, with reference to our findings on generic contextual factors, abstracting to some extent contributes to a better understanding and interpretability of identified CMO configurations.

Our sample consisted of actors involved in CBHEPA programs selected by local project leaders or initiators. Participation was on a voluntary basis. Consequently, we had to rely on the selection and recommendation of our local partners; this may have created bias in the sample in favour of participants most involved and enthusiastic about CBHEPA initiatives. Therefore, our findings relating to contextual factors, such as lack of continuity in actor involvement, and mechanisms highlighting efforts to keep the right people around the table and actively involved, cannot simply be extrapolated to those actors who left the collaboration or (for whatever reason) refrained from participation, as we did not interview them.

Conclusion

CBHEPA programs do not start from scratch and are generally entangled with related community-based projects. Based on practice-informed theorising using realist synthesis, our study provides an elaboration on existing program theories for CBHEPA programs, showing how actors' passion for, and past experiences with, sport and physical activity as well as commitment to the target group were key factors triggering outcomes alongside exercise trainers' responsive leadership skills. As of yet however, local governance structures appear often to lack the necessary adaptive capacity to accommodate the interactive processes and mobilise the resources needed at multiple levels to realise sustained CBHEPA program activities.

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CHAPTER 8

General discussion and conclusion: piecing the evidence together

Marion Herens

Introduction

In the Netherlands, the government's rationale for subsidising recreational or community-based sport and physical activity schemes, such as CBHEPA programs, is based on the notion that participation in these programs supports the development of a community's social capital and quality of life by contributing to community bonding [1-4] and to participants' health and wellbeing [5, 6]. CBHEPA programs are compatible with wider Dutch policy, recognising the neighbourhood and communities as settings for health and physical activity promotion [7, 8]. Indications are that, to stimulate physical activity behaviour effectively and equitably, multiple-strategy interventions are needed [6, 9]. However, to date, information on the effectiveness of these approaches is scarce. The overall aim of this research was to gain more insight into the effectiveness of Dutch CBHEPA programs targeting socially vulnerable groups and to generate recommendations about how to evaluate physical activity promotion interventions targeting socioeconomic inequities in health and physical activity.

This research assessed the effectiveness of seven CBHEPA programs at different impact levels (individual, group, and program level) using a mixed methods approach. At individual level, physical activity behaviour was monitored repeatedly, alongside health-related quality of life and other indicators, to assess whether people became more active over time and to gain insight into the explanatory factors. The value attributed to CBHEPA programs at participant level was assessed by measuring participants' willingness to pay for sports and physical activity. Parallel to the monitoring at individual level, perceptions of group-based principles for action were explored in the exercise groups, to gain more understanding of the group-related processes relevant for program effectiveness. Likewise, the factors that influence physical activity maintenance were explored from a group and a program perspective. Finally, for six of the CBHEPA programs assessed, the outcomes of interest were identified in relation to the contextual factors and mechanisms from a program perspective, using a realist synthesis approach.

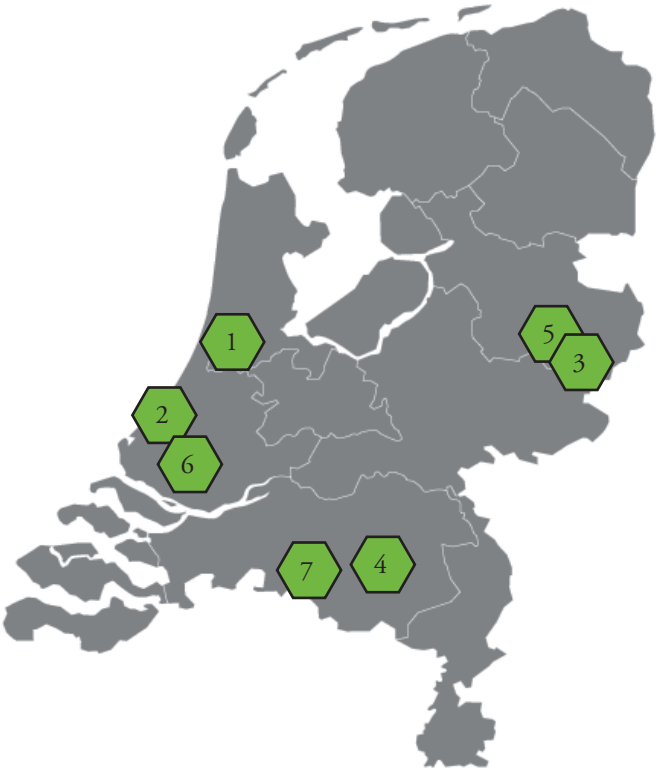
This chapter first summarises the main empirical findings from each chapter. Then, we present the integrated findings resulting from the mixed methods approach. The relevance of our findings is discussed, including methodological considerations, followed by overall conclusions and implications for future research.

Summary of main findings

We examined seven on-going Dutch CBHEPA programs between 2012 and 2015, involving 19 groups and 268 participants (Figure 8.1). The main empirical findings, as presented in chapters three to seven, are summarised in Table 8.1.

In **chapter three**, we addressed the research question: 'Do CBHEPA programs contribute to an increase in, and maintenance of, physical activity in socially vulnerable groups over time?' We first examined whether the CBHEPA programs reached the intended target groups and found that socially vulnerable groups in terms of

socioeconomic and health-related quality of life outcomes were reached. However, the overall average of physical activity levels measured was 216 minutes per day, which is not below the Dutch average of 202 per day for adults [10].



Seven CBHEPA programs:

1. Amsterdam (1 group)
2. Den Haag (3 groups)
3. Enschede (3 groups)
4. Helmond (2 groups)
5. Hengelo (4 groups)
6. Rotterdam (4 groups)
7. Tilburg (2 groups)

Reach: 268 participants

Figure 8.1 Research setting: multiple CBHEPA programs

Next, we examined the effectiveness of programs at individual level by monitoring physical activity levels for 12 months in four cohorts of participants (n=268), at six-month intervals. Three hypotheses were further tested, using a combination of statistical analytical methods. The first hypothesis – participation in a CBHEPA program for one year leads to higher physical activity levels and health-related quality of life outcomes in participants (activated people) compared to starters (control group by proxy) (H1) – was tested using a quasi-randomised control trial (RCT) design. No significant differences were found between the active and the starter groups, except that physical activity enjoyment achieved significantly higher scores after twelve months among the active participants ($p \leq 0.001$).

The second hypothesis – CBHEPA program participants perform better on physical activity and health-related quality of life outcomes than participants who drop out of the CBHEPA programs (H2) – was tested by comparing participants with program dropouts. After twelve months, dropouts scored significantly lower on leisure-time physical activity levels (p<0.01), and reported more health complaints (p<0.05) and lower levels of physical activity self-efficacy (p<0.001) and enjoyment (p<0.01). BMI and care consumption scored significantly higher among dropouts (p<0.05).

The third hypothesis – participation in a CBHEPA program leads to an increase in, and maintenance of, participants' daily physical activity levels over time (H3) – was tested using multilevel modelling. No significant within-subject differences amongst the participants were found in leisure-time physical activity at the three points of measurement. The time varying covariates indicated positive significant associations over time between health-related quality of life (p<0.05), self-efficacy (p<0.05), and enjoyment (p<0.05), and leisure-time physical activity. BMI and sense of coherence were not significantly associated with leisure-time physical activity. Program dropouts, however, showed a significant decrease in leisure-time physical activity, compared to participants (p<0.05). Between-subject differences showed that women scored significantly lower leisure-time physical activity levels at baseline (p<0.01) than men, but not in follow-up measurements. No significant differences were found between participants for age or ethnic origin, but higher educational levels were significantly associated with higher leisure-time physical activity (p<0.05). Between-group differences in leisure-time physical activity levels were not significant. The findings relating to the fixed effects at group level showed, however, that short CBHEPA programs (<13 weeks) with multiple trainers, addressing gender homogeneous groups, were significantly associated with lower leisure-time physical activity levels over time (p<0.01) compared to on-going programs with a single known trainer.

In short, on the basis of our findings, it seems that intrapersonal time-varying covariates, e.g., health-related quality of life, physical activity self-efficacy, and enjoyment, are more relevant in explaining physical activity maintenance than interpersonal characteristics (e.g., gender, age, or ethnic origin) or group level characteristics. H3 was partially rejected, as no increase in physical activity levels was found, and partially accepted as participation in CBHEPA programs contributed to physical activity maintenance in socially vulnerable groups.

Because little was known about predictors of socially vulnerable groups' willingness to pay for sports and physical activity, in **chapter four** we addressed the research question: 'What is the willingness to pay (WTP) for sport and physical activity of participants in CBHEPA programs in terms of money and time (WTP_{money} and WTP_{time})? And what factors predict WTP_{money} and WTP_{time}?' Expected positive relations were tested for 1) personal and socioeconomic predictors: income and educational level; 2) health-related predictors: perceived health, life satisfaction, sense of coherence, and

self-efficacy; and 3) sport and physical activity-related predictors: duration and frequency of participation in a CBHEPA program, physical activity enjoyment, additional leisure-time physical activity or sports, sports club membership, and membership fee. Expected negative relations were tested for age and non-Dutch origin. We studied participants' WTP_{money} and WTP_{time} in seven CBHEPA programs (n=268).

Participants in CBHEPA programs were willing to pay for sports and physical activity, albeit low amounts. The average WTP_{money} was €9.60/month (*sd* 10.60). Over 16% of the respondents were not willing to pay at all for sport and physical activity, mostly respondents in free CBHEPA programs. The average WTP_{time} was 17.6 minutes (*sd* 15.1) single journey travel time; this is comparable with other Western European studies reporting between 15 to 35 minutes of single journey travel time to a sports venue [11, 12].

