



Citizen preferences regarding the public funding of projects promoting a healthy body weight among people with a low income

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ABSTRACT

Overweight and obesity are a growing problem, especially among people with a low income. Policymakers aspire to alleviate this problem by implementing publicly funded projects. This study has three aims: 1) to explore citizen preferences regarding the public funding of projects promoting a healthy body weight among people with a low income, 2) to identify whether such preferences differ between citizens with a low income and those with a higher income, and 3) to identify the reasons underlying these preferences. We conducted a Participatory Value Evaluation (PVE) among 1053 Dutch citizens to achieve these aims. In an online choice experiment, respondents were asked to advise on the implementation of eight different projects that encourage a healthy body weight among citizens with a low income, with a total resource constraint of 100,000 euros. The projects were 1) lifestyle coaching including sports, 2) lifestyle coaching without sports, 3) local sports coach, 4) fruit and vegetable boxes, 5) bariatric surgery, 6) improving the living environment, 7) courses on healthy lifestyles, and 8) sports vouchers. We used the “Multiple Discrete-Continuous Extreme Value” model to estimate the preferences of respondents towards these eight projects. Fruit and vegetable boxes and sports vouchers were the most popular projects, while bariatric surgery was least popular. Respondents with a low income tended to spend less of the budget than respondents with a higher income. Respondent arguments for the choices they made were qualitatively analysed using inductive content analysis. They often mentioned the value judgements ‘importance’, ‘healthiness’ and ‘usefulness’, as well as project costs and efficacy, as reasons for their decisions. Policymakers could use the results to ensure their decisions on the allocation of public funding to projects that encourage a healthy weight among people with a low income are aligned with citizen preferences.

1. Introduction

The number of overweight and obese people is increasing, particularly for people with a low socioeconomic status, who often have a low income (RIVM, 2018; Mackenbach et al., 2008). Projects or activities that promote a physically active and healthy lifestyle could reduce the risk of becoming overweight and developing related chronic diseases, such as diabetes (Bailey et al., 2013; Penedo and Dahn, 2005). However, people with a low income often experience their limited financial resources as a barrier to participating in health-promoting projects (Helminck et al., 2011); therefore, it is crucial that such projects are provided for little to no cost for this segment of the population, for instance by using funding from municipalities or healthcare insurances. To decide which health-promoting projects should be funded, the current body of

literature has largely focussed on their (cost-)effectiveness (Bukman et al., 2017; Lindström et al., 2006; Schutte et al., 2015; Lin et al., 2014; Horodyska et al., 2015; Mulderij et al., 2020; Morgan et al., 2016; Frew et al., 2014); however, to improve public support for the funding of health-promoting projects, it is also particularly important to take into account the preferences of the general public, including people with a low income, since the public eventually pays for the projects through taxes and premiums. Policymakers could use this information to align their decisions on the allocation of public funding with citizen preferences.

To elucidate this topic, our main research question is: what are citizen preferences regarding the public funding of projects that promote a healthy body weight among people with a low income? People with a low income are the proposed beneficiaries of these projects, and may

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hold different views about the projects compared with people with higher incomes (Pfarr and Schmid, 2016; Xesfingi et al., 2016; Herens et al., 2015); thus, our second research question is: to what extent do citizen preferences regarding the public funding of those projects differ between people with different incomes? Finally, to understand which aspects of projects shape citizen motives to prefer some projects over others, our third research question is: why do citizens prefer certain projects that promote a healthy body weight among people with a low income over others?

To answer the research questions, we conducted a Participatory Value Evaluation (PVE). A PVE is a preference elicitation method originally developed for the evaluation of physical infrastructure projects (Mouter et al., 2020; Mouter et al., 2019), but more recently the method has also been deployed for measuring Dutch citizen preferences towards public health policies, such as (the impacts of) relaxation options for lockdown measures imposed during the COVID-19 pandemic (Mouter et al., 2021). The essence of a PVE is that citizens are put in the shoes of a policymaker. In an online environment they see 1) the projects the government is considering, 2) the concrete impacts of the projects from which the government can choose, and 3) the constraint(s) that the government faces (e.g. a limited budget). Subsequently, citizens are asked to provide a recommendation to the government in terms of the projects the government should choose, subject to the constraint(s). Individual preferences over (the impacts of) projects can be determined by feeding these choices into behaviourally informed choice models (Mouter et al., 2021). The obtained preferences can be used to rank government projects in terms of their desirability.

PVEs are closely related to so-called labelled discrete choice experiments (DCEs), in the sense that both preference-elicitation techniques allow individuals to express preferences towards specific projects as well as project impacts. A first fundamental distinction is that participants in a DCE express preferences by selecting a single project, whilst participants in a PVE can select a bundle of projects (Mouter et al., 2021); hence, participants in a PVE can evaluate bundles of projects in relation to each other. A second fundamental distinction is that participants in a PVE express preferences not only towards specific government projects, but also towards the allocation of scarce public resources (Mouter et al.,

2021). PVE participants make 1) a continuous choice regarding the extent to which they think public resources should be allocated, and 2) discrete choices about whether to include specific projects in the bundle they recommend to the policymaker. The main contribution of this study is that it is the first to use a PVE to explore citizen preferences regarding the public funding of projects that promote a healthy body weight among people with a low income, which could inform policymakers when making decisions regarding budget allocation.

2. Methods

2.1. Instrument

The development of the PVE instrument for this study consisted of several steps (Fig. 1).

