

MASTER

Goal setting and action planning for healthful meals with a recipe cookbook

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Goal Setting and Action Planning for Healthful Meals with a Recipe Cookbook

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in partial fulfilment of the requirements for the degree of

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in Human Technology Interaction**

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Abstract

The main objective of this research is to formulate recommendations for a pleasure future recipe recommendation system. In a literature study, we explored a method called action planning and goal setting which is effective to support people engaging in an intended behavior. Our aim is to investigate if action planning and goal setting technique is feasible in the context of a recipe recommender. Furthermore, we want to investigate if MCC's decision-support-tool (health indicator) assists participants to make healthier recipe choices.

For this purpose, we performed a longitudinal study with 10 women (between the ages of 25 to 35, who resided in the Netherlands, motivated to eat healthy and enjoyed cooking to some extent). We tested action planning and goal setting using the cookbook version of MyCookingCompanion with and without health indicators for the duration of 3 weeks. In the trial, we asked participants to choose their health goals (e.g. select and prepare healthy recipes 4 times this week.) from different kinds of goal settings (e.g. difficult vs. easy goals, abstract vs. concrete goals). Our purpose is to find out which goal setting is more motivating for people to perform better.

As a result, we obtained some interesting findings though not all of them reached statistical significance due to the limited number of participants we could run in this longitudinal study. First, it is seen that action planning and goal setting method is feasible with cooking book version of MCC. Second, most participants found MCC and health indicator as a beneficial tool to indicate healthy recipes. Furthermore, participants who were given concrete goals and health indicator chose healthier recipes compared to participants who were given abstract goals and no health indicator. In addition, our results confirmed the findings of goal setting theory by Latham and Locke. It is also seen that goal difficulty, goal commitment and goal specificity are three important criterions for performing better on health goals.

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Chapter 1

1. Introduction

The World Health Organization (WHO) has reported that health problems caused by wrong eating habits are increasing more and more each year (Geleijnse et al., 2010). The most important problem concerning public health is the increase of diabetics, cardiovascular diseases and obesity. Bad eating habits are the primary reason for these illnesses to become more common (Bouwman, 2009). Therefore, it is of importance to analyze and understand healthy eating habits and develop new methods for discouraging unhealthy behavior. Research has been conducted in the past to analyze the reasons behind people's healthy and unhealthy eating habits. Studies revealed that with regard to eating habits most people suffer from an intention-behavior gap (Gollwitzer and Sheeran, 2006).

For individuals who have the intention to improve their eating habits, it is not straightforward to actually change their behavior. Individuals who have the intention to eat healthier cannot implement their intentions into actions as they often face a combination of barriers such as lack of knowledge, cooking skills and social (family) constraints. With the extensive set of choices, the current availability of food products makes it difficult to make proper decisions and select and prepare healthful meals. Also, excessive amount of information lead them to be distracted from their intentions to choose healthy foods (i.e. the increased amount of choices in supermarkets and nutrition information).

Developing computer systems to support customers with their decisions has shown to be a way to make a sustainable behavior change towards eating healthier (Gros, 2009). Personalized advice and recommendation systems help in selecting and preparing meals for dinners. These systems suggest various tips on for example food purchasing and cooking techniques and help their users to lessen cognitive overload.

Nachtigall and Geleijnse (2010) suggest an intelligent, easy-to-use nutritional support system with a recipe browser and cooking guide for the users who have the intention to change their diet towards a healthier one (Nachtigall and Geleijnse, 2010). Developed by Philips research; this nutrition support system is called *My Cooking Companion (MCC)*.

MCC promises to reduce the perceived barriers towards selecting and preparing healthy meals by indicating healthful recipes with an easy-to-use health indicator (See Figure 1.1). The health indicator uses traffic-light scores in order to quantify the healthfulness of a meal. Health scores are based on the amount of calories, types of ingredients and the way of preparation of meals. The color codes are helpful for users to make proper decisions since they convey health information in an easy to understand manner. Besides, users can increase their knowledge on healthful meals by studying the health scores for recipes. This set-up is proposed to increase users' awareness of the healthfulness of their food intake. In addition, it reduces the time and cognitive effort that is required for selecting healthy food. In MCC, all recipes are divided into 5 categories with 85 unhealthy (red and orange color), 56 neutral (yellow color) and 76 healthy (light green and green color) recipes.

Figure 1.1 MCC health indicator



In an earlier study by Gros (2009), it was tested whether the intention-behavior gap can be decreased by presenting the participants with a recipe recommendation system. In our experiment, one aim is to reevaluate Gros' conclusions. Similar to Gros's methodology, a simple health criterion has been developed by making use of colors. While designing the overall structure, some of the limitations in Gros' research have also been taken into consideration. For example in Gros' study, health goals for the participants were directly assigned by the researcher. Participants were given the goal of eating healthy meals for the duration of 2 weeks. The participants who participated in the experiment were motivated to eat healthy but it was observed that the participants had difficulty achieving this goal. Therefore, in this experiment we asked the participants to set their own goals. In our opinion, this allowed the participants to become more motivated towards eating healthy. In the literature survey we conducted, we have found evidence which support this idea. Saini suggests that participants should set their own health goals since it is an important factor affecting behavior change (Saini, 2005).

