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IMPROVING VEGETABLE SNACK CONSUMPTION: THE EFFECTIVENESS OF A WORKSITE INTERVENTION OVER TIME

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Abstract

Objective: Many studies have established that the workplace is a unique environment to stimulate healthy eating behavior since it enables to access a considerable population of adults. However, no research has been conducted where the dynamics and influence of a worksite intervention on snack vegetable consumption has been determined over time. Therefore, this study examined the dynamics of a worksite intervention over time to increase the vegetable snack intake among employees. The intervention of the study consisted of placing a tomato dispenser next to the entrance of the canteen for 20 weeks. The objective of this study was to firstly explore how often and in what way the intervention was used. Secondly, the influence of the intervention over time on the appreciation of the intervention, the consumption of the snack tomatoes at work, the intake of unhealthy snacks at work and the vegetable consumption at home was determined. Lastly, the employees' motives on the appreciation level, the consumption of the snack tomatoes at work, the intake of unhealthy snacks and the consumption of the snack tomatoes at home was investigated.

Methods: This study included a mixed-method approach, being first two days of observing to distinguish the behavior around the snack tomato intervention. After this, a three-wave longitudinal study with self-administered surveys examined the influence of the intervention over time. Finally, three focus groups with the office employees and one focus group with the staff of the canteen of the municipality were held to establish the motives and rationale of the employees.

Results: First of all, the findings of the self-administered surveys demonstrated that the majority of the participants never consumed the snack tomatoes. The intervention did not have a significant effect on the appreciation, the intake of unhealthy snacks at work and the vegetable consumption at home over time. Even so, over the three measuring points, the appreciation level was high and the intervention was perceived as positive due to the intervention being for free and convenient, and the valued role of the employer towards the health of the employees. Moreover, the snack tomatoes did not function as a substitution for unhealthy snacks, but rather as an addition to the current diet. The influence of co-workers appeared to be an important topic determining the eating behavior of individuals. Furthermore, the influence of the intervention on the vegetable consumption at home was questioned. The participants' families, media and existing eating habits were factors perceived to influence the vegetable consumption at home. A significant effect on the snack tomato consumption over time was found. Factors which were relevant for the consumption of the snack tomatoes consisted of the visibility/availability of the intervention, location/distance to the dispenser, time and bringing food from home.

Conclusions: Taking the findings of this study in account, the long-term availability intervention addressing the availability of snack tomatoes, significantly increased the consumption. Moreover, adding variety in snack vegetables options could limit the selectiveness of snack vegetable interventions.

Keywords: snack vegetables, consumption, worksite intervention, food environment, availability, over time

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1.Introduction

Research has repeatedly shown that poor nutrition in combination with a lack of physical activity is associated with many illnesses and responsible for the increasing worldwide overweight population (Ng et al., 2014; Wang et al., 2016). Unhealthy snacking has been identified as a contributor to this issue. Over the last years, the frequency of unhealthy snacking as well as the contribution of snacks to the total calorie intake has increased (Piernas & Popkin, 2010; Verhoeven et al., 2015). Consuming more fruits and vegetables is recognized as healthy snacking behavior and a likely approach to diminish the diseases linked to obesity such as cancer, heart diseases and diabetes (Forouzanfar et al., 2015; McCullough et al., 2002; Shepherd et al., 2006).

The majority of the population living in Western countries eats an insufficient amount of the suggested fruits and vegetables (Yngve et al., 2005). This is also the case in the Netherlands. According to the Netherlands National Institute for Public Health and the Environment (Rijksinstituut voor Volksgezondheid en Milieu), it is recommended to consume 200 grams of vegetables and 200 grams of fruit every day. The Netherlands Nutrition Centre (Stichting Voedingscentrum Nederland) advises to eat even more vegetables, namely at least 250 grams a day. However, the average Dutch adult only consumes 145 grams of vegetables and 112 grams of fruit on a daily basis (Rijksinstituut voor Volksgezondheid en Milieu, nd; Voedingscentrum, nd). In order to increase the consumption of fruits and vegetables, the Netherlands Nutrition Centre suggests eating more during the day (Voedingscentrum, nd).

The inconsistency between the recommended consumption and actual consumption has led to many initiatives from governmental- and public health organizations to increase the fruit and vegetable consumption under the general public (Brug et al., 1995). Strategies adjusting the environment to improve the health of individuals have been widely used and acknowledged. This is supported by studies concluding that elements in the food environment, such as availability, visibility and accessibility, strongly influence the amount of food consumed (Cohen & Farley, 2008; Shepherd et al., 2006). The workplace positions itself as a unique environmental setting since enables to reach a considerable population of adults (European Commission, 2005; Pomerleau et al., 2005; Wanjek, 2005). Next to increasing the fruit and/or vegetable consumption of employees, multiple studies recognized the potential of worksite interventions in other behavioral changes. These consists of unhealthy snacks being substituted for healthy snacks as well as the intervention influences the eating behavior of the employees at home (Alina et al., 2010; Backman et al., 2011; Devine et al., 2006; Lake et al., 2016).

Many studies on the development of a healthy diet focused on short-term worksite interventions to increase the fruit and vegetable consumption, often only by measuring the effect of the intervention once (Pomerleau et al., 2005; Sorensen et al., 2004). Especially interventions in worksite canteens aiming to improve healthy eating have been widely researched (Engbers et al., 2006; Steenhuis et al., 2004; Vermeer et al., 2011; Vyth et al., 2011). However, the findings from these studies demonstrated that the interventions did not always have an effect on the eating behavior of the participants (Engbers et al., 2006; Steenhuis et al., 2004; Vermeer et al., 2011).

There are hardly any studies focusing solely on increasing the healthy snack consumption with an environmental intervention positioned at the worksite (Engbers et al., 2006; Alinia et al., 2010; Backman et al., 2011). Especially measuring the effect of the intervention over a period of time (Beresford et al., 2001; Hutchinson, 2013). In addition, there are hardly any studies focusing solely on increasing the vegetable snack consumption (Kushida et al., 2004). In this field, no research has been conducted where the dynamics and influence of a worksite intervention on snack vegetable consumption has been determined over time. Therefore, this study will examine the dynamics of a worksite intervention over time to increase the vegetable snack intake among employees. The study aims to increase the healthy snacking behavior of employees through a free vegetable intervention which addresses the availability. This will be done by exploring how often and in what way the intervention is used, investigating the influence of the intervention over time, and determining the rationale of the employees. Therefore, this study will include three research questions:

1. *How often and in what way do employees make use of the intervention?*
2. *What is the influence of a free vegetable worksite intervention over time on:*
 - *the appreciation of the intervention*
 - *the self-reported consumption of vegetables at work*
 - *the self-reported consumption of unhealthy snacks*
 - *the self-reported consumption of vegetables at home*
3. *What are the motives of the employees behind:*
 - *the appreciation of the intervention*
 - *the self-reported consumption of vegetables at work*
 - *the self-reported consumption of unhealthy snacks*
 - *the self-reported consumption of vegetables at home*

For this research, a snack tomato dispenser was placed near the canteen of the municipality of Venray, the Netherlands for 20 weeks in 2019. The employees of the municipality had the opportunity to 'tap' the tomatoes every Wednesday and Thursday afternoon from the dispenser into a cup provided adjacent to the dispenser.

In order to answer the first research question, the first study will determine the behavior and intake of the employees around the dispenser by observing. During the two-day observations, the behavior of the employees using the dispenser will be tracked. The second research question will be answered by conducting a three-wave longitudinal study, with an interwave interval of seven weeks. For this, self-administered surveys were used to determine the effect over time of the tomato dispenser on the appreciation of the intervention, the consumption of the snack tomatoes at work and at home, and the intake of unhealthy snacks. The final study will answer the third research question by conducting an exploratory qualitative approach. This consists of three focus groups with the office workers and one focus group with the staff of the canteen of the municipality of Venray. This will give in-depth insight in the rationale of the appreciation level, the consumption of the snack tomatoes at work, the intake of unhealthy snacks and the consumption of the snack tomatoes at home.

The findings of this study can offer a better insight in the vegetable consumption at the worksite as well as understanding the determinants of the employees' snacking behavior. Since the majority of the population works, influencing the food environment by an intervention is a promising method to stimulate and sustain the vegetable consumption. The knowledge gained

from this research may pertain to improving the health by altering the snacking habits of employees as well as the health of the general public.

2. Theoretical background

In order to get more insight in the effectiveness of a worksite intervention on the snack vegetable consumption of employees, it is of importance to understand the elements which influence and determine the vegetable consumption. Therefore, this chapter will start by explaining the food decision process which elaborates why it is difficult for people to make healthy food choices. Next to this, relevant frameworks and models are provided which focus on the decision making of individuals as well as the intention to change behavior. Thereafter, worksite interventions which focused on creating a healthy snack environment will be examined. The different dynamics and the sustained effects of interventions will also be touched upon. Finally, the conceptual model and hypotheses for this study will be discussed.

2.1 The food decision-making process

Human beings make an abundance of food choices every day. At first sight, these seem straightforward and uncomplicated. However, this is quite the contrary. Making decisions related to consumption are complex and influenced by a great deal of elements. These decisions are unconsciously influenced by the underlying preferences and automatic behavior of individuals which makes choosing healthy food choices even more difficult (Köster, 2009). Therefore, in order to stimulate the vegetable snack consumption, insight in the food decision-making process of individuals is of importance.

2.1.1 Why choosing healthy food is difficult

When making food choices, the aspiration to eat healthily is often hindered by unconscious desires and underlying preferences. The decision process linked to this can be categorized into System 1 and System 2 introduced by Kahneman (2003). The dual-system decision-making process explains the cognitive processes a human being goes through and the trade-offs he or she will have to make when making food choices. System 1, also known as the intuitive process, is quick, emotion-based, effortless and automatic. It contributes to the first impression and intuition a person has about a certain phenomenon. On the other hand, System 2, also known as the rational process, is distinguished as rule-based, controlled and effortful. System 2 often generates a feeling of second-guessing and doubt (Kahneman, 2003; Stanovich & West, 2002; Stanovich, 2011). The framework has provided opportunities in the domain of health choices. Specifically elaborating on why System 1 prefers unhealthy over healthy food options and the biases related to it. Thereby, multiple psychological factors have been identified as determinants in the unhealthy eating behavior of individuals.

Conflict between the systems

Firstly, the systems encounter a struggle since System 1 answers to certain and immediate pleasure, while System 2 has to consciously deliberate about the future consequences. This leads to complexity between System 1 and System 2. A lack of self-control is created due to System 2 failing and choosing for an unhealthy option preferred by System 1. Self-control is required in order to make healthy food decisions. Resisting the temptation of desirable unhealthy food demands self-control. Utilizing self-control is particularly difficult in situations when individuals are tired, stressed, or under time pressure (Chance et al., 2014; Schmeichel, 2007). Velema et al. (2018) found that a driver for unhealthy snacking was the feeling of deserving it. In their study aiming to determine the motives for food selection in the worksite

cafeteria, employees indicated having the desire to have a break from work and take a moment to relax which led them to visit the worksite canteen. The combination of stress, lack of time and the availability of unhealthy food options in the canteen diminishes the self-control and stimulates cravings which leads to unhealthy snacking. The feeling of not having the self-control to resist the temptation consequently led to a feeling of guilt. This is rationalized by the idea that they deserve it, as the participants mentioned in the study (Velema et al., 2018). Next to handling stress, coping with negative emotions and rewarding oneself have also been identified as reasons for unhealthy snacking (Verhoeven et al., 2015).

Short and long-term effects

Secondly, people have the tendency to overestimate the short-term benefits and underestimate the long-term effects of choosing an unhealthy food option. In addition, people have the belief they will make healthier choices in the future which reduces the perception of the negative effects. Thus, System 1 favors again an unhealthy option.

Unconscious consideration

Lastly, eating behavior and food choices are often executed without conscious consideration (Köster, 2009; Marteau et al., 2012). People are not aware of the food and the amount of food they have consumed. Consumption is therefore an automatic behavior since it is performed mindlessly (Cohen & Farley, 2008). This shows that the conscious deliberation of System 2 is ignored. Next to this, since people make an abundant of food decisions every day, food choices will become habitual (Chance et al., 2014). In the study aiming to determine the factors influencing the healthy and unhealthy snack behavior among students, Hsieh (2004) found that habits play an important role in choosing a snack. Habitual behavior, in particular related to food, is difficult to overcome. This is especially the case when people are under time pressure or distracted (Wood & Neal, 2009). Individual-level interventions attempted to change the behavior of people. However, these type of interventions are unlikely to result in behavioral change. Interventions which disrupt the food environment are successful for adjusting food habits. This is because habits are cued by the environment (Verplanken & Wood, 2006).

2.1.2 Shifting towards making healthy food choices

Since the failure to eat healthily can be explained by the dual-system decision-making process, it also offers opportunities to trigger individuals towards a desirable outcome such as making healthy snack choices. The 4Ps Framework for Behavior Change provides a framework which facilitates healthy snacking through interventions in the area of Possibilities, Process, Persuasion and Person (Chance et al., 2014).

Possibilities

Firstly, Possibilities concerns the assortment, quantity and variety of the available options. Interventions within this domain stimulate individuals to make healthy choices. This is done by adjusting the attractiveness to favor a healthier option or by encouraging human beings towards a healthy choice. Availability was found to be a strong predictor of food choices. Individuals have the tendency to eat what is in front of them (Backman et al., 2011; Chance et al., 2014). This is substantiated by the number of worksite intervention studies focusing solely on increasing the availability of healthy food products such as fruit and vegetables to stimulate healthy dietary behavior (Alinia et al., 2010; Backman et al., 2011; Lake et al. 2016; Pescud

et al., 2016). Moreover, the variation of food options influences consumption. The perception of a large variety of options satisfies individuals (Chance et al., 2014). The probability that a food product meets the goal of the consumer is higher when the options of that product type are increased (Chernev, 2012). The study by Velema et al. (2018), confirms this presumption in their study where the motivation for food choices was investigated of Dutch employees. The participants referred to more variety of healthy products as a way to stimulate making healthy food choices. Similar results were found by Pechey et al. (2018). The intervention in their study consisted of increasing the proportion of healthier options available in worksite cafeterias. Even though the impact varied across the different cafeterias, increasing the variety of healthy options is seen as a promising intervention to stimulate healthy food choices (Pechey et al., 2018).

Process

Secondly, Process refers to how choices are made. This entails interventions that change the behavior of individuals by adjusting the physical area. This changes the attractiveness or ease of choosing the options. These type of interventions are also referred to as environmental interventions or 'choice architecture'. Increasing the convenience or accessibility has a powerful influence on the choices individuals make (Chance et al., 2014). Similar to availability, healthy food options should be easy to access in order to stimulate healthy food choices since it determines the food consumed (Backman et al., 2011; Cohen & Farley, 2008; Shepherd et al., 2006).

Persuasion

Thirdly, Persuasion interventions aim to adjust behavior by presenting information and messages. This method specifically targets System 1, which makes healthy options favorable compared to unhealthy options. Here, persuasive visuals and descriptions guide individuals in making the healthy choice (Chance et al., 2014).