2.2. Projects, attributes and attribute values in the PVE

Two 1-hour brainstorming sessions were held with health promotion experts ($n = 11$) to create a list of possible projects that promote a healthy body weight among people with a low income. This resulted in a shortlist of 17 projects. To ensure that respondents would not be overburdened with choices, we selected a variety of eight projects to be included in the PVE, based on how often they were mentioned during the brainstorm sessions and based on how unique (i.e. how different from the other projects) they were. For example, we not only selected projects focussing on sports and physical activity (PA), but also those focussing on lifestyle in general or on the environment, including a project outside the health domain. The eight projects we eventually selected were further processed to include all necessary details, such as a description of the project (Table 1) and the project's scores on six attributes (Table 2). This information was mostly based on comparable existing projects (RIVM, 2021). For each project, the values for these attributes were set by the researchers (Appendix 1), as much as possible determined using data from existing projects (RIVM, 2021; Buchwald et al., 2004).

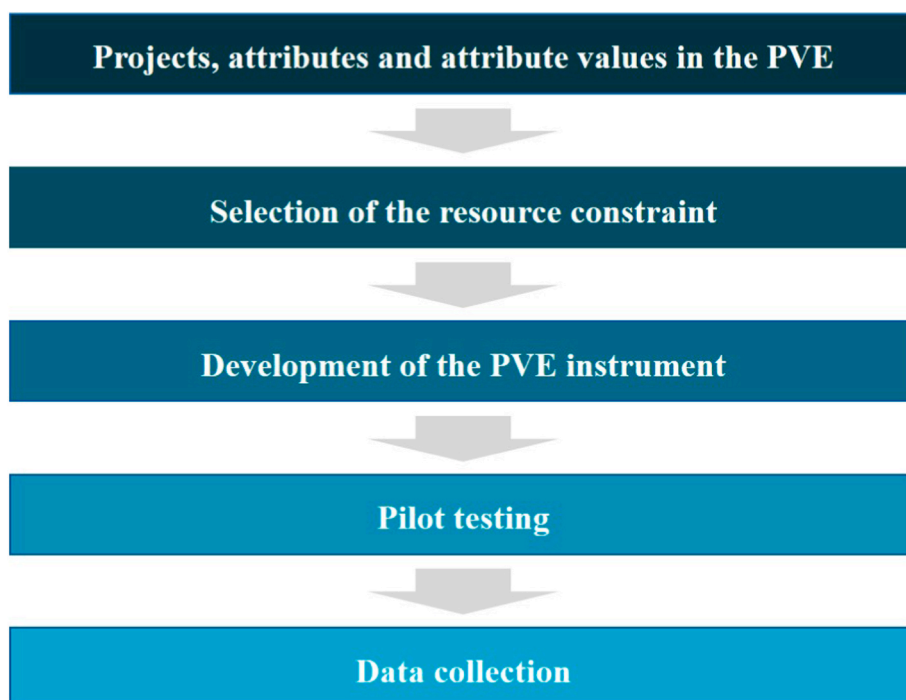


Fig. 1. Steps taken in the development of the PVE instrument.

Table 1
Name and description of the projects included in the PVE.

Project	Description
1: Lifestyle coaching including PA	A free two-year trajectory to improve the health and lifestyle of participants, guided by a lifestyle coach, dietician and sports coach, including sports sessions in a group.
2: Lifestyle coaching without PA	A free two-year trajectory to improve the health and lifestyle of the participants, guided by a lifestyle coach and dietician.
3: Local sports coach	A local sports coach will be appointed for one year in neighbourhoods with a high percentage of people with a low income to provide free activities and personal guidance to increase the PA of these citizens.
4: Fruit and vegetable boxes	A free one-year subscription to weekly fruit and vegetable boxes. Their own contribution is 2.50 euros a week.
5: Bariatric surgery	A free five-year trajectory in which they receive bariatric surgery.
6: Living environment	Municipal budget for one year to improve the public environment of neighbourhoods with a high percentage of people with a low income to make neighbourhoods more attractive for PA outdoors.
7: Courses on healthy lifestyles	Participation in up to four free lifestyle courses a year per participant to help them with improving their lifestyle.
8: Sports vouchers	Free sports vouchers to participate in PA programmes for free or with a discount, or to buy sports clothes (maximum compensation: 225 euros/year).

Table 2
Name and description of the attributes included in the PVE.

Attribute	Description
Reach	Number of participants in a project.
Total costs	All costs of a project; everything that is paid for with money from the municipality and healthcare insurance companies (which mostly comes from taxes and premiums paid by Dutch citizens).
Costs per participant	Costs of the project, displayed per participant.
Expected weight loss	How much weight loss is expected from participants in the year after the start of the project.
Expected self-rated health before start	Score people give to their own health prior to participation in the project, which can have any value between 0 and 10: 0 means the worst health you can imagine, 10 means the best health you can imagine.
Expected self-rated health after start	Score people give to their own health after participation in the project, which can have any value between 0 and 10: 0 means the worst health you can imagine, 10 means the best health you can imagine.
Expected change in self-rated health	Expected increase in self-rated health due to participation in the project. It is also possible that the score does not change.

2.3. Resource constraint of the PVE

We indicated a resource constraint of 100,000 euros in the PVE, which was based on the costs of the projects as indicated in the PVE (Appendix 1). This resource constraint meant respondents were not able to select all projects, ensuring respondents were forced to choose between them.

2.4. PVE instrument in the webtool

The PVE instrument was developed in a webtool (Supplementary data 1). The PVE started with an explanation of the study aim, asking the respondents to sign an informed consent, and requesting some information about their socio-demographic and health characteristics. The respondents then entered the choice task, which began with an explanation (Box 1). In addition, the Dutch poverty lines were provided (Statistics Netherlands, 2020a). Since the PVE was conducted during the COVID-19 pandemic, we indicated in the PVE that the respondents could assume that in all projects, the (locally) applicable COVID-19 measures and guidelines would be taken into account. Subsequently, the eight projects and the corresponding attribute values were introduced. The respondents could use this information to decide which projects they would fund while respecting the resource constraint. They could, if allowed by the resource constraint, select each project more than once.

