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UNIVERSITEIT TWENTE.

School of Management and Governance

Health Technology and Services Research (HTSR)

Health Sciences (HS)

Conjoint analysis of community-based childhood obesity prevention

People's preferences regarding the outcomes of obesity prevention programs and their willingness to pay for a change in the outcomes.

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August 2012

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Michael Ilgun (s0176656)

University of Twente
Health Technology and Services Research (HTSR)
Enschede, August 2012

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Summary

INTRODUCTION: In current evaluations of obesity prevention programs for children the effectiveness of the program is mainly based on weight loss. Sustainability of effects after the program, however, co-depends on individual's continuous adherence to healthy eating habits and exercise behaviors. This adherence is not only determined by weight loss but is also co-determined by, for example, social factors and psychological factors. It is also important to consider costs incurred by households because community-based prevention programs typically rely upon their participation. Because the own contribution may influence the motivation for participation and continuation of the desired behavior, it may also affect the reach and sustainability of program effects.

OBJECTIVE: The primary aim of this research was to identify what outcome measures capture people's preferences in youth obesity prevention and how much people were willing to pay for a change in an outcome measure. In this research it was investigated which outcome measures, beyond weight loss, were relevant to children and their parents. In the process a conjoint analysis was conducted. Data of approximately 150 households were collected for analysis.

METHODS: Data was collected through a discrete choice experiment among parents and children living in the municipalities Cuijk and Rijnwaarden in the Netherlands. A d-efficient design with a balanced overlap was developed. Twenty random and two fixed choice-tasks (for consistency purposes) were used. To improve the statistical strength of the questionnaire, four different versions of the questionnaire were developed in which the levels of the outcome measures (attributes) varied. Using the results of an extensive literature search conducted in 2011 on outcome measures related with overweight the following attributes were included in the questionnaire: weight, mental wellbeing, social wellbeing, lifestyle, and monthly household costs. Dummy coding was used for the levels of the attributes. The conditional logit model was used for the analysis, which was performed in SPSS with a Cox regression analysis.

RESULTS: One hundred thirty respondents completed the questionnaire, from which 126 (97%) passed the consistency test. All the levels, with the exception of the cost attribute levels, had the expected sign and were significant at the 5% level. Most preferred outcome measure was weight, followed by mental wellbeing, lifestyle, and social wellbeing. Coefficient of the cost level €20 was positive rather than negative as expected, suggesting that respondents were willing to pay more for less desirable outcomes compared to the coefficient of the reference cost level €10 (€143 for a loss of one utility). Reexamination of the data indicated that respondents were most likely cost insensitive up to and including the cost level €20. Ignoring this problem and calculating the cost coefficient using the cost levels €10 and €30 coefficients as reference levels, resulted in respondents willing to pay: €950 for a change from 'obese' to 'normal weight' (€706+€244),€724 for a change from 'worse than average' mental wellbeing to 'better than average' mental wellbeing (€627+€97), €487 for a change from 'worse than average' social wellbeing to 'better than average' social wellbeing (€428+€59), and €552 for a change from 'unhealthy lifestyle' to 'healthy lifestyle'.

CONCLUSION: Children and their parents value the level of weight as the most preferred outcome, followed by mental wellbeing, lifestyle, and social wellbeing. Willingness to Pay for a change in an outcome is much more than €30 for respondents with a household income close to or above the national average household income of €33,000.

Content

Introduction

Overweight and obesity are the fifth leading risk for global deaths. In 2010, more than 40 million children under five were overweight. Childhood obesity is associated with a higher chance of obesity, premature death and disability in adulthood. But in addition to increased future risks, obese children experience breathing difficulties, increased risk of fractures, hypertension, early markers of cardiovascular disease, insulin resistance and psychological effects. The good news, however, is that overweight and obesity, as well as their related noncommunicable diseases, are largely preventable. Supportive environments and communities are fundamental in shaping people's choices, making the healthier choice of foods and regular physical activity the easiest choice, and therefore preventing obesity (1).

In this research, therefore, the focus will be on obesity prevention programs for children and the evaluation of such programs. In this chapter several aspects of the overweight and obesity topics will be portrayed before moving on to the more in depth narrative about obesity prevention programs for children. This will lead to the rationale for this research as well as its objective. This research is conducted in the Netherlands at the University of Twente.

Overweight and health consequences

When the human body accumulates fat in abnormal or excessive amounts which can lead to health impairments, this is regarded as either overweight or obesity. The difference between the two classifications is derived from a measure called Body Mass Index (BMI). The BMI is calculated by dividing the person's weight (kilograms) by the square of the person's height (meters). According to the World Health Organization (1) a person has overweight when the BMI score is greater than or equal to 25 and a person is obese when the BMI score is greater than or equal to 30. BMI is used in national and worldwide population-levels to determine the prevalence of overweight and obesity for both genders and for all ages of adults. It should however not be used as conclusive measure but rather as a guide, because a measure of the degree of fatness in one individual may differ or not correspond to the same degree of fatness in other individuals (1).

The fore mentioned BMI limits do not apply for children (<18 years). The classification of body weight for children depends on both the age and the gender of the individual. The limit values have been set by the International Task Force (2, 3). Table 1 shows the age and gender specific BMI values for children as reported by the Quality Institute for Healthcare (CBO) in the Netherlands (4).

Overweight and obesity are associated with many diseases. The higher the BMI value, the greater the risk becomes of getting a disease or disorder (5). Overweight is the most important risk factor for type 2 diabetes and also leads to an increased risk for developing cardiovascular diseases and certain types of cancer (5). A recent study revealed that in one of seven patients with cardiovascular diseases in the Netherlands, the cardiac mal condition can be attributed to overweight (6). Overweight also causes disorders that impair movement, lead to difficulty in breathing and cause infertility (7).

Overweight and obesity also have a negative impact on psychological and social wellbeing. People with overweight have a greater risk of developing psychological problems, being stigmatized or being discriminated against (8). Next to this obese people experience more anxiety disorders or depressions, but it is not clear whether overweight is the cause or consequence in this case.

Overweight among people with a depression could for example be the consequence of weight increasing effects of antidepressants (9).

Age	Boys		Girls	
	Overweight	Obese	Overweight	Obese
2	18,41	20,09	18,02	19,81
3	17,89	19,57	17,56	19,36
4	17,55	19,29	17,28	19,15
5	17,42	19,30	17,15	19,17
6	17,55	19,78	17,34	19,65
7	17,92	20,63	17,75	20,51
8	18,44	21,60	18,35	21,57
9	19,10	22,77	19,07	22,81
10	19,84	24,00	19,86	24,11
11	20,55	25,10	20,74	25,42
12	21,22	26,02	21,68	26,67
13	21,91	26,84	22,58	27,76
14	22,62	27,63	23,34	28,57
15	23,29	28,30	23,94	29,11
16	23,90	28,88	24,37	29,43
17	24,46	29,41	24,70	29,69

Table 1: BMI cut-off values for children.

Overweight and (especially) obesity also influence the length of life and the quality of life. Obese people have a lower life expectancy and spend more years in significantly compromised health because chronic diseases and physical disabilities occur earlier than in people with no or little overweight (10). Not only do overweight and obesity have negative physical, psychological and social consequences for the individual, they also have an impact on society as a whole. Economical consequences are considerably high and therefore also play a significant role in decision making. The amount of years lived in poor health (lived with diseases and disorders) as a consequence of overweight lead to an increase in costs to society. Costs associated with this aspect are costs that arise due to disability and sick leave and costs made in the healthcare system (11).

Health consequences for children

Overweight and obesity among children deserves extra attention because of the severe impact on health during their adolescence and the increased negative effect on health in their adulthood. Children who have (severe) overweight have a greater risk of developing health care related problems, while they are young as well as they get older. They have a great risk of developing glucose intolerance and type 2 diabetes. The risk of developing cardiovascular diseases also increases as they get older. The consequences for health are even greater when the individual was overweight when he or she was young. Some studies indicate that the time period of being overweight or obese plays an important role in developing for example type 2 diabetes (12).

Children who's appearance clearly shows indications of overweight or obesity are often confronted with being stigmatized, especially young girls (13). This could lead to lower self-esteem and psychological and social problems that are associated with a low self-esteem, such as loneliness, sadness and tension (14). Obese children are less content with themselves and relatively often have thoughts on suicide (15). It is however again unsure whether overweight is a cause or consequence in

this case. It could be that because of feeling sad the child tends to eat more, thus overweight being a consequence and not a cause (16).