Person

Lastly, Person concerns changing the goals and habits of individuals towards the healthy choices by providing advice and information. Interventions in this domain focus on creating goals in a specific context such as eat at least 250 grams of vegetables every day. Thus, making it measurable and related to a specific goal or target (Chance et al., 2014).

Next to The 4Ps Framework for Behavior Change, pricing strategies have also shown to be promising to stimulate healthy food choices. Subsidizing healthy food products and introducing taxes on unhealthy food have been identified as being effective to change consumption and food purchases (Lakerveld et al., 2018). Simply discounting fruit and vegetables increases the consumption of fruit and vegetables (Mackenbach et al., 2016; Waterlander et al., 2013).

2.2 The workplace as a contributor to healthy consumption

Within the literature regarding the influence of the food environment on the consumption patterns of individuals, the workplace has proposed itself as an influential factor. Adults spend a significant amount of time at work which enables the worksite to be a unique setting to reach a large part of the adult population. Next to this, it stimulates healthy food choices which has been related to a reduction in absenteeism and sick leave (Sorensen et al., 2004; Wanjek,

2005). Therefore, the workplace has been identified by various studies as an ideal setting to implement dietary modifications (Allan et al., 2017; Geaney et al., 2013; Hutchinson, 2013; Lake et al., 2013; Mhurchu et al., 2010). The literature provides many intervention studies aiming to improve the dietary behavior of individuals. Yet, for the purpose of this research, solely worksite intervention studies focused on increasing the fruit and/or vegetable intake of employees as a healthy snack will be examined.

2.2.1 Worksite interventions

Various worksite interventions can be found in the literature which specifically focus on implementing healthy behavior among employees. These focused on environmental adjustments only or in combination with educational interventions involving the stimulation of physical activity, dietary changes and improving lifestyle factors (Mhurchu et al., 2010).

A review of the literature showed that there are many studies using educational and environmental interventions to stimulate the healthy behavior of employees. The reason for combining educational and environmental interventions derives from the presumption that there is a strong link between individuals and their environment. The food selection and eating behavior of individuals is complex and determined by an abundance of factors.

Therefore, environments have the potential to help stimulate healthy dietary behavior. Solely the skills and motivations of individuals are not enough, yet the environment should be attractive, accessible as well as motivate and educate people to eat healthy (Sallis et al., 2008; Sallis & Owen, 2002).

However, worksite intervention studies solely focusing on improving the fruit and/or vegetable intake are less common (Beresford et al., 2001; Hutchinson et al., 2013; Lassen et al., 2011; Sorensen et al., 1999). The findings from reviewing the relevant literature suggests that worksite interventions are effective in improving the fruit and/or vegetable consumption. Yet, studies using follow-up periods reported a reduction in the effect of the intervention after the follow-up period (Beresford et al., 2001; Hutchinson et al., 2013).

Next to determining the effect of the intervention on the intake of fruit and/or vegetable intake, some studies also determined other outcomes such as high-fat snack consumption and fat intake (Hutchinson et al., 2013; Lassen et al., 2011). The effects found in the studies are significant, yet generally small. This implies that environmental and educational adjustments improve, amongst others, the fruit and/or vegetable intake of employees. However, all outcomes in the studies were measured using self-reported surveys. This makes it probable that the effect on the diet of the individuals is overestimated (Mhurchu et al., 2010).

The table below gives an overview of studies combining educational and environmental changes to the workplace to stimulate healthy dietary behavior by targeting the fruit and/or vegetable intake of employees.

Table 1: Educational and environmental worksite intervention studies on fruit and vegetable consumption

Author(s) & year	Study design	Intervention study	Setting	Outcome measured	Results
Beresford et al. 2001 <i>Seattle 5 a Day worksite program to increase fruit and vegetable consumption</i>	Randomized, controlled trial Data collection at baseline and 2-year follow-up with self-reported measure surveys.	Environmental: Changing the eating context and availability Individual: Education and information provision	28 worksites with cafeterias around Seattle, USA.	Daily fruit and vegetable intake per serving	Intervention effect of 0.3 daily servings of fruit and vegetable (Intervention group increase of 0.5 servings and control group increase of 0.2 servings)
Hutchinson et al. 2013 <i>Increasing employees' fruit consumption through access and peer support at work</i>	Randomized intervention divided into three conditions: A: free fruit provision B: free fruit provision and peer education C: Control group Data collection pre- and post-intervention and after 2-week maintenance period with self-reported measure surveys.	Environmental: Free fruit provision Individual: Peer support	3 South-Australian utility companies 75 employees	Weekly fruit consumption at work per serving Weekly fruit consumption at home per serving Weekly high fat snack consumption per serving	Fruit consumption at work increased for group A and group B between pre- and post measure (3.38 servings per week). No significant difference in fruit consumption at home for all groups High fat snack consumption decreased for group A and group B and increased for group C. Difference pre- and post measure of 3.49 servings and post and maintenance measure difference of 4.34 servings.
Lassen et al. 2011 <i>Improving the diet of employees at blue-collar worksites: results from the 'Food at Work' intervention study</i>	Randomized 6-month intervention Data collection at baseline and endpoint with employee dietary and canteen surveys.	Environmental: Changes to physical environment (e.g. free fruit program and healthy canteen choices) Individual: Education and information provision	8 Danish blue-collar worksites	Fruit and vegetable intake in average grams per day Daily fat intake in %E	Intervention group: decrease intake daily fat (-2.2 %E), increase intake fiber (9g.) and fruit (55g.)
Sorensen et al. 1999 <i>Increasing fruit and vegetable consumption through worksites and families in the treatwell 5-a-day study</i>	Randomized intervention divided into three conditions: A: Minimal intervention B: Worksite intervention C: Worksite-plus-family intervention Data collection at baseline and endpoint with self-reported measure surveys.	A: Education and information provision B: Education and information provision, physical changes to environment C: Education and information provision, physical changes to environment, take-home educational information.	22 worksites in Eastern Massachusetts, USA	Daily fruit and vegetable intake per serving Coworker and household support for healthy eating Worker characteristics	Fruit and vegetable intake per serving increase of Minimal intervention: 0% Worksite intervention: 7% Worksite-plus-family intervention: 19%

A worksite intervention study aiming to increase the fruit and vegetable intake with an environmental and educational approach is The Seattle 5-a-Day Work-Site Project (Beresford et al., 2001). The randomized controlled trial included 28 worksites located in Seattle, USA. The environmental interventions consisted of adjusting the eating context and the availability of healthy food options. Furthermore, education and information were provided to the employees of the workplaces. Self-administered questionnaires were used to measure the fruit and vegetable intake. The results showed that there was a significant differential increase of 0.5 servings in the fruit and vegetable intake of the employees in the intervention group. The fruit and vegetable intake of the control group increased by 0.2, which implies an intervention effect of 0.3 servings (Beresford et al., 2001).

Another intervention study, which investigated the food and nutrient intake of Danish blue-collar worksites, found increases in daily fruit and fiber intake and decreases in daily fat intake (Lassen et al., 2011). The interventions included changes to the physical environment such as a free fruit program and healthy canteen choices. Next to this, educational information material was provided. The six-month randomized intervention assessed the intake of the employees with dietary and canteen surveys. The intervention group had an increase of 3 grams of fiber, 55 grams of fruit and a decrease of 2.2 %E fat intake (Lassen et al., 2011).

There were two relevant studies which determined the effect of educational and environmental changes to a worksite with similar study designs. The study design consisted of dividing the interventions into three conditions. Both studies found that the combination of educational and environmental changes had the largest effect on the fruit and/or vegetable intake (Hutchinson et al., 2013; Sorensen et al., 1999).

The study by Hutchinson et al. (2013) investigated the influence of free fruit provision and peer support at work. The randomized intervention study, divided the three South-Australian companies into three different conditions groups. Group A only received the free fruit, group B received free fruit and peer support and group C was the control group. The fruit intake as well as the consumption of high-fat snacks was measured using self-reported surveys. The results of the worksite intervention study demonstrated that group A had an increase in fruit intake in combination with a decrease in unhealthy snacking. The combination of free fruit provision and peer support led to a sustained effect of increased in fruit intake and less unhealthy snacking (Hutchinson et al., 2013).

The Treatwell 5-a-Day study by Sorensen et al. (1999) aimed to increase the fruit and vegetable intake of workers with a worksite intervention. The randomized study divided 22 worksites into three conditions. Group A was the minimal intervention control group. Group B received a worksite intervention and group C included a worksite and family intervention. The data was collected by using self-reported questionnaires before and after the intervention. The results demonstrated that the worksite and family intervention was the most successful in increasing the daily fruit and vegetable intake. Group C had a fruit and vegetable consumption increase of 19% (approximately 0.5 servings), while group B increased with 7% (approximately 0.2 servings) and group A remained unchanged (Sorensen et al., 1999).

2.2.2 Environmental workplace interventions

Environmental interventions, also known as 'choice architecture', concern alterations to the position and/or properties of an object which affect the appeal or ease of the selection (Allan et al., 2016; Chance et al., 2014).

According to Glanz & Mullis (1988): "*Environmental interventions can be defined as that class of strategies which does not require individuals to self-select into a defined educational program (i.e., class, group, or counseling situation). These strategies reach populations through influencing the availability of healthy food, access to information for making food choices, and the attractiveness of nutrition education experiences*" (p. 397).

When comparing environmental interventions to individually based interventions at the workplace, environmental interventions have two theoretically based advantages. Firstly, the environmental interventions do not require human beings to put an effort to adjust their behavior. This is due to effortless and automatic process the decision making process goes

through. Secondly, environmental interventions have the potential to be cost-effective since only a few resources are typically necessary (Allan et al., 2017).

A review of the literature showed that the majority of these studies combined interventions types (e.g. increase availability and healthy labeling) and there are hardly any studies not focusing on the worksite cafeteria and meals during lunch to stimulate healthy food decisions (Engbers et al., 2006; Jeffery et al., 1994; Kushida et al., 2014).

Next to this, before-after designs at single settings and controlled trials are common in this domain. Outcomes measured related mainly to the effect of the intervention on the eating behavior. These included objective as well as subjective measures of adjustments of eating behavior such as fruit and vegetable consumption and overall calorie intake. Secondary outcomes such as measures related to the weight change were also common (Allan et al., 2017).

The table below gives an overview of environmental worksite interventions aiming to improve, amongst others, the fruit and/or vegetable intake of employees. The findings from the studies demonstrated mixed results. This implies that one study found no effects due to the intervention (Engbers et al., 2006), while other studies did find significant changes in the sales or intake of fruit and/or vegetables (Jeffery et al., 1994; Kushida et al., 2014). Next to this, studies using follow-up periods reported a decrease in the influence of the intervention after the follow-up period (Engbers et al., 2006; Jeffery et al., 1994). Determining why the intervention has an effect or not is difficult due to the combined intervention types used in these studies (e.g. increase availability and healthy labeling).

Table 2: Illustrative environmental worksite interventions studies

Author(s) & year	Study design	Intervention study	Setting	Outcome measured	Results
Engbers et al. 2006	Controlled trial: cluster	Health promotion materials	Two Dutch governmental organizations	Daily fruit and vegetable intake in grams	No effects found on fruit, vegetable and fat intake
<i>The effects of a controlled worksite environmental intervention on determinants of dietary behavior and self-reported fruit, vegetable and fat intake</i>	12-month intervention study.	Provision of information and healthy food options		Daily fat consumption in grams	Change in dietary behavior: more support from colleagues to eat less fat
	Data collection at baseline, 3 and 12 months after baseline with self-administered questionnaires			Psychosocial determinants of behavior (attitude, social support, self-efficacy and intention)	
Jeffrey et al. 1994	Interrupted time series	Increase availability healthy options	University office building, USA	Number of fruit sales per day	Fruit and salad sales increased threefold during intervention period
<i>An environmental intervention to increase fruit and salad purchases in a cafeteria.</i>	3-week intervention study	Decrease price healthy options		Pound of salad sales per day	Fruit increase of 47.59 purchases Salad increase of 95.36 purchases
	Observations 3 weeks of baseline, 3 weeks of intervention, and 3 weeks after intervention.				
Kushida et al. 2004	Controlled trial: cluster	Health promotion materials	16 worksites in Niigata, Japan	Daily vegetable intake per serving	Increased vegetable intake for intervention group (+0.18 servings per day)
<i>Effects of environmental intervention in workplace cafeterias on vegetable consumption by male workers.</i>	6-month intervention study	Menu adjustments	349 male workers		
	Data collection at baseline and post intervention with self-administered questionnaires				

One study presented the effects of an environmental worksite intervention on the intake of fruit, vegetables, and fat as well as the determinants of behavior related to making food choices (Engbers et al., 2006). The 12-month controlled trial consisted of one intervention group and one control group. The interventions included the provision of health promotion materials and the introduction of information and healthy food options in the company which facilitated making healthier food choices. The results of the study demonstrated that there were no effects found on the self-reported fruit, vegetable and fat intake. Adjustments in the dietary behavior of the intervention group were found. Namely, the perception of more support for colleagues. In particular, related to eating less fat (Engbers et al., 2006).

Another study, where the impact of an environmental worksite intervention to increase the vegetable intake in canteens was assessed (Kushida et al., 2014). This six-month nonrandomized controlled trial included eight intervention and eight control workplaces in Japan. The intervention included providing health promotional materials and making changes to the menu. The vegetable intake of male workers in company canteens was measured with self-administered questionnaires. The findings of the study identified that there was a significant increase of 0.18 servings of vegetables of the intervention group (Kushida et al., 2014).

Likewise, a three-week intervention study increasing the availability and reducing the price of healthy options found that the consumption of fruit and salad in a canteen setting increased (Jeffery et al., 1994). The study was conducted at the canteen of a University office building and measured by assessing the sales of fruit and salad. The results of the study demonstrated that the sales of fruit increased threefold in the intervention period compared to non-intervention periods, namely to 47.59 purchases per day.

2.2.3 Availability interventions

Research has shown that simply making food available strongly influences the consumption of individuals (Backman et al., 2011; Cohen & Farley, 2008; Hsieh, 2004; Shepherd et al., 2006; Verhoeven et al., 2014). Availability has been identified as the number one driver in fruit and vegetable intake among children. Backman et al. (2011) found that by inferring that the eating patterns of working adults are similar to those of children when provided with free fruit, the increase in fruit consumption can be assigned to the increased availability and accessibility of fruit at worksites (Backman et al., 2011).

Since individuals have the tendency to eat what is in front of them (Chance et al., 2014; Backman et al., 2011), and different studies demonstrated the influencing role of availability on the food choices of individuals (Backman et al., 2011; Cohen & Farley, 2008; Hsieh, 2004; Pechey et al., 2018; Shepherd et al., 2006; Verhoeven et al., 2014), increasing the provision of healthy snacks can improve the eating behavior of individuals (Schätzer et al., 2010). Simply introducing healthy snacks into the workplace is an easy way to offer employees access to healthy snacks without the requirement of cooking or preparation (Alinia et al., 2010).