Different attribute values were provided to the respondents to gain more insight into citizen preferences concerning the different attributes (Appendix 1). Specifically, each participant faced one of 64 versions of the PVE experiment. Each version was composed of the same projects for all respondents, but they differed in terms of their attribute values and individual costs.

We followed an experimental design process aimed at selecting combinations of attribute values and costs for each of the 64 versions, such that the correlation between each attribute and the individual cost of the projects was minimised. A detailed explanation of the experimental design process for this PVE was provided by Mouter et al. (2021), who describe a study in which a similar process was adopted. After the choice task, the respondents were asked to provide a written motivation for their selection of projects, an explanation for not selecting the other projects, and any final remarks.

2.5. Pilot testing

A draft version of the PVE was tested using a convenience sample ($n = 20$). We asked them to fill out the PVE and to provide us with feedback about it, such as whether it was easy or difficult to use the webtool, and whether the text and explanations were understandable. Based on participant feedback, we improved the formulation of the questions, the clarity of the explanatory texts, and the functionality of the webtool.

2.6. Data collection

We asked a survey company, Kantar Public, to draw a randomly selected sample representative of the Dutch adult population in terms of age, gender and education level. In total, 1053 respondents completed the choice task, of whom 295 (35%) had a low income.

3. Data analysis

3.1. Quantitative data analysis

To analyse the choices of the respondents, we used a Kuhn–Tucker-type choice model developed by Bhat (2008), known as the Multiple

Box 1

Aim and resource constraint as provided in the PVE

Imagine that the municipality you live in and the Dutch healthcare insurance companies together have a budget of 100,000 euros to help **people with a low income** to reach and maintain a healthy body weight. This budget comes from taxes and premiums paid by the Dutch citizens. This task contains eight projects that promote a healthy weight, but due to the limited budget, not all projects can be implemented. In this task, you recommend which of the projects you want to be implemented in your municipality. Any leftover budget will be shifted to next year.

Discrete-Continuous Extreme Value (MDCEV) model. This model aims to elicit the preferences of individuals towards the consumption (or expenditure) of a finite number of goods, subject to a budget constraint. In the context of this PVE, the MDCEV model is suitable when individuals are asked to jointly choose 1) whether each project should be funded and whether the budget should be totally consumed (multiple discrete choices), and 2) how many times each project should be funded and how much available budget should not be spent (multiple continuous choices).

We used the MDCEV framework as described in Bhat (2008), which in turn is based on the consumer's problem of microeconomic theory. Under this framework, it is assumed that individuals choose to conduct the projects that maximise their utility. In turn, this utility depends on the (un)observed characteristics of each project, as well as the amount of unspent budget and individual-specific characteristics. The utility function assumed by Bhat's MDCEV incorporates the so-called satiation and translation parameters. The former allows us to capture the extent to which individuals prefer not to add additional quantities of a project, while the latter recognises that individuals may prefer not to advice some projects. Both types of parameters cannot be estimated jointly, thus we selected the so-called γ -profile, in which only the translation parameters are estimated, while the satiation parameters are fixed to zero (Bhat, 2008).

We used the estimated parameters of the MDCEV to assess the preferences for projects using the procedure described by Dekker et al. (2019). This method determines the composition of the bundle of projects that satisfies the available budget and maximises the expected utility of society by enumerating the utility of all feasible combinations of projects. A drawback of this procedure is that, since each project can be selected more than once, the number of possible combinations to evaluate is huge. We therefore established limits for the maximum quantities of each project using the method described by Pinjari and Bhat (2011), which is aimed at determining a point estimate of the optimal quantities and expenditures of the MDCEV models. Since this latter method can deliver non-integer optimal quantities, we decided to use it only as input for the procedure described by Dekker et al. (2019).

3.2. Qualitative data analysis

The qualitative data consisted of respondent motivations for choosing certain projects and reasons for not choosing the other projects. To analyse the project motivations, an inductive content analysis was conducted. Two researchers coded the project motivations for the first 100 respondents using the software programme ATLAS.ti, resulting in 24 codes. Each project motivation was first coded with the corresponding project number (project 1, project 2, etc.), and then with one or more content codes. After discussing these results, one researcher coded the remaining project motivations. A co-occurrence table was then developed to check the occurrence of the different codes for the different projects. Lastly, we divided the codes into subcodes to distinguish the themes within the codes. We also conducted an inductive content analysis of the reasons for not choosing the other projects. One researcher coded the available data for the first 100 respondents and 30 randomly selected respondents, which resulted in data saturation with 19 codes.

4. Results

4.1. Demographic characteristics

The sample included almost the same number of females and males (Table 3). Most respondents were aged between 26 and 65 years old, with the largest group aged between 41 and 64 years old. Furthermore, approximately one third of the respondents had a low education level. Approximately one third of the respondents reported a low net household income (<2000 euros) and the majority of respondents declared

Table 3
Characteristics of respondents.