Causes of overweight

Overweight and obesity are caused by a disturbance in the energy balance. The energy balance is considered to be balanced when the body uses up as much energy by physical activity as it absorbs energy from food (17). There are several factors that have an influence on the energy balance. The most important factors are the following:

- Consuming high doses of energy through food. Food with a high energy density (rich in fat or sugar and low on fibers), drinks containing sugar and consuming large portions increase the amount of energy the body absorbs (18).
- Insufficient physical activity. This factor plays a significant role depending on the amount of energy a person consumes.
- Psychological factors and emotions. Psychological factors concern the characteristics of the personality or the opinions of others on someone's behavior and the consequences this may have. Emotions play an important role in food consumption. There are people that allow mood swings to strongly influence their eating habits, some consume more food to feel better or happier where others eat less to reach this condition (16). Others are simply influenced by the presence of food. The continuous availability of food makes it very difficult for people with this disorder to control their own eating habits (19).
- Social and physical environment. There are several social factors that directly influence the behavior of the individual. The opinions of friends and family influence the eating habits and the amount of physical activity, trying to correct it in a way more fitting the 'social standard'. Social support is also crucial to promote this behavior. When promoting more physical activity in the population of children, it is considered extremely important that the parents support their child. Next to supporting the child, the parent also has someone to do some exercises with (20, 21). Several studies on the environment and the association with overweight have shown that the prevalence of overweight increases in societies that promote more food consumption and less physical activity. Adjustments in those environments could lead to healthier eating habits. Such adjustments could be smaller portion sizes, lower prices for healthy food and a greater variety of products (22-24).

Prevalence and trends of overweight

Almost half of the Dutch population of adults (> 21 years) and approximately 14% of the Dutch population of children (2-21 years) is overweight or obese. Table 2 shows the distribution of gender compared to the classification of overweight, for both adults and children. The numbers are based on the BMI scores for adults and children, which have been explained earlier in this report. The prevalence of overweight and obesity among adults is reported by CBS StatLine (25) and the prevalence of overweight and obesity among children is derived from the Fifth National Growth study by TNO (26).

	Adults (> 21 years)		Children (2-21 years)	
	male	female	boys	girls
Total Overweight (of Dutch population)	52,5	41,9	13,3	14,9
Moderate overweight (not obese)	41,3	29,5	11,5	12,7
Severe overweight (obese)	11,2	12,4	1,8	2,2

Table 2: Percentage of adults with overweight or obesity in 2009 and percentage of children with overweight or obesity in 2010.

Table 2 shows that in 2009 more male adults than female adults were overweight, but more female adults were obese. In the year 2010 there were more girls overweight than boys, there were also more girls obese than boys. The Fifth National Growth study by TNO (26) also shows the prevalence of overweight in children continues to rise. Figure 1 shows the trend which has taken place from 1980 till 2010. The prevalence of both overweight and obesity has increased over the years.

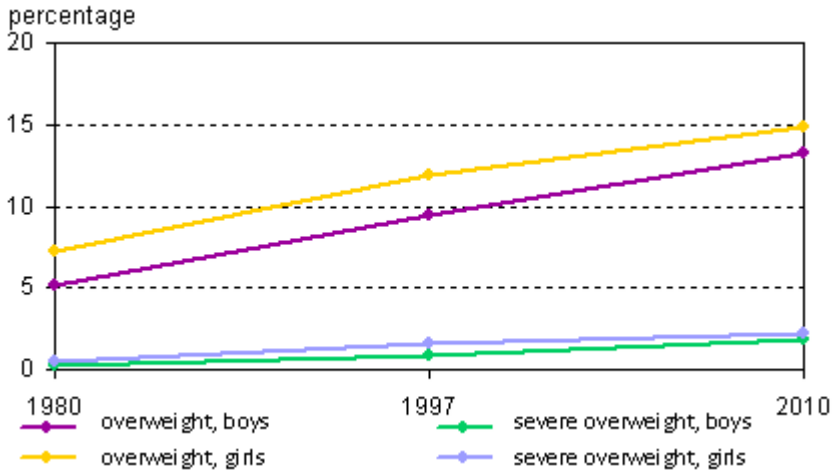

Figure 1: Percentage of children (< 21 years) with overweight and obesity in 1980, 1997 and 2010.

Obesity prevention programs

Effectiveness

Much has already been undertaken in the field of overweight prevention. In theory much can be gained from prevention of overweight and obesity on early age. It is however not clear what the exact effects of such initiatives are on weight, lifestyle (physical activity and energy intake) and social and psychological factors. This lack of knowledge can be attributed to the fact that after

implementation of a preventive measure, the effects are often not evaluated (27). In current evaluations of obesity prevention programs for children the effectiveness of the program is mainly based on weight loss. Sustainability of effects after the program, however, co-depends on individual's continuous adherence to healthy eating habits and exercise behaviors. This adherence is not only determined by weight loss but is also co-determined by, for example, social factors and psychological factors.

Direct costs

On the cost side, it is mainly the direct costs to the healthcare system which are assessed, rather than evaluating both direct and indirect costs. In the following sub paragraphs the direct and indirect costs of obesity as well as possible cost savings of obesity prevention will be portrayed to underline the importance of taking the cost side into account in obesity prevention. Costs incurred as a result of diagnosis and treatment of obesity in the healthcare system are called direct costs. Some examples of direct costs are (28):

- Healthcare professionals salaries
- Primary care and hospital services
- Medicines and other medical supplies
- Emergency and rehabilitation services
- Costs incurred by patient themselves as a result of:
  - alternative ways of travel
  - help in housekeeping
  - diet and sport related products
  - attendance at obesity prevention programs

The direct costs of treating obesity increase substantially as the boundary of severe obesity approaches (28). In the long term, therefore, investments made in obesity prevention programs can lead to cost savings for stakeholders in the network of obesity prevention. A study in England shows that the majority of direct costs are incurred by treating the consequences of obesity and not by treating obesity itself (28). Table 3 shows the estimated direct costs of treating obesity and its consequences in England in 1998.

Cost component	*Estimated cost (£ million)*
Treating obesity	
GP consultations	6.8
Ordinary admissions	1.3
Prescriptions	0.8
Outpatient attendances	0.5
Day cases	0.1
Total direct costs of treating obesity	9.5
Treating the consequences of obesity	
Prescriptions	247.2
Ordinary admissions	120.7
Outpatient attendances	51.9
GP consultations	44.9
Day cases	5.2
Total direct costs of treating consequences	469.9
Total direct costs	479.4

Table 3: Estimated direct costs of treating obesity and its consequences in England in 1998.

Medication for treating the consequences of obesity accounts for more than half of the total direct costs. Although the numbers presented here are based on the situation in England it should be noted that the same type of drugs are used in the Netherlands (sibutramine en orlistat). The increased number of GP consultations and visits to dieticians/specialists are taken into account in the total costs for administering the drugs. The drugs only lead to a weight loss of just over three kilograms a year and because of that patient adherence to the drug therapy is as low as 10% (29).

The approximately 500 million direct costs of treating obesity and its consequences in England in 1998 only account for one fifth of the total costs of treating obesity and its consequences incurred in the same year (30). Studies on the share of direct costs in the same year in other countries, including the Netherlands, show similar outcomes. This means that the majority of costs are incurred by indirect costs.

Indirect costs

Exact estimates of the indirect costs incurred by obesity are difficult to assess because indirect costs are affected by a variety of outcome measures such as absenteeism, disability and premature death as a consequence of severe obesity. The Council for Public Health and Care in the Netherlands (RVZ) estimates the total indirect costs of treating obesity and its consequences to amount to two billion Euros per year (31). These consequences of obesity are translated into outcomes such as increased social benefits, early retirement age and the loss of commercial and service production. But lower levels of education and diminished chances on the labor market are significant indirect costs as well. Chronic, non-fatal diseases caused by obesity incur more costs than premature death because many more people are involved and remain involved for a longer period of time (28). Given the high indirect costs that are incurred in the fight against obesity and its consequences, it cannot be stressed enough how important obesity prevention in an early stage is to save costs.

Assessing the direct and indirect costs of obesity prevention as incurred by the healthcare sector is in important part of the evaluation of obesity prevention programs (32). It is also important to consider direct and indirect costs incurred by municipalities, schools and households. Although they are stakeholders outside the healthcare system, community-based prevention programs typically rely upon their participation. The most important one might be the household's own contribution, particularly among low income subgroups. Because the own contribution may influence the motivation for participation and continuation of the desired behavior, it may also affect the reach and sustainability of program effects.