A review of the literature showed that there are less environmental intervention studies focusing solely on one type of intervention to stimulate healthy eating behavior among employees (Alinia et al., 2010; Backman et al., 2011). Particularly studies addressing the influence of increasing the availability of healthy snacks such as fruits and vegetables at the worksite are limited (Table 3). The relevant literature demonstrated that interventions addressing the availability of fruits and/or vegetables are successful in increasing the fruit and/or vegetable intake.

A worksite intervention study investigating the feasibility of increasing fruit consumption with a minimal fruit intervention, found an increase in the fruit consumption of employees by increasing the availability and accessibility (Alinia et al., 2010). In the study, fruit baskets containing apples, pears, oranges or bananas were provided in a free accessible room at the workplaces. A minimum of one piece of fruit was made available per day per participant. The availability and accessibility of the fruit increased the daily fruit intake of the participants with 112 grams. The daily intake sugar significantly decreased and the daily fiber intake significantly increased. Next to this, the total energy intake remained unchanged implying that the fruit provided substituted other food items in the diet of the participants (Alinia et al., 2010).

Next to investigating the impact of making fresh fruit available on the fruit intake, the study by Backman et al (2011), also established the influence of related psychosocial determinants. The intervention study focused amongst others on self-efficacy. Self-efficacy is specifically of interest due to the fact that self-efficacy has been recognized as a strong predictor for fruit and vegetable intake (Shaikh et al., 2008). The study found that improving the accessibility of fruit at work, leads to an increased fruit and vegetable consumption and improves the purchasing habits of employees (Backman et al., 2011). In this study, the influence of fresh fruit availability at nine worksites in Los Angeles, CA was investigated. Here, six worksites received fresh fruit delivery, three times a week for 12 weeks while the three other worksites received nothing. The results of the study demonstrated that the participants in the intervention group had a significant increase of 0.13 over the assessment points in the total fruit and vegetable consumption, 0.16 increase purchasing of fruit, increase of 0.14 family purchasing of

vegetables. The study also found that the self-efficacy, the belief of an individual's capability to accomplish a behavior, of eating two pieces of fruits on a daily basis increased (Backman et al., 2011).

Table 3: Worksite intervention studies on the influence of availability on fruit and vegetable consumption

Author(s) & year	Study design	Setting	Outcome measured	Result
Alinia et al. 2010 <i>A workplace feasibility study of the effect of a minimal fruit intervention of fruit intake</i>	Cluster controlled trial 5-month free fruit intervention study. Data collection at baseline and endpoint with a 24h recall questionnaire.	8 Danish worksites	Total fruit intake Total dietary intake	Intervention group: Fruit intake increased (112 g.) Fiber intake increased (3•0 g.) Sugar intake decreased (10•7 g.) Vegetable, total energy intake remained unchanged
Backman et al. 2011 <i>Effect of fresh fruit availability at worksites on the fruit and vegetable consumption of low-wage employees</i>	Cluster randomized trial 12-week fresh fruit intervention study. Data collection at baseline, week 4, week 8 and endpoint.	9 worksites in Los Angeles, CA	Fruit and vegetable consumption per serving and purchasing habits, self-efficacy, job satisfaction and overall health	Intervention group: Significant increase total fruit and vegetable consumption (0.13), purchasing of fruit (0.16), family purchasing of vegetables (0.14) and self-efficacy (0.18).

2.2.4 Dynamics and influential factors of intervention

Within worksite intervention studies aiming to stimulate fruit and vegetable consumption, different dynamics have emerged. These consist of additional effects of the intervention as well as determinants found to be relevant for successful interventions.

Additional effects of the intervention

Awareness and openness

Next to determining the effect of the intervention on the intake of fruits and/or vegetables, Lake et al. (2016) focused on establishing the effect on the behavior of the employees. Lake et al. (2016) found that the participants in their study initiated other perceived behavioral changes. These consisted of increased awareness of the food they were consuming which as a result led to looking at food labels. The intervention also led to the participants being more adventurous in trying and purchasing new fruits for themselves and their families. This also implied that the variety of fruits the participants consumed increased (Lake et al., 2016).

Spillover effect

There is some evidence that workplace-based interventions have the potential to create a spillover effect (Backman et al., 2011; Lake et al., 2016). This implies the intervention effect at work is brought home and has the potential to affect others as well. Elements such as job satisfaction, working hours and job strain have been identified as factors which influence the individual and family behavior. This has been linked to eventually influencing the fruit and vegetable consumption (Devine et al., 2006).

The study by Backman et al. (2011) did find an effect of the workplace intervention on the eating behavior of the employees beyond the workplace. The study postulated that the fresh fruit availability intervention would increase the fruit consumption and purchasing.

The participants in their fresh fruit availability intervention study at work showed a significant increase over the assessment points in the self-purchasing of fruit (0.16 servings). However, no statistically significant differences were found in the family purchasing of fruit in the intervention group.

At first sight, it appears that interventions have the potential to influence the consumption at home. However, the literature has demonstrated that there is hardly or no effect of an intervention at work to the home environment or it is difficult to determine.

Respondents in the explorative qualitative study by Lake et al. (2016) mentioned that the intervention where free fruit was provided at the workplace, also had a perceived effect on others. By participating in the intervention study, the participants and their families were consuming more fruits. It is however difficult to determine what the exact effect of the intervention is on the consumption at home due to the fact that this study was set up as a qualitative study to explore the perceived behavioral changes of the employees (Lake et al., 2016).

The study by Hutchinson et al. (2013) aimed to determine the effect of providing free fruit and peer support in the work environment. No dietary adjustments beyond the workplace were found in their study. This implies no significant differences were found in the fruit consumption at home. This means that the changes in the fruit consumption of the participants at work were not generalized to the home environment (Hutchinson et al., 2013).

Unhealthy snacking

Next to aiming to increase the fruit and/or vegetable consumption among employees, multiple studies also focused on reducing unhealthy snacking behavior. There are intervention studies addressing the effect of increasing the fruit intake to decrease the total energy intake. However, these are either behavioral intervention studies or focus on the population as a whole (Ledikwe et al., 2006; Oliveira et al., 2008).

Unfortunately, there is a limited number of environmental worksite intervention studies aiming to substitute unhealthy snacks for fruits and vegetables (Alina et al., 2010; Lake et al., 2016). Next to this, not all interventions have shown to be effective ((Lake et al., 2016). Lake et al. (2016) found in their qualitative exploratory study that the majority of their respondents did not substitute fruit for less unhealthy snacks, which contrasted with the aim of the study. Yet, the participants in the study did mention that they perceived behavioral changes in their eating patterns. The intervention demonstrated the option of eating fruits instead of other unhealthy snacks such as chocolate bars (Lake et al., 2016).

Moreover, the minimal fruit intervention study by Alina et al. (2010) presented a positive influence of the intervention study on the fruit intake and total energy intake of the participants. The increased fruit consumption did not lead to a higher total energy intake indicating that the participants substituted other foods in their diets with the provided fruits.

Determinants for interventions

Peer effect

One substantial difference between individual interventions and worksite interventions is the possibility of the peer effect. The peer effect has been identified as an influential factor when making food choices. By merely seeing a co-worker eating fruit and vegetables, the likelihood

of eating at least one piece of fruit or vegetable a day was reported to increase (Tabak et al., 2015).

Lake et al. (2016) found that there was a range of peer effects in their study. This was due to the substantial amount of time the employees spend with each other as well as the knowledge and motivations of each other's behavior. An interesting peer effect established from the study was the creation of a fruit-eating competition. Here, a department from the company created a sense of fun around the intervention by stimulating and encouraging the consumption of fruit amongst each other.

Similar findings were reported by Sorensen et al. (2007). In their study identifying the influence of social context in fruit and vegetable consumption, specifically social norms and social networks were linked to fruit and vegetable intake. Hence, supportive social norms and networks were associated with increasing in fruit and vegetable intake (Sorensen et al., 2007). The other way around, social norms and pressure can also lead to unhealthy snacking. Reasons such as 'because you do not want to stand out' and 'because you feel like you cannot say no' have been identified as determining food choices (Verhoeven et al., 2015).

Perception of time

Time has been previously recognized as a factor influencing the dietary patterns and adjustment in eating habits of individuals. Particularly lack of time is referred to as the reason for consuming less fruit and vegetables and eating unhealthily (Jabs & Devine, 2006; Lake et al., 2004). Moreover, inconvenience and preparation time have been identified as barriers of consuming fruits and vegetables (Schätzer et al., 2010).

The perception of time has been linked to making food choices at work as well. Hence, the time available at work influences the choice of food. An intervention study where free fruit was made available on every floor at the workplace, so no time would be 'wasted' to acquire the fruit demonstrated this principle. Here, the participants mentioned they did not want to 'waste' time to get food. Thus, by making the fruit highly available and easy to access, they would be able to eat the fruit at their desk. This would allow them to leave earlier or take more time off (Lake et al., 2016).

Taste, appearance and liking of vegetables

Next to extrinsic factors such as the peer effect, intrinsic factors have a determining role in the consumption of individuals. This is in particular relevant for vegetable consumption. A variety of reasons lie behind vegetable consumption. Here, factors such as the taste, appearance and liking of vegetables determine the vegetable consumption (Appleton et al., 2016; Larson et al., 2008; Poelman et al., 2016). Taste, appearance and liking of vegetables are particularly relevant for intervention studies aimed at adults. Interventions can be selective since the only individuals indicating being interested in eating the vegetables or who like eating the specific vegetables will participate (Lake et al., 2016). For example, the effect of an intervention that offers free snack tomatoes may be non-existent or small due to the fact that an individual can dislike tomatoes. This implies that these intrinsic factors may distort the influence of the intervention.

2.2.5 Sustaining the intervention effect

A review of the literature on the feasibility, acceptability and impact of worksite interventions has shown that interventions are promising approaches. Particularly in increasing the fruit and/or vegetable consumption, as well as the potential to decrease unhealthy snacking.

Sustaining the effect of the intervention depends on multiple factors. The existing habits have to be adjusted, new behavior has to be initiated or triggered and the new behavior has to be maintained. This can be done by the creation of new habits. New habit formation requires repetition and reinforcement of behavior. Repeated exposure of desired behavior or prevention of undesired behaviors are examples of these (van't Riet et al., 2011; Verplanken & Wood, 2006). Adjusting the physical environment of food-related environments was found to be effective for both creating new healthy eating habits and guiding individuals to adjust existing eating habits (Neal et al., 2006). Successful sustainable interventions which adjust old habits and create new habits must follow three steps (van't Riet et al., 2011; Verplanken & Wood, 2006).

There is evidence derived from an intervention study demonstrating that an intervention can sustain its effect. Thorsen et al. (2010) investigated whether the changes of the intervention persisted over time. The study built upon the Danish '6 a day' study by Lassen et al. (2004), to investigate the long-term sustainability of the worksite intervention study five years after the initial intervention study. This derived from the assumption that the initial success of an intervention does not imply a continuous success. The method aimed at changing the canteen environment by increasing the availability of healthy food options and diminishing the access to unhealthy foods for eight months. The setting of the study was similar to the research Lassen et al. (2004), namely with five Danish workplaces. The study found that it is feasible to sustain interventions aimed at fruit and vegetable consumption. Even though there was a difference in success between the five worksite canteens, on average they all increased the fruit and vegetable intake (Thorsen et al., 2010).

2.3 Conceptual model and hypotheses

This study investigated the dynamics of a worksite intervention which addresses the availability to increase the vegetable snack consumption among employees. The study included a mixed-method approach, being first two days of observing to distinguish the behavior of the employees around the intervention. After this, repeatedly the effect of the intervention with surveys was measured with a longitudinal design. Thereafter, multiple focus groups were held to further determine the rationale of the appreciation level, the consumption of the snack tomatoes at work, the intake of unhealthy snacks and the consumption of the snack tomatoes at home. The conceptual framework for the longitudinal study can be found in Figure 1. The longitudinal study will examine the effect of the exposure of the snack tomato intervention to the dependent variables (appreciation of the intervention, vegetable intake at work, unhealthy snacking, vegetable intake at home).

The literature has shown that variation of food impacts individuals (Chance et al., 2014). Having a large variety of options has a satisfactory effect on people. More food options increase the possibility of an individual to meet its goals (Chernev., 2012). Since the intervention of this study consists of only offering free snack tomatoes, no variation of vegetables is considered. It may therefore occur that the satisfactory level of a variety of options is not reached. As a result, impressions such as boredom may arise which influence the appreciation of the intervention. It is therefore hypothesized that the appreciation of the intervention will negatively change over time.

H1: The appreciation of the intervention will negatively change over time.

As various studies have identified the powerful effect of the availability of food on the consumption of individuals (Cohen & Farley, 2008; Hsieh, 2004; Pechey et al., 2018; Verhoeven et al., 2014), multiple availability intervention studies have demonstrated that by simply making healthy snacks such as fruits or vegetables available and accessible, individuals will increase their fruit or vegetable intake (Alinia et al., 2010; Backman et al., 2011; Lake et al., 2016). In order to maintain and sustain the effect of an intervention on individuals, the literature has shown that creating habits is of importance. Adjusting habits is difficult since these are initiated unconsciously and automatically. Yet, interventions with repetition and reinforcement are successful for adjusting food habits over time and creating new eating habits (Chance et al., 2014; van't Riet et al., 2011; Verplanken & Wood, 2006). It is therefore hypothesized that the snack tomato intake of the employees at work will positively change over time.

H2: The snack tomato consumption at work will positively change over time.

The literature demonstrated that it is difficult for individuals to make healthy food choices due to the conflict between System 1 and System 2, the trade-off between short and long-term effects and pleasure, lack of self-control and unconscious consideration. Next to this, adjusting the eating behavior of individuals is challenging due to habitual behavior. Yet, environmental interventions have been found to disrupt this automatic behavior which eventually may lead to a long-term impact (Chance et al., 2014). This will enable individuals to adjust their food habits over time. In addition, the literature review showed that there are intervention studies that found relationships between the availability of healthy snacks such as fruits and vegetables

and less unhealthy snacking (Alinia et al., 2010; Hutchinson et al., 2013). Based on these findings, the following hypothesis is postulated:

H3: Unhealthy snacking in the workplace will negatively change over time.

Since adults spend a significant amount of time at work, events and situations at the workplace are proposed to affect individual and family behavior (Devine et al., 2006). Thus, a spillover effect may develop. The literature demonstrated that the relevant intervention studies have some or hardly any effect on the consumption of fruits and/or vegetables of the participants and their families (Backman et al. 2011; Hutchinson et al., 2013; Lake et al., 2016). This implies that interventions at work hardly or do not have an influence on the fruit and/or vegetable consumption of individuals at home. Since the influence of interventions on the vegetable consumption at home is difficult to determine, the relationship will be exploratorily established.