Characteristic	n (%)
Gender	
Female	525 (49.9%)
Male	528 (50.1%)
Age	
18–25 years	145 (13.9%)
26–40 years	248 (23.8%)
41–65 years	471 (45.2%)
>65 years	179 (17.2%)
No answer	10
Education level*	
Low	322 (30.6%)
Middle	357 (33.9%)
High	374 (35.5%)
Income	
Low (<2000 euros)	295 (35.4%)
Higher (≥2000 euros)	539 (64.6%)
I do not know	27
I prefer not to say	115
No answer	77
Financial situation	
We cannot make ends meet	61 (6.5%)
We can make ends meet	371 (39.7%)
We can easily make ends meet	503 (53.8%)
I prefer not to say	41
No answer	77
Receives municipal benefits	
Yes	81 (8.8%)
No	839 (91.2%)
I do not know	28
I prefer not to say	28
No answer	77
Body Mass Index (BMI)	
<18.5 kg/m ²	48 (5.2%)
18.5–24.9 kg/m ²	420 (45.9%)
25.0–29.9 kg/m ²	288 (31.5%)
≥30.0 kg/m ²	159 (17.4%)
No answer	138
Self-rated health score (EuroQol, 2017)	
1–3	9 (2.5%)
4–7	152 (42.5%)
8–10	197 (55.0%)
No answer	695

* **Low education level:** leaving after primary school, preparatory secondary vocational education, senior secondary vocational education level one, or the first three years of senior general secondary education or pre-university education; **middle education level:** leaving after completing senior general secondary education or pre-university education, or senior secondary vocational education level two, three or four; **high education level:** completed higher professional education or university (Statistics Netherlands, 2020b).

they could (easily) make ends meet. Finally, fewer than 10% of the respondents relied on municipal benefits. The greatest group of respondents (51.1%) had a self-reported BMI of between 18.5 and 25 kg/m², while 48.9% were overweight or obese (BMI > 25 kg/m²). Many respondents (n = 695) did not answer the question concerning self-rated health; of those who answered, the majority rated their health ≥ 8.

4.2. Quantitative results

We estimated two specifications of the MDCEV model. The first specification (henceforth referred to as the aggregate MDCEV model) identified the overall preferences for projects and their impacts by estimating a model only with a constant term for each project, and common taste parameters for each impact that describe how the attractiveness of a project is affected by the attributes. The second specification of the MDCEV model (henceforth, the MDCEV model with

Table 4
Main estimated coefficients of the aggregate MDCEV model.

	Utility function parameters	Satiation/Translation parameters
Project-specific parameters		
Budget shift	0.0000 (fixed)	-0.4789*** (0.1343)
1: Lifestyle coaching including PA	-0.2996* (0.1512)	-0.0405 (0.0970)
2: Lifestyle coaching without PA	-1.0203*** (0.1562)	0.0200 (0.1063)
3: Local sports coach	-0.2226 (0.1558)	0.3462* (0.1391)
4: Fruit and vegetable boxes	-0.1476 (0.1264)	-0.2771*** (0.0801)
5: Bariatric surgery	-2.6307*** (0.3143)	0.2271 (0.1579)
6: Living environment	0.1567 (0.1423)	0.1765 (0.1128)
7: Courses on healthy lifestyles	0.1655 (0.1415)	0.0135 (0.1060)
8: Sports vouchers	0.5030*** (0.1370)	0.0346 (0.1018)
Taste parameters		
Weight loss	0.0208*** (0.0049)	
Self-rated health increase	0.4381*** (0.0762)	
Scale		
Scale parameter	1.2033*** (0.0264)	
Observations	1053	
Log-likelihood	-7185.7227	
Akaike Information Criterion (AIC)	14329.4454	
Bayesian Information Criterion (BIC)	14225.2980	

Note: Standard errors in parentheses. Significance codes: ***p < 0.001; **p < 0.01; *p < 0.05.

income effect) incorporated the additional effect of being part of the low-income group on the preferences for each project. For both specifications, we estimated different forms of the MDCEV model (see Bhat (2008) for more details about these different forms). We reported the form with the best model fit (in terms of log-likelihood), also reporting the estimates of the so-called corner solution parameters described in the methodology section, but we do not focus on describing their implications as they do not affect the aims of this study.

4.2.1. Aggregate MDCEV model

Four out of eight project-specific constants were statistically significant at the 95% confidence level (Table 4). The magnitude of these constants represents the extent to which funding the project (i.e. allocating budget to the first unit of a project) increases the utility for the respondent, regardless of the attribute values included in the PVE experiment (i.e. weight loss and self-rated health increase). Thus, a higher-value constant implies that the associated project is more attractive without considering the level of weight loss and self-rated health increase, and vice versa for smaller values. For example,

irrespective of the attributes, respondents were more willing to allocate budget to providing sports vouchers, whereas bariatric surgery was the least attractive option.

All taste parameters were statistically significant (Table 4); thus, an attribute can be preferred (positive taste parameter) or avoided (negative taste parameter) by the respondents. Taste parameters can be compared with each other in terms of their magnitude by computing marginal rates of substitution (MRS) as the ratio between two taste parameters (Dekker et al., 2019). The MRS reflects the degree of substitution between two attributes of a project that keeps a respondent indifferent. In this case, the MRS between the two attributes indicated that respondents are willing to exchange 0.47 points of self-rated health (on a 10-point scale) for 1 kg of weight loss, or 1.56 kg of weight loss for a one-point increase in self-rated health.

Finally, the value of the estimated taste parameters reflects the extent to which attribute values should increase to ensure that a specific project is socially desirable. For example, the utility losses derived from the negative project-specific constant of bariatric surgery can be outweighed either by a self-rated health increase of 60%, by 126 kg of

Table 5

Top five optimal bundles of projects. The numbers indicate the frequency of the chosen projects in each bundle, within a budget limit of 100,000 euros.