Cost savings

A study on cost savings in England has shown that obesity prevention programs which are effective in reducing weight and maintaining this weight loss can lead to cost savings of approximately £130 million per year in healthcare expenditure (33). In the same study it is emphasized that it is important to focus not only on people who are (severely) obese, but also people who are moderate overweight. There is a difference in price levels of the healthcare system and in the incidence and prevalence of obesity and its comorbidity between England and the Netherlands. The results of the study in England, therefore, cannot be translated directly to the situation in the Netherlands (34). It does give an impression of the huge cost savings as result of effective interventions. Moreover, other studies on costs savings as a result of obesity prevention programs have shown that significant cost savings can be achieved by obesity prevention (35).

More recent research has also shown the importance of obesity prevention programs. Accounting and consulting firm PricewaterhouseCoopers (PwC) published its findings in 2010 on whether prevention pays off or not and to what extent. In the least favorable scenario, in which an investment is made to decrease the prevalence of obese and underweight people, a return on investment of approximately 30 percent can be achieved (36). This concerns a small campaign and a small program. A larger, more intensive program may realize a return on investment up to 130 percent. The largest part of these profits are generated in the area of absenteeism (36). This emphasizes the importance of youth obesity prevention, to prevent them from ending up in the group of obese patients.

Cost-effectiveness

A cost-effectiveness analysis is referred to when the results of an intervention are expressed as a unit of effect, such as life years gained or reduction in kilograms of body weight. An intervention is cost effective when the costs incurred per life year gained or kilogram body weight reduced are lower than in existing interventions or compared to doing nothing (no intervention). The outcome is also often a clinical outcome measure, such as a decrease in the incidence or prevalence of the disease or disorder.

International research has shown that obesity prevention is cost effective (37). A study on the costs, effects and cost-effectiveness in the fight against obesity in the Netherlands shows that interventions against obesity are cost effective (38). The social perspective in these interventions was not taken into account. The conclusion of the study is that obesity prevention programs are cost effective even without taking the indirect costs into account.

Most empirical cost-effectiveness (CE) studies of obesity prevention programs assess the value of the program by determining the costs per kilogram weight gain avoided (39). In modeling studies it is common that broader effectiveness measures such as Quality Adjusted Life Years (QALYs) gained are reported. This measure in relation to overweight and obesity is however heavily based on assuming that there is a relation between weight loss on morbidity and mortality and therefore leading to an increase in QALYs (40). Next to this assumption it is a known fact that estimates based on models strongly depend on sustainability of effects and not taking into account that there may be a change in effects over time. As stated before, the sustainability of effects after the program is determined by more factors then just weight loss. The validity of estimates based on previously mentioned models that focus on weight loss is therefore questionable.

Relevance

It has been mentioned earlier that current evaluations depend on the reach of the program and sustainability of effects after the program. Body weight and measures such as the BMI are key measures in evaluating the value of obesity prevention programs. But these effectiveness measures are however not solely determining the individual's preferences for participating in programs and (afterwards) continuing adherence to healthy eating habits and exercise behaviors. Studies have shown that especially in prevention programs the earlier mentioned factors causing overweight are important too. Factors like self-image, perceived competences for healthy behavior, psychological well-being, weight perception and ability to participate in social activities have been reported to play a role as well (40, 41). This emphasizes how relevant it is to develop an instrument that includes both health and non-health measures. More data on how children and their parents value such measures is greatly desired. Next to identifying what outcome measures capture people's preferences in youth

obesity prevention, this research also provides more information on how much people are willing to pay for a change in an outcome measure. This research, therefore, also contributes to the field of obesity prevention in providing more information in the cost aspect of obesity.

This research also contributes to the research program as described in the Netherlands Organization for Health Research and Development (ZonMw) “Preventie 4 - Vernieuwing voor Langer Gezond Leven” (42).

Objective and research question

This research contributes to the important final part of a two-year study that is funded by the Netherlands Organization for Health Research and Development (ZonMw)**.** The primary aim of this research is to identify what outcome measures capture people’s preferences in youth obesity prevention and how much people are willing to pay for a change in an outcome measure. In this research it will be investigated which outcome measures, beyond weight loss, are relevant to children and their parents. In the process a conjoint analysis (discrete choice modeling) will be conducted. Data of approximately 150 households will be collected for analysis.

In this research an answer will be given on the following research question:

> *Which outcome measures of obesity prevention programs for children are relevant to children and their parents and how much are they willing to pay for a change in an outcome measure?*

Theoretical framework

The conjoint analysis (CA) applied in this research is a survey method of data collection and analysis and was developed during the 1990s. It was developed to elicit patients´ and the community´s views on health care (43).

Conjoint analysis is based on two premises (43). The first is that goods and services can be described by their characteristics, commonly also labeled as attributes. The second is that the extent to which individuals or communities value certain goods and services, depends on the level of these attributes. It has been successfully used in several different areas, such as in market research, transport economics and environmental economics. In all of these areas CA has been well received by policymakers. Since its success in other areas it has gained widespread use in health care. Within the healthcare sector the method has been successfully applied in (43):

- including eliciting patients' and the community's preferences in the delivery of health services
- establishing consultants' preferences in priority setting
- developing outcome measures
- determining optimal treatments for patients
- evaluating alternatives within randomized controlled trials
- establishing patients' preferences in the doctor-patient relationship

The design of a CA study consists of five key stages (44):

1. ***Establishing the Attributes***
   The first stage involves defining the attributes. There are several methods to do this, including literature reviews, group discussions, interviews, and direct questioning of individual subjects.
2. ***Assigning Levels to the Attributes***
   The attributes are assigned levels that are plausible, actionable and capable of being traded.
3. ***Which Scenarios to Present?***
   Respondents are presented hypothetical scenarios that combine different levels of attributes. The more attributes and levels are involved, the higher the number of possible scenarios. There are methods to reduce the number of scenarios needed to infer utilities for all possible scenarios.
4. ***Establishing Preferences***
   In order to establish the preferences for scenarios a survey must be conducted. The design of the questionnaire is based on either ranking, rating, or discrete choices.
5. ***Analysis of Data***
   In the final stage of a CA study, regression techniques are used to estimate utilities (in the context of conjoint analysis, a utility is a regression coefficient β). It is possible to establish the importance of attributes (statistical significance level of parameters), relative importance of attributes (relative size coefficients), willingness to trade between attributes (marginal rate of substitution), willingness to pay (WTP) and utility scores (for different combinations of levels of attributes).

Methodology

In this research the valuation of health and non-health measures was based on a conjoint analysis method (discrete choice modeling). The conjoint analysis was combined with a Willingness to Pay (WTP) approach. In order to get a WTP estimate as outcome, a cost attribute has to be included in the scenarios. This cost attribute is required to estimate the amount of money the respondents are willing to pay for a one level change in any of the other attributes. The WTP estimates in this research are hypothetical as they were not derived from direct observation, which would give estimates of actual WTP. The process of this research was performed according to first four steps described in the five key stages in the design of a CA study (44), with the addition of the step 'selection of respondents'. The last step, analysis of data, is reported in the results section of this study.

Establishing the Attributes

In research where the focus is on obesity prevention programs for children and the evaluation of such programs, there was the need for information on what measures capture people's preferences regarding the outcomes of such programs. Very recently a study was done at the University of Twente in which this particular literature research was conducted (45). The extensive literature review done in that study is the foundation for this research. Many outcome measures were identified and divided into the categories physical aspects, mental aspects and social aspects. The study will be referred to as the 'previous study' from here on.

For the choice pairs in the questionnaire to remain comprehensible, it was decided to use the main categories as attributes, except for the main category physical aspects, which was split in weight and lifestyle. This way, each attribute could be assigned different levels and the relative importance of the other attributes compared to weight could be quantified. The attributes included in the scenarios were: weight, mental wellbeing, social wellbeing, lifestyle, and monthly household costs in Euros (Table 4).

Each attribute was defined as straightforward as possible to ensure that all survey respondents regardless of their education level understand what was meant by it. After consulting with an expert in the field health sciences (for a simplified, yet correct definition of the aspect) the attributes were defined as follows:

- Weight = weight can be normal, overweight or obese (weight level after the program)
- Mental wellbeing = a state in which the individual is feeling mentally well, does the person in question feel happy or unhappy?
- Social wellbeing = you feel comfortable in your environment and you can cope well with people around you. Also think about a social life with regular social contacts and/or friends.
- Lifestyle = the way one lives, this can be healthy or unhealthy. Healthy behavior is a balance between sufficient movement and energy intake through nutrition. Unhealthy behavior means the individual gets too much energy through nutrition and does not move sufficiently.
- Monthly household costs = obesity prevention programs sometimes come with costs for sports and nutrition. For example, think about sport related products, sports contribution or healthier nutrition. It is also possible that there is a monthly fee for participating in the program.