We also analysed who would be more likely to spend money on sports and physical activity. Our findings showed that this related to people with household incomes higher than €1,000/month (p<0.10), who scored higher on perceived health status (p<0.10), who participated at least once a week (p<0.05) for more than three months (p<0.10), who scored higher on physical activity enjoyment (p<0.10), who engaged additional sport in leisure-time (p<0.10), and who were, or used to be, engaged in sport (p<0.05). We also analysed who would be more likely to spend more time travelling to a sports venue and found that this related to people with household incomes lower than €1,000/month ((p<0.001) and to people who were over 50 years of age (p<0.10).

Our assumption that factors predicting health-related quality of life and WTP for health improvements might be relevant for predicting WTP for sport and physical activity was not unequivocally supported by our study. Income and short-term program satisfaction may have more predictive value for sports and physical activity-related WTP than long-term perspectives of improving health-related quality of life.

In **chapter five**, we addressed the research question: 'What group-based principles for action, such as active participation, enjoyment, and fostering group processes, are perceived as important by participants in CBHEPA programs?' As a rule, local program activities were organised group-wise and, therefore, revolved around group-based principles for action. Thus, group dynamics were considered to be part of the mechanisms explaining success or failure. Because the use and outcomes of group-based principles for action are hardly ever made explicit, our study explored three selected group-based principles for action in CBHEPA programs in more detail. Respondents (n=76) from ten focus groups scored their individual appreciation of group-based principles for action – active participation, enjoyment, and fostering group processes – on a three-point, statement-based scale. Opinions were further discussed in the focus groups.

CBHEPA programs thrived on participants having fun together and on

exercise trainers' leadership skills. In fact, participatory programming was perceived as less important than enjoyment and fostering group processes. Statements about the role and importance of participatory programming generated less consensus in appreciation among respondents than statements about enjoyment and fostering group processes. To some extent, group members participated in the development of program content. Participation in group formation or community initiatives was less frequently perceived as something within the group members' control. Enjoyment, expressed as physical and emotional experiences, was found as an individual driver of becoming engaged in, and adhering to, group exercise. Fostering group processes emerged as an overarching principle, conditional for spin-offs in terms of enjoyment and active participation. This, in turn, led to a sense of ownership amongst participants in relation to taking responsibility for the exercise group as well as for their individual physical activity behaviour. Responsive leadership, ensuring responsive guidance, and an enthusiastic exercise trainer acting as a role model were identified as additional principles for action for success in CBHEPA programs.

In **chapter six,** we addressed the research question: **'**What factors influence physical activity maintenance in socially vulnerable groups?' Factors of influence in physical activity initiation have been widely studied. Much less is known about the factors that influence physical activity maintenance. We conducted an exploratory study in women of non-Western origin, who had been participating in a CBHEPA program on a weekly basis for more than one year. Based on the literature, a four-level framework was developed - the individual, group, environmental, and program levels [13] - to cluster our findings from interviews with program representatives (n=6) and three focus group discussions, including 25 women.

Factors of influence at individual level were perceived (health) benefits, self-regulation, and learning outcomes regarding physical activity and social participation. Factors of influence at group level were mutual support, perceived security, sharing stories, and trust. Factors of influence in the social and physical environment were negotiated changes in social and cultural norms, a larger and more diverse supportive social network, and the perceived accessibility of activities. Factors of influence at program level were (perceived) program quality, staff responsiveness, and continuity in the range of activities available. The interaction between individual perceived benefits and shared learning experiences on the one hand, and fostering group processes and responsive support on the other, emerged as important features of successful physical activity maintenance.

In **chapter seven**, we addressed the research question: 'What contextual factors and mechanisms trigger outcomes in CBHEPA programs targeting socially vulnerable groups?' We explored the outcomes of interest, as defined by local stakeholders, at program level, and the related combinations of contextual factors (C) and mechanisms (M) that triggered these outcomes (O). Data were collected in six CBHEPA programs.

A realist synthesis protocol was used to analyse context–mechanisms–outcomes configurations.

Overall, our findings indicated that reasons for launching a CBHEPA initiative were mainly historically rooted, such as past successful experiences with physical activity projects or longstanding working relationships within the target communities. The defined outcomes of interest encompassed a range of organisational and programmatic aims, besides the aim of enhancing participants' active lifestyles, such as improved community outreach, intersectoral collaboration, and program sustainability. Community outreach was identified as an outcome, defined in terms of organisational visibility and reach of target groups. Program sustainability was identified as an outcome, defined in terms of setting up ownership within the communities and of expanding groups and group sizes. Intersectoral collaboration was identified as an outcome, defined in terms of sustained enthusiasm and learning from experiences. And enhancing participants' active lifestyles was identified as an outcome, defined in terms of increased physical activity levels, program adherence, and societal participation.

Related supportive contexts were municipal policies in support of community-based programs, established collaborative structures and community networks, and alignment with other health and welfare projects. Actors' past experiences with sport and physical activity projects and commitment to the target group were strong additional supportive contextual factors. Related supportive mechanisms were entrepreneurship, leadership, and responsiveness, deployment of professional exercise trainers, and ensuring the implementation of tailored and accessible program activities. The drive and responsiveness of competent exercise trainers were identified as the most dominant mechanisms in sustained programs. Lack of actor involvement, project discontinuity, limited access to resources, and a trainer's stand-alone position were at the heart of negative context–mechanisms–outcomes configurations, hampering the realisation of outcomes of interest.

Table 8.1 Summary of empirical findings

Thesis chapter	Research objectives	Methods	Main findings
Chapter 3	*Participant perspective* Assess effectiveness of CBHEPA programs at individual level by measuring increase in, and maintenance of, physical activity in socially vulnerable groups over time, and map the associated factors at multiple levels with physical activity levels. Three hypotheses were tested: Participation in a CBHEPA program for one year leads to higher physical activity levels and health-related quality of life outcomes in participants compared to starters (H1). CBHEPA program participants perform better on physical activity and health-related quality of life outcomes than participants who drop out of CBHEPA programs (H2). Participation in a CBHEPA program leads to an increase in, and maintenance of, participants' daily physical activity levels over time (H3).	Longitudinal sequential cohort design. Monitoring four successive cohorts, starting at a six-month interval for 12 months. Data collection based on repeated questionnaires. Multilevel modelling for analysis.	Dutch CBHEPA programs reach socially vulnerable groups in terms of socioeconomic and health-related quality of life outcomes. Physical activity levels were not below the Dutch average. Over 50% of people participate for health reasons. Around 50% of participants are still active after 12 months. No increase in physical activity levels over time was observed. H1 was rejected, and H3 was partially rejected. Dropouts' leisure-time physical activity, health-related quality of life, self-efficacy, and enjoyment outcomes were significantly lower compared to continuing participants. H2 was accepted. BMI and care consumption were significantly higher among dropouts. Positive significant associations over time were found between leisure-time physical activity levels and health-related quality of life, self-efficacy, and enjoyment. H3 was partially accepted. Short CBHEPA programs (<13 weeks) with multiple trainers and gender-homogeneous groups were significantly associated with lower physical activity levels over time.
Chapter 4	*Participant perspective* Explore CBHEPA program participants' willingness to pay, and its predictors, for sports and physical activity in terms of time and money. Expected positive relations were tested for: Personal and socioeconomic predictors: income and educational level. Health-related predictors: perceived health, life satisfaction, sense of coherence, and self-efficacy. Sports and physical activity-related predictors: duration and frequency of participation in a CBHEPA program, physical activity enjoyment, additional leisure-time physical activity or sports, sports club membership, and membership fee. Expected negative relations were tested for: Personal and socioeconomic predictors: age, and non-Dutch origin.	Literature review, identifying predictors for WTP for sport and physical activity. Cross-sectional data collection based on questionnaires. Ordered probit for analysis.	WTP_{money} was on average €9.60/month. WTP_{time} was on average 17.6 minutes single journey travel time. Based on significance: Expected positive relations for personal and socioeconomic predictors with WTP_{money} and WTP_{time} were confirmed for: income Expected positive relations for health-related predictors with WTP_{money} were confirmed for: perceived health. Expected positive relations for sport and physical activity-related predictors with WTP_{money} were confirmed for: duration and frequency of program participation, enjoyment, and (former) sports club membership. Expected negative relations for personal and socioeconomic predictors with WTP_{time} were confirmed for: age (< 50 years). In conclusion, short-term program satisfaction was found to be probably more decisive for WTP than long-term perspectives of improving health-related quality of life

Table 8.1 - *Continued*

Thesis chapter	Research objectives	Methods	Main findings
Chapter 5	*Group perspective* Explore whether the identified group-based principles for action – active participation, enjoyment, and fostering group processes – are perceived as important by participants?	Statements probing themes for focus group discussions. Thematic analysis.	Fostering group processes is an overarching principle, conditional for spin-offs in terms of enjoyment and active participation. Participatory programming perceived as less important than enjoyment and fostering group processes. Professional and responsive guidance and leadership identified as additional principles for action.
Chapter 6	*Group and program representative perspective* Map the factors that influence physical activity behaviour maintenance at multiple levels.	Interviews. Statements probing themes for focus group discussions. Thematic analysis.	Perceived (health) benefits, self-regulation, and learning outcomes regarding physical activity and social participation were important factors (individual level). Mutual support, feelings of safety, sharing stories, and trust were important factors (group level). Program quality (diversity in activities, accessible, findable, affordable), staff responsiveness, continuity, and accessibility were important factors (program level). Interaction between individual perceived benefits and shared learning experiences on the one hand, and group management and staff responsiveness on the other, was important.
Chapter 7	*Program representative perspective* Identify outcomes of interest at program level and unravel underlying generic and specific contextual factors and mechanisms triggering outcomes in CBHEPA programs.	Interviews Timeline-based focus group discussions Realist synthesis, based on thematic analysis	Outcomes of interest: community outreach, program sustainability, intersectoral collaboration, and enhancing active lifestyle Actors' passion for, and past experiences with, physical activity programs triggers outcomes of interest. Supportive contexts: alignment with related health and welfare projects; established community networks; community-based policies Supportive mechanisms: entrepreneurship, leadership, responsiveness, professional exercise trainers, tailored and accessible program activities. Program discontinuity, limited access to resources, and a trainer's stand-alone position hamper realisation of outcomes of interest. Local governance structures appear often to lack adaptive capacity to accommodate multilevel processes to realise sustainment of CBHEPA programs.