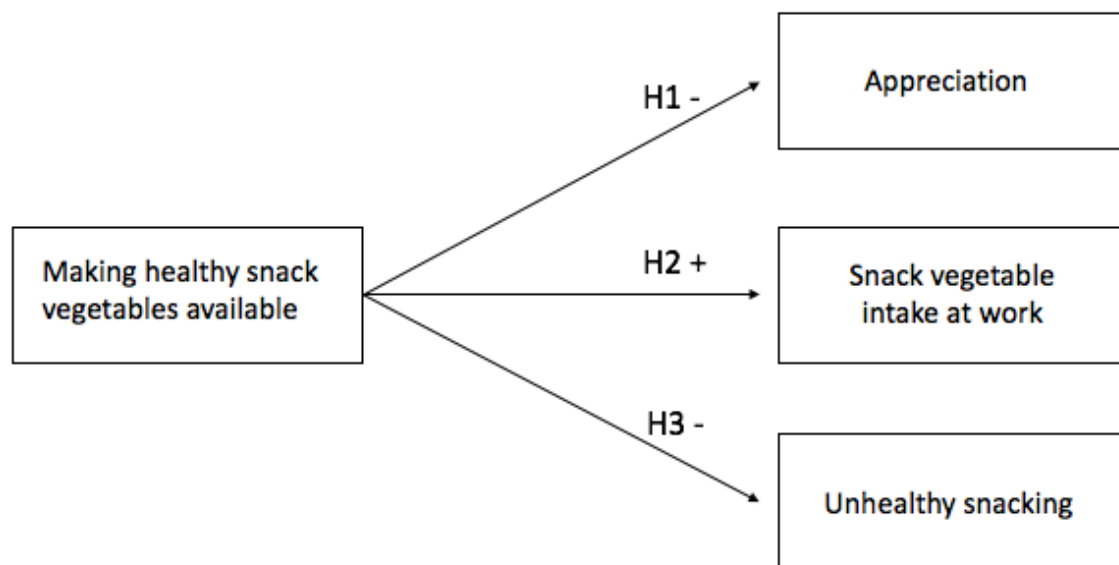


Figure 1: Conceptual model of study

3. Setting of the intervention study

The literature has shown that successful sustainable interventions require new habit formation. This entails placing cues in the environment that trigger new behavior and function as incentives (van't Riet et al., 2011; Verplanken & Wood, 2006). The minimal intervention used throughout this research consisted of placing a tomato dispenser near the entrance of the canteen. Furthermore, introducing vegetables, such as snack tomatoes, at the worksite is relatively easy since it does not require any radical adjustments to the physical environment (Alinia et al., 2010). Next to this, time and inconvenience have been recognized as barriers for consuming fruits and vegetables (Schätzer et al., 2010). However, the snack tomatoes can be consumed as a snack without any preparation necessary.

In addition, repetition and reinforcement of behavior ensure the maintenance of new habit formation. Therefore, the tomato dispenser was available and accessible for the 350 employees at the municipality of Venray, the Netherlands for 20 weeks, from in February 2019 until June 2019. Every Wednesday and Thursday afternoon after lunch (± 13.30) until 17.00, the tomato dispenser was placed near the entrance by one of the staff members of the canteen. Next to placing the tomato dispenser to its set location, the staff of the canteen ensured that the dispenser was filled. Every week, 8-12 kilograms of snack tomatoes were delivered to the canteen of the municipality. The employees of the municipality had the opportunity to 'tap' the tomatoes from the dispenser into a 100-gram cup provided adjacent to the dispenser. The figure below depicts the tomato dispenser used for the intervention study.



Figure 2: Snack tomato dispenser located near the entrance of the canteen of the municipality of Venray.

4. Study 1: Two-day observations on the behavior and tomato intake of the employees

4.1 Introduction

In order to determine how often and in what way the employees made use of the intervention, two days of observations were conducted. The following chapter presents the method used and results from the two days of observations. The method includes the design, procedure, measures and data analysis of the first study of this research. The results section provides an overview of the frequency and in what way the tomato dispenser was used.

4.2 Method of study 1

4.2.1 Design

The design of the observation was in a natural setting, implying that the office employees of the municipality of Venray were observed using the tomato dispenser as they would use it on a regular day. The individuals that were included in this study consisted of Venray's municipality office employees who used the snack tomato dispenser during the two days of observing. In addition, no further distinguishment between age, gender, race and occupation within the municipality was made in this study.

4.2.2 Procedure

The two days of observations took place on Wednesday 20 February, 2019 and Thursday 21 February, 2019 from 13.30 - 17.00. Prior to the observations, the employees were not informed about the observations in order to give a realistic view of their behavior.

Immediately after the lunch break at the municipality of Venray, the tomato dispenser was placed next to the entrance of the canteen. This gave the employees the opportunity to tap the snack tomatoes during the rest of their working day. The purpose of the observations was to identify how many employees of the municipality tapped the tomatoes, and if certain behavior appeared during this.

4.2.3 Measures

The researcher reported the behavior of the employees by tracking their actions, by the hour, on the observation form which was prepared in advance, and can be found in Appendix 1. The topics on the form consisted of the following:

- The number of employees who used the dispenser
- Tapping the tomatoes alone or in a group
- Individual consumption or tapping a full cup
- Tapping one cup or tapping multiple cups

Once the dispenser was positioned at its location, the observer tracked the behavior accordingly.

4.2.4 Data analysis

The data gathered from the two-day observations were analyzed by using Excel. The frequencies of the actions were manually transferred into Excel.

4.3 Results of study 1

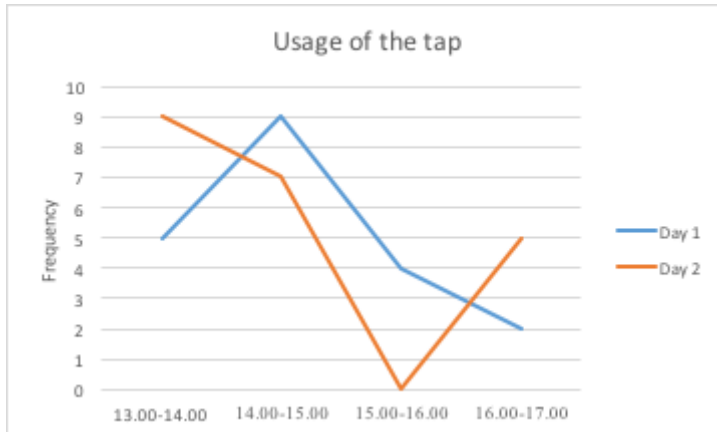


Figure 3: Frequency of the usage of the dispenser during the two-day observations

On the first day the dispenser was used 20 times and on the second day 21 times. The dispenser was most frequently used between 14.00 - 15.00 on day one (nine times), and for day two between 13.00 - 14.00 (nine times). A pattern of taking a cup full of tomatoes after the lunch back to the office was observed. Thus, when walking from the canteen back to the desk. Moreover, the canteen of the municipality of Venray also functions as a meeting spot. Once employees walked from their desk to the canteen for a meeting, the dispenser was almost always used. On both days, the majority of the employees filled a full cup while a hand full consumed some tomatoes individually. The first day, 16 individuals filled a full cup and four individually consumed a tomato from the dispenser. The second day 20 employees tapped a full cup and only one person individually consumed a single tomato from the dispenser. Tapping more than one cup one the day by the same individual was uncommon. However, it did become apparent that the majority of the individuals that used the dispenser on day one, also used the dispenser on day two. The first day four individuals used the dispenser more than two times and on the second day only two employees tapped more than once. Nearly all tapping was done alone. 18 out of 20 usages of the tomato dispenser was done alone on day one and 13 out of 21 on day two. When tapping was done in a group, not necessarily all the employees in the group used the dispenser. Some employees declined the offer by their colleagues to also use the dispenser. Yet, these employees were addressed about their choice not to use it by their colleagues. The table below shows the frequencies of the topics measures during the two day observations.

Table 4: Frequency tables of the topics measured during the two day observations

Day 1	Usage	1 cup	>2 cups	Alone	Group	Individual Consumption	Full cup
13.00-14.00	5	3	1	4	1	1	4
14.00-15.00	9	6	2	9	0	2	7
15.00-16.00	4	3	1	4	0	0	4
16.00-17.00	2	2	0	1	1	1	1
Total	20	14	4	18	2	4	16

Day 2	Usage	1 cup	>2 cups	Alone	Group	Individual Consumption	Full cup
13.00-14.00	9	9	0	4	2	0	9
14.00-15.00	7	6	1	4	2	1	6
15.00-16.00	0	0	0	0	0	0	0
16.00-17.00	5	4	1	5	0	0	5
Total	21	19	2	13	4	1	20

Next to observing, a short conversation with a staff member of the canteen was held. During the conversation, she mentioned that she noticed that many employees used and liked the dispenser. She even noticed that the same principles as 'getting coffee for colleagues' applied to the dispenser. A week prior to the observation she recalled seeing an employee filling a serving tray with cups full with the snack tomatoes. The employees however did refer to the size of the cup as too small and inconvenient when tapping.

4.4 Discussion of study 1

During the two days of observing multiple behavioral patterns became apparent. These consisted of the fact that the dispenser was used 20 and 21 times respectively on day one and day two. The frequency of using the dispenser was the highest the first hours after lunch. Tapping more cups for e.g. colleagues had taken place, yet was not prevalent. When using the dispenser, the majority of the employees did this alone and tapped a full cup.

The design of the study created a first realistic view of how the employees would use the dispenser in real-life. However, the study only presented an overview of how often and in what way the employees made use of the tomato dispenser for two consecutive days at the start of the intervention. Therefore, the following study will determine the influence of the intervention over time. The three-wave longitudinal study with self-administered surveys will examine the influence of the intervention over time on the appreciation, the consumption of the snack tomatoes at work, the intake of unhealthy snacks at work and the vegetable consumption at home.

5. Study 2: Self-administered surveys on the effect of the intervention over time

5.1 Introduction

In order to determine the effect of the intervention over time, a three-wave longitudinal study was conducted. Self-administered surveys were used to establish the effect over time of the tomato dispenser on the appreciation of the intervention, the consumption of the snack tomatoes at work, the intake of unhealthy snacks at work and the vegetable consumption at home. This chapter starts by establishing the method used for study. This entails an explanation of the participants, design, procedure, measure and data analysis. Thereafter, the results of the effect over time of the intervention on the appreciation, the consumption of the snack tomatoes at work and at home, and the intake of unhealthy snacks are provided.

5.2 Method of study 2

5.2.1 Participants

The participants of this study consisted of Venray's municipality office employees. Prior to each wave in the longitudinal study, the employees of the municipality of Venray received a message via their intranet about the self-administered surveys. The participants were personally recruited at their desk by shortly informing them about the survey and kindly asking them to participate. Moreover, no distinguishment between age, gender, race and occupation within the municipality was made in this study.

5.2.2 Design

The majority of worksite intervention studies determined the effect of the intervention by measuring the outcomes solely before and after the intervention (Alinia et al., 2010; Backman et al., 2011; Lassen et al., 2011; Sorensen et al., 1999; Sorensen et al., 2007). This implies that the sustained effect of the intervention was not always taken into account and it was difficult to determine whether the intervention had a persistent influence over time (Chance et al., 2014). Therefore, in this study, in order to examine the effect of the snack tomato intervention over time, a longitudinal design was used. The longitudinal study included three waves, which implied that the survey will be conducted three times. The self-reported survey was comprised of seven short questions. It was purposively chosen to limit the number of questions in order to increase the response rate.

5.2.3 Procedure

The first wave took place on Monday, February 25, 2019. The following waves had an interwave interval of seven weeks. Thus, the consecutive waves took place on Monday, April 15, 2019 and Monday, June 3, 2019. The distribution of the surveys started at 11.00 until 12.00. The researcher spread the self-administered surveys personally by handing the paper surveys to the employees at their desk. After lunch, from 13.30 until 15.00, the researcher gathered the distributed surveys. At the beginning of the survey, participants were informed about the objective. Only participants were included who were familiar with the tomato

dispenser. Therefore, the first question consisted of asking the participants if they were aware of the snack tomato dispenser near the canteen. Thereafter, questions regarding the appreciation, presence at work, snack tomato intake at work, unhealthy snacking at work, vegetable consumption at home and energy level were asked. The question regarding the energy level of the participants was included in the survey in collaboration with the Louis Bolk Instituut. The data and results from this variable will not be included in this research.

5.2.4 Measures

In order to determine the influence of the free snack tomato intervention, the dependent variables consisting of the appreciation, vegetable intake at work, unhealthy snacking and vegetable intake at home were assessed. Next to this, general questions regarding the awareness of the tomato dispenser and presence at work were asked. The survey which was used for the longitudinal study can be found in Appendix 2.

Dependent variables

Appreciation

The employees of the municipality of Venray were asked to what extent they agree with the following statement: 'I appreciate the tomato dispenser offered by the municipality of Venray'. The level of appreciation was determined by using three answer options consisting of 'disagree', 'I do not know' and 'agree'.

Snack intake at work

The consumption was established by determining the frequency the tomato dispenser was used by the participants at work. The perceived tomato intake was assessed using four answer options. These consist of 'never', 'once a week', 'once every day' and 'several times a day'.

Unhealthy snacking at work

In order to detect if the snack tomato intervention had an effect on the unhealthy snacking behavior of the employees, the perceived unhealthy snacking behavior was determined. This was done by asking the participants if they had the impression that they eat more or less unhealthy snacks since the tomato dispenser was placed. Five answer options assessed this consisting of 'less unhealthy snacking', 'same amount', 'more healthy snacks', 'unsure' and 'not consuming unhealthy snacks at all'.

Vegetable intake at home

The final dependent variable consisted of establishing if there is a spillover effect due to the intervention. This means establishing if the intervention influenced the perceived vegetable intake at home. Therefore, the participants were asked to determine if they consumed more or less vegetables at home. The answer options for this question involved 'less vegetables', 'same amount', 'more vegetables' and 'unsure'.

Background information

Awareness

In order to determine the awareness of the snack tomato dispenser, the participants were asked if they were familiar with it. The answer options consisted of 'yes, continue with questions 2' and 'no, thank you for your participation'.

Presence

Since the intervention was placed at its determined location every Wednesday and Thursday, the respondents were asked on which days they were present at the office. The participants were able to select the days on which they were present at the municipality.

5.2.5 Data analysis

The analyses which were conducted were done with the statistical software package IBM Statistics 22.0. Prior to analyzing the data, the data derived from the surveys will be manually inserted into SPSS. Next to this, each paper survey was digitized.

The chi-square test was conducted to examine significant differences in the appreciation level, unhealthy snacking and vegetable consumption at home over time. The effect of the exposure of the snack tomato dispenser over time on snack tomato consumption at work was determined with a one-way ANOVA test and post hoc test. A significance level of $P < 0.05$ was used.

5.3 Results

5.3.1 Descriptive information

In total, 227 individuals filled in the survey. Of these 227 data entries, 209 were suitable for analyses. This means that 209 individuals were aware of the tomato dispenser. Measuring point 1 and 2 included both 77 participants and measuring point 3 73 participants. The suitable number of data entries for analyses were respectively 71, 70 and 68. The majority of the participants were present on both days of the intervention, namely on Wednesdays and Thursdays.

Table 5: frequency table of the participants' presence on the days on the intervention

		Presence				Total
		Not	Wednesday	Thursday	Both	
Measuring time point	Time point 1	2	9	16	44	71
	Time point 2	3	7	15	45	70
	Time point 3	15	11	7	35	68
Total		20	27	38	124	209

For all measuring points, nearly all participants of the study appreciated the intervention. 88.7%, 82.6% and 88.2% of the participants respectively agreed with the statement provided in the self-administered survey. The majority of the participants never consumed the snack tomatoes. The results of the study show that 43 out of 71 in time point 1, 49 out of 70 in time point 2 and 38 out of 68 in time point 3 never consumed the snack tomatoes.