Assigning Levels to the Attributes

To ensure the levels for the attributes were plausible, actionable and capable of being traded, an expert in health services research and health technology assessment was consulted (Table 4).

Attribute	Levels
Weight	Normal weight Overweight Obese
Mental Wellbeing	Better than average Average Worse than average
Social Wellbeing	Better than average Average Worse than average
Lifestyle	Healthy lifestyle Unhealthy lifestyle
Monthly household costs (€)	10 20 30

Table 4: Attributes and levels.

The attributes and levels gave rise to 162 possible scenarios (3^4 x 2^1 = 162). Due to the large number of possible combinations of attribute levels it was impossible to display all these scenarios to a single respondent, hence a d-efficient design was used and reduced to 20 scenarios per respondent.

Scenarios to Present

The next step was to design the questionnaire. The discrete choice approach was adopted in this research. A d-efficient design with a balanced overlap was developed with Sawtooth Software. A balanced overlap strategy would ensure no duplicate scenarios in one choice task. Survey respondents were presented different scenarios in choice pairs (n=20) in which multiple program outcome measures (attributes) were conjoint and were requested to choose the scenario which was most preferred by or relevant to them. In this context, a scenario implied a set of possible outcomes as the result of a prevention program. Figure 4 shows an example of two choice pairs. To improve the statistical strength of the questionnaire, four different versions were developed. Increased variation in questionnaires reduces potential context and order biases (46). Each version of the questionnaire also contained two fixed control choice pairs, which were identical in all of the four versions. These control choice pairs were included as a consistency test. Control choice pairs showed one of the two scenarios clearly having more desirable outcomes as compared to the other choice. This was done to prevent including completed questionnaires from respondents who either did not understand the instructions (even after checking the “I understand what to do” box) or clearly did not engage with the survey. Also an example of a scenario and a choice pair with response instructions was included to increase validity.

Respondents were also requested to report their age, cultural background, and four digits of their postcode. The latter was used to derive the household income (25) without compromising the guaranty of anonymity. Cultural background and age could be used for a prioritized group analysis.

VRAAG 1	Programma A	Programma B
Gewicht	normaal gewicht	matig overgewicht
Mentaal welzijn	slechter dan gemiddeld	beter dan gemiddeld
Sociaal welzijn	gemiddeld	beter dan gemiddeld
Leefstijl	gezond gedrag	ongezond gedrag
Uitgaven per maand	10	10

VRAAG 2	Programma A	Programma B
Gewicht	ernstig overgewicht	matig overgewicht
Mentaal welzijn	beter dan gemiddeld	gemiddeld
Sociaal welzijn	gemiddeld	slechter dan gemiddeld
Leefstijl	ongezond gedrag	ongezond gedrag
Uitgaven per maand	30	30

Figure 4: The first two choice pairs of version 1 of the questionnaire.

Prior to distribution a pilot was conducted for design improvement. The design was explored by holding interviews on a small scale (N=12) with students of the department Health Technology and Services Research at the University of Twente. It was also made available on Facebook for feedback from the general public. Comments about questions' content and format resulted in further refinement. Respondents from the pilot did not participate in the actual study. The final questionnaire was written in the Dutch language since it was expected that all survey respondents were able to understand common Dutch. If needed, a translation would be provided but no requests were made. The full questionnaire is attached in Appendix A.

Selection of respondents

At the time of this research there was an international project being conducted named "Gesunde Kinder in Gesunde Kommunen (GKGK)", Healthy Children in Healthy Communities. The aim of this project was to help children develop a healthy lifestyle within three years. The countries involved in this collaboration were the Netherlands and Germany. With regards to the earlier mentioned relevance of this research it was decided to contact the participating municipalities in the Netherlands. After a meeting with the contact person for the Dutch part of the GKGK project, it was decided to distribute the four versions of the questionnaire in the municipalities Cuijk and Rijnwaarden in the Netherlands. Children who were in a group that participated in the GKGK project were given one of the four versions of the questionnaire to bring home to their parents to be filled out. It was not specified in the questionnaire that parents could or could not involve their children in this process; each household could decide this for themselves. This distribution took place in the classrooms of participating schools. Random assignment of questionnaire version to respondent was applied to ensure a probabilistic equal distribution of each of the four versions and also to prevent bias. There is a rule-of-thumb to determine the minimum sample size for this type of research (47):

$$\text{Sample size} = \frac{nta}{c} \geq 1000$$

where n is the number of respondents, t is the number of tasks, a is the number of alternatives per task and since the aim of this research was to find main effects, c equals the largest number of levels for any one attribute .

$$\text{Sample size} = \frac{n*22*2}{3} \geq 1000 \quad \rightarrow \quad n = \frac{3}{44} * 1000 \approx 69$$

The minimal number of respondents needed was 69 according to the rule-of-thumb, any number above this estimation was accepted for this research. A greater sample size increases the power of the study and the likelihood to find significant results and it is, therefore, always desirable to have more respondents than the minimum estimation. In total 169 questionnaires were distributed. Respondents (parents of the children) were considered to be cognitively capable of participating and able to read and understand the questionnaire if they passed the consistency test. Questionnaires were returned to the researcher as hard copies.

Establishing Preferences

Two files were constructed using SPSS version 20 of IBM SPSS Statistics. The first file (*Ontwerp vragenlijsten.sav*) contained all of the scenarios and choice pairs in the four versions of the questionnaire. Scenarios were assigned a variable idCard to distinguish them from each other. The second file (*Uitkomsten enquête basis.sav*) was a database containing general information of the respondent (postal code, age, country of origin and household income) and the answer to each choice pair given by the respondent (A or B). Incomplete and inconsistent questionnaires were not entered into this data file. These two files were then combined (*Uitkomsten enquête.sav*) with the aid of a statistical analysis expert at the University of Twente to ensure it was done in a correct way. Dummy coding was applied for the levels of the attributes, with the last level as reference except for the cost levels where the first level was the reference level. The reference levels were set to zero and the remaining levels were estimated as contrasts with respect to zero (48). It was expected that there would be an inverse relation between cost and utility, resulting in negative utility values (coefficients), with higher costs corresponding to lower utility. Setting the lowest cost level as the reference level makes it easier to interpret the results regarding the cost levels. The expectation is that the utility value of the cost level €20 is lower than 0 (reference level €10) and the value of the level €30 being lower than that of the level €20.

After computing the dummy codes, the conditional logit model was used for the analysis, which was performed in SPSS with a Cox regression analysis (see Appendix B). Time refers to the a variable in the matrix which assigns a 1 if the scenario was preferred and a 2 if it was not chosen. Variable 'choice2(1)' indicates that a 1 means the scenario was preferred. Variable 'id' indicates a choice pair per respondent. The next step was to enter all the dummy levels except the reference level and run the Cox regression command. It is important to realize that:

In the context of conjoint analysis, (part-worth) utilities are reported as regression coefficient β. Total utility of a conjoint set of outcome measures is the sum of all part-worth utilities:

$$U_{scenario} = \beta_{weight1} + \beta_{weight2} + \beta_{mental\ wellbeing1} + \beta_{mental\ wellbeing2} + \beta_{social\ wellbeing1} + \beta_{social\ wellbeing2} + \beta_{lifestyle1} + \beta_{monthly\ household\ costs2} + \beta_{monthly\ household\ costs3} + \varepsilon + u$$

where U is the utility of a scenario with conjoint levels of the attributes, β-coefficients are the part-worth utility weights of the (dummy) level of a certain attribute, ε is the unobservable error term due

to differences in observations, and u is an unobservable error term due to differences among respondents (44). The odds ratio (OR), reported by SPSS as 'Exp(B)', indicated the relative probability that an attribute level was preferred to the reference level. 95% Confidence intervals (CI) were estimated using an Excel spreadsheet (Appendix C).