Integrated findings: observations and discussion

The results from each of the five studies were integrated, pooling together the findings relating to the different research questions [14, 15]. The integrated findings indicate that the CBHEPA programs reach the intended target groups. A majority of the study population are vulnerable in terms of low SES, are at risk of health problems, and have low SoC scores. In terms of physical activity behaviour, however, they cannot be labelled inactive. No effectiveness of CBHEPA programs was found in terms of an increase in physical activity behaviour at individual level. The absence of the expected increase can be explained in two ways: (1) genuine baseline data were lacking as we did not get access to people before they started the program; (2) CBHEPA programs may attract only people who are already more motivated for sport and physical activity to start with [16]. Literature shows that, in everyday life, people balance their time between paid work, household tasks, and leisure-time activities, such as physical activity or sport. From this time allocation perspective it is very plausible that people face limitations to their ability to increase the amount of time they spend on (leisure-time) physical activity behaviour [17, 18].

Nonetheless, we found strong indications that participation in CBHEPA programs has positive influence, with particular reference to ongoing CBHEPA programs. Participants reported a perceived increase in self-awareness, self-regulatory skills, such as everyday planning and goal setting, and improved ability to cope with everyday stressors, which all contribute to physical activity maintenance. The mutual support, trust, and safety offered in the exercise groups, alongside perceived program quality, contribute to program adherence.

CBHEPA programs were generally entangled with related community-based, health promotion projects or existing collaborative structures, and mainly run by professional and responsive exercise trainers. Local governance structures, however, appeared often to lack adaptive capacity to accommodate multilevel processes to realise sustainment of CBHEPA programs. Policy volatility often results in discontinuity in project funding and collaborative processes, and in availability of professional expertise, thus hampering program development and sustainability.

Parallel tracking in managing contextual dynamics

On the basis of the integrated findings, and in accordance with a realist perspective, we elaborated further the group-based CBHEPA program approach [19, 20]. The key principles for action at program and community level were theoretically defined as intersectoral collaboration, and coordinated action for sustainability, involving local stakeholders (organisations and community representatives). The key principles for action at group and individual level were defined as a social network approach, participants' active participation in program development, enjoyment, group bonding and creating supportive environments [21]. In practice however, principles for action were seldom made explicit within and across the CBHEPA programs, and their application was mostly driven by common sense: tacit knowledge, experiential skills, and competences

of all actors involved, i.e. program representatives, exercise trainers and participants. For example, the principle of social network approach was not explicitly addressed in any of the program involved in our study.

The principles for action as defined in the CBHEPA programs are modelled according to our empirical findings in Figure 8.2, highlighting two parallel tracks of value co-creation. The process of value co-creation, defined from a social constructivist viewpoint and reflecting value-in-social-context [22], is shaped by social forces, reproduced in social structures through interaction and dialogue. The process of value-co-creation can be asymmetric for the actors involved. This means that the benefits of the program are not at all times shared equally, because the social consensus on the value of the program rests on a compromise between the opinions of participants, program developers, and what the institutionalised reality allows [23].

In this research, we identified parallel tracks of value co-creation in which professionals as well as participants form collaborative structures aimed at enhancing active lifestyles, through learning from, with, and about one another: (1) the *institutional track,* referring to the collaborative processes between organising parties needed to initiate, develop, implement, and sustain a CBHEPA program and (2) the *exercise group track*, referring to the group-dynamic processes between participants and exercise trainers to create the dynamic learning environments for enhancing and maintaining active lifestyles. The exercise trainer usually is the only linchpin between these parallel tracks.

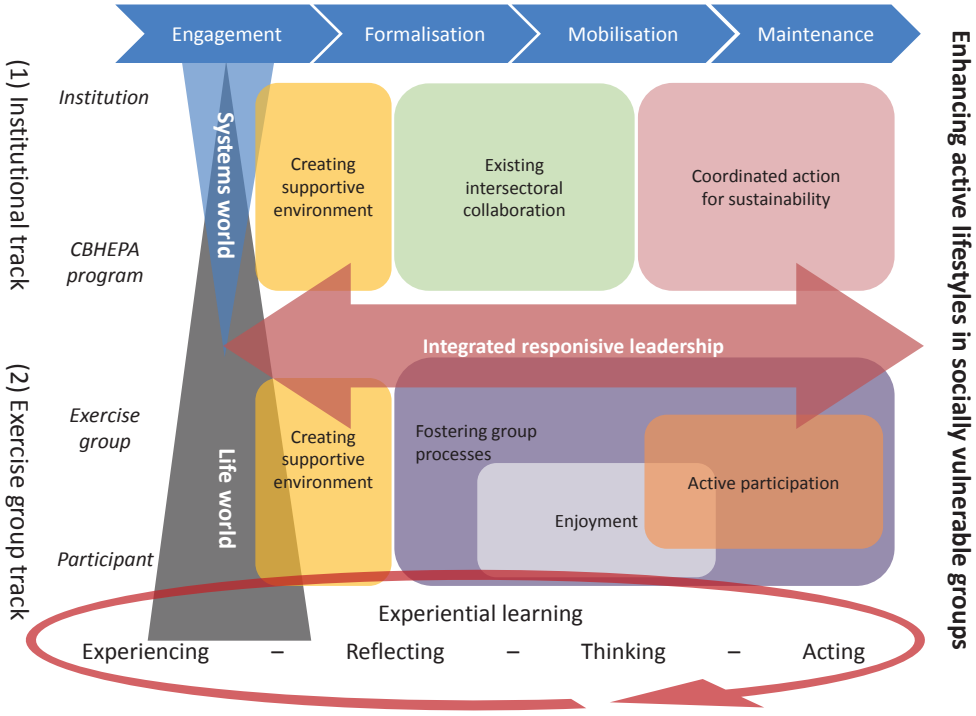


Figure 8.2 Principles for action in the CBHEPA program approach revisited

The *institutional track* relates to formulated institutional and community goals or ambitions and is influenced by higher level policy aims (Figure 8.2;(1)). The main parties involved are sports services, social workers, or educational institutions. The presence of community networks and related projects in social work or health promotion are found as catalysts for coordinated action for sustainability. The different program development phases encompass the engagement of the actors and communities, the design and formalisation of an intervention approach, mobilisation and program implementation, and program optimisation and maintenance [24, 25]. The proposition is that all actors involved in the collaboration become co-creators of value, organising themselves as a system for coordinated action to manage both the program content and the relationships with the participants and other relevant stakeholders [26], and can adapt to, and ultimately master, its contextual dynamics. Program sustainability thus relies on an iterative process of experiential co-learning, producing knowledge customised to the local contexts, with the potential to offer practical solutions in case of change [27]. In practice, however, as our studies show, the uncertainties for program sustainability – volatile policies, changing actors, limited access to financial resources and expertise – often disturb the reflexive processes needed for experiential learning in the institutional track.

In the *exercise group track*, similar group-dynamic processes play a role (Figure 8.2;(2)). The proposition is that participants become co-creators of value; this emphases the development of relationships between participants and trainer through interaction and dialogue [22], which are non-linear, dynamic, and often unconscious processes [26]. Once they become group members, participants grow into a group role, taking responsibility for group atmosphere, task achievement, and group maintenance. In practice, the exercise trainer is the one in position to connect both tracks through organised interaction and dialogue between the parties involved in the institutional track and the participants involved in the exercise track [26].

Our findings support the notion of contextual interdependencies [28]. The process of value co-creation in the institutional track to create the supportive environments for CBHEPA programs occurs in open systems, hardly contained by defined systems boundaries, and thus it seems highly sensitive to fluctuations in national policies shaping local policy contexts for CBHEPA programs. In addition, the CBHEPA programs in our study were generally weakly tied to local policy and hardly embedded in established organisations. This results in organsational weaknesses at program level, hampering the ambition of providing sustained program activities. In contrast, the value co-creation in the exercise groups, which can be viewed as a more contained group process, with a clear role for the exercise trainer, is much less sensitive to contextual fluctuations.

Exercise trainers' leaderships and experiential learning

A key factor triggering outcomes in CBHEPA programs is the crucial role of responsive leadership by the exercise trainer (Figure 8.2). In group-based CBHEPA programs an exercise trainer, or leader, has two main responsibilities, ensuring that (1) the demands of the organisation are satisfied by taking care of planning and organisation of the exercise classes, group maintenance, satisfactory group size, and cost-covering level, and (2) the needs and aspirations of group members are satisfied [29]. Exercise trainer's leadership skills, and responsive teaching are indispensable to support group development and transformative changes in behavioural outcomes [29, 30].

Thus, there is a need to extend the perception of exercise trainers' leadership requirements beyond the traditional technical performance and individual feedback in exercise classes. A more integrated approach towards leadership should be acknowledged, explicitly focusing on the leadership functions needed to be successful. These include image management by building credibility and trust, relationship development to enable others involved to move towards individual and collective goal attainment, and resource deployment by effectively using the knowledge, skills, and material resources available to accomplish the shared mission of enhancing active lifestyles [31, 32].

The overall mechanism thus identified as supportive of successful CBHEPA programs is experiential learning at all levels [27, 33]. The experiential learning theory defines learning as 'the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience' [34] (p. 41). The concept of deep learning means learning that fully integrates four modes of the experiential learning cycle – experiencing, reflecting, thinking, and acting (Figure 8.2). When a concrete experience is enriched by reflection, given meaning by thinking and transformed by action, the new experience becomes richer, broader, and deeper [33].

At participant and group level, our findings on the value attributed to enjoyment and social interaction link up with what Kolb and Kolb describe as learning to play, and playing to learn [35]. They introduced the concept of the ludic learning space in relation to sports and play, wherein participants achieve deep learning through the integration of intellectual, physical, moral, and, spiritual values in a free and safe context that provides the opportunity for individuals to play with their potentials and ultimately commit themselves to learning, developing, and growing [35].