5.3.2 Influence on the dependent variables

Table 6: Associations between the dependent variables and the different time points

	χ^2	df	P value
Appreciation	4.773	4	0.311
Unhealthy snacking	11.338	8	0.183
Vegetable consumption at home	2.731	4	0.604

p<0.05.

The chi-square test was used to determine significant differences in appreciation level, unhealthy snacking and vegetable consumption at home over time.

- **Effect over time on the appreciation**

The results of the chi-square test demonstrate that there is no association between the time points and appreciation was observed, $\chi^2(4) = 4.773$, $p = 0.311$. This implies that there was no significant difference in the appreciation level between the three measuring points.

- **Effect over time on unhealthy snacking at work**

No association between the time points and unhealthy snacking was observed, $\chi^2(8) = 11.338$, $p = 0.183$. So, no significant difference in unhealthy snacking between the three measuring points was found.

- **Effect over time on the vegetable intake at home**

No association between the time points and vegetable consumption at home was observed, $\chi^2(4) = 2.731$, $p = 0.604$. This shows that there also no significant difference in the vegetable consumption at home between the measuring points.

- **Effect over time on tomato intake at work**

The influence of the intervention over time on the tomato consumption at work was established using a one-way ANOVA and Tukey test.

Table 7: effect of snack tomato consumption over time

	F	P value
Snack consumption at work	3.102	.047*

p<0.05.*

		Mean difference	P value
Time point 1	Time point 2	0.14930	0.533
	Time point 3	- 0.20070	0.328
Time point 2	Time point 1	- 0.14930	0.533
	Time point 3	- 0.35000*	0.037
Time point 3	Time point 1	0.20070	0.328
	Time point 2	0.35000*	0.037

P<0.05.*

There is a statistical difference between the time points as determined by one-way ANOVA ($F(2,206) = 3.102$, $p = 0.047$). A Tukey post hoc test revealed that the snack tomato consumption was statistically higher after time point 3 (1.7500 ± 0.99813 , ($p = 0.037$))

compared to time point 2 (1.4000 ± 0.71017). There was no statistically significant difference between time point 1 and time point 2 ($p = 0.533$) and between time points 1 and 3 ($p = 0.328$). So, there was a significant increase in tomato consumption at work from time point 2 to 3.

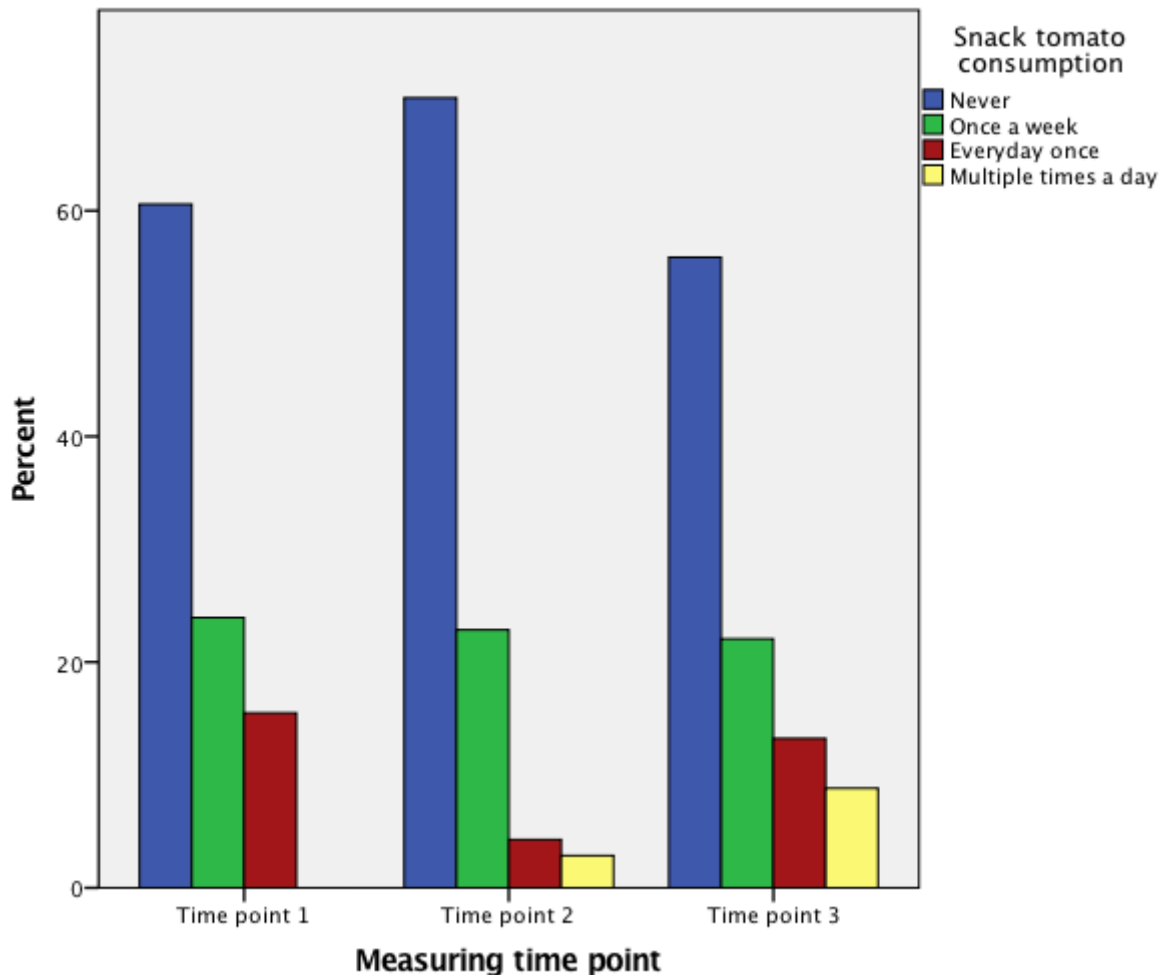


Figure 4: the snack tomato consumption at work visually represented during the three measuring points

5.4 Discussion of study

The results from the self-administered surveys over time showed that there is no effect of the intervention on the appreciation of the intervention, intake of unhealthy snacks at work, vegetable consumption and at home. This implies the relevant hypotheses being rejected. Yet, the analyses demonstrated that there was an effect over time on the snack tomato intake at work. There was a significant increase in snack tomato consumption at work between time point 2 and time point 3. The post hoc analysis established an increase between the time points, which means hypothesis 2 is accepted.

This study solely gives a quantified overview over time of the behavior of the employees. Therefore, the third study will consist of determining the motives and rationale of the employees' behavior around the tomato dispenser.

6. Study 3: Focus groups on the rationale of the behavior around the intervention

6.1 Introduction

In order to determine the rationale and motives of the behavior of the employees around the intervention, four focus groups were held. This gave in-depth insight in the rationale and motives on the appreciation level, the consumption of the snack tomatoes at work, the intake of unhealthy snacks and the consumption of the snack tomatoes at home. This chapter provides the method and results used for the final study of this research. It firstly includes the method of the focus groups which consist of an explanation of the participants, design, procedure and data analysis. This is followed by the results, which provides in-depth insight in the rationale of the appreciation level, the consumption of the snack tomatoes at work, the intake of unhealthy snacks and the consumption of the snack tomatoes at home.

6.2 Method study 3

6.2.1 Participants

Canteen staff

One focus group was conducted with the staff of the canteen of the municipality of Venray. The selection for the participants was executed by the Advisor for the Municipality of Venray. No distinction between age, race or occupation within the municipality was made for the study.

Office employees

Three focus groups were conducted with the employees working at the office of the municipality of Venray. The selection procedure consisted of personally recruiting participants on Monday, May 13, 2019 during lunchtime in the canteen. The researcher shortly informed the employees about the focus group and kindly asked them to participate. Free lunches offered by the canteen at the municipality of Venray were used as rewards for the participation of the focus groups. No distinction between age, race or occupation within the municipality was made for the study.

6.2.2 Design of study 3

The focus groups were conducted in the mother tongue of the participants and researchers, namely in Dutch. The purpose of the focus groups in this study was to gain in-depth insight in the influence of the intervention by understanding the employees' motives behind the appreciation, vegetable intake at work, unhealthy snacking and vegetable intake at home. Focus groups are fundamental for filling gaps in knowledge and provide an understanding of the reasoning and motives of the target group (French et al., 2010).

The design of the focus groups focused on four main topics. The topics of the focus group were the same as the topics of the self-administered surveys. The participants of the focus groups were asked to indicate to what extent they agree with multiple statements provided in a booklet. This was followed by a discussion regarding the statements.

Table 8: Interview guide for canteen staff and office employees' group discussion sessions

	Topic	Sample statement/questions
Canteen staff		
<i>Part 1: introduction and welcome</i> - Explanation of topics and discussion	<ul style="list-style-type: none"> • <i>Appreciation snack tomato dispenser</i> • <i>Office employees' appreciation snack tomato dispenser</i> 	<i>'The employees use the tomato dispenser on the days the dispenser is present.'</i>
<i>Part 2: Employees' behavioral motivations and reasoning related to tomato dispenser</i> - Discussion about four statements	<ul style="list-style-type: none"> • <i>Office employees' snack tomato consumption</i> • <i>Office employees' unhealthy consumption</i> 	<i>'Do you think that the employees eat more or less unhealthy snacks such as cakes, chocolate and chips at work due to the tomato dispenser?'</i>
Office employees		
<i>Part 1: introduction and welcome</i> - Explanation of topics and discussion	<ul style="list-style-type: none"> • <i>Appreciation snack tomato dispenser</i> • <i>Consumption snack tomato dispenser</i> • <i>Unhealthy consumption</i> • <i>Healthy consumption</i> 	<i>'I think it is positive that the municipality of Venray offers snack vegetables in the Tomato Tap.'</i>
<i>Part 2: Behavioral motivations and reasoning related to tomato dispenser</i> - Discussion about four statements		<i>'Do you think that you eat more or less unhealthy snacks such as cakes, chocolate and chips at work due to the tomato dispenser?'</i>

The full scripts which were used for the focus groups with the canteen staff can be found in Appendix 3 and the script for the focus group with the office employees in Appendix 4.

6.2.3 Procedure of study 3

The four focus groups took place on Monday, May 13, 2019 and Tuesday, May 14, 2019. Each focus group took approximately 25 - 30 minutes. The focus groups used a semi-structured format and were structured with an interview guide (Table 8).

The sessions were all audio-recorded and were conducted with the same researchers. One researcher had the role of the interviewer while the other observed. This entailed taking notes and keeping an overview of the focus groups.

The participants each received a booklet and a pen prior to the start of the focus group. The participants were not informed about the larger aim of the intervention to stimulate healthy snack consumption. But rather about understanding the motives of the intervention on their perceived health behavior. Immediately after the focus groups, the researcher took notes concerning the atmosphere in the group.

6.2.4 Data analysis of study 3

Full transcripts from the focus groups discussions were made. In order to examine if there were themes which derived from the data, thematic analysis was conducted (Braun & Clarke, 2006). The first phase of analyzing the data consisted of getting familiar with the gathered data. Thereafter, initial codes were generated and themes derived from this were searched. The transcripts were coded manually. This meant working through the transcripts' hardcopies

with highlighters and making notes. Since the study addressed specific research questions, a theoretical thematic analysis was conducted. This implied that in each transcript, segments of text were coded which appeared to be relevant or concerned the four research questions. Open coding was used which meant that there were no predetermined codes, but they were developed and adjusted during the coding process. The following phase revised and renamed the themes. This enabled to develop a coding framework and derive dominant themes. The result chapter included representative quotes to illustrate the meaning of the participants' answers. Since the language of the focus groups was in Dutch, the representative quotes were translated into English.

6.3 Results of study 3

Table 9: Focus group composition and atmosphere

		N (Occupation)	Atmosphere in the group
Group 1	Canteen staff	5 (n= 4 employees in the canteen, n= 1 back office employee)	Atmosphere was okay. All the participants were female and knew each other well. Occasionally the participants discussed personal matters with each other, often in dialect.
Group 2	Office employees	7 (n= 6 enforcement, n= 1 office employee)	Relaxed atmosphere. Majority of the respondents knew each other. Jokes were made. Not all respondents spoke spontaneously, but the participants spoke freely. Even when the opinions differed. The group has diverse perspectives towards eating healthy, in particular differences were noticeable between the males and females.
Group 3	Office employees	8 (n= 8 office employees)	Atmosphere was informal and good. Respondents seemed engaged with the topics. Crosstalk occurred often and personal matters were discussed. Some participants were more dominant sharing their opinions than others.
Group 4	Office employees	4 (n= 4 office employees)	Atmosphere in the group with only females was good. Jokes were made, personal matters were discussed and respondents spoke freely, often in dialect. The majority of the group did not eat tomatoes, but was conscious about eating healthily. One member spoke often about her attitude towards the initiative and eating healthy, others entered in a discussion with her.

In total 24 people (19 female; 5 male) participated in four focus groups. The number of participants per focus group ranged from four to eight individuals. The first focus group was conducted with the employees from the canteen, whilst the other focus groups participants consisted of individuals working at the office of the municipality. Table 9 gives an overview of the composition of the different groups as well as a description of the atmosphere during the focus group session. The results of this study derived from statements of the participants. Table 10 provides for each research topic the factors mentioned by the participants of the focus groups.

Table 10: Factors mentioned by the participants in the focus groups per topic

Topic	Factors mentioned
Influence on the appreciation of the intervention	<ul style="list-style-type: none"> • Taste of tomatoes • Role of employer • Healthiness of eating tomatoes • Convenience and ease of dispenser • Free/payment • Internal communication at work
Influence on the consumption of vegetables at work	<ul style="list-style-type: none"> • Taste of tomatoes • Location/ distance to dispenser • Healthiness of eating vegetables • Convenience and ease of dispenser • Lack of time • Careful consideration is necessary • Eating habits and routines • Visibility/availability of dispenser • Bring food from home
Influence on the consumption of unhealthy snacks	<ul style="list-style-type: none"> • Gender differences • Colleagues • Visibility/availability of dispenser • Deserve it • Not satisfactory • Health (in relation to body weight) • Eat what you desire • Existing eating habits
Influence on the consumption of vegetables at home	<ul style="list-style-type: none"> • Family • Media • Existing eating habits

6.3.1 Influence on the appreciation of the intervention

The participants were asked what their level of appreciation is of the intervention and thereafter the reason why. The majority of the participants appreciated the initiative. Factors throughout the discussion which were mentioned most often consisted of the role of the employer, taste and health. Reasons for liking the provision of the snack tomatoes consisted of the role of the employer, healthiness of tomatoes and convenience and ease of the dispenser. Offering healthy snack options such as snack tomatoes was seen as a gesture towards the health of the employees. The intervention was perceived as positive since the employees had the flexibility to take and consume the snack tomatoes when suited them best. The taste of tomatoes, free/payment and internal communication at work were used as arguments for questioning the appreciation level of the intervention. Taste was mostly referred to as limiting the appreciation of the intervention. Many participants commented not liking tomatoes due to its taste.