To characterize the relative importance of each attribute, the following formula was applied:

$$AI = (AUR / URT) * 100\%$$

- AI = Attribute Importance in %
- AUR = Attribute Utility Range
- URT = Utility Range Total

WTP estimates for the various levels of attributes were given by the ratio of the level coefficient to the cost coefficient (44). In other words, it was possible to estimate the cost coefficient per Euro and then dividing the coefficient difference between the two levels of an outcome measure by the cost coefficient. The cost coefficient was estimated with the following formula:

$$\beta_{\text{cost coefficient}} = (\beta_{TO} - \beta_{FROM}) / [\Delta€]$$

where β_{TO} is the utility/coefficient of the level which to achieve and β_{FROM} the starting level, and [Δ€] is the absolute change in costs. WTP for a change in an outcome measure was then estimated as:

$$WTP (€) = (\beta_{TO} - \beta_{FROM}) / \beta_{\text{cost coefficient}}$$

Results

Respondents

The response rate of the survey was 100% (169 out of 169). A completion rate of 77% (130 out of 169) was realized. After testing for consistency 126 (75%) questionnaires remained for inclusion in the main analysis. There were 39 incomplete questionnaires excluded from the analysis for various reasons of which the most common were not fully completed and refused to participate (no permission from the parents). Table 5 shows a detailed summary of the results regarding the returned questionnaires.

Characteristics	Total N (%)	Cuijk N (%)	Rijnwaarden N (%)
Response (respondents/invited)	169/169 (100)	88/88 (100)	81/81 (100)
Completed questionnaires	130 (77)	63 (72)	67 (83)
Consistent questionnaires	126 (75)	61 (70)	65 (80)
Age (years) **Mean** **SD (minimum-maximum)**	 40.7 5.34 (27-64)	 41.11 5.59 (27-64)	 40.31 5.10 (29-54)
Cultural background **Dutch** **Foreign**	 121 (96) 5 (4)	 56 (92) 5 (8)	 65 (100) 0
Household income **Above national average** **Below national average**	 25 (20) 101 (80)	 24 (39) 37 (61)	 1 (2) 64 (98)

Table 5: Characteristics of respondents.

Conjoint Analysis results

The regression results are shown in Table 6.

Statistical significance of effects

Almost all the levels of the attributes had the expected sign and were significant at the 5% level, suggesting that these attributes are relevant to the respondents in obesity prevention programs for children. The levels of the attribute monthly household costs, however, were not significant at the 5% level. Respondents did not find a change from €30 to €10 (p=0.544) relevant, nor a change from €20 to €10 (p=0.475).

A positive sign in front of the coefficients (β) indicates that the presence of this level of an attribute in a scenario is considered a benefit while a negative sign suggests that having this is a disbenefit. Almost all of the coefficients of the levels had a positive sign. This was not surprising because the

reference level was the worst state of an attribute, therefore it was expected that the more desirable levels have a higher utility value than zero.

Attribute importance

The results are shown in Table 7. The attribute which was most preferred by the respondents in this research was weight, followed by mental wellbeing, lifestyle, social wellbeing and monthly household costs.

Size of effect

The probability that one scenario was preferred to the other was approximately 17 times higher if the program outcome of the attribute weight was 'normal weight' than if the outcome was 'obese' (OR 17.292; 95%CI 1.26 - 4.44). The preference of having 'better than average' mental wellbeing compared to 'worse than average' mental wellbeing was almost nine times higher (OR 8.774; 95%CI 0.65 - 3.70). The preference of having 'better than average' social wellbeing compared to 'worse than average' social wellbeing was slightly more than four times higher (OR 4.309; 95%CI -0.03 - 2.95). The probability that a scenario was preferred to the other if the program outcome was 'healthy lifestyle' than if the outcome was 'unhealthy lifestyle' was approximately five times higher (OR 5.243; 95%CI 0.50 - 2.81).

Willingness To Pay

The levels of the attribute monthly household costs were not significant at the 5% level. The coefficient of the cost level €20 (0.07) was positive rather than negative as expected. This may happen due to random noise in the data or because respondents were cost insensitive to a certain amount of costs. This kind of reversal of coefficients would suggest that respondents were willing to pay more for less desirable outcomes. In this case the cost coefficient was estimated to be:

$$\beta_{\text{cost coefficient}} = (\beta_{TO} - \beta_{FROM}) / [\Delta€] =$$
$$(\beta_{10} - \beta_{20}) / €10 = -0.007$$

This suggests that for each utility loss of 0.007, respondents were willing to pay €1. The expectation, however, was that respondents should be willing to pay for an increase in utility, not for a loss. After reexamination of the data, it was found that the cause for the cost coefficient reversal at the cost level €20 was most likely that the majority of households had incomes that are close to or above the national average household income (€33,000). The majority of respondents in this research was, therefore, most likely cost insensitive up to and including the cost level €20.

Although not sufficiently significant to influence choice, respondents did value the cost level €10 more than the cost level €30 ($B_{10} > B_{30}$). If we ignored the above described problem and use the cost levels €10 and €30 as reference levels, it was still possible to estimate willingness to pay for a change in an outcome measure. The cost coefficient was then estimated to be:

$$\beta_{\text{cost coefficient}} = (\beta_{TO} - \beta_{FROM}) / [\Delta€] =$$
$$(\beta_{10} - \beta_{30}) / €20 = 0.003$$

This suggests that respondents were willing to pay €1 for each utility gain of 0.003. WTP was estimated using an Excel spreadsheet (Appendix D) and the results are shown in Table 8.

Attribute and Levels	Part-Worth Utility (β)	95% CI	Odds Ratio (OR)
Weight			
Normal weight	2.85*	(1.26 to 4.44)	17.292
Overweight	2.12*	(0.71 to 3.53)	8.321
Obese (reference)	0		
Mental Wellbeing			
Better than average	2.17*	(0.65 to 3.70)	8.774
Average	1.88*	(0.30 to 3.46)	6.553
Worse than average (reference)	0		
Social Wellbeing			
Better than average	1.46*	(-0.03 to 2.95)	4.309
Average	1.29*	(-0.04 to 2.61)	3.615
Worse than average (reference)	0		
Lifestyle			
Healthy lifestyle	1.66*	(0.50 to 2.81)	5.243
Unhealthy lifestyle (reference)	0		
Monthly household costs (€)			
10 (reference)	0		
20	0.07	(-1.15 to 1.29)	1.071
30	−0.06	(-1.24 to 1.13)	0.945

Table 6: Regression results from SPSS analysis.
*Significant at the 5% level.

Attribute	Level	Part-Worth Utility (β)	Attribute Utility Range	Attribute Importance
Weight	Normal weight	2.85		(2.85 / 8.27) *
	Overweight	2.12	2.85 - 0 = 2.85	100% =
	Obese	0		34%
Mental Wellbeing	Better than average	2.17		(2.17 / 8.27) *
	Average	1.88	2.17 - 0 = 2.17	100% =
	Worse than average	0		26%
Social Wellbeing	Better than average	1.46		(1.46 / 8.27) *
	Average	1.29	1.46 - 0 = 1.46	100% =
	Worse than average	0		18%
Lifestyle	Healthy lifestyle	1.66		(1.66 / 8.27) *
	Unhealthy lifestyle	0	1.66 - 0 = 1.66	100% =
				20%
Monthly household costs (€)	10	0		(0.13 / 8.27) *
	20	0.07	0.07- (−0.06) =	100% =
	30	−0.06	0.13	2%

Table 7: Relative importance of attributes.

Attribute	Change in level (from → to)	Utility Difference (B_{TO} - B_{FROM})	Willingness to Pay for change (€)
Weight	Obese → Overweight	2.119	706
	Overweight → Normal weight	0.731	244
Mental Wellbeing	Worse than average → Average	1.880	627
	Average → Better than average	0.292	97
Social Wellbeing	Worse than average → Average	1.285	428
	Average → Better than average	0.176	59
Lifestyle	Unhealthy lifestyle → Healthy lifestyle	1.657	552

Table 8: WTP estimates for a change in an outcome measure. Coefficients are not rounded up to two decimals as shown in other tables to estimate WTP as accurately possible.

Prioritized groups

A prioritized group analysis was not possible because only 5 of the 126 respondents, who returned a complete and consistent questionnaire, had a foreign cultural background and due to the selection method of respondents chosen in this research there were few substantial differences between household incomes. Although the majority of respondents was reported to have a household income below the national average household income (Table 5), the absolute difference (in €) was unsubstantial.

Discussion and conclusion

In this research a discrete choice experiment was conducted to identify what outcome measures capture people's preferences for youth obesity prevention and how much people are willing to pay for a change in an outcome measure.