At program level, our results link up with the findings of Kurt Lewin who first investigated the importance of experiential learning and group dynamics in teams [36]. From his work emerged three key insights that frame the experiential approach to team learning as it has evolved over the years: (a) the crucial role of reflective conversation; (b) the theory of functional role leadership, leadership not being a characteristic of one person, but groups sharing leadership roles, e.g., task accomplishment, group building and maintenance; and (c) the experiential learning process as the key to group

development [27]. Lewin pinpointed the lack of adequate feedback as the most salient determinant of ineffective team action [36]. As we have seen, the contextual dynamics in which CBHEPA programs operate – and often hamper program sustainability – also disturb the reflexive processes needed for experiential learning in the institutional track. In this light, it seems that the experiential learning cycles needed to arrive at program sustainability and behavioural maintenance are better supported in the exercise group tracks than in the institutional tracks, because exercise group tracks operate in more contained settings.

Finding common ground in CBHEPA programs relates to sport experiences

In the CBHEPA programs in our study, all actors, at all levels, were driven by a profound belief in the beneficial value of sports and physical activity for people's health and wellbeing. This overall notion has important implications for the way in which the driving forces in CBHEPA programs can be understood, and for the way in which planning and evaluation procedures should be addressed.

Our findings indicate that programs thrive primary on highly dedicated individuals with a passion for sport and a genuine concern for socially vulnerable groups. At the risk of an oversimplification of what is a very comprehensive and complex theory, Habermas' theory on communicative action is helpful for elucidating the interrelatedness between people's personal experiences and perceptions (lifeworld) and their communication and actions in institutionalised environments (systems world) [37], as indicated in Figure 8.2. The lifeworld is based on communication, agreement, and consensus - in our case relating to the values attributed to sports and physical activity - and defined by: (1) culture, the stock of knowledge upon which participants in communication draw in order to provide themselves with interpretations that will allow them to reach understanding; (2) society, the legitimate orders through which participants in communication regulate their membership in social groups and thereby secure solidarity; and (3) personality, the competences that make persons capable of speech and action, and thus enable them to participate in processes of reaching understanding and thereby assert their own identity [38]. The systems world relates to the policy and organisational contexts for CBHEPA programs and can be understood as rationalisations of the lifeworld, representing economic and political systems in need of instrumental rationality for the sake of control. Sports and physical activity are deeply rooted in Dutch society as meaningful leisure-time activities from an early age in large sections of the populations. This might very well explain the strong bearing of lifeworld perspectives on (professional) communication and actions when it comes to stakeholders' motivations to get engaged in sport and physical activity programs for socially vulnerable groups.

Taking into consideration the experience-based and deeply rooted beliefs relating to sport and physical activity, our findings underline the necessity for

careful inclusion of appropriate techniques for systemic planning and evaluation of CBHEPA initiatives. The planning and organisation of CBHEPA programs call for a specification and matching of interventions at multiple levels, using theories to map specific interventions from prior research and practice [39]. Factors such as complexity and contextual dynamics, the phase of the program, and the time available to develop and implement the program should be included in the planning approach [40]. A systemic assessment of experiences from prior projects and community-based interventions should be included, so as best to balance the insights of documented theory-based best practices with practice-informed insights on what works best, and how, in a particular community [39]. In addition, the importance of actor involvement in evaluation should be acknowledged, highlighting their narratives in the processes of program development and mutual learning [41]. Underlying theories in support of such planning and evaluation techniques are grounded in the work on experiential and loop learning [33, 42] and on community empowerment [43, 44], which help deepen our understanding of the social construction of reality and processes of value attribution of actors involved in community-based (physical activity) programs.

Active participation for empowerment in CBHEPA programs

Active participation in health promotion research is considered a crucial principle for action to address socioeconomic inequalities in health and relates to the desired processes of individual and communal empowerment [45-48]. In physical activity research however, active participation is usually framed differently and usually relates to individual participants' program adherence or sports engagement [49-51]. In this research, fostering group processes appeared to be a precondition for the desired spin-off in terms of physical activity enjoyment and active participation, which, in turn, resulted in the development of a sense of ownership, people taking responsibility for the exercise group and for their own physical activity behaviour, resulting eventually in empowerment (Figure 8.2). Participants were found to rely heavily on their exercise trainer's expertise and skills to support them in these developments. Participation in the exercise group should, therefore, be viewed as an outcome of societal participation in itself, and consequently as a measure of success in the process of empowerment, rather than as a means to further stimulate societal participation.

Our findings link up with the current debate on health equity, active participation, and empowerment. As recently posited by Rifkin [52]: 'Community participation, to date, has most often been seen as an intervention to improve health outcomes rather than a process to implement and support health programmes to sustain these outcomes, thus being treated as a top-down health promotion strategy. The main issues challenging the investigation of a link between participation and improved health status are a lack of common definitions for the terms community and participation, an acknowledgement of a key role of community participation without providing

conceptual and practical frameworks to articulate this role, the inability to disaggregate the contribution of community participation to health from other community development improvements, and evidence showing that outcomes are determined by contexts and contextual dynamics'(p. ii103).

Added value of our evaluation approach

Health-enhancing physical activity initiatives usually start from an intervention perspective and focus mainly on behaviour change [53]. The natural aim of evaluation research is then to arrive at theory-guided, or evidence-based, interventions that not only effectively succeed in changing behaviour, but also provide convincing explanations for the underlying mechanisms that trigger success [54]. The focus of evaluation is primarily the aspect of accountability, taking the form of assessing effectiveness and efficiency of a program or a project [55]. The evaluation context addressing the question of CBHEPA program effectiveness is thus in line with an evidence-based practice research paradigm [56]. It therefore converges with the main policy approach towards health promotion in the Netherlands, as reflected in the Dutch recognition system for quality control of lifestyle interventions [57].

We developed a logical framework for evaluation to study the effectiveness of CBHEPA programs, in which we framed the program rationale as a multilevel intervention: ecologically based, collaboratively conducted, culturally situated, and designed to increase individual as well as community capacity [21]. Embracing the rationale of studying real-life interventions from a realist perspective, the added value of our evaluation approach lies in the redefinition of its goal: from an ex post evaluation, investigating program effectiveness based on pre-set outputs and outcome indicators, towards an ex durante evaluation, also exploring mechanisms and learning outcomes [55, 58].

As discussed by Luke and Stamatakis [59], the methodological implications of ecological systems thinking involves new research designs equipped to deal with the complexities of individual behaviour in ecological contexts. While implementing our evaluation design, we sought our way through the methodological issues resulting from the application of an ecological perspective (Table 8.2). This included systems modelling from a multilevel perspective – whenever possible in collaboration with actors involved in our study – and the use of reflective methods and participatory research processes to contribute to individual and program learning outcomes [60].

Table 8.2 Underlying assumptions of analytic techniques in traditional, the CBHEPA program evaluation, and ecological system approaches (after Luke and Stamatikis [59])

Assumption	**Traditional analytic techniques**	**CBHEPA program evaluation mixed methods techniques**	**Ecological systems analytic techniques**
Functional form	Linearity	Combining linearity and non-linearity through mixed methods, at multiple levels	Non-linearity
Common distributions	Normality	Non-randomised, self-selective	Non-normality
Characteristics of actors	Homogeneity	Looking for commonalities across multiple cases	Heterogeneity
Level of analysis	Single level	Multiple levels (intra- and inter individual, group, program)	Multiple levels
Temporality	Static or discretely longitudinal	Discretely longitudinal, participatory	Dynamic, with feedback
Fundamental relationships	Among variables	Among variables in quantitative analyses; constructivist at group and program level in qualitative analysis	Interaction of actors
Perspective	Reductionist	Data driven and thematic; integrating findings from different studies	Holistic
Contextual dimension	Reduced to controllable variables	Valuable information for interpretation of outcomes (realist synthesis)	Contextual interdependencies explaining adaptive capacities

We used mixed methods as 'multiple ways of seeing' [14], combining quantitative techniques and qualitative approaches, in order to build a comprehensive and better understanding of how CBHEPA programs operate and what they deliver. The different kinds of evidence pulled from all cases contributed to the robustness of the mixed methods approach and to the generalisability of the findings. The adjustments made in the original evaluation design, among other things necessitated by the change in the role of the national partner NISB, as highlighted earlier in the intermezzo, resulted in the uptake of each CBHEPA program as an in-depth case study. This enforced our mixed methods approach in its objective to obtain different but complementary data on how best to understand CBHEPA programs and their effectiveness in relation to their natural operational settings.

Reflections on alternative indicators for evaluation

From our findings, the need and relevance of alternative research methods and indicators for evaluating CBHEPA programs become apparent for two reasons. First, CBHEPA programs can be characterised as adaptive process-based approaches. This involves

collaborative processes and efforts to be resilient to contextual dynamics at institutional level on the one hand, and group-dynamic processes in the exercise groups, enabling fun and learning, on the other. Second, unlike the general focus of intervention research, relevant indicators to assess CBHEPA program effectiveness should relate more to program sustainability and behavioural maintenance than to indicators of (behaviour) change only.

Relevant process-based indicators for evaluation relating to the institutional track were: intersectoral collaboration, assessed in terms of sustained enthusiasm, actor engagement, and outcomes of experiential learning; community outreach, assessed in terms of organisational visibility and reach in the intended target groups; and program sustainability, assessed in terms of participant engagement, program adherence, and setting up ownership within the communities.

Relevant process-based indicators for evaluation relating to the exercise group track were: fostering group processes, assessed in terms of the role of the exercise trainer, social support, and learning achievements; active participation, assessed in terms of participation in group formation, program content, and community initiatives; and enjoyment, assessed in terms of experienced feelings of enjoyment and safety. Our findings show that so-called soft process-related indicators are important, such as mutual care, trust, respect, and responsiveness, as well as team role indicators relating o different task requirements, such as interpersonal, information, analytical, and action behaviour roles [27].