	1 st bundle	2 nd bundle	3 rd bundle	4 th bundle	5 th bundle
1: Lifestyle coaching including PA	1	0	1	0	0
2: Lifestyle coaching without PA	0	0	0	0	1
3: Local sports coach	0	0	0	0	0
4: Fruit and vegetable boxes	2	3	1	2	2
5: Bariatric surgery	0	0	0	0	0
6: Living environment	0	0	0	0	0
7: Courses on healthy lifestyles	0	0	0	0	0
8: Sports vouchers	1	1	1	1	1
Bundle cost (euros)	85,510	66,010	77,250	57,740	77,800

Table 6
MDCEV results considering differences between respondents with low and higher incomes.

	<i>Project-specific constants</i>	<i>Income effect</i>	<i>Taste parameters</i>	<i>Satiation/Translation parameters</i>
Budget shift	0.0000			-0.5200*** (0.1467)
1: Lifestyle coaching including PA	-0.1044 (0.1743)	-0.4822** (0.1779)		-0.0025 (0.1087)
2: Lifestyle coaching without PA	-0.8045*** (0.1801)	-0.4624* (0.1968)		0.0515 (0.1176)
3: Local sports coach	0.0040 (0.1819)	-0.4400* (0.2164)		0.3610* (0.1535)
4: Fruit and vegetable boxes	-0.0793 (0.1474)	-0.2158 (0.1543)		-0.2284* (0.0891)
5: Bariatric surgery	-2.3299*** (0.3500)	-0.3962 (0.2600)		0.2615 (0.1739)
6: Living environment	0.3494* (0.1657)	-0.4990** (0.1930)		0.2037 (0.1266)
7: Courses on healthy lifestyles	0.3025 (0.1645)	-0.2924 (0.1852)		0.0318 (0.1175)
8: Sports vouchers	0.5974*** (0.1601)	-0.2448 (0.1744)		0.0917 (0.1152)
Scale parameter	1.1790*** (0.0287)			
Weight loss			0.0195*** (0.0053)	
Self-rated health increase			0.4607*** (0.0837)	
Observations	834			
Log-likelihood	-5699.9192			
AIC	11341.8385			
BIC	11204.7777			

Note: Standard errors in parentheses. Significance codes: ***p < 0.001; **p < 0.01; *p < 0.05.

weight loss, or a combination of both.

4.2.2. Optimal bundles of projects for the aggregate MDCEV model

The maximum consumption estimated with the procedure of Pinjari and Bhat (2011) is around 2.5 units. Thus, we defined a limit of three units of each project to compute the optimal bundles using the procedure described by Dekker et al. (2019), and determined the five best

bundles of projects that satisfy the limit of 100,000 euros (Table 5). The fruit and vegetable boxes appeared in all bundles, with a range of between one and three units per bundle. The sports vouchers also appeared in all bundles, with five single appearances. The other projects included in the optimal bundles were lifestyle coaching with and without PA. The costs of each project bundle were below the budget limit of 100,000 euros, with the optimal bundle costing 85,510 euros.

Table 7

Top five optimal bundles of projects for respondents with low and higher incomes. The numbers indicating the frequency of the chosen projects in each bundle, within a budget limit of 100,000 euros.

	<i>Low income</i>				
	<i>1st bundle</i>	<i>2nd bundle</i>	<i>3rd bundle</i>	<i>4th bundle</i>	<i>5th bundle</i>
1: Lifestyle coaching including PA	0	0	1	1	0
2: Lifestyle coaching without PA	0	0	0	0	1
3: Local sports coach	0	0	0	0	0
4: Fruit and vegetable boxes	3	2	2	1	2
5: Bariatric surgery	0	0	0	0	0
6: Living environment	0	0	0	0	0
7: Courses on healthy lifestyles	0	0	0	0	0
8: Sports vouchers	1	1	1	1	1
Bundle costs (euros)	66,540	58,280	86,300	78,040	78,310
	<i>Higher income</i>				
	<i>1st bundle</i>	<i>2nd bundle</i>	<i>3rd bundle</i>	<i>4th bundle</i>	<i>5th bundle</i>
1: Lifestyle coaching including PA	1	1	0	1	0
2: Lifestyle coaching without PA	0	0	0	0	1
3: Local sports coach	0	0	0	0	0
4: Fruit and vegetable boxes	2	1	3	1	2
5: Bariatric surgery	0	0	0	0	0
6: Living environment	0	0	0	0	0
7: Courses on healthy lifestyles	0	0	0	0	0
8: Sports vouchers	1	1	1	1	1
Bundle costs (euros)	86,300	78,040	66,540	94,570	78,310

Table 8

Frequencies of the 24 project motivation codes, displayed for each project, for all respondents together.