Response rate

Taken into consideration that this research was conducted as a master thesis assignment, the response rate was quite high. Only four of the 130 respondents who completed the questionnaire had inconsistent answers to the control choice pairs, suggesting that the majority of respondents engaged with the survey. There were 39 incomplete questionnaires excluded from the analysis for various reasons of which the most common were not fully completed and refused to participate. With regards to the not fully completed questionnaires, for which the most common reason was that the questions were too difficult, in follow up research it should be considered to omit one outcome measure, reducing the total number of variables in a scenario to four (assuming a cost attribute will still be included). This reduces the complexity of the scenarios but also leads to less data to be analyzed. Another solution is to simply send out an amount of questionnaires while taking into account a complete and consistent questionnaire return rate of 75% (according to this research).

With regards to respondents refusing to participate, the most common reason was that parents did feel they had to "choose the lesser of two evils" (scenarios) for their child(ren) and therefore did not give their permission for participation. This could be solved by redesigning the example question in the questionnaire to illustrate the worst possible scenario (all outcome measures on the worst level) and stating that a respondent should imagine that he or she had a child in this state. There is no scenario in the actual choice pairs that reflects this worst possible state, so any scenario will reflect a more desirable set of outcomes. Not only does this (partially) take care of the 'lesser of two evils' dilemma it also reduces the level of influence that the actual state of their own child(ren) has on choosing the scenario they prefer the most. There is, however, also a disadvantage to this solution. Asking to choose a set of outcomes for a hypothetical child, rather than for their own child(ren), increases the risk of socially desirable answers. Choices are not made with regards to an actual person, therefore possibly not choosing what they actual prefer for themselves, but what they think society prefers in general.

Outcome measures

The results of this research indicate that children and their parents value the level of weight as the most preferred outcome. It suggests that program attendance or participation is most likely influenced by the expected weight loss or weight gain avoided by participating in that specific obesity prevention program. The second most preferred outcome was mental wellbeing. The next two preferred outcomes were, almost equally important, lifestyle and social wellbeing. The preference for the level 'normal weight' of the outcome weight is so strong that the data suggests that respondents are most likely to participate in a obesity prevention program that explicitly state a strive for normal weight in its aim description. The results reported in this paper indicate that the outcomes mental wellbeing, lifestyle and social wellbeing are also considered relevant according to the respondents. Although the relative attribute importance is not as high for these outcomes as reported for the outcome weight, the results still indicate that decision makers in the organization of obesity prevention programs should also focus on such outcomes.

There is, however, a significant contrast between the result of this research and the result of the main study conducted in 2011. The outcome of the main study was, according to the respondents, that weight was most certainly not the most preferred outcome measure. Lifestyle (most preferred) and certain aspects of mental and social wellbeing were considered to be more relevant than weight (45). The difference between this research and the main study, which most likely explains the difference in results, is the method of establishing preferences. In the main study, relevance of outcomes was measured with the Analytic Hierarchy Process (AHP) technique. Respondents were presented a pair of outcomes, for example weight and lifestyle, and were requested to state their preference for an outcome on a scale from -9 (extreme value of one outcome) to 9 (extreme value of the other outcome). At the top of each page of the questionnaire, a definition of the outcomes presented in the pair wise comparisons was given. Unlike this research where respondents might interpret the question as '*we offer you these conjoint outcomes, which set do you prefer*', in the main study respondents merely based their decision on the definition of an outcome that was given. The reason why weight is considered the most preferred outcome in this research is most likely because the majority of parents prefer their children to have a normal body size without overweight, rather than selecting a program which 'assigns' their child(ren) (severe) overweight. This preference is regardless of the states of mental wellbeing, lifestyle and social wellbeing since these outcomes are not immediately visible (unlike obesity).

The results of this research are considered to be more valid than the results of the previous study. The method of questioning in the previous study was more subject to socially desirable answers, compared to the method of questioning in this research. In the previous study, respondents were not asked to answer which state they prefer for their child/themselves but which outcome measure of the two in the pair wise comparison they find the most relevant. In this research, respondents are confronted with a more realistic situation (two states, which do you prefer to be in) and are therefore inclined to base their choice on actual stated preferences (in contrast to possible socially desirable preferences).

Cost measure and WTP

The results of this research also indicate that respondents are willing to pay a lot more for a change in a certain outcome than the maximum cost level of €30. The WTP estimates shown in Table 8 should be interpreted with caution. It was expected that there would be an inverse relation between cost and utility, resulting in negative utility values (coefficients), with higher costs corresponding to lower utility. Although this was the case for the cost level €30 (−0.06) compared to the reference level €10 (0), which made WTP estimates possible, utility was not linearly related to price. For utility to be somewhat linearly related to price, the cost level €20 should have had an utility value between 0 and −0.06 (−0.03 for perfect linearity). Not only was this not the case, the utility value of the cost level €20 was positive (0.07). This positive value suggested that respondents were willing to pay more for less desirable outcomes, which is of course an illogical conclusion in the context of this research. Next to this, absence of linearity also implies that referencing different cost levels (€10 and €20 or €20 and €30) to estimate the cost coefficient per Euro will result in different measures of utilities per Euro. The problem regarding the utility values of the cost levels may be caused by the fact that the cost levels were not significant at the 5% level. If the levels had been significant at 5% statistical significance, not only would there be an inverse relation between cost and utility as expected, but a certain degree of linearity in the cost levels would have been present as well. If there is perfect linearity, you can choose any two reference levels to estimate the cost coefficient per Euro.

But even without perfect linearity, any two reference levels would give a valid estimate of the cost coefficient per Euro as long as the cost levels are significant at the 5% level or lower.

The fact that the cost level €30 did have a negative coefficient as expected suggests that costs do start to become relevant from here on going up. Being far from significant implies that this relevance if very low, which is exactly the reason why certain WTP estimates amount in the hundreds. The reason for these high WTP estimates is that the majority of households in this research had incomes that were close to or above the national average household income. In retrospect, the monthly household costs attribute had too low levels for the respondents in this research to influence their choice.

Conclusion

The results of this research indicate that children and their parents value the level of weight as the most preferred outcome, followed by mental wellbeing, lifestyle and social wellbeing. This suggests that program attendance or participation is most likely influenced by the expected weight loss or weight gain avoided by participating in that specific obesity prevention program. Willingness to Pay for a change in an outcome is much more than €30 for respondents with a household income close to or above the national average of €33,000.

Limitations

The primary aim of this research was to identify what outcome measures capture people's preferences in youth obesity prevention. There can be differences in valuation of such measures between prioritized groups, depending on social economic stats (SES) and cultural background. The reason why this could be of interest is because the benefits of obesity prevention programs (so far) are mainly accrued within white, educated populations (40). In contrast to this, effectiveness among prioritized groups is reported to be relatively low (7, 40). The relevance of a prioritized group analysis can be explained in two steps. First of all, there is little known on the impact of obesity prevention programs in such prioritized groups. There is even less known when it concerns the impact of such programs on outcomes other than weight reduction and BMI. There is significantly more overweight and obesity among Turkish and Moroccan children compared to children with a Dutch cultural background, emphasizing the importance of effective and cost-effective programs in prioritized groups (7). Cultural background also plays a significant role because some health and non-health measures may be more culture-dependent than weight loss in itself is. Depending on the individual's preferences this could affect the valuation of a program in different ways.

To determine valuation of the fore mentioned measures between prioritized groups it is advised to pay attention to SES, cultural background, gender differences, as well as age groups. In this research an attempt was made to include data of prioritized groups in the analysis. Respondents were asked to report the four digits of their postcode. The researcher was able to estimate the household income based on this information without compromising the guaranty of anonymity. Respondents were also asked to report their cultural background and age. Unfortunately only 5 of the 169 respondents had a foreign cultural background and due to the selection method of respondents chosen in this research there were insufficient differences between household income to conduct a prioritized groups analysis. Moreover, if the purpose of the research is to compare groups of respondents and detect significant differences, it is recommended to include a minimum of 800 respondents (47).

Although the attempts to include people with different cultural backgrounds and income did not succeed in this research, the measurement instrument itself should not be considered less generally applicable (external validity) in today's multicultural societies. The outcomes in the scenario's are chosen because of their relation with the topic of overweight and are independent of cultural background or income. For a prioritized group analysis, however, it is recommended that in future research respondents are chosen based on differences in cultural background and income. For example, databases which contain information on these two factors (CBS in the Netherlands) could be used to establish populations which meet these requirements. From these populations random assignment could be applied to acquire respondents for the survey. Possible prioritized groups would be:

- Income below national average and foreign cultural background
- Income below national average and Dutch cultural background
- Income approximately or equal to national average income and foreign cultural background
- etcetera

From here on, the same measurement instrument and data analysis method applied in this research could be used to gather data on the prioritized groups for analysis. This kind of research would require significantly more time and effort than is generally acceptable for a single master thesis.