Women, Group 4: ‘...I don't really like snack tomatoes. So that does not make it [the snack tomato initiative] accessible to me. While I actually, I actually really like and applaud the initiative. But purely because they are tomatoes, which I do not eat, then I can hardly say I agree with the statement.’

The fact that the snack tomato dispenser was free was identified as being of importance by the staff of the canteen. If the intervention required payment, it would not be as successful. A

handful of employees acknowledged this by mentioning payment being a constraining factor. Internal communication about the intervention was identified as an aspect which limited the level of appreciation. Employees mentioned not always knowing about the initiatives organized within the organization.

6.3.2 Influence on the consumption of vegetables at work

A number of factors were identified which influenced the consumption of the snack tomatoes. The taste of tomatoes, location/distance to the dispenser, visibility/availability of the dispenser and bring food from home was mentioned most frequently.

Taste was named in different contexts. Some participants mentioned liking the snack tomatoes while others disliked it. Not liking the taste of the tomatoes restricted them from consumption. A number of participants suggested adding variations in snack vegetables to solve this issue. Variety in snack vegetable options would also function as a method to tackle potential boredom. One participant sustained this by mentioned that eating tomatoes every time would become monotonous.

Bringing food from home was mentioned as the reason for not consuming the snack tomatoes provided in the dispenser. However, many employees established that if they would see the snack tomato dispenser, they would eat the snack tomatoes because that was convenient.

Woman, group 4: 'I often bring snack vegetables myself, bell peppers and cucumbers, but it is just easy if it is just there to take. Then I do not have to cut in the vegetables in the morning.'

The location of the dispenser as well as the walking distance to the tomato dispenser were determined as limiting the consumption. This was clearly stated by the following participant:

Woman group 3: '..I don't give myself time to come downstairs. Our department is all the way up and that is very far away.'

Consumption of the snack tomatoes was often related to lunchtime. As most of the employees eat their lunch in the canteen, this was established as a time when the usage of the tomato dispenser would occur.

Woman group 4: 'I would only use it if I had lunch in the canteen, but I don't lunch in the canteen every day. I would not walk to the canteen for the snack tomatoes, only if I had lunch there.'

Visibility/availability of the dispenser was identified as influencing the consumption of the participants. Merely seeing the dispenser triggered the employees to use the dispenser and consume the snack tomatoes.

Woman, group 2: 'Yes I really like snack tomatoes very much, so as soon as I see that dispenser, it is immediately empty [laughter]. Yes, I will use it immediately.'

Lastly, consideration was mentioned by some participants. Multiple participants mentioned finding that careful consideration about the existence of the snack tomato dispenser was necessary for the consumption. The following statements in a discussion between the researcher and two participants from group 3, shows the importance of consideration as a factor.

Researcher: 'So on the days that you are present at work, then you use the dispenser?'

Woman 5: *'Yes occasionally. When I think about it.'*

Woman 6: *'Yes I have that too.'*

Woman 5: *'Yes.'*

Researcher: *'Can you explain why?'*

Woman 5: *'When I think about it or when I am downstairs to have lunch or whatever, yes then I think about it and then I make use of it [tomato dispenser].'*

6.3.3 Influence on the consumption of unhealthy snacks

When asking the participants about the influence of the tomato dispenser on their unhealthy snacking, the majority of the respondents mentioned doubting unhealthy snacks being replaced for snack tomatoes. The participants mentioned not feeling it changed their unhealthy snack consumption. This was due to multiple elements. Some participants mentioned not eating any unhealthy snacks at work, due to health choices. Next to this, snack tomatoes would not satisfy the participants' cravings. Some participants mentioned that snack tomatoes would not still a big appetite. Furthermore, eating what you are desiring at the moment was seen as determining the snack choices. This was often related to convenience. Thus, making the easiest food choice which required the least amount of time and/or work. In addition, the feeling of deserving an unhealthy snack was established as a reason for not choosing the snack tomatoes. Feeling it was perfectly fine to occasionally eat unhealthily was used as a reason. Lastly, the snack tomatoes were seen as an addition to their current diet instead of a substitution.

Woman group 3: *'I see it [the snack tomatoes] more as something extra, than as a replacement.'*

Factors identified by the participants which influence the eating behavior, in particular related to unhealthy snacking, were gender differences, colleagues, eating what you desire and health. The staff from the canteen initially established their perceived difference in eating behavior between males and females. The following discussion conducted in group 1 reflects this:

Woman 2: *'yes, I think ladies [are influenced] more than men.'*

Researcher: *'yes?'*

Woman 1: *'yes.'*

Researcher: *'why?'*

Woman 2: *'Yes, I never actually see them, that those men get fruit or vegetables.'*

Woman 1: *'No I think women are more sensitive to that yes.'*

These views were consistent with the perceptions of the office employees. The office employees noticed a difference between males and females in making food choices. Multiple participants linked health choices to gender. Male-dominated departments were often seen as having unhealthy eating patterns. Female-dominated departments were perceived as being engaged with a healthy lifestyle and making healthy food choices. Dieting was frequently referred to as being a common lifestyle choice for women.

Man, group 2: *'uh, I am not a health freak, so to speak. And uh, yes. That is it actually. I do not attach much value to it. If they are there and I like them, I have tasted them in the past, and if I feel like it, I will take it, but if I don't feel like it, then I'll take something else. I don't go searching for anything healthier than candy.'*

The influence of colleagues in each department was seen as unquestionably influencing the eating behavior of the participants. Especially when making choosing between unhealthy and healthy snacks. An example of this can be established by the following:

Woman, group 2: *..We had a colleague in our department for a very long time who was very aware of health. And she really brought [healthy food] for everyone in the department, so we were not allowed to eat white chocolate at that time anymore. Uh, yes those mini cauliflowers and uh just a big bowl with fresh vegetables. So if it is present in the department itself, then I notice that I am going to eat less [unhealthy snacks].'*

6.3.4 Influence on the consumption of vegetables at home

The final topic of the focus groups consisted of identifying if the intervention had any influence on the participants' vegetable consumption at home. So, does the tomato dispenser have the potential to positively impact the eating behavior of the employees. The participants nearly all mentioned doubting the influence of the intervention on their vegetable consumption at home. Some participants did notice that the intervention created a sense of awareness concerning their eating behavior. In particular consciousness towards the number of vegetables eaten a day.

When asking the employees about the motivations behind their answer family and eating habits were mentioned most often. Influence of the family was identified as impacting the eating behavior of the employees. The following conversation between the researcher and two participants in group 2 established this phenomenon:

Man: *'..but we do eat those snack carrots. We do have that at home. We do that instead of eating chips or uh or something else. But I don't take that with me either. I really like that, but that is as much noise as you eat.'*

Researcher: *'Where does that come from? That the chips are replaced for the carrots?'*

Man: *'Well, they are tasty too. But yes, my wife actually started it. She said, I will no longer eat chips on weekdays and then I said okay.'*

Woman: *'So neither will do.'*

Man: *'So neither will I.'*

Existing eating habits was also referred to as explaining why the intervention did not lead to more vegetable consumption at home. Many participants, in particular women, mentioned already a lot of vegetables on a daily basis.

Finally, the influence of media was identified as influencing eating habits. Multiple participants mentioned believing that nowadays eating healthy was a 'hype' or 'trendy' initiated from the media. This was clearly stated by the following participant:

Woman, group 2: *'Well, uh I think it is much more a hype anyway than it used to be. Healthy eating is just really a theme. And that is, you see it everywhere so that also triggers yourself to more often eat things that are healthy, or to put more vegetables on your plate, I think.'*

6.4 Discussion of study 3

The results of the focus groups established multiple themes which emerged to be relevant in the employees' behavior around the tomato dispenser. The taste of the tomatoes were factors mentioned most often. Frequently, the taste was identified as a barrier in relation to the appreciation of the intervention and the consumption of the snack tomatoes at work. Adding variety in snack vegetables was seen as a suitable solution for this.

The results from the focus groups established that the location/distance to the dispenser was limiting the consumption of the snack tomatoes. The time it would take to walk from the desk to the dispenser was perceived as an obstacle. Careful consideration about the presence of the snack tomato dispenser was necessary for the participants to make use it. This was repeatedly related to visibility/availability. Seeing the dispenser when passing it would lead to consumption. Lastly, many participants mentioned always bringing their own food from home. However, the presence of the dispenser was described as being convenient because it implied that no snacks had to be brought from home but tomatoes could be tapped and consumed as an afternoon snack.

The influence of the intervention on the consumption of unhealthy snacks at work was questioned by the participants. Reasons for this doubt derived from participants mentioning not eating unhealthy snacks at work, tomatoes not being satisfactory for a big appetite, occasionally deserving an unhealthy snack and eating what you currently desire. Gender differences and the influence of colleagues were most often mentioned as determining the snack consumption at work.

Lastly, the participants were hesitant about the effect of the tomato dispenser on the vegetable consumption at home. The established factors influencing the eating behavior of the participants consisted of their family, existing eating habits and media.

7. Overall conclusion and discussion

The majority of the people living in Western countries eats an insufficient amount of vegetables (Yngve et al., 2005). Consuming more vegetables has been recognized as healthy snacking behavior and is a suitable method to diminish obesity (Forouzanfar et al., 2015; McCullough et al., 2002; Shepherd et al., 2006). To stimulate healthy snack consumption, this research was conducted among employees with an environmental worksite intervention addressing the availability. The minimal intervention used throughout this research consisted of placing a tomato dispenser near the entrance of the canteen for 20 weeks. Three studies were conducted in this study which explored the usage of the intervention, investigated the influence of the intervention over time and determined the rationale of the employees. The first study consisted of two days of observation. This determined the behavior and snack tomato intake of the employees of the municipality of Venray around the dispenser. The second study involved a three-wave longitudinal study with self-administered surveys. This established the effect of the intervention over time on the appreciation, intake of snack tomatoes at work, the consumption of unhealthy snacks and the vegetable consumption at home. The final study included three focus groups with the office employees and one focus group with the staff of the canteen of the municipality. This gave insight in the motives behind the appreciation, tomato consumption at work, intake of unhealthy snacks and vegetable consumption at home.

The results of the three-wave longitudinal study with self-administered surveys firstly demonstrated that the majority of the participants never consumed the snack tomatoes. The municipality of Venray has a total of 350 employees, yet the two days of observations established that the usage of the tomato dispenser was 20 and 21 times. This demonstrates the relatively low usage of the tomato dispenser. The focus groups found that reason for not consuming the snack tomatoes was mainly due to the fact that the participants did not like tomatoes. As the literature has shown, vegetable consumption is determined by preference and taste (Appleton et al., 2016; Larson et al., 2008; Poelman et al., 2016). Determinants of vegetable consumption such as taste were found to be relevant for intervention studies, since they influence the success of the intervention (Lake et al., 2016). The intervention of this study only provided snack tomatoes, which explains the limited usage numbers of the observations and surveys.

Contrary to the expectations, the three-wave longitudinal study with self-administered surveys found that the intervention did not have any effect over time on the appreciation of the intervention, intake of unhealthy snacks at work, and vegetable consumption at home. It was expected that the appreciation level of the intervention would negatively change over time. This was based on the literature stating that variation in food options has a satisfactory effect on people (Chance et al., 2014; Chernev., 2012). The intervention of the study consisted of only offering free snack tomatoes. Thus, no variation of vegetables was considered. This would, following the literature, lead to a decrease in appreciation. The results of the three-wave longitudinal study demonstrated that the appreciation level did not significantly change over time. Even though this was not predicted, the results from the self-administered surveys and focus groups were consistent with each other. Over the three measuring points, the appreciation level was high. The findings from the focus groups found that the vast majority of the participants appreciated the initiative. It was perceived as positive due to the fact that the

intervention was for free and convenient, it stimulated healthy food choices and the role of the employer towards the health of the employees was highly valued.

The fact that there was no significant difference over time in the consumption of unhealthy snacks at work can be explained by the literature and the focus groups conducted in this research. Lake et al. (2016) found in their free fruit study that the majority of the participants did not substitute fruit for unhealthy snacks. Hence, the provided free fruit did not function as a replacement (Lake et al., 2016). Similar results derived from the focus groups conducted in this research. The participants mentioned that the snack tomatoes did not function as a substitution for unhealthy snacks, but rather as an addition to their current diet. Occasionally deserving an unhealthy snack, eating what you currently desire and tomatoes not being satisfactory for a big appetite were reasons for not choosing the provided snack tomatoes.

The literature has shown that the peer effect is relevant for worksite interventions. The peer effect has been identified as an influential factor when making food decisions at the workplace (Tabak et al., 2015). Social norms and networks were linked to the consumption of individuals at work (Sorenson et al., 2007). The two days of observation confirmed this. When the dispenser was used by multiple people at once, not necessarily all the employees in the group used the dispenser. The employees who did not use the dispenser, were addressed about this by their colleagues. This implies a possible peer effect. This is due to the fact that employees spend a substantial amount of time with each other and are aware of each others (eating) behavior (Lake et al., 2016). The main factor identified by the participants impacting their eating behavior at work was the influence of colleagues. The participants mentioned colleagues directly and indirectly influencing their eating behavior. This was both positively in the sense of more vegetable consumption but also negatively by eating unhealthy snacks brought into the office by co-workers. The influence of the department on one's eating behavior was often related to gender. Male-dominated departments were perceived as having an unhealthy eating culture while female-dominated departments were seen as healthy and engaged with healthiness in general.

The effect over time of the intervention on the vegetable consumption at home was established in an exploratory way. This was done because the literature demonstrated that the relevant intervention studies have some or hardly any effect on the consumption of fruits and/or vegetables of the participants and their families (Backman et al. 2011; Hutchinson et al., 2013; Lake et al., 2016). It was therefore difficult to determine the impact of the intervention on the vegetable consumption of employees at home. The results from the three-wave longitudinal study found that there was no effect over time on the vegetable consumption at home. The study by Hutchinson et al. (2013) found that there were no dietary adjustments beyond the workplace. This implies that the changes in consumption at work cannot be generalized to the home environment (Hutchinson et al., 2013). The results gathered from the focus groups confirmed this as well. The participants mentioned questioning the influence of the intervention on the vegetable consumption at home. The participants' families, media and existing eating habits were factors perceived to influence the vegetable consumption at home.

Consistent with the literature, the three-wave longitudinal study on the intervention did find a significant effect over time on the snack tomato consumption. The study aimed to positively change the tomato consumption of the employees by placing a tomato dispenser near the entrance of the canteen for 20 weeks. The literature has established that the workplace can

contribute to the health of its employees (Allan et al., 2017; Geaney et al., 2013; Hutchinson, 2013; Lake et al., 2013; Mhurchu et al., 2010). Adjusting the food environment by making healthy foods available stimulates healthy food choices (Alinia et al., 2010; Backman et al., 2011). It is however difficult to change eating habits since they are initiated unconsciously and automatically (Chance et al., 2014). Yet, long-term environmental interventions disrupt automatic behavior and enable individuals to create a new habit. Repetition and reinforcement of behavior will then ensure that the new habit will be maintained (van't Riet et al., 2011; Verplanken & Wood, 2006). The results found that there was an effect over time on the snack tomato intake at work. Namely an increase in snack tomato consumption at work between the second and third measuring points. Following the literature, this implies that due to placing the intervention near the entrance of the canteen, the existing habits of the employees were triggered and changed. Repeatedly seeing the snack tomato dispenser promoted the formation of the new associations and therefore developed into a new habit.