Relevant indicators at individual level, alongside the pre-defined physical activity outcome indicators, related to physical activity maintenance and were: phase-specific self-efficacy, coping abilities, motivational behaviour and experiences, and self-determination. Having fun and the social get-together during the exercise classes can be viewed as intermediate outcomes relating to program adherence. For participants, physical activity enjoyment is the intended goal of participation in the exercise group, in terms of behaviour or cognitive processes, as well as physical and emotional experiences. Our findings resonate with those of other studies identifying physical activity enjoyment as a moderator of self-efficacy in physical activity behaviour and maintenance [61] and indicating that not only self-control and discipline, but also enjoyment, pleasure and 'not worrying', are key values in maintaining an active and healthy lifestyle [62-64]. Health-related quality of life indicators, generally defined as long-term outcome indicators of CBHEPA programs, surfaced in our research more as predictors of physical activity maintenance than as sensitive outcome indicators of physical activity behaviour. This reciprocal relationship between health-related quality of life and physical activity behaviour and maintenance, is probably one of the most wickedest problems when the effectiveness of CBHEPA programs is being studied [65, 66].

Methodological considerations

Several strengths characterised our evaluation approach, in which we addressed systematically the multiple-level nature of CBHEPA programs from an ecological perspective. At individual level, the use of hierarchical data structures and multilevel statistical procedures [67-69] in the quantitative analyses contributed to a better understanding of physical activity behaviour and maintenance [13, 70, 71]. Monitoring physical activity behaviour longitudinally in socially vulnerable groups in combination with multilevel modelling, confirmed our understanding of the interdependency of physical activity behaviour, and time-varying covariates, such as health-related quality of life, self-efficacy, and enjoyment. Reaching out to the target groups through a personalised approach, using a constructivist perspective, added to the richness of our data.

At group level, we worked with inductive techniques grounded in a constructivist research paradigm. We started with participants' views and built patterns, theories, and generalisations from there. In exploring participants' perceptions of group-based principles for action, for example, we applied a three-step iterative approach: a) identification of indicators of group-based principles for action through literature and expert consultation; b) identification of existing group interview techniques to explore perceptions of group principles for action through literature and expert consultation; and c) pilot testing the developed group interview technique in exercise groups in the different CBHEPA programs in our study.

Similarly, at program level, we used the narrative timeline technique, guiding a group discussion through what participants themselves marked as relevant experiences throughout the process. By building a retrospective and contextual understanding of developments in the different CBHEPA programs, and by identifying how they may have had an impact on program outcomes, the timelines thus supported learning experiences within the CBHEPA programs [39, 72, 73]. The use of a realist protocol for analysis at program level filled a gap in our understanding as to why particularly ongoing CBHEPA programs have been found to result in higher physical activity levels, better program adherence and compliance, and under what conditions these programs actually work, and how [65].

Several limitations of our evaluation approach should also be mentioned. Our study locked onto natural experiments - the CBHEPA programs - by design. We evaluated ongoing field practice rather than conducting an experimental setup to investigate the determinants of physical activity behaviour and maintenance in socially vulnerable groups. Monitoring real-world settings was challenging. No random selection procedures could be applied, simply because it was difficult to find CBHEPA programs willing to participate. Our datasets, therefore, suffer from a potential self-selection bias at all levels studied. In addition, groups of participants could be included at baseline only after the start of a CBHEPA program, some of which were already in

existence for a number of years. Thus, no genuine baseline data for physical activity behaviour and health-related quality of life indicators could be established. To address the methodological weakness of lacking baseline data, we had to rely on the availability of population-wide trend reports on physical activity behaviour and related indictors.

Furthermore, the quantitative studies could be critiqued for not using control groups. Arguments cited for not doing so [21] were the limitations regarding the selection of adequate control groups in real life settings. Comparable communities are not easily identified, information about the CBHEPA programs cannot be restricted to one community, and non-observable differences such as initial motivation are not easily matched [74]. Also, people cannot be participants and non-participants in an intervention at the same time. This gives rise to methodological problems of attribution of observed effects to the intervention [75, 76]. To deal with this matter, we used a sequential cohort design in which the intervention effects were measured repeatedly. The baseline measurements acted as the point of reference, thus offering the possibility to compare effects over time in addition to comparing effects between cohorts (between program adherents and starters) [77].

The quantitative studies could also be critiqued for the small size of the study populations. Power calculations prior to the start of the study showed that a number of 240 participants at baseline and, assuming a 30% dropout, around 170 participants available for further analysis would be acceptable. The actual recovery rate at the third measurement was 54% (n=145) and at the fourth 48% (n=129), despite our efforts to diversify our ways of data collection during follow-up measurements in order to retain as many participants as possible in our study (questionnaire-based data collection using personalised on-site, postal, and telephonic interviews as strategies). The potential bias resulting from these combined strategies was partially counterbalanced by the use of multilevel analysis, helping to correct for possible interdependencies within and between individuals and groups.

We tried to counteract all the limitations relating to the effect measurements by evaluating CBHEPA program effectiveness at participant level in relation to the perceived mechanisms at group and program level. This contributed to our avoiding the risk of making type III errors, which result from evaluating a program that has not been adequately implemented and thus drawing incorrect conclusions about the effectiveness of a given intervention [78]. The reported interrelatedness of the different principles for action in CBHEPA programs, however – usually enacted by force of habit by the actors involved – bears some serious implications for evaluation. It puts pressure on both the clarity and stability, or uniformity, of the program components in place. This hampers the possibility of establishing clearly causal relationships [79].

As was to be expected, gathering data in socially vulnerable groups was a challenge in itself, despite the highly personalised strategies for data collection, explained above, in order to keep the socially vulnerable groups engaged in our research

[80]. We faced every hurdle documented on questionnaire use in socially vulnerable groups. Lack of health literacy, lack of basic reading and writing skills, and different beliefs about health concepts across cultures led to difficulties in understanding and interpreting the questions [80, 81]. This also probably explains why the dropout rates were higher than expected [82]. Alternatives, however, such as translations, working with images or digital devices, were not found and anyway are reported to suffer from similar limitations [80]. We were forced to limit ourselves to collecting information about the most important explanatory factors for physical activity behaviour and maintenance in CBHEPA programs, such as health-related quality of life, self-efficacy, and enjoyment.

With respect to conducting focus groups with our target population, several limitations should also be mentioned. In some groups, all members were of Dutch origin; in others, a large ethnic and cultural diversity was found. A limitation to our research is that it was necessary to use Dutch as the common language, hindering some respondents from expressing themselves freely in their mother tongue, and challenging others to show their language skills. Occasionally, those who spoke Dutch fluently translated for others. We cannot rule out, therefore, the possibility that socially desirable responses entered our dataset, also because the focus groups were held in existing group settings. With reference to the literature on culturally appropriate health promotion, several strategies were applied to address potentially different beliefs about health concepts within and between groups [83, 84]. Most of these strategies, however, build on the assumption of within-group sociocultural and ethnic homogeneity. This was not a priori the case in the CBHEPA programs involved in our study. So, on the one hand we cannot rule out possible influences of different beliefs across cultures, and differences in understanding and interpreting the questions asked in our focus groups. On the other hand, we had positive experiences in getting respondents engaged in a meaningful dialogue about physical activity behaviour and maintenance.

Finally, using the timeline technique to evaluate contexts, mechanisms, and outcomes at program level bears the risk of being self-referential. The power of the timeline technique is that it generates knowledge acceptable to all actors involved, because it is based on actors' own perceptions and an analysis that is transparent and open for discussion. Such accepted knowledge is essential for processes of co-creation. The other side of the coin is that some issues may not have been raised, because actors overlooked them or had reasons not to mention them.

Conclusions and implications for future research

CBHEPA programs are generally initiated and implemented by sports services, social workers, or educational institutions. This mixed methods evaluation research describes how CBHEPA programs, if supported in their performance and sustainability, succeed in generating physical activity maintenance in socially vulnerable groups. In doing so, they make a contribution to the overall challenge of reducing socioeconomic inequalities in health and physical activity behaviour.

This research generated strong evidence of contextual dynamics shaping the local CBHEPA initiatives, and the need for responsiveness and adaptive mechanisms in order to realise sustained CBHEPA programs. It is predominantly actors with a passion for sport and physical activity, committed to socially vulnerable groups, that value the collaboration necessary for sustained programs. However, the current situation emerging from this research is that there are generally weak linkages between the exerciser trainers implementing the group-based activities and the usually volatile group of actors at the institutional level involved in coordinated action for sustainability. There is an apparent need for more systemic and systematic planning and evaluation approaches to support long-term policy development in relation to community-based initiatives addressing health inequities, at both local and national level, which also acknowledge historical contexts and interrelatedness in contextual dynamics.

People from socially vulnerable groups participate in CBHEPA programs primarily for fun, and most of them are willing to pay a modest contribution. This research generated evidence emphasising the need for a better understanding of the processes of value co-creation at different levels in CBHEPA programs, and ways to facilitate, manage, and supervise them from a social constructivist paradigm. The need for actor involvement in evaluation is highlighted to deepen our understanding of the social construction of reality and processes of value attribution in community-based programs. This would require a shift in perspective on how CBHEPA programs operate: from an intervention to a service logic or transactional paradigm, in which participants are seen as co-creators of value from a consumer perspective, putting emphasis on the need to develop so-called consumer–supplier relationships through interaction and dialogue.

In line with the above, with reference to the Dutch recognition system aiming to disclose evidence-based lifestyle interventions to a wide audience of potential users, this research challenges the assumptions underlying the intervention concept as such. The assumptions of clarity of intervention ownership and linearity in goal-setting - usually addressing behavioural change outcomes - pursuing a head-to-tail process of program development, implementation, and dissemination were not univocally endorsed in the CBHEPA programs studied. Rather, CBHEPA program development is grounded in the local contextual realities and geared towards the creation of sustained tailored programs within these specific contexts. Consequently, these process- and value-driven

approaches are hard to align with project-inspired views on lifestyle interventions.