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Appendix A: Questionnaire Version 1

UNIVERSITEIT TWENTE.

Introductie

Beste ouders en kinderen,

Overgewicht is een alledaags probleem geworden waar wereldwijd steeds meer gezinnen mee te maken hebben. Gelukkig wordt er veel gedaan om overgewicht te voorkomen en tegen te gaan. Misschien heeft u of uw kind via school meegedaan aan een preventieprogramma ter voorkoming van overgewicht. Voorkomen is beter dan genezen en daarom is het belangrijk om op jonge leeftijd te beginnen met het voorkomen van overgewicht.

Deze enquête is opgesteld naar aanleiding van een onderzoek dat uitgevoerd wordt door de Universiteit Twente in Enschede. Het doel van dit onderzoek bestaat uit twee delen. De onderzoekers willen weten wat ouders en hun kind(eren) het meest belangrijk vinden aan preventieprogramma's ter voorkoming van overgewicht. Daarnaast worden er ook kosten geschetst die bij een programma kunnen horen om te onderzoeken hoeveel het volgens de ouders mag kosten.

Instructie

Wij vragen u zo eerlijk mogelijk te zijn bij het beantwoorden van de vragen in deze enquête. Er bestaat geen goed of fout antwoord, het gaat in dit onderzoek alleen om uw mening. Als u bij een vraag twijfelt over het antwoord, sla dan de vraag alstublieft niet over maar probeer dan toch een zo eerlijk mogelijk antwoord te geven.

Het is niet nodig om uw naam op deze enquête te zetten. Alle ingevulde enquêtes worden anoniem verwerkt. Wilt u uw naam wel aangeven of gebeurt dit per ongeluk, dan kunt u er gerust op zijn dat uw gegevens vertrouwelijk behandelt zullen worden en niet aan derden worden verstrekt. U kunt uw gegevens aan het einde van de enquête invullen.

Heeft u nog vragen of opmerkingen, dan kunt u per e-mail contact met ons opnemen:
Email: m.ilgun@student.utwente.nl

Hartelijk dank voor de genomen moeite.

Uitleg begrippen

Hieronder staat een korte uitleg van de begrippen die in de enquête naar voren komen:

GEWICHT = het gewicht kan normaal gewicht, matig overgewicht of ernstig overgewicht zijn.
MENTAAL WELZIJN = toestand waarin het geestelijk goed met iemand gaat, voelt de persoon zich gelukkig of ongelukkig?
SOCIAAL WELZIJN = je voelt je thuis in je omgeving en kunt goed omgaan met mensen om je heen. Denk ook aan een sociaal leven met regelmatig sociale contacten of veel vrienden.
LEEFSTIJL = de manier waarop iemand leeft, dit kan gezond of ongezond zijn. Bij gezond gedrag is er een balans tussen voldoende beweging en energie inname via voedsel. Bij ongezond gedrag krijgt iemand te veel energie binnen en beweeg hij of zij onvoldoende.
UITGAVEN PER MAAND = bij preventieprogramma´s ter voorkoming van overgewicht kan het zijn dat er kosten worden gemaakt voor bijvoorbeeld sport en voeding. Denk aan sportartikelen, sport contributie of gezondere voeding. Het is ook mogelijk dat er een maandelijkse bijdrage geleverd moet worden voor het volgen van een programma.

Voorbeeldvraag

In het project Gezonde Kinderen in een Gezonde Kinderomgeving (GKGK) worden de kinderen die naar de basisschool gaan gestimuleerd om een actieve leefstijl aan te nemen. In dit project gaat het vooral om het begrip leefstijl waarbij gekeken wordt naar hoeveel het kind beweegt, wat het binnenkrijgt aan voeding en hoeveel tijd hij of zij achter de computer of voor de tv zit. Daarnaast wordt er ook aandacht besteed aan hoe kinderen omgaan met leeftijdsgenoten en volwassenen om zich heen. Er zijn veel combinaties van aandachtspunten mogelijk, maar wat vindt u nu het meest belangrijk? Hieronder ziet u een voorbeeld met een korte uitleg.

In het voorbeeld zijn de resultaten weergegeven van twee preventieprogramma´s ter voorkoming van overgewicht, programma A en programma B. Welke resultaten als gevolg van een preventieprogramma ziet u het liefst voor uw kind(eren), welk programma heeft voor u de voorkeur?

VB. VRAAG	Programma A	Programma B
Gewicht	normaal gewicht	matig overgewicht
Mentaal welzijn	gemiddeld	beter dan gemiddeld
Sociaal welzijn	gemiddeld	beter dan gemiddeld
Leefstijl	gezond gedrag	gezond gedrag
Uitgaven per maand	20	30
		X

Nogmaals er is geen goed of fout antwoord. Als u zoals in het voorbeeld programma B zou hebben aangekruist, dan betekent dit dat u een beter sociaal en mentaal welzijn belangrijker vind dan iets overgewicht en hogere maandelijkse uitgaven. Als u voor programma A zou hebben gekozen dan betekent dit dat u het gewicht van uw kind(eren) en de maandelijkse uitgaven belangrijker vind dan een beter sociaal en mentaal welzijn. De uitkomst leefstijl is in beide programma's gelijk aan elkaar.

Op de volgende pagina beginnen de enquêtevragen.

Versie 1

De enquête begint nu met enkele algemene vragen.

Geef aan of u het met de volgende stelling eens bent:
“Ik heb de introductie en de instructies gelezen en ik begrijp de informatie. Ik heb de gelegenheid gehad om aanvullende vragen te stellen. Mijn deelname aan dit onderzoek is geheel vrijwillig.”

- ○ Ja
- ○ Nee

Wat zijn de vier cijfers van uw postcode?

Wat is de datum waarop u deze vragenlijst invult?

				2	0	1	2	

Wat is uw leeftijd?

Waar komt u oorspronkelijk vandaan?

- ○ Antillen
- ○ Marokko
- ○ Turkije
- ○ Nederland
- ○ Anders, namelijk ……

Wat is de leeftijd en het geslacht van uw kind(eren)?

o Jongen	**o** Jongen	**o** Jongen
o Meisje	**o** Meisje	**o** Meisje

Op de volgende pagina gaat de enquête verder met het vergelijken van programma’s.

Versie 1

Geef bij elke vraag aan welke uitkomsten van een programma u het liefst ziet voor uw kind(eren) door aan het einde van de kolom een kruis te zetten bij het programma dat voor u de voorkeur heeft.

VRAAG 1	Programma A	Programma B
Gewicht	normaal gewicht	matig overgewicht
Mentaal welzijn	slechter dan gemiddeld	beter dan gemiddeld
Sociaal welzijn	gemiddeld	beter dan gemiddeld
Leefstijl	gezond gedrag	ongezond gedrag
Uitgaven per maand	10	10

VRAAG 2	Programma A	Programma B
Gewicht	ernstig overgewicht	matig overgewicht
Mentaal welzijn	beter dan gemiddeld	gemiddeld
Sociaal welzijn	gemiddeld	slechter dan gemiddeld
Leefstijl	ongezond gedrag	ongezond gedrag
Uitgaven per maand	30	30

VRAAG 3	Programma A	Programma B
Gewicht	ernstig overgewicht	normaal gewicht
Mentaal welzijn	slechter dan gemiddeld	beter dan gemiddeld
Sociaal welzijn	slechter dan gemiddeld	beter dan gemiddeld
Leefstijl	ongezond gedrag	gezond gedrag
Uitgaven per maand	20	20

VRAAG 4	Programma A	Programma B
Gewicht	matig overgewicht	ernstig overgewicht
Mentaal welzijn	beter dan gemiddeld	slechter dan gemiddeld
Sociaal welzijn	gemiddeld	slechter dan gemiddeld
Leefstijl	gezond gedrag	gezond gedrag
Uitgaven per maand	30	10

VRAAG 5	Programma A	Programma B
Gewicht	normaal gewicht	ernstig overgewicht
Mentaal welzijn	gemiddeld	gemiddeld
Sociaal welzijn	beter dan gemiddeld	beter dan gemiddeld
Leefstijl	ongezond gedrag	gezond gedrag
Uitgaven per maand	20	30

VRAAG 6	Programma A	Programma B
Gewicht	matig overgewicht	normaal gewicht
Mentaal welzijn	beter dan gemiddeld	gemiddeld
Sociaal welzijn	slechter dan gemiddeld	gemiddeld
Leefstijl	ongezond gedrag	gezond gedrag
Uitgaven per maand	20	10