During the focus groups, multiple factors were relevant for the consumption of the snack tomatoes. Visibility/availability was a theme which was mentioned often. Merely seeing the snack tomato intervention lead to usage and consumption. This is in line with the literature regarding the influence of availability on consumption. The availability of food, whether it is healthy or unhealthy, drives an individual's consumption (Backman et al., 2011; Cohen & Farley, 2008; Hsieh, 2004; Shepherd et al., 2006; Verhoeven et al., 2014). Factors identified as barriers for the consumption of the snack tomatoes consisted of the location/distance to the dispenser and time. Since the snack tomato dispenser was located near the entrance of the canteen, this implied the employees had to walk from their desk to the canteen. The time it would take to acquire the snack tomatoes was perceived as limiting the usage of the dispenser. Participants did not allow themselves to walk down to get the tomatoes. The perception of lack of time is referred to as the reason for consuming less fruit and vegetables and eating unhealthily (Jabs & Devine, 2006; Lake et al., 2004). The two days of observing confirms this. The utilization of the snack tomato dispenser was the highest immediately after lunch on both days. Thus, when the employees walked from the canteen back to their desks. This demonstrates that employees do not want to 'waste' time to acquire the snack tomatoes, but use the dispenser when passing it anyway (Lake et al., 2016).

Bringing food from home was often mentioned as a reason for not consuming the snack tomatoes. The participants were already used to bringing their own snack vegetables from home which implied the usage of the dispenser was not necessary. Yet, the availability of the snack tomatoes in the dispenser was referred to as convenient since it meant that no snacks had to be brought from home but snack tomatoes could be eaten.

7.1 Strengths

This research includes different strengths. First of all, the combination of the studies used for this research gives a comprehensive analysis. In this area of interest, no research has been conducted where the dynamics and influence of a worksite intervention on snack vegetable consumption has been determined over time. This research examined the dynamics of free vegetable intervention which addresses the availability. This was done by using two days of observing to determine how often and in what way the intervention used. Thereafter, the three-wave longitudinal study with self-administered surveys established the effect of the intervention over time. Next to a quantified overview over time of the behavior of the

employees, an exploratory qualitative approach was used to find the motives and rationale of the employees' behavior around the tomato dispenser. This all together provides an extensive research on the influence of a worksite intervention on snack vegetable consumption over time. In addition, the design of the first study, the two days of observing, created a realistic view of the actual behavior of employees around the dispenser. Moreover, the procedure of the three-wave longitudinal study with self-administered surveys is a strength as well. It was purposively chosen to limit the number of questions and personally recruit respondents to increase the number of data entries. Furthermore, the combination of the office employees and canteen staff as participants in the focus groups provided a complete understanding in the reasoning and motives of the employees' behavior around the tomato dispenser (French et al., 2010). In addition, the data was gathered in a real-life work setting. The setting at the municipality of Venray allowed gathering a comprehensive dataset for all three studies conducted in the research.

7.2 Practical implications

Despite the fact that not all results of the study were in line with the expectations, the findings did offer a better insight in the vegetable consumption at the worksite as well as understanding the determinants of the employees' snacking behavior. The three-wave longitudinal study with self-administered surveys demonstrated that 130 of the 209 respondents never used the snack tomato dispenser. The focus groups found that the reason for not consuming the snack tomatoes was mainly due to the fact that employees dislike tomatoes. Adding variety in snack vegetable options could solve this, and thereby increase the success of snack vegetable interventions (Chance et al., 2014). Next to this, availability appeared to be an important topic in this area of interest (Alinia et al., 2010; Backman et al., 2011; Lake et al. 2016; Pescud et al., 2016). The findings from the focus groups established that the availability of food was determined the eating behavior of the participants. This could be both positive with healthy food options yet also negatively influence the employees with unhealthy snack options. As found in the literature, it is therefore important to increase the provision of healthy snacks (Schätzer et al., 2010). Introducing snack vegetables into the workplace is an easy way to offer employees access to healthy food options without the requirement of cooking or preparation (Alinia et al., 2010). In addition, the literature and the study demonstrated that long-term environmental interventions trigger existing habits and change them. Repetition and reinforcement of that behavior will enable the creation of a new habit (van't Riet et al., 2011; Verplanken & Wood, 2006). It is for that reason of importance that interventions remain long enough for habits to adjust and the new behavior to sustain. Lastly, the vegetable snack intervention in this study was free. As was identified by the participants in the focus groups, this possibly determines the success of the intervention.

7.3 Limitations and suggestions for future research

In this research, there are some limitations to keep into account when reviewing the results. From these limitations, suggestions for future research will follow. First of all, the intervention only included snack tomatoes. Therefore, the intervention can be seen as selective. Only individuals liking the taste of tomatoes would be able to make use of the snack tomato dispenser. This limited the reach and success of the initiative (Lake et al., 2016). Thus, a suggestion for future research is to add more variety in snack vegetable options to decrease

the selectiveness. Furthermore, the two days of observations were only held at the beginning of the intervention. Conducting observations at other time points could have given different results. Next to this, the design of the two days of observing is difficult to replicate since the sample size of each observation day was different. This implies possible differences in the results when repeating the research. Additionally, it was unfortunately not possible to conduct the self-reported surveys with the same sample for each measuring point in this study. This implies that there was no consistency in individuals included in the three-wave longitudinal study. Therefore, it could be interesting to conduct a longitudinal study with the same sample for each measuring point. Moreover, the outcomes in the three-wave longitudinal study were measured using self-administered surveys. Reporting bias makes it probable that outcomes are over- or underestimated (Mhurchu et al., 2010). In addition, socially desired behavior can be identified as a possible limitation for the self-administered surveys and focus groups. Some participants were aware of the aim of the study. This may have influenced the answers participants. Next to this, participants in the focus groups may have adjusted their opinion to the one of the group to fit in. So, an idea for future research is to conduct one-on-one interviews to limit the influence of socially desired behavior in groups. Furthermore, in this study gender differences were not taken into account. It can be argued that the intervention had a different influence on women than on men. Thus, further research should take this into account and perhaps include data about how frequently the intervention is used and what the motives are per gender when analyzing the data. Another suggestion for future research is to let participants pay for the snack vegetables. For the purpose of this research, the snack tomatoes were provided without any payment. Future research could look into the effect of payment for snack vegetables in worksite interventions.

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Appendix

Appendix 1: Observation lists

Observatieformulier TomatenTap Venray
20-02-2019

Tijdsblok 1: 13.00-14.00

Mensen in de buurt:	Mensen die gebruik maken van de tapper:			Hoeveelheid:		Verdere opmerkingen:
		Alleen	Groep	Halfvol	Vol	

Tijdsblok 2: 14.00-15.00

Mensen in de buurt:	Mensen die gebruik maken van de tapper:			Hoeveelheid:		Verdere opmerkingen:
		Alleen	Groep	Halfvol	Vol	

Tijdsblok 3: 15.00-16.00

Mensen in de buurt:	Mensen die gebruik maken van de tapper:			Hoeveelheid:		Verdere opmerkingen:
		Alleen	Groep	Halfvol	Vol	

Tijdsblok 4: 16.00-17.00

Mensen in de buurt:	Mensen die gebruik maken van de tapper:			Hoeveelheid:		Verdere opmerkingen:
		Alleen	Groep	Halfvol	Vol	

Tijdsblok 1: 13.00-14.00

Mensen in de buurt:	Mensen die gebruik maken van de tapper:			Hoeveelheid:		Verdere opmerkingen:
		Alleen	Groep	Halfvol	Vol	

Tijdsblok 2: 14.00-15.00

Mensen in de buurt:	Mensen die gebruik maken van de tapper:			Hoeveelheid:		Verdere opmerkingen:
		Alleen	Groep	Halfvol	Vol	

Tijdsblok 3: 15.00-16.00

Mensen in de buurt:	Mensen die gebruik maken van de tapper:			Hoeveelheid:		Verdere opmerkingen:
		Alleen	Groep	Halfvol	Vol	

Tijdsblok 4: 16.00-17.00

Mensen in de buurt:	Mensen die gebruik maken van de tapper:			Hoeveelheid:		Verdere opmerkingen:
		Alleen	Groep	Halfvol	Vol	

Appendix 2: Self-reported survey

Beste medewerker,

Graag vragen wij uw medewerking aan ons onderzoek naar de Tommies TomatenTap op de werkvloer. We zijn benieuwd naar uw mening over en het gebruik van de Tomatentap.

Het kost u slechts een aantal minuten om deze enquête in te vullen. Uw antwoorden worden volledig anoniem verwerkt.

Hartelijk dank voor uw deelname!

Victor Immink en Desirée Leukel
Wageningen University and Research

victor.immink@wur.nl

Vraag 1

Bent u bekend met de TomatenTap die staat bij de ingang van het bedrijfsrestaurant?

- ☐ Ja, ga door naar vraag 2
- ☐ Nee, hartelijk dank voor uw medewerking

Vraag 2

Geef aan in hoeverre u het eens bent met de volgende stelling.

Ik vind het positief dat de gemeente Venray snackgroente aanbiedt in de TomatenTap.

- ☐ Mee oneens
- ☐ Ik weet niet/Ik twijfel
- ☐ Mee eens

Vraag 3

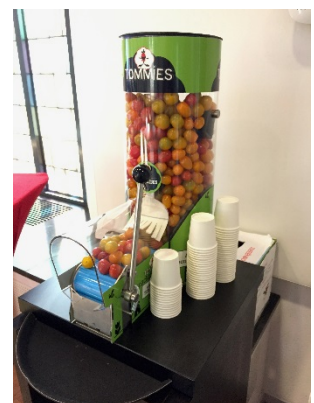
Welke dagen was u afgelopen woensdag en donderdag aanwezig op het werk zodat u in de gelegenheid was om tomaatjes te tappen?

- ☐ Woensdag
- ☐ Donderdag

Vraag 4

Hoe vaak heeft u vorige week tomaatjes getapt op woensdag en/of donderdag?

- ☐ Nooit
- ☐ 1 keer in de hele week
- ☐ Elke dag 1 keer
- ☐ Meerdere keren per dag
- ☐ Z.O.Z.



Vraag 5

Denkt u dat u meer of minder ongezonde snacks zoals koek, chocolade en chips eet op het werk nu de TomatenTap aanwezig is?

- ☐ Nu minder ongezonde snacks
- ☐ Ongeveer dezelfde hoeveelheid ongezonde snacks
- ☐ Nu meer ongezonde snacks
- ☐ Dat weet ik niet
- ☐ Ik eet geen ongezonde snacks

Vraag 6

Denkt u dat u meer of minder groente thuis eet nu de TomatenTap aanwezig is? Denk hierbij aan warme groente bij de maaltijd en groentesnacks.

- ☐ Nu minder groente thuis
- ☐ Ongeveer dezelfde hoeveelheid groente thuis
- ☐ Nu meer groente thuis
- ☐ Dat weet ik niet

Vraag 7

Geef aan op een schaal van 1-10 hoe energiek u zich op dit moment voelt (1 helemaal niet energiek en 10 heel energiek)

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10

Vraag 8

Als u nog opmerkingen heeft voor de onderzoekers, schrijf deze dan hieronder.

Appendix 3: Script for focus groups with canteen staff

Discussiegroep met kantine medewerkers gemeente Venray over het aanbieden van gratis snacktomaten: Handleiding voor interviewer

Achtergrondinformatie

Het hoofdonderwerp van deze focus groep discussie is de snacktomaten tap op de werkvloer. Wij willen graag weten hoe u denkt over het aanbieden van de gratis snacktomaten door middel van de tap op de werkvloer. Verder zijn wij geïnteresseerd in uw mening wat de invloed is van de tap op de werkvloer op de kantoormedewerkers.

Vorbereiding groepsdiscussie

Zorg dat:

- voorbereidingen klaar zijn, tenminste 30 minuten voor de start van de discussie
- er genoeg stoelen in de kamer zijn
- de audio recorders klaarzetten
- Koffie en thee beschikbaar zijn

Print uit:

- Een antwoordboekje voor elke deelnemer (zie bijlage 1).
- Een informed consent formulier voor elke deelnemer (zie bijlage 2)

Neem mee:

- Een notulist die alles woordelijk uittipt. Deze notulist moet geen privacygevoelige info uittypen, maar deze direct anoniem notuleren met codes voor sprekers.
- Twee werkende audio recorders, reserve batterijen en hebben ze nog genoeg geheugen?!
- Genoeg pennen voor elke deelnemer
- Pen en papier voor gespreksleider (maken van notities)
- Een klok of horloge.
- Uitgeprinte materialen
- Handtekeninglijst en namenlijst deelnemers
- Laptop voor de notulist met verlengsnoer
- Camera (is deze opgeladen en is er nog genoeg geheugen?)

Gespreksfase 1: Introductie en welkom (10 minuten)

Heet mensen welkom wanneer ze binnenkomen. Deel informed consent formulieren uit. Zodra iedereen er is:

Allereerst wil ik u graag welkom heten en bedanken voor uw komst.

Mijn naam is Desirée Leukel ik ben een onderzoeker van aanbieden van gratis snacktomaten op de werkvloer en ik zal vandaag met jullie hierover praten. Mijn collega's (*voorstellen*) maken aantekeningen.

- We gaan in een groep praten over het aanbieden van de snacktomaten. Ik ben geïnteresseerd in alle meningen en er zijn geen foute antwoorden. Reageer ook op wat andere mensen zeggen.
- Af en toe zal ik vragen stellen over bepaalde onderwerpen of doorvragen om nog meer te weten te komen.
- Als er vragen zijn waar u geen antwoord op wilt geven dan hoeft u dat niet te doen.
- De discussie van vandaag zal opgenomen worden met een audio recorder omdat we geen enkele opmerking die wordt gemaakt willen missen en we niet zo snel kunnen meeschrijven. Alles wat jullie zeggen zal anoniem verwerkt worden, en we zullen geen namen of andere persoonlijke informatie bekend maken.

Heeft iemand nog vragen of opmerkingen hierover?

- Voordat we verder gaan; heeft iedereen het toestemmingsformulier ondertekend?

Deelnemers die het niet prettig vinden mogen de discussie verlaten.

De discussie zal ongeveer 60 minuten duren. Omdat we maar weinig tijd hebben zal ik misschien zo nu en dan een discussie moeten onderbreken om alle onderwerpen binnen de tijd te kunnen bespreken. U mag op elk moment stoppen met dit onderzoek zonder opgaaf van reden.

Heeft iemand nog vragen of opmerkingen voordat we beginnen?

Als begin zou ik graag een rondje willen maken waarin iedereen zichzelf even heel kort voorstelt.

Vertel ons alsjeblieft uw voornaam en wat is uw functie binnen de gemeente?

Start de twee audio recorders en leg ze neer op verschillende plaatsen in de kamer. Notulist gebruikt codes.