Future research identifying factors for physical activity maintenance should focus not only on how individuals act, but also on how individuals, groups, and environments interact. The need to incorporate more systematically a systemic perspective on group dynamic theories in physical activity promotion interventions is proposed, applicable to the parallel tracks at institutional and exercise group level. In terms of evaluation demands, this calls for explicit strategies in community-based physical activity programs, involving actors from all levels, which align accountability with learning through evaluation.

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List of abbreviations

BMI	Body Mass Index
CBHEPA	Community-Based Health-Enhancing Physical Activity programs
CGL	Centre for Healthy Living
CMO	Context-Mechanism-Outcome
CoM	Communities on the Move
CSA	Computer Science Applications, Inc. activity monitor
EQ-5D-3L	5-Dimensions, 3-Level Euro Quality of Life Questionnaire
EQ-Index	Index based on EQ-5D-3L outcomes (Dutch time-trade-off value set)
EQ-VAS	Euro Quality-of-Life Visual Analogue Scale
HiAP	Health in All Policy
LOG LTPA	LOG transformed Leisure-Time Physical Activity
LTPA	Leisure-Time Physical Activity
NISB	Netherlands Institute for Sport and Physical Activity
NNGB	Dutch Healthy Physical Activity Guidelines
PA	Physical Activity
PACES	Physical Activity Enjoyment Scale
QALY	Quality Adjusted Life Year
QoL	Quality of Life
RCT	Randomised Controlled Trial
RE-AIM	Reach-Effectiveness-Adoption-Implementation-Maintenance
REML	Restricted Maximum Likelihood
SCT	Social Cognitive Theory
SES	Socio Economic Status
SoC	Sense of Coherence
SQUASH	Short Questionnaire to Asses Health enhancing physical activity
TPB	Theory of Planned Behaviour
WHO	World Health Organisation
WMO	Act on review of Medical Research involving human subjects
WTP	Willingness to Pay
ZonMw	Netherlands Organisation for Health Research and Development

Summary

Background

In the Netherlands, inequalities in physical activity behaviour go hand in hand with socioeconomic inequalities in health. To stimulate physical activity behaviour and promote physical activity effectively and equitably, participatory community-based physical activity interventions seem promising. The Dutch government's policy is to support community-based sport and physical activity schemes at municipal level, on the assumption that participation in these programs supports the development of social capital, the quality of life in a community, and health and wellbeing. Although many strategies have been developed to increase physical activity levels in general and in socially vulnerable groups in particular, most evaluations show only small to moderate effects. To date, the evidence base rests mainly on correlational, cross-sectional studies at participant level, lacking insight into causal relationships and interaction patterns between factors influencing physical activity. In addition, in line with Dutch health promotion policy, there is a general demand for community-based health-enhancing physical activity (CBHEPA) programs to be evaluated for impacts and (cost) effectiveness.

Aim

The aim of this thesis is to report on the design and implementation of an evaluation approach, assessing the effectiveness of CBHEPA programs at different impact levels (individual, group, and program), and the mechanisms involved. This study aims to contribute to the evidence base of programs targeting socially vulnerable groups, by applying systematically a multilevel and realist perspective in order to generate recommendations about how to evaluate physical activity promotion interventions targeting socioeconomic inequalities in health and physical activity.

Methods

The study was built on a mixed methods design, combining quantitative techniques and qualitative approaches, to monitor 268 participants in 19 groups in seven ongoing CBHEPA programs between 2012 and 2015. We collected data at multiple levels. At individual level, a sequential cohort design was used to acquire quantitative longitudinal data on developments in physical activity behaviour and health-related indicators, and to assess participants' willingness to pay for sport and physical activity. At group and program level, interviews and focus group qualitative techniques of measurement were used. Thus, we were able to link outcomes at multiple impact levels from different datasets over a period of time, adding contextual and time-related value to our findings. The different kinds of evidence pulled from all cases contributed to the robustness of the mixed methods approach and to the generalisability of the findings.

Results

Part I of this thesis presents the theoretical orientations for the development of a context-sensitive monitoring and evaluation approach in order to measure the effectiveness of CBHEPA programs. It presents an evaluation design, grounded in an ecological perspective on human health, enabling the identification of underlying mechanisms at multiple levels which explain what works and why in community-based physical activity programs.

Part II presents the empirical findings from multiple perspectives. A multilevel analysis highlights the longitudinal developments from a participant perspective, addressing (leisure-time) physical activity behaviour in relation to participants' personal factors and covariates. CBHEPA programs reach socially vulnerable, but not necessarily inactive, groups in terms of socioeconomic and health-related quality of life outcomes. No increase in physical activity levels over time was observed, but the findings suggest that ongoing CBHEPA programs in particular contribute to physical activity maintenance in socially vulnerable groups. Over time, significant positive associations were found between leisure-time physical activity, and health-related quality of life, self-efficacy, and enjoyment.

Furthermore, participants' willingness to pay (WTP) for sports and physical activity was explored– as also its associated predictors – in terms of money and time. From the literature, relevant predictors of WTP were identified, relating to personal, socioeconomic, health-related, and sports and physical activity-related predictors. The average monetary WTP amounted to €9.60/month, exceeding the average monthly program fees actually paid by €2.64, and was positively associated with income and sport and physical activity experiences. The average WTP in travel time was close to18 minutes and was positively associated with income and age. Short-term program satisfaction is probably more decisive for WTP than long-term perspectives of improving health-related quality of life.

At group level, participants' appreciation of the group-based principles for action was explored, addressing active participation, enjoyment, and fostering group processes. Fostering group processes was found as an overarching principle, conditional for spin-offs in terms of enjoyment and active participation, which, in turn, lead to a sense of ownership among participants, who take up responsibility for the exercise group as well as for their individual activity behaviour. CBHEPA programs thrive on participants having fun together and on exercise trainers' leadership skills. A professional, competent, responsive exercise trainer plays a key role in the organisation and maintenance of CBHEPA programs.

A multilevel framework was used to explore the issue of physical activity maintenance in the case of women of non-Western origin. The factors influencing physical activity maintenance at individual level were: perceived (health) benefits, self-regulation, and learning outcomes regarding physical activity and social participation. At

group level, mutual support, security, sharing stories, and trust were important factors. At program level program, quality, staff responsiveness, continuity, and accessibility were important factors. Individual perceived benefits and factors at group and program level, aimed at an appropriate mix of exercise and social activities, contributed significantly to physical activity maintenance by women of non-Western origin.

From a local stakeholders' perspective, key combinations of contextual factors and mechanisms triggering outcomes of interest were explored. Outcomes of interest related to community outreach, program sustainability, intersectoral collaboration, and enhancing participants' active lifestyles. Supportive contexts were municipal policies in support of community-based programs, established collaborative structures and community networks, and alignment with other health and welfare projects. Stakeholders' past experiences with sport and physical activity projects and commitment to the target group were strong additional supportive contextual factors. Supportive mechanisms were entrepreneurship, leadership, responsiveness, deployment of professional exercise trainers, and ensuring the implementation of tailored and accessible program activities. Local governance structures, however, appeared often to lack adaptive capacity to accommodate multilevel processes to realise the sustainment of CBHEPA programs. Policy volatility often results in discontinuity of project funding and collaborative processes, and a reduction in the availability of professional expertise, thus hampering program development and sustainability.

Conclusions

Part III of this thesis describes how CBHEPA programs, if supported in their performance and sustainability, succeed in generating physical activity maintenance in socially vulnerable groups. Two parallel tracks of value co-creation were identified, reflecting value-in-social-context shaped by social forces and reproduced in social structures through interaction and dialogue: the institutional track, involving the collaborative processes at institutional level, and the exercise group track, involving the collaborative processes in the exercise groups. The exercise trainer is usually the only linchpin responsible for connecting these parallel tracks. Strong evidence was found on how contextual dynamics shape local CBHEPA initiatives and on the need for responsiveness and adaptive mechanisms in the institutional track as well as in the exercise group track, in order to realise sustained CBHEPA programs.

People from socially vulnerable groups participate in CBHEPA programs primarily for fun, and most of them are willing to pay a modest contribution. Evidence was found – emphasising the need for a better understanding of the processes of value co-creation at different levels in CBHEPA programs – of the necessity for a shift in perspective on how CBHEPA programs operate: from an intervention to a service logic or transactional paradigm, in which participants are seen as co-creators of value from a consumer perspective, putting emphasis on the need to develop so-called

consumer–supplier relationships through interaction and dialogue.

With reference to the Dutch recognition system, put in place to promote quality assurance of lifestyle interventions by encouraging scientific substantiation of intervention effectiveness and feasibility, this research challenges the assumptions underlying the intervention concept as such. CBHEPA program development is grounded in the local contextual realities and geared towards the creation of sustained tailored programs within these specific contexts. Consequently, these process and value-driven approaches are hard to align with project-inspired views on lifestyle interventions.

Future research on physical activity behaviour and maintenance should focus not only on how individuals act, but also on how individuals, groups, and environments interact. The need to incorporate more systematically a systemic perspective on group dynamic theories into physical activity interventions is proposed. In terms of evaluation demands, this calls for explicit strategies in community-based physical activity programs, involving actors from all levels, which align accountability with learning through evaluation.