Thus, the present study has two main objectives;

- *To formulate recommendations for a pleasurable future recommendation system*
- *To develop new methods for motivating healthy behavior*

In order to search these objectives, we will investigate the goal literature first. Our purpose is to look for how to support people set their own "healthy goals". Thus, we require some technique that can be applied with MCC and health indicator. Next chapter explains our findings from literature study.

Chapter 2

2. Literature Research

This chapter discusses the literature research, aims to look for how to improve the recommendations on food choices. So, it includes new methods such as goal setting and action planning, as well as theoretical studies done by Bandura, Locke and Latham. Interesting findings in clinical research area are also mentioned briefly.

All of this research gives ideas about how to motivate people to adopt healthier diets. Later, in Chapter 3 we will combine these ideas with our design, to attribute on a recipe recommendation system (MCC).

2.1 Previous Literature

2.1.1 Gros' Study

Gros (2009) investigated if the electronic version of MCC increased perceived easiness to select and prepare healthy meals. The study showed that participants who used MCC as a decision support tool had higher *self-efficacy* scores (self-efficacy is the confidence in one's ability to take action) compared to participants who made their own decisions without MCC. Gros concludes that the result for higher self-efficacy scores is partly due to the health indicator. Interestingly, the results did not show superior effects of the electronic version over the printed version of MCC.

2.1.2 Limitations of Gros' Study

The results from Gros' study give rise to further investigations with MCC.

In the previous trial by Gros, participants were assigned the following implementation intention: *"I will eat healthy (only meals marked light green or green) everyday during dinner in the forthcoming two weeks"*. So they did not set their own goal. Nevertheless, Bandura's social cognitive theory proposes that goal attainment improves if user sets a goal himself/herself (Bandura, 2004). Furthermore, Erez's study showed that participative goals generated higher commitment and performance than assigned goals (Latham & Locke, 1968). In addition, implementation intentions in Gros' study were hard to attain for many participants, who desired to eat from orange and red labeled meals once a while. *(Some participants even quitted the study even though they were motivated to eat healthy.)*

Thus, the current study should let participants decide on the level of difficulty of their health goals and be designed in such a way that health goals are set by the participant and not imposed by the investigator.

2.1.3 Goal Setting Theory (Latham & Locke, 1991)

To be able to support people in setting their own goals, we will first discuss theory on goal settings. In 1991, Latham and Locke proposed goal setting theory. According to this theory, there are three attributes contributing to the goal performance; *difficulty, commitment and specificity* of the goal.

Goal difficulty is separated into three levels; *easy goals, moderate goals and difficult goals*. The theory assumes that difficult goals produce higher levels of performance than easy goals, other things being equal. Locke (1968) presents 12 studies on this topic, where goals are assigned by the researcher, where some tasks were e.g. brainstorming, complex computation, and academic performance. The results demonstrated that the performance gets better as the goal becomes harder, although it was found that the participants with very difficult goals reached their goals less often than the ones with very easy goals. These studies also showed that goal difficulty depends on a person's ability and experience. Thus, the same task can be easy for a person while it is difficult for another one.

Another attribute to the performance is a person's **goal commitment**. The goal commitment shows if an individual is determined to attain the goal, finds it important and stick with it when facing obstacles. The findings of Locke showed that the higher goal commitment results in better performance, especially when the goal level is difficult.

The final attribute of goal performance is **goal specificity**. It is shown that specific goals lead to better performance than abstract goals. This is because specific goals do not allow many variations in the outcome. For instance, 'take a walk' is an abstract goal that is open to variations in the outcome. However, 'walk one mile' is more specific and gives clear direction to the person. Larson & Schaumann's study provide evidence by showing that specific and difficult goals are more effective than abstract goals in group tasks (Latham & Locke, 1991).

2.1.4 Goal Setting and Action Planning in Clinical Research

Besides the theoretical literature i.e Bandura, Locke and Latham' studies, goal setting has been studied in clinical research. Behavior change literature in the area of clinical research points out that action planning and goal setting are effective mechanisms to engage in an intended behavior (Bodenheimer et al., 2007; Handley et al., 2006). In this area, one of the most extensive studies was done by Bodenheimer et al. (2007).

Focusing on patients with chronic conditions and adverse risk factors, Bodenheimer found that goal setting lead to healthier lifestyle. His clinical studies execute the following procedure. First, clinicians initiate a goal setting discussion by asking questions to patients in order to determine their motivation for behavior change. After agreeing on a general goal, patient and clinician negotiate on a specific action plan. For instance, if the goal of the patient is to lose 4.5 kg, the action plan is to consume water rather than sugar included drinks or if the goal of the patient is to exercise more, the action plan is to walk 3 miles per day or walk for 15 minutes after lunch 3 days per week. During the trial, the participants are checked by call if they realize their action plans during the week.