Oké, dit was een kleine opwarming om elkaar wat te leren kennen. Nu wil ik graag met jullie praten over het aanbieden van de tomaatjes.

Gespreksfase 2: Stellingen (10 minuten per stelling)

Vraag 1:

Wilt u alstublieft **vraag 1** eerst invullen uit het boekje? Dit zijn een aantal stellingen. Geef voor elk van de stellingen aan of u het er mee eens bent of niet. U kunt ook aangeven dat u het niet weet.

Iedereen klaar?

We zullen nu de stellingen een voor een doornemen en bespreken.

Stelling 1: Waardering

Ik vind het positief dat de gemeente Venray snackgroente aanbiedt in de TomatenTap.

Wie is het eens met de eerste stelling van deze opdracht? Kunt u toelichten waarom? Zijn er ook mensen die er anders over denken?

Stelling 2: Waardering kantoormedewerkers

De kantoormedewerkers vinden het positief dat de gemeente Venray snackgroente aanbiedt in de TomatenTap.

Wie is het eens met de eerste stelling van deze opdracht? Kunt u toelichten waarom? Zijn er ook mensen die er anders over denken?

→ Hoe merken jullie dit?

→ Zien jullie bepaald gedrag rondom de TomatenTap?

Stelling 3: Consumptie

De medewerkers maken gebruik van de TomatenTap op de dagen de Tap aanwezig is.

Wie is het eens met de eerste stelling van deze opdracht? Kunt u toelichten waarom? Zijn er ook mensen die er anders over denken?

→ Waarom wel?

→ Op welke dagen?

→ Waarom wel/niet op die dagen

→ Waarom niet?

→ Hoe merken jullie dit?

→ Zelfde medewerkers?

→ In groepjes?

Onderwerpen die invloed hebben op gebruik:

- Tijd

- Invloed van collega's
- Voorkeur/ smaak/lusten
- Variatie in keuze
- Afstand van werkplek tot tap

Stelling 4: Ongezonde compensatie

Denkt u dat de medewerkers meer of minder ongezonde snacks zoals koek, chocolade en chips eten op het werk nu de TomatenTap aanwezig is?

Wie is het eens met de eerste stelling van deze opdracht? Kunt u toelichten waarom? Zijn er ook mensen die er anders over denken?

→ Hoe merken jullie dit?

Afsluiting groepsdiscussie (5 minuten)

Dit was de laatste opdracht. Ik wil jullie graag hartelijk bedanken voor jullie komst en voor het delen van jullie meningen met mij. Ik hoop dat jullie de discussie prettig hebben gevonden, voor mij was het in ieder geval erg waardevol. Mochten jullie eenmaal thuis nog vragen hebben over het onderzoek dan kunnen jullie me een e-mail sturen. Ik wens jullie nog een fijne dag.

Bijlage 1 Antwoordboekje

Stelling 1

	Mee oneens	Weet niet / twijfel	Mee eens
Ik vind het positief dat de gemeente Venray snackgroente aanbiedt in de TomatenTap.			

Stelling 2

	Mee oneens	Weet niet / twijfel	Mee eens
De kantoormedewerkers vinden het positief dat de gemeente Venray snackgroente aanbiedt in de TomatenTap.			

Stelling 3

	Mee oneens	Weet niet / twijfel	Mee eens
De medewerkers maken gebruik van de TomatenTap op de dagen dat de Tap aanwezig is.			

Stelling 4

	Meer	Weet niet / twijfel	Minder
Denkt u dat de medewerkers meer of minder ongezonde snacks zoals koek, chocolade en chips eten op het werk nu de TomatenTap aanwezig is?			

Bijlage 2

Toestemmingsformulier

- Ik heb de inhoud van het onderzoek begrepen. Ook kon ik vragen stellen. Mijn vragen zijn voldoende beantwoord. Ik had genoeg tijd om te beslissen of ik meedoe.
- Ik weet dat meedoen vrijwillig is. Ook weet ik dat ik op ieder moment kan beslissen om toch niet mee te doen of te stoppen met het onderzoek. Daarvoor hoef ik geen reden te geven.
- Ik weet dat alleen Victor Immink / Ellen van Kleef / Desirée Leuker mijn gegevens kunnen inzien. De gegevens worden tijdens het onderzoek geanonimiseerd.
- Ik weet dat de gegevens bewaard worden op een locatie bij de WUR die alleen deze onderzoekers kunnen openen.
- Ik geef toestemming om mijn gegevens op de onderzoekslocatie nog 2 jaar na dit onderzoek te bewaren.
- Ik wil meedoen aan dit onderzoek.

Naam:

Handtekening:

Datum : __ / __ / __

Ik verklaar dat ik deze proefpersoon volledig heb geïnformeerd over het genoemde onderzoek.

Als er tijdens het onderzoek informatie bekend wordt die de toestemming van de proefpersoon zou kunnen beïnvloeden, dan breng ik hem/haar daarvan tijdig op de hoogte.

Naam onderzoeker (of diens vertegenwoordiger):

Handtekening: Datum: __ / __ / __

Met het geven van uw toestemming verklaart u deze persoonsgegevens vrijwillig te hebben verstrekt. De door u verstrekte persoonsgegevens zullen uitsluitend voor het doel worden gebruikt waarvoor u deze heeft verstrekt. U heeft het recht op inzage, verwijdering, correctie of beperking van de verwerking van persoonsgegevens, alsmede het recht om bezwaar te maken en het recht op gegevensoverdraagbaarheid. Verder heeft u het recht om de gegeven toestemming in te trekken. Indien u een klacht heeft, kunt u deze indienen bij WUR via privacy@wur.nl. Ook kunt u een klacht indienen bij de Autoriteit Persoonsgegevens. Meer informatie kunt u vinden op www.autoriteitpersoonsgegevens.nl. Heeft u vragen, dan kunt u terecht bij de Functionaris Gegevensbescherming van WUR via functionarisgegevensbescherming@wur.nl.

Appendix 4: Script for focus groups with office employees

Discussiegroep met medewerkers gemeente Venray over het aanbieden van gratis snacktomaten: Handleiding voor interviewer

Achtergrondinformatie

Het hoofdonderwerp van deze focus groep discussie is de snacktomaten tap op de werkvloer. Wij willen graag weten hoe u denkt over het aanbieden van de gratis snacktomaten door middel van de tap op de werkvloer.

Vorbereiding groepsdiscussie

Zorg dat:

- voorbereidingen klaar zijn, tenminste 30 minuten voor de start van de discussie
- er genoeg stoelen in de kamer zijn
- de audio recorders klaarzetten
- Koffie en thee beschikbaar zijn

Print uit:

- Een antwoordboekje voor elke deelnemer (zie bijlage 1).
- Een informed consent formulier voor elke deelnemer (zie bijlage 2)

Neem mee:

- Een notulist die alles woordelijk uittipt. Deze notulist moet geen privacygevoelige info uittypen, maar deze direct anoniem notuleren met codes voor sprekers.
- Twee werkende audio recorders, reserve batterijen en hebben ze nog genoeg geheugen?!
- Genoeg pennen voor elke deelnemer
- Pen en papier voor gespreksleider (maken van notities)
- Een klok of horloge.
- Uitgeprinte materialen
- Handtekeningenlijst en namenlijst deelnemers
- Laptop voor de notulist met verlengsnoer
- Camera (is deze opgeladen en is er nog genoeg geheugen?)

Gespreksfase 1: Introductie en welkom (10 minuten)

Heet mensen welkom wanneer ze binnenkomen. Deel informed consent formulieren uit. Zodra iedereen er is:

Allereerst wil ik u graag welkom heten en bedanken voor uw komst.

Mijn naam is Desirée Leukel ik ben een onderzoeker van aanbieden van gratis snacktomaten op de werkvloer en ik zal vandaag met jullie hierover praten. Mijn collega's (*voorstellen*) maken aantekeningen.

- We gaan in een groep praten over het aanbieden van de snacktomaten. Ik ben geïnteresseerd in alle meningen en er zijn geen foute antwoorden. Reageer ook op wat andere mensen zeggen.
- Af en toe zal ik vragen stellen over bepaalde onderwerpen of doorvragen om nog meer te weten te komen.
- Als er vragen zijn waar u geen antwoord op wilt geven dan hoeft u dat niet te doen.
- De discussie van vandaag zal opgenomen worden met een audio recorder omdat we geen enkele opmerking die wordt gemaakt willen missen en we niet zo snel kunnen meeschrijven. Alles wat jullie zeggen zal anoniem verwerkt worden, en we zullen geen namen of andere persoonlijke informatie bekend maken.

Heeft iemand nog vragen of opmerkingen hierover?

- Voordat we verder gaan; heeft iedereen het toestemmingsformulier ondertekend?

Deelnemers die het niet prettig vinden mogen de discussie verlaten.

De discussie zal ongeveer 60 minuten duren. Omdat we maar weinig tijd hebben zal ik misschien zo nu en dan een discussie moeten onderbreken om alle onderwerpen binnen de tijd te kunnen bespreken. U mag op elk moment stoppen met dit onderzoek zonder opgaaf van reden.

Heeft iemand nog vragen of opmerkingen voordat we beginnen?

Als begin zou ik graag een rondje willen maken waarin iedereen zichzelf even heel kort voorstelt.

Vertel ons alsjeblieft uw voornaam en wat is uw functie binnen de gemeente?

Start de twee audio recorders en leg ze neer op verschillende plaatsen in de kamer. Notulist gebruikt codes.

Oké, dit was een kleine opwarming om elkaar wat te leren kennen. Nu wil ik graag met jullie praten over het aanbieden van de tomaatjes.

Gespreksfase 2: Stellingen (10 minuten per stelling)

Vraag 1:

Wilt u alstublieft **vraag 1** eerst invullen uit het boekje? Dit zijn een aantal stellingen. Geef voor elk van de stellingen aan of u het er mee eens bent of niet. U kunt ook aangeven dat u het niet weet.

Iedereen klaar?

We zullen nu de stellingen een voor een doornemen en bespreken.

Stelling 1: Waardering

Ik vind het positief dat de gemeente Venray snackgroente aanbiedt in de TomatenTap.

Wie is het eens met de eerste stelling van deze opdracht? Kunt u toelichten waarom? Zijn er ook mensen die er anders over denken?

Stelling 2: Consumptie

Ik maak gebruik van de TomatenTap op de dagen de Tap aanwezig is.

Wie is het eens met de eerste stelling van deze opdracht? Kunt u toelichten waarom? Zijn er ook mensen die er anders over denken?

Wie heeft er gebruik gemaakt van de tomatentap?

→ Waarom wel?

→ Op welke dagen?

→ Waarom wel/niet op die dagen

Wie heeft er geen gebruik gemaakt van de tomatentap?

→ Waarom niet?

Onderwerpen die invloed hebben op gebruik:

- Tijd
- Invloed van collega's
- Voorkeur/ smaak/lusten
- Variatie in keuze
- Afstand van werkplek tot tap

Stelling 3: Ongezonde compensatie

Denkt u dat u meer of minder ongezonde snacks zoals koek, chocolade en chips eet op het werk nu de TomatenTap aanwezig is?

Wie is het eens met de eerste stelling van deze opdracht? Kunt u toelichten waarom? Zijn er ook mensen die er anders over denken?

Stelling 4: Gezonde compensatie

Denkt u dat u meer of minder groente thuis eet nu de TomatenTap aanwezig is? Denk hierbij aan warme groente bij de maaltijd en groentesnacks.

Wie is het eens met de eerste stelling van deze opdracht? Kunt u toelichten waarom? Zijn er ook mensen die er anders over denken?

Heeft iemand nog een laatste opmerking of vraag?

Afsluiting groepsdiscussie (5 minuten)

Dit was de laatste opdracht. Ik wil jullie graag hartelijk bedanken voor jullie komst en voor het delen van jullie meningen met mij. Ik hoop dat jullie de discussie prettig hebben gevonden, voor mij was het in ieder geval erg waardevol. Mochten jullie eenmaal thuis nog vragen hebben over het onderzoek dan kunnen jullie me een e-mail sturen. Ik wens jullie nog een fijne dag.

Bijlage 1 Antwoordboekje

Stelling 1

	Mee oneens	Weet niet / twijfel	Mee eens
Ik vind het positief dat de gemeente Venray snackgroente aanbiedt in de TomatenTap.			

Stelling 2

	Mee oneens	Weet niet / twijfel	Mee eens
Ik maak gebruik van de TomatenTap op de dagen dat de Tap aanwezig is.			

Stelling 3

	Meer	Weet niet / twijfel	Minder
Denkt u dat u meer of minder ongezonde snacks zoals koek, chocolade en chips eet op het werk nu de TomatenTap aanwezig is?			

Stelling 4

	Meer	Weet niet / twijfel	Minder
Denkt u dat u meer of minder groente thuis eet nu de TomatenTap aanwezig is? Denk hierbij aan warme groente bij de maaltijd en groentesnacks.			

Bijlage 2

Toestemmingsformulier

- Ik heb de inhoud van het onderzoek begrepen. Ook kon ik vragen stellen. Mijn vragen zijn voldoende beantwoord. Ik had genoeg tijd om te beslissen of ik meedoe.
- Ik weet dat meedoen vrijwillig is. Ook weet ik dat ik op ieder moment kan beslissen om toch niet mee te doen of te stoppen met het onderzoek. Daarvoor hoef ik geen reden te geven.
- Ik weet dat alleen Victor Immink / Ellen van Kleef / Desirée Leuker mijn gegevens kunnen inzien. De gegevens worden tijdens het onderzoek geanonimiseerd.
- Ik weet dat de gegevens bewaard worden op een locatie bij de WUR die alleen deze onderzoekers kunnen openen.
- Ik geef toestemming om mijn gegevens op de onderzoekslocatie nog 2 jaar na dit onderzoek te bewaren.
- Ik wil meedoen aan dit onderzoek.

Naam:

Handtekening:

Datum : __ / __ / __

Ik verklaar dat ik deze proefpersoon volledig heb geïnformeerd over het genoemde onderzoek.

Als er tijdens het onderzoek informatie bekend wordt die de toestemming van de proefpersoon zou kunnen beïnvloeden, dan breng ik hem/haar daarvan tijdig op de hoogte.

Naam onderzoeker (of diens vertegenwoordiger):

Handtekening: Datum: __ / __ / __

Met het geven van uw toestemming verklaart u deze persoonsgegevens vrijwillig te hebben verstrekt. De door u verstrekte persoonsgegevens zullen uitsluitend voor het doel worden gebruikt waarvoor u deze heeft verstrekt. U heeft het recht op inzage, verwijdering, correctie of beperking van de verwerking van persoonsgegevens, alsmede het recht om bezwaar te maken en het recht op gegevensoverdraagbaarheid. Verder heeft u het recht om de gegeven toestemming in te trekken. Indien u een klacht heeft, kunt u deze indienen bij WUR via privacy@wur.nl. Ook kunt u een klacht indienen bij de Autoriteit Persoonsgegevens. Meer informatie kunt u vinden op www.autoriteitpersoonsgegevens.nl. Heeft u vragen, dan kunt u terecht bij de Functionaris Gegevensbescherming van WUR via functionarisgegevensbescherming@wur.nl