Samenvatting

Achtergrond

Verschillen in beweeggedrag in Nederland gaan hand in hand met sociaaleconomische gezondheidsverschillen tussen verschillende bevolkingsgroepen. Participatieve, buurtgerichte beweegprogramma's lijken veelbelovend om lichaamsbeweging te stimuleren bij sociaal kwetsbare groepen. Het Nederlandse overheidsbeleid ondersteunt in veel gemeenten buurtgerichte sport en beweegprogramma's. Over het algemeen wordt aangenomen dat deze programma's de ontwikkeling van sociaal kapitaal en leefbaarheid in de buurt stimuleren, en bijdragen aan persoonlijke gezondheid en welzijn. Hoewel er in Nederland veel programma's zijn ontwikkeld om kwetsbare groepen meer aan het bewegen te krijgen, laten de meeste evaluatiestudies weinig effecten zien. Tot op heden berust het meeste bewijs op correlatiestudies en cross-sectioneel onderzoek, met de individuele deelnemer als subject van onderzoek. Daardoor is er maar beperkt inzicht in de causale relaties tussen factoren van invloed op beweeggedrag, zoals bijvoorbeeld persoonsgebonden factoren, ervaren gezondheid of sportverleden, groepsdynamieken, en hun onderlinge samenhang. Tegelijkertijd is er een grote belangstelling vanuit het Nederlandse beleid voor gezondheidsbevordering voor het evalueren van de (kosten) effectiviteit van buurtgerichte beweegprogramma's.

Doelstelling

Deze thesis rapporteert over de opzet en uitvoering van een evaluatiestudie van buurtgericht beweegprogramma's op verschillende niveaus (individu, groep en programma), en over de mechanismen die daar een rol in spelen. Daarmee beoogt dit onderzoek bij te dragen aan meer kennis over de werkzame factoren in buurtgerichte beweegprogramma's voor kwetsbare doelgroepen. Het doel van deze studie is om tot aanbevelingen voor evaluatie te komen van buurtgerichte beweeginterventies, die zich richten op het terugdringen van gezondheids-verschillen in kwetsbare groepen.

Methode van onderzoek

Het onderzoek is gebaseerd op een zogenaamd 'mixed methods design'. In dit design zijn zowel kwantitatieve als kwalitatieve onderzoekstechnieken gebruikt. In de periode van 2012 tot 2015 zijn in totaal 268 deelnemers van 19 beweeggroepen gevolgd in buurtgerichte beweegprogramma's in zeven gemeenten. Data zijn op verschillende niveaus verzameld. Op individueel niveau is een longitudinale studie gedaan van opeenvolgende cohorten. Elk half jaar (drie metingen) werden kwantitatieve data verzameld over het beweeggedrag en gezondheid gerelateerde indicatoren van de deelnemers. Ook werd gevraagd hoeveel mensen wilden betalen voor sport en bewegen. Op groeps- en programmaniveau zijn gegevens over de werkzame factoren van buurtgerichte beweegprogramma's verzameld via kwalitatieve technieken. Interviews werden afgenomen en focus groep discussies gehouden in de groepen en met vertegenwoordigers van de beweegprogramma's. Op die manier konden we over

een bepaalde periode de resultaten van de verschillende deelstudies, gemeten op verschillende niveaus, aan elkaar relateren. Dit had als meerwaarde dat de invloed van context en tijd bestudeerd kon worden. Het verzamelen en integreren van verschillende soorten bewijs bij alle betrokken beweegprogramma's heeft het 'mixed method design' verstevigd, en diverse inzichten opgeleverd op verschillende niveaus.

Resultaten

In deel I van deze thesis wordt de theoretische onderbouwing beschreven van een context-sensitieve monitoring en evaluatiestrategie om de effectiviteit van buurtgerichte beweegprogramma's te onderzoeken. Het beschreven evaluatiedesign is gebaseerd op een ecologische benadering van gezondheid. Zo kunnen de onderliggende mechanismen in buurtgerichte beweegprogramma's geïdentificeerd worden op verschillende niveaus, die verklaren wat werkt, voor wie, en waarom.

In deel II worden de empirische bevindingen beschreven van de verschillende deelstudies. Buurtgerichte beweegprogramma's blijken sociaal kwetsbare groepen te bereiken. De sociaaleconomische status en gezondheid gerelateerde kwaliteit van leven scoren lager dan het gemiddelde van de Nederlandse bevolking. Uit scores voor beweeggedrag blijkt echter dat deelnemers niet minder actief zijn dan de gemiddelde volwassen Nederlander. Uit een multilevel analyse blijkt dat er in de loop van een jaar geen toename in beweeggedrag heeft plaatsgevonden. Significante verbanden werden gevonden tussen bewegen in de vrije tijd en ervaren gezondheid, eigen effectiviteit en plezier in bewegen. Uit de bevindingen blijkt ook dat met name langer lopende buurtgerichte beweegprogramma's bijdragen aan het volhouden en in stand houden van beweeggedrag in sociaal kwetsbare groepen.

Verder is onderzocht hoeveel deelnemers willen investeren in sport en bewegen in termen van geld en tijd. Op basis van de literatuur zijn eerst de relevante voorspellers voor de bereidheid tot investeren in kaart gebracht. Deze hadden betrekking op persoonlijke, sociaaleconomische zoals inkomen, leeftijd, geslacht, en herkomst; gezond gerelateerde factoren, zoals ervaren gezondheid en levenstevredenheid; en sport en beweeggedrag gerelateerde factoren, zoals sportlidmaatschap. Deelnemers waren bereid gemiddeld €9,60 per maand te betalen. Dit was €2,64 meer dan de werkelijke gemiddelde maandelijkse kosten voor deelname aan de bestudeerde beweegprogramma's. Mensen met een hoger inkomen en meer ervaring met sport en bewegen bleken meer te willen betalen. Deelnemers waren bereid gemiddeld 18 minuten reistijd te besteden naar de sportzaal. Mensen met een hoger inkomen en een hogere leeftijd bleken meer reistijd te willen besteden. Uit de bevindingen blijkt dat tevredenheid over het beweegprogramma op de korte termijn mogelijk meer bepalend is voor de bereidheid tot investeren, dan een lange termijn perspectief op een betere ervaren gezondheid.

Op groepsniveau is in kaart gebracht hoe deelnemers de groepsgerichte handelingsprincipes actieve participatie, plezier en het stimuleren van groepsdynamische

processen beoordelen. Het stimuleren van groepsdynamische processen bleek een overkoepelend en voorwaardelijk principe voor het creëren van het plezier en de actieve participatie. Beiden bleken nodig voor de ontwikkeling van eigenaarschap onder deelnemers voor het functioneren van de beweeggroep en voor het volhouden van het eigen beweeggedrag. Buurtgerichte beweegprogramma's gedijen op het plezier dat deelnemers eraan beleven, en op leiderschapsvaardigheden van een beweegleider. Een professionele, competente en responsieve beweegleider speelt een sleutelrol in de organisatie en het behoud van buurtgerichte beweegprogramma's.

Factoren, die bijdragen aan het in stand houden van beweeggedrag bij de doelgroep vrouwen van niet-Westerse herkomst, werden verschillende niveaus bestudeerd. Op individueel niveau bleken ervaren (gezondheids)voordelen, zelfregulatie, aangeleerde (beweeg)vaardigheden en maatschappelijke participatie belangrijke factoren. Op groepsniveau bleken sociale steun, een veilige beweegomgeving, het delen van verhalen, en onderling vertrouwen belangrijke factoren. Op programmaniveau bleken de kwaliteit van het beweegprogramma, responsiviteit van de begeleiding, continuïteit en toegankelijkheid belangrijke factoren. De individueel ervaren voordelen in combinatie met factoren op groeps- en programmaniveau, gericht op een passende mix van beweeg- en sociale activiteiten, bleken van groot belang voor deze vrouwen om te blijven meedoen.

Tot slot zijn, vanuit het perspectief van lokale betrokkenen van de betrokken beweegprogramma's, combinaties van contextuele factoren en mechanismen in kaart gebracht, die zorgen voor de gewenste resultaten. De gewenste resultaten hadden betrekking op het bereik en zichtbaarheid van de organisatie en het beweegprogramma in de buurt, verduurzaming van het beweegprogramma, intersectorale samenwerking tussen betrokken organisaties, en het stimuleren van een actieve leefstijl onder deelnemers. Ondersteunende contextuele factoren bleken buurtgericht gemeentebeleid, bestaande samenwerkingsstructuren en netwerkrelaties in de buurt, en afstemming met andere gezondheids- en welzijnsinitiatieven in de buurt. Ervaringen in het verleden van stakeholders met sport en beweegprojecten, en betrokkenheid bij de doelgroep, bleken bijkomende ondersteunende contextuele factoren. Ondersteunende mechanismen bleken ondernemingszin, leiderschapskwaliteiten, responsiviteit, het inzetten van professionele beweegbegeleiders, en zorgen voor toegespitste en toegankelijke programma-activiteiten. De duurzaamheid van buurtgerichte beweegprogramma's werd geregeld belemmerd door factoren in de lokale (beleids)context, waardoor de noodzakelijke samenwerkingsprocessen onvoldoende konden worden gefaciliteerd. Veranderingen in beleid resulteerden vaak in discontinuïteit in financiering en samenwerking, en bijgevolg in de beschikbaarheid van professionele expertise.

Conclusies

In deel III van deze thesis wordt beschreven hoe buurtgerichte beweegprogramma's een bijdrage kunnen leveren aan het beweegbehoud van sociaal kwetsbare groepen, mits ze worden ondersteund in hun dienstverlening en verduurzaming. Twee parallelle processen, waarin sprake is van waarde co-creatie via interacties en dialoog binnen de kaders van een lokale context, kwamen aan het licht: de institutionele samenwerkingsprocessen, met daarin centraal de samenwerking tussen stakeholders van instituties, en de groepsprocessen, met daarin centraal de samenwerking tussen deelnemers in de beweegroepen. De beweegleider bleek in het algemeen degene die actief verbinding legt tussen deze beide processen. Veranderingen in de context blijken van grote invloed op de organisatie en duurzaamheid van buurtgerichte beweegprogramma's. Dit vraagt om responsiviteit en aanpassingsvermogen in zowel de institutionele samenwerkingsprocessen als binnen de beweeggroepen.