Code	Description of the code	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8
Accessibility	Accessibility of a healthy lifestyle, such as (removing) barriers	3	24	17	20	0	6	4	49
Awareness and learning	Learning and creating awareness about a healthy lifestyle	38	43	7	43	1	4	148	3
PVE budget	The available budget in the PVE	3	9	4	12	1	7	2	3
Coaching	Coaching on living a healthy lifestyle: advice, support, etc.	156	69	57	4	1	7	13	10
Costs and income	Costs of sports and nutrition, income of the participants, etc.	19	20	12	174	5	16	25	148
Do it yourself	Participants have to do it [healthy lifestyle] themselves	4	5	4	2	1	2	5	2
Effects	Effects of the projects: weight loss, self-rated health, etc.	62	49	28	61	44	34	42	47
Emergency solution	Last resort for a healthy weight	0	0	0	1	30	0	0	0
First steps	First step or basis of a healthy lifestyle	12	5	5	31	2	1	17	1
Free choice	Participants have freedom of choice for healthy activities	3	3	2	0	1	0	5	11
Health	Overweight, obesity, mental health, staying healthy, etc.	15	6	2	19	7	30	11	16
Lifestyle	Way of living, becoming more physically active/healthier, etc.	67	64	10	25	1	25	106	17
Living environment	The environment in which people live	1	2	18	1	0	132	1	2
Long term	Sustainability of the effects of health behaviour	30	24	16	13	6	10	19	10
Motivation and stimulation	Motivation, stimulation, discouragement, mindset, etc.	70	35	61	48	6	54	27	72
Nutrition	Diet of participants, healthy and unhealthy products, etc.	24	24	4	356	9	11	45	7
Other/unclear	Vague/unclear motivations	10	6	4	7	6	10	8	2
Personal situation	Respondents argue from their own situation	16	17	4	22	9	10	6	16
Practicality of project	How easy/difficult a project is to conduct	0	0	1	4	1	0	0	0
Project duration	How long a project will last	8	6	0	0	0	4	2	0
Reach	How many people can participate or can be reached	13	14	50	25	5	68	27	31
Social aspect	The social aspect of the project, such as meeting new people	21	7	76	2	0	14	7	10
Sports and PA	Inclusion of sports and PA	158	81	76	11	5	48	18	221
Value judgement	How respondents value the project: healthy, good, etc.	86	44	36	218	20	69	64	80
Total number of codes	Total number of codes per project	819	557	494	1099	161	562	602	758

4.2.3. The income effect

To consider differences between respondents with different incomes, we incorporated an indicator variable (the “income effect”) for each respondent that was equal to one if they had a low income, or zero otherwise (Table 6). If an income effect is statistically significant, it means that respondents with a low income have a different preference for this particular project than respondents with a higher income. Negative statistically significant income effects imply that respondents with a low income are less likely to prefer this particular project than respondents with a higher income, and vice versa in case of a positive sign. Four projects had a significant negative income effect, namely lifestyle coaching with and without PA, the local sports coach, and the living environment.

4.2.4. Income differences in the optimal bundles of projects

We observed three slight differences between the two income groups in terms of the quantities of projects appearing in the optimal bundles (Table 7). First, respondents with a low income preferred more units of the fruit and vegetable box project to be funded than respondents with a higher income in the first two bundles. Second, respondents with a low income preferred lifestyle coaching including PA in the third and fourth bundle, while respondents with a higher income preferred this project in the first two bundles and the fourth bundle. In terms of bundle costs, respondents with a higher income were generally more inclined to spend a higher share of the budget than respondents with a low income.

4.3. Qualitative results

The project motivations of 826 respondents were coded; the other 227 respondents did not provide any project motivations. The respondents indicated the ‘importance’, ‘helpfulness’ and ‘usefulness’ of each project for promoting a healthy body weight among participants. Respondents rarely considered the ‘practicality of the project’ or ‘project duration’. We discuss the most frequently mentioned project motivation codes for each project (Table 8), followed by the most important reasons for not selecting particular projects. We did not observe substantial differences in code occurrence between respondents with low or higher incomes, except for three observations: 1) for all projects, the percentage of respondents providing a value judgement was slightly higher for respondents with a higher income, 2) for projects where ‘costs’ were often mentioned (project 4 and 8), the percentage of respondents providing a motivation concerning costs was slightly higher for respondents with a low income (25.4% versus 15.2% respectively 23.7% versus 19.1%), and 3) for project 5, the percentage of respondents indicating something about ‘motivation and stimulation’ was higher for respondents with a low income (20.0% versus 2.1%).

4.3.1. Project 1: lifestyle coaching including PA

A myriad of the respondents who selected project 1 stressed the importance of a lifestyle coach to motivate participants to be physically active: ‘PA is important at every age. Coaching motivates and probably has better results than independent PA’ (respondent [r.] 529). Some respondents indicated that project 1 seems more effective than project 2 because of the addition of sports. Respondents also stressed that the

coach could improve participants' diets and lifestyles in addition to promoting PA: *'This seems helpful to support people in the beginning. A lifestyle coach can also inform about healthy nutrition. This often also results in extra motivation'* (r. 720).

4.3.2. Project 2: lifestyle coaching without PA

Several respondents chose project 2 over project 1 because not all people are able to participate in sports activities: *'Not everyone wants or has time to do sports. That's what this coach is for, to show that one can live healthily without sports (find other ways to do PA)'* (r. 434). The main reasons for choosing this project were guidance by the lifestyle coach to improve participants' lifestyles and the project's impact on weight and self-rated health: *'[This project has] quite a large reach [and results in] highly increased self-rated health and a few kilograms of weight loss'* (r. 672). A few respondents chose this project because they themselves *'hate sports'*. Some respondents indicated that this project could be nicely combined with project 3.

4.3.3. Project 3: local sports coach

Respondents indicated that the most important part of this project is the social aspect: *'Doing sports with your neighbours is convivial. People who know each other better motivate each other'* (r. 227). Besides this mutual participant motivation, the local sports coach also stimulates citizens: *'I think this is a positive way to improve your health. Moreover, it brings people together and a coach can make people enthusiastic and motivated'* (r. 566). The reach of the project was perceived to be high, since the whole neighbourhood could participate, including children: *'This project reaches many people. It involves the whole neighbourhood and potentially also family members'* (r. 1037).

4.3.4. Project 4: fruit and vegetable boxes

Respondents who selected this project often indicated that fruit and vegetable boxes are *'tasty', 'healthy' or 'good'*. Respondents also perceived fruit and vegetables as expensive, which makes them inaccessible for people with low incomes: *'A healthy choice, because fruits and vegetables are not cheap'* (r. 65). According to respondents, the positive effects of fruit and vegetable boxes are the impact on health, body weight and vitamin intake; the fact that the boxes reach households including children; and that fruit and vegetable boxes may motivate participants to continue healthy eating after the project has ended: *'If fruits and vegetables are more accessible (e.g., cheaper), then people are more likely to eat them more often. When people get used to this, they will include them in their diet permanently'* (r. 131).