Versie 1

VRAAG 7	Programma A	Programma B
Gewicht	matig overgewicht	ernstig overgewicht
Mentaal welzijn	slechter dan gemiddeld	gemiddeld
Sociaal welzijn	beter dan gemiddeld	slechter dan gemiddeld
Leefstijl	ongezond gedrag	gezond gedrag
Uitgaven per maand	30	20

VRAAG 8	Programma A	Programma B
Gewicht	normaal gewicht	matig overgewicht
Mentaal welzijn	beter dan gemiddeld	gemiddeld
Sociaal welzijn	beter dan gemiddeld	gemiddeld
Leefstijl	gezond gedrag	ongezond gedrag
Uitgaven per maand	10	20

VRAAG 9	Programma A	Programma B
Gewicht	ernstig overgewicht	normaal gewicht
Mentaal welzijn	slechter dan gemiddeld	slechter dan gemiddeld
Sociaal welzijn	slechter dan gemiddeld	gemiddeld
Leefstijl	gezond gedrag	ongezond gedrag
Uitgaven per maand	10	30

VRAAG 10	Programma A	Programma B
Gewicht	ernstig overgewicht	normaal gewicht
Mentaal welzijn	gemiddeld	beter dan gemiddeld
Sociaal welzijn	slechter dan gemiddeld	gemiddeld
Leefstijl	gezond gedrag	ongezond gedrag
Uitgaven per maand	10	20

VRAAG 11	Programma A	Programma B
Gewicht	matig overgewicht	ernstig overgewicht
Mentaal welzijn	slechter dan gemiddeld	beter dan gemiddeld
Sociaal welzijn	beter dan gemiddeld	gemiddeld
Leefstijl	ongezond gedrag	gezond gedrag
Uitgaven per maand	30	10

VRAAG 12	Programma A	Programma B
Gewicht	normaal gewicht	matig overgewicht
Mentaal welzijn	gemiddeld	slechter dan gemiddeld
Sociaal welzijn	beter dan gemiddeld	slechter dan gemiddeld
Leefstijl	gezond gedrag	ongezond gedrag
Uitgaven per maand	20	20

Versie 1

VRAAG 13	Programma A	Programma B
Gewicht	ernstig overgewicht	normaal gewicht
Mentaal welzijn	gemiddeld	beter dan gemiddeld
Sociaal welzijn	beter dan gemiddeld	slechter dan gemiddeld
Leefstijl	ongezond gedrag	gezond gedrag
Uitgaven per maand	10	30

VRAAG 14	Programma A	Programma B
Gewicht	matig overgewicht	matig overgewicht
Mentaal welzijn	gemiddeld	slechter dan gemiddeld
Sociaal welzijn	gemiddeld	beter dan gemiddeld
Leefstijl	gezond gedrag	gezond gedrag
Uitgaven per maand	10	20

VRAAG 15	Programma A	Programma B
Gewicht	ernstig overgewicht	normaal gewicht
Mentaal welzijn	beter dan gemiddeld	gemiddeld
Sociaal welzijn	beter dan gemiddeld	gemiddeld
Leefstijl	ongezond gedrag	ongezond gedrag
Uitgaven per maand	10	20

VRAAG 16	Programma A	Programma B
Gewicht	ernstig overgewicht	matig overgewicht
Mentaal welzijn	slechter dan gemiddeld	beter dan gemiddeld
Sociaal welzijn	slechter dan gemiddeld	beter dan gemiddeld
Leefstijl	ongezond gedrag	gezond gedrag
Uitgaven per maand	30	20

VRAAG 17	Programma A	Programma B
Gewicht	ernstig overgewicht	matig overgewicht
Mentaal welzijn	slechter dan gemiddeld	slechter dan gemiddeld
Sociaal welzijn	gemiddeld	gemiddeld
Leefstijl	ongezond gedrag	gezond gedrag
Uitgaven per maand	30	20

VRAAG 18	Programma A	Programma B
Gewicht	normaal gewicht	normaal gewicht
Mentaal welzijn	beter dan gemiddeld	gemiddeld
Sociaal welzijn	slechter dan gemiddeld	gemiddeld
Leefstijl	gezond gedrag	ongezond gedrag
Uitgaven per maand	10	30

Versie 1

VRAAG 19	Programma A	Programma B
Gewicht	matig overgewicht	normaal gewicht
Mentaal welzijn	gemiddeld	beter dan gemiddeld
Sociaal welzijn	slechter dan gemiddeld	beter dan gemiddeld
Leefstijl	ongezond gedrag	gezond gedrag
Uitgaven per maand	30	30

VRAAG 20	Programma A	Programma B
Gewicht	normaal gewicht	matig overgewicht
Mentaal welzijn	slechter dan gemiddeld	gemiddeld
Sociaal welzijn	beter dan gemiddeld	gemiddeld
Leefstijl	ongezond gedrag	gezond gedrag
Uitgaven per maand	10	20

VRAAG 21	Programma A	Programma B
Gewicht	ernstig overgewicht	ernstig overgewicht
Mentaal welzijn	beter dan gemiddeld	slechter dan gemiddeld
Sociaal welzijn	slechter dan gemiddeld	slechter dan gemiddeld
Leefstijl	gezond gedrag	gezond gedrag
Uitgaven per maand	30	20

VRAAG 22	Programma A	Programma B
Gewicht	ernstig overgewicht	normaal gewicht
Mentaal welzijn	beter dan gemiddeld	slechter dan gemiddeld
Sociaal welzijn	slechter dan gemiddeld	gemiddeld
Leefstijl	ongezond gedrag	ongezond gedrag
Uitgaven per maand	20	10

Versie 1

U bent aan het einde van de enquête gekomen.

Wilt u op de hoogte worden gebracht van de uitkomsten van dit onderzoek?

- Ja
- Nee

Mogen we u in de toekomst benaderen voor eventueel vervolgonderzoek? Als u ´JA´ invult dan is het ook nodig om uw gegevens te vermelden zodat er contact met u kan worden opgenomen.

- Ja
  naam: ……
  e-mail of tel.nr.: ……
- Nee

HARTELIJK DANK VOOR HET INVULLEN VAN DE ENQUÊTE

Appendix B: Cox regression

```
COXREG time
/STATUS=choice2(1)
/STRATA=id
/METHOD=ENTER Dgew1 Dgew2 Dment1 Dment2 Dsoc1 Dsoc2 Dleef1 Duit20 Duit30
/CRITERIA=PIN(.05) POUT(.10) ITERATE(20).
```

Appendix C: 95% CI estimates

lower 95% CI formula: B - t(0.025) * SE										
upper 95% CI formula: B + t(0.025) * SE										
Variable and level (dummy)		Coefficient (B)		t (0.025) df=1		SE		lower 95% CI		upper 95% CI
Weight										
Normal weight		2,850		12,71		0,125		1,26		4,44
Overweight		2,119		12,71		0,111		0,71		3,53
Obese (reference)		0								
Mental Wellbeing										
Better than average		2,172		12,71		0,120		0,65		3,70
Average		1,880		12,71		0,124		0,30		3,46
Worse than average (reference)		0								
Social Wellbeing										
Better than average		1,461		12,71		0,117		-0,03		2,95
Average		1,285		12,71		0,104		-0,04		2,61
Worse than average (reference)		0								
Lifestyle										
Healthy lifestyle		1,657		12,71		0,091		0,50		2,81
Unhealthy lifestyle (reference)		0								
Monthly costs (€)										
10 (reference)		0								
20		0,069		12,71		0,096		-1,15		1,29
30		-0,057		12,71		0,093		-1,24		1,13

Appendix D: WTP estimates

$B_{monthly\ costs} = (B_{€10} - B_{€30}) / (€30 - €10) = (0 - -0.06) / €20 = 0.003$					
$WTP\ (€) = (B_{TO} - B_{FROM}) / B_{monthly\ costs}$					
Attribute	**Change in level (from --> to)**		**Coefficient Difference ($B_{TO} - B_{FROM}$)**		**WTP (€)**
Weight	Obese --> Overweight		2,119		706
	Overweight --> Normal weight		0,731		244
Mental Wellbeing	Worse than average --> Average		1,880		627
	Average --> Better than average		0,292		97
Social Wellbeing	Worse than average --> Average		1,285		428
	Average --> Better than average		0,176		59
Lifestyle	Unhealthy lifestyle --> healthy lifestyle		1,657		552