Mensen uit sociaal kwetsbare groepen bleken vooral voor hun plezier mee te doen aan buurtgerichte beweegprogramma's, en de meesten wilden daar ook een bescheiden contributie voor betalen. Dit duidt op een mogelijk alternatief perspectief op hoe buurtgerichte beweegprogramma's functioneren, waarbij de focus meer ligt op het goed begrijpen van de parallelle processen van waarde co-creatie in buurtgerichte beweegprogramma's. Het betreft een verschuiving van een interventie- naar een dienstverlenend paradigma, waarin deelnemers gezien worden als consumenten, die zelf waarde toekennen aan de dienst van hun keuze.

Dit onderzoek geeft ook aanleiding tot reflectie op de aannames die ten grondslag liggen aan het Nederlandse Erkenningssysteem. Dit systeem is in het leven geroepen om de kwaliteit van leefstijlinterventies te bevorderen. Wetenschappelijke onderbouwing van effectiviteit en haalbaarheid van interventies staat hierbij centraal. De ontwikkeling en implementatie van buurtgerichte beweegprogramma's in deze studie, bleken sterk af te hangen van de lokale context, en gericht op het ontwikkelen van duurzame en passende programma's binnen de eigen lokale context. Het gevolg hiervan is dat deze procesmatige en waarde-gedreven programma's moeilijk in lijn te brengen zijn met een overwegend projectmatige benadering van leefstijlinterventies, zoals gehanteerd door het Erkenningssysteem.

Toekomstig onderzoek naar effecten en implementatie van beweegprogramma's gericht op het stimuleren en behoud van beweeggedrag, zou zich zowel moeten richten op wat mensen doen, als ook op hoe zij interacteren in hun groep en met hun omgeving. Voor vervolgonderzoek wordt aanbevolen een systeemperspectief te hanteren, inclusief gebruikmaking van groepsdynamische theorieën. In het geval van buurtgerichte beweegprogramma's vraagt dit om een evaluatie-aanpak, gericht op het leren van en met elkaar, samen met betrokken actoren van verschillende niveaus.

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'Er is niets nieuws onder de zon. Maar niets is ooit hetzelfde, alles borduurt voort. Haperend, recapitulerend, afzwaaiend, dat wel, maar nooit identiek, zelfs al zou men willen. Het platwalsen van vroeger tot blauwdruk voor het heden beneemt ons elk inzicht in voortgang, vooruitgang, degeneratie of welke ontwikkeling dan ook. En zonder historisch inzicht blijven we in herhalingen vervallen'
[Herman Pleij, in: Moet Kunnen; p.29]

With the above reflection, quoting Herman Pleij on the need to generate an understanding of the past to build an understanding of the present and plan for the future, I conclude my PhD exercise. The quote nicely underlines my main findings relating to community-based physical activity programs, emphasising the need to understand the historic and contextual dynamics to explain their success (or failure).

The start of my PhD research in 2012 was an outcome of a three-year collaborative process between NISB, now Knowledge Centre Sports, and Wageningen University Health and Society. But actually, at the personal level, the relationships date back much further, to the times I walked around as a student at Wageningen University. At that time, I never would have thought that my own experience would eventually lead to doing a PhD. But apparently the recurrent issue in my professional work to give practice-based evidence in many projects, was the trigger to take up this challenge.

From a philosophy of science viewpoint, this research has been an interesting and challenging exercise. My research reflects an ongoing struggle trying to collate different research paradigms into one study, which seems to be quite symbolic for the state of the art in health promotion research. Based on my 25-odd years of personal experience in various food security and health promotion domains, I understood the research aims from a social constructivism perspective. The aim to evaluate effectiveness of an intervention, such as community-based physical activity programs, clearly originated from a positivist research philosophy. I have tried to use methods, which not only suited the academic need to generate scientifically valid and robust data, but which also took into account stakeholders' knowledge, information, and development needs. In doing so, I hope to have made some contribution to professional practice in the field. But, looking back at my numerous field visits, I realise that many stories are left untold, despite the many words in this bulky thesis.

Om al die geweldige mensen te bedanken, waarmee ik gedurende mijn onderzoek heb samengewerkt door het hele land, schakel ik over op het Nederlands. Want ik kan het niet vaak genoeg herhalen: zonder jullie inzet, betrokkenheid, drive en enthousiasme was dit onderzoek niet tot stand gekomen. Dit geldt op de eerste plaats voor alle lieve, enthousiaste, kritische, maar altijd betrokken deelnemers in de beweeggroepen. Dank voor jullie openheid en bereidheid om steeds weer mijn vragen te

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About the author

Marion Herens was born on 3 February 1962 in Maasdijk, the Netherlands, where she grew up. She graduated from the Hugo Grotius High School in Delft in 1980, and acquired her academic degree in Human Nutrition at Wageningen University in 1987. Her main subjects were human nutrition, health promotion, research methods in social sciences, and in communication and innovation studies.

Marion started her professional career in the field of food and nutrition security in the international development cooperation. For more than ten years (1988-1998) she has worked for several national and international organisations in various countries (e.g., SNV and FAO), and has been involved in the formulation, implementation and evaluation of multi-sectoral food and nutrition security programs and projects. In 1998, in the slipstream of the developments in her personal life, Marion moved to stay in the Netherlands, and continued her professional career in the field of health promotion. Her work involved the formulation, implementation and evaluation of lifestyle interventions and health policy at national and municipal level. Facilitating interactive planning processes and providing training courses were an integral part of her work. She worked as a health promotion officer and program manager at the Municipal Health Service in Nijmegen (1999-2005). She also worked as a project coordinator in an educational project on migration and human rights at the Centre for Training and Education at Utrecht University (2005-2006). Thereafter, she worked for nearly ten years as an advisor at the Netherlands Institute for Sports and Physical activity (NISB). To further deepen the knowledge base of that line of work, she recently finalised her PhD research on evaluating community-based physical activity programs targeting socially vulnerable groups (2012-2016).

Her current position of food and nutrition security expert at Wageningen University and Research Centre for Development Innovation (CDI) brings her back to her original field of interest. In this job she is taking up the challenge to integrate her knowledge and research skills in health promotion with food and nutrition security issues worldwide. Her new responsibilities will include program and project advice on linking agriculture and nutrition, research and advice on formulation, implementation, monitoring and evaluation of integrated programs in food and nutrition security, and capacity development and professional training programs in food and nutrition security.

Marion lives in Wageningen, is married, and mother of three young adults. In her spare time, she loves to hang out with friends and family, and to engage in outdoor activities. But she also loves to read, practice improvisation theatre, and enjoy art works.

List of journal publications

Herens M, Wagemakers A, Vaandrager, L, van Ophem J, Koelen M. Contexts, mechanisms and outcomes that matter in Dutch community-based physical activity programs targeting socially vulnerable groups. Accepted for publication by Evaluation & the Health Professions. 2016

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Marion Christine Herens
Wageningen School of Social Sciences (WASS)
Completed Training and Supervision Plan

Wageningen School of Social Sciences

Name of the learning activity	Department/Institute	Year	ECTS*
A) Project related competences			
21st ETC-PHHP Summer School 'Assets for Health'	Glyndwr University Wrexham, UK	2012	8.0
'Evaluation design for a community-based physical activity program for socially disadvantaged groups: the case of Communities on the Move.'	European Association for Sport Management, Aalborg, DK	2012	1.5
19th annual Conference on Multi-Organisational Partnerships. Alliances and Networks (MOPAN) Workshop: 'The Healthy Alliance Framework'	WUR/CDI	2012	0.8
'Evaluatie van de van de aanpak Communities in Beweging: opzet en opbrengsten na 1 jaar'	National Public Health Congress (NCVGZ), Amsterdam	2012	0.8
Workshop: 'Achter de wolken schijnt de zon: op ontdekkingsreis naar hulpbronnen voor kwaliteit van leven.'	National Public Health Congress (NCVGZ), Ede	2013	1.0
'Factoren die zorgen voor duurzaam beweeggedrag bij migrantenvrouwen'	National Public Health Congress (NCVGZ), Rotterdam	2014	0.8
'What predicts WTP for sport and physical activity in socially vulnerable groups?'	National Public Health Congress (NCVGZ), Rotterdam	2015	0.8
Workshop: 'Buurtgerichte beweegprogramma's: veelbelovend voor activeren van sociaal kwetsbare groepen, maar hoe zit het met evaluatie?'	National Public Health Congress (NCVGZ), Rotterdam	2016	0.8
Member of review committee and workshop chair "Assessing effectiveness of Communities on the Move: challenges and preliminary results'	Tafisa International Conference, Netherlands Institute for Sports and Physical Activity (NISB), Enschede	2013	2.4
'Factors for Physical Activity Maintenance in Women of non-Western origin in the Netherlands'	Health Enhancing Physical Activity (HEPA) Conference, Zurich, SW	2014	0.4
'Health-related quality of life, self-efficacy and enjoyment keep the socially vulnerable physically active'	Health Enhancing Physical Activity (HEPA) Conference, Istanbul, TK	2015	1
'Participant views on principles for action in Dutch community-based physical activity programs'	8th European Public Health Conference: Health in Europe, Milan, IT	2015	1

Name of the learning activity	Department/Institute	Year	ECTS*
B) General research related competences			
WASS Introduction Course	WASS, Wageningen	2012	1
Information Literacy and EndNote introduction	Wageningen Library	2012	0.5
Techniques for Writing and Presenting a Scientific Paper	WASS, Wageningen	2012	1.2
Elaboration research proposal	HSO, Wageningen	2012	2
Data management	Wageningen Library	2013	0.4
Qualitative Data Analysis wit Atlas.ti:	WASS, Wageningen	2013	1
Basic Statistics	Sense, Wageningen	2013	1.5
Mixed model analyses quantitative data	Tridata, The Hague	2013	1.5
C) Career related competences/personal development			
Trainer in train-the-trainer course Working in networks (2x)	NISB Wageningen Business School	2012	4
Lecturer in the courses Global Health and Health policy in Action	HSO, Wageningen	2012-2015	4
Student (MsC/BsC) co-supervision en coaching	HSO, Wageningen	2013-2015	
Total			**36.4**

*One credit according to ECTS is on average equivalent to 28 hours of study load

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