4.3.5. Project 5: bariatric surgery

Bariatric surgery was seen as an *'emergency solution'* that is highly effective to lose lots of body weight quickly: *'This is for many people who have tried everything. Eventually it is the only solution to actually lose weight permanently'* (r. 227). Additionally, respondents indicated that surgeries are sometimes *'necessary'* for obese citizens to lose body weight and to be able to become physically active. A few respondents, who had bariatric surgery themselves or knew people who have had this surgery, mentioned the positive impact on body weight: *'I learned from people around me that this is the only way to permanently stop being overweight or obese'* (r. 302). Lastly, some respondents chose this project because they themselves would like to get bariatric surgery to lose some body weight: *'Seems to be the only solution for me'* (r. 328).

4.3.6. Project 6: living environment

Many respondents stressed the importance and healthiness of improving the living environment, since it influences both mental and physical health: *'A good living environment stimulates people to live healthier. It is also good for mental health (which in turn influences physical health)'* (r. 854). Furthermore, respondents chose this project because it reaches many citizens, not only people with low incomes, and because they believe citizens will engage more in sports and PA when their living

environment improves: *'An attractive and safe environment encourages people to go outside and have a walk, or to go cycling instead of taking the car'* (r. 866). Respondents indicated that this is not only the case for adults, but also for children: *'By building playgrounds, basketball courts or football fields, you encourage children and adolescents to be physically active'* (r. 281). Lastly, this project was seen as an investment in the future, since the changes and improvements would last for many years.

4.3.7. Project 7: courses on healthy lifestyles

The most frequently mentioned reason why respondents chose this project was to create awareness, knowledge and insights among participants about healthy lifestyles: *'Many people do not know what a healthy lifestyle entails. Such a course could provide insights'* (r. 929). Suggested topics for such courses were mostly *'lifestyle'* and *'nutrition'*, particularly when combined with project 5, and rarely *'sports and PA'*. Respondents also mentioned the impact of the project on body weight, self-rated health and lifestyle in general, but some respondents did not expect a major effect on participants' lifestyles: *'I expect that this will not be very effective because it does not target the most important factor: motivation. How do you get people to participate in courses? Nevertheless, I would schedule one course and evaluate the turn-out'* (r. 108).

4.3.8. Project 8: sports vouchers

Sports, and going to a gym in particular, were perceived to be expensive for people with low incomes: *'A low income makes it hard or impossible to pay for a subscription, to buy clothes, and to pay for membership'* (r. 669). This project makes sports and PA accessible for these citizens: *'Some people see their friends play at a sports club and would like to participate themselves, but do not have enough money. These people do not need motivation; they need financial support like these sports vouchers'* (r. 403). Respondents also stated it is *'healthy'* and *'important'* that everyone gets the opportunity to be physically active, and that sports vouchers could motivate citizens to increase their PA: *'When your income is low, you do not have money left over to spend on sports. This [project] encourages people to exercise more and makes it financially possible'* (r. 164).

4.3.9. Reasons for not choosing projects

The main reasons given for not choosing certain projects were the high costs, limited reach and lack of effectiveness: *'I had to make a trade-off between projects. I chose projects that seemed most effective to me'* (r. 815). Furthermore, the project choices were influenced by the overall PVE budget (100,000 euros) and by personal preferences: *'I thought many projects were important, but with this budget I had to choose, so I chose the two projects that would make me the happiest'* (r. 31). Specifically, project 5 was perceived as risky and insufficient, with a low reach: *'Some projects (like project 5) do not solve the problem; the cause is not addressed'* (r. 37).

4.3.10. Respondents' opinions about the study

Respondents thought it was interesting to participate in the study and liked being part of the study: *'Interesting survey concerning a good and important topic'* (r. 218). They also hoped the results would be used in policymaking and stressed the importance of this: *'I think it is a good project and I hope it will be realised'* (r. 184).

5. Discussion

This study aimed to explore citizen preferences regarding the public funding of projects that promote a healthy body weight among people with a low income. The most attractive project was the sports vouchers, while the least attractive projects were bariatric surgery and lifestyle coaching without PA. The optimal combination of projects within the budget constraint contained one round of lifestyle coaching including PA, two rounds of fruit and vegetable boxes, and one round of sports vouchers.

The fruit and vegetable boxes and the sports vouchers were included

in all optimal bundles, indicating that these were the most preferred projects, mostly because making a healthy lifestyle cheaper or free was considered to improve its accessibility for people with a low income. The appearance of these two projects in all optimal bundles (i.e. the general optimal bundles and the optimal bundles for respondents with a low and a higher income separately) might imply that these project are in some way *unanimously* preferred, regardless of income. In a study in which health promotion experts unravelled the effective elements of PA initiatives for people with a low socioeconomic status, improving accessibility was identified as an important effective element (Mulderij et al., 2020). Although the projects concerning lifestyle coaching with or without PA appear in three of the five optimal bundles, it is interesting to see that respondents' intrinsic preference for most projects with some form of coaching was relatively low, despite three of the effective elements in a previous study focussing on coaching (Mulderij et al., 2020). This could be explained by the higher project costs per participant. It also appeared from our PVE that respondents valued change in self-rated health more than change in body weight. A reason could be the broader definition of self-rated health compared with body weight, but future research is needed to explain this observation.

In previous Willingness-to-Pay (WTP) studies that aimed to identify how much citizens are willing to pay for certain projects with their private money, people with lower incomes had a lower WTP (Herens et al., 2015; Romé et al., 2010). We therefore explored whether preferences differed between citizens with different incomes. We observed that respondents with a low income were less likely to choose four of the projects than people with a higher income: adaptation of the living environment, lifestyle coaching with and without PA, and the local sports coach. We did not observe differences for the other four projects; however, our results suggest that a difference exists between what citizens with a higher income prefer to be funded for people with a low income, and what citizens with a low income would like to see funded for themselves. Paternalistic altruism, meaning that citizens care about the use of resources regardless of the value of these resources to the users, could explain these results (Jacobsson et al., 2007; McConnell, 1997). Citizens with a high income might advise the government to allocate public budget toward funding a lifestyle coach for people with a low income because they think that the coach might positively affect their health, although people with a low income may not want such a coach to interfere in their lives. Future research may be needed to further identify this phenomenon in terms of projects that promote a healthy body weight among people with a low income. Moreover, a normative question concerns the extent to which policymakers should weigh the preferences of people who are affected by the policies (those with a low income) and those who are not affected (higher incomes) in their decisions.

Overall, respondents with a low income tended to spend less of the available budget than respondents with a higher income, which means that they shifted more money to next year. Although we focussed on a public budget from the municipality and a healthcare insurance company in this study, the observed difference aligns with findings from the previous WTP studies (Herens et al., 2015; Romé et al., 2010). It therefore seems that having a low income not only influences citizens' WTP with private money, but also their willingness to allocate the public budget; however, this contrasts with the results of Pfarr and Schmid (2016), who observed that citizens benefiting from public coverage had a higher WTP.

Lastly, we aimed to identify the reasons for citizens' preferences, which for most projects contained a value judgement, such as importance, healthiness or usefulness. Other project motivations were related to project costs and their effects in terms of motivating participants to improve their lifestyle, weight loss and self-rated health. Few meaningful differences were found between respondents with a low income and respondents with a higher income.

This is the first study to explore citizen preferences regarding the public funding of projects that promote a healthy body weight among

people with a low income; however, previous studies explored citizen preferences for the spending of public resources regarding healthcare insurance (e.g. social health insurance, and public spending on or public funding of healthcare) using DCE, surveys, and a Citizen Forum (Pfarr and Schmid, 2016; Xesfingi et al., 2016; Bijlmakers et al., 2020). More recently a PVE was used to examine citizen preferences for lockdown measures against the spread of COVID-19 (Mouter et al., 2021). These studies, including our own, stress the importance and usefulness of citizen participation and opinions in decision-making processes regarding public budgets. Based on our results, it appears that citizens prefer projects that improve the accessibility of healthy lifestyles, such as sports vouchers or fruit and vegetable boxes, over projects that focus on coaching. Such projects are often not limited to the field of public health policy, so policymakers inside and outside the health domain could use these results to guide their decisions on budget distributions to promote a healthy body weight among people with a low income.

5.1. Strengths and limitations

To date, PVEs have been used for studies related to infrastructure (Mouter et al., 2020), municipal energy projects (Spruit et al., 2020; Mouter et al., 2021) and COVID-19 (Mouter et al., 2021). Our study shows that a PVE appears to be a useful instrument to provide insights into citizen preferences for the health domain as well. We were able to map citizen preferences from a large sample that reflected Dutch society with regard to gender, age and education level. Projects for people with low incomes are often funded by public money, and although public budgets usually consist of taxes and premiums paid for by citizens, these citizens often do not have a say in how these budgets are spent. Therefore, an important strength of our study is that it gives citizens a voice in the allocation of public money. A PVE puts citizens into the shoes of policymakers, making this a more realistic representation of decision making than a DCE (Mouter et al., 2019). Additionally, respondents can compare bundles of projects instead of two single projects at a time, as they would in a DCE. Studies like this one could inform policymakers about the views or opinions of citizens to improve the correlation between citizen preferences and the actual allocation of public budgets to health-promoting projects.

However, our study also has some limitations. First, the generalisability of this study is limited, since it was only conducted in the Netherlands. The results might differ when conducting the study in other countries due to differences in, for example, culture or economic position. Second, respondents could only choose from eight projects. Although we aimed to include a variety of projects, respondents might have preferred projects that were not included in the PVE. Furthermore, our selection of projects was based on the input of health promotion experts. Other projects may have been suggested and included if the brainstorm session included citizens.

6. Conclusions

We conducted the first PVE to identify citizen preferences for the allocation of a public budget regarding projects that promote a healthy weight among people with a low income. Our results indicate that projects that improve the accessibility of a healthy lifestyle, such as sports vouchers and fruit and vegetable boxes, are most preferred, while bariatric surgery or projects that include coaching were less preferred. Citizens with a low income tended to spend less of the available budget than citizens with a higher income. Policymakers could use this information to align their public health policies with citizens' opinions, and with the needs and desires of the target population, which would improve public support for projects that encourage a healthy weight among people with a low income.

Declaration of competing interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2021.114015>.

Ethical considerations

The study was approved by the Social Sciences Ethics Committee of Wageningen University & Research.

Author statement

Lisanne: Conceptualization; Methodology; Data curation; Formal analysis; Investigation; Visualization; Writing – original draft; Writing – review & editing. Ignacio: Methodology; Data curation; Formal analysis; Visualization; Writing – original draft; Writing – review & editing. Niek: Conceptualization; Methodology; Supervision; Writing – review & editing. Kirsten: Conceptualization; Formal analysis; Supervision; Writing – review & editing. Annemarie: Conceptualization; Formal analysis; Supervision; Writing – review & editing.

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