Handley (2006) demonstrated also the favorable effects of goal setting and action planning. In his study, the same procedure as the one of Bodenheimer et al. (2007) was used. Similarly, the

patient chose a goal and negotiated with the clinician for the specific action plan. In this study, 228 patients made action plan at the beginning. Out of 228, 180 of the patients followed the action plan for the full 3 weeks. Thus, the majority of the patients were able to make behavioral change action plans.

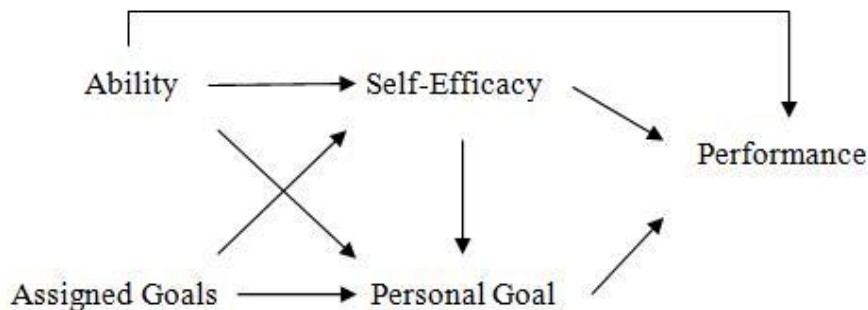
2.1.5 Other Related Literature

2.1.5.1 Self-efficacy, Goals and Performance

Self-efficacy is a key factor in affecting performance, next to personal goals and one's ability. (See Figure 2.2). Self-efficacy refers to one's self-confidence to perform well at a specific task, which is measured by asking participants to rate their confidence level for the task, e.g. eating healthy, cooking, planning. Self-efficacy includes all factors that influence the performance like adaptability, creativity and resourcefulness (Latham & Locke, 1991).

Self-efficacy also has effect on performance through choice and commitment of personal goals (Bandura, 2002). Thus, individuals who have high self-efficacy usually choose higher goals and show higher commitment to their goals. In contrast, people with low self efficacy are more likely to choose less challenging goals. This implies that self efficacy is a good indicator of how individuals are going to perform.

Figure 2.2 Relation of ability, self-efficacy, goals and performance



Remarkably, Bandura showed that self-efficacy is a key factor to predict the performance on health behavior. This is because individuals with high self-efficacy set higher health goals and show more commitment towards realizing these goals. Also, the self-efficacy beliefs influence individuals' expectations from the efforts they put to realize their goals.

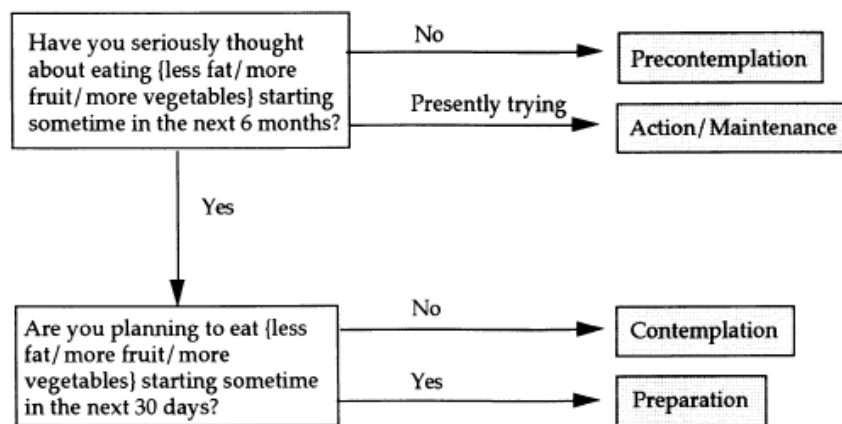
2.1.5.2 Transtheoretical Model of Change (TTM)

Developed by Prochaska & Diclemente (1977), the *Transtheoretical Model of Change (TTM)* is a comprehensive model of change that cultivates the understanding of addictive behaviors and how to change these behaviors. The model presents a complete cycle of change, including 5 series of stages that are; *pre-contemplation, contemplation, preparation, action and maintenance*. The model gives insight on an individual's readiness for change and guide the treatment of the addictive behaviors like over-eating, alcohol abuse and cocaine dependence. The findings of the research done with the model shows that the model is successful to predict the participants who have a sustainable behavior change after treatments for addictive behaviors.

According to the TTM model, self-efficacy is an important variable in behavior change. Prochaska & Diclemente developed questionnaires and demonstrated that self-efficacy level increases from pre-contemplative stage to maintenance stage. In addition, Bodenheimer showed that the patients on *pre-contemplative stage* have low self-efficacy and followed their action plans less frequently than the ones with high self efficacy. In contrast, the patients on the *action stage* showed more improvements regarding health conditions compared to the pre-contemplated patients.

Furthermore, Campell et. al (1994) used the TTM model framework for their study on dietary intervention strategies. In this study, the intervention on dietary intake was tailored to participants' stage of change. In order to assess the stage of change, a new questionnaire was developed by Campell et al. based on the framework of Prochaska& Diclemente (1977) (See Figure 2.3). The findings of the study showed that the self-reported stage of change was a significant predictor for fat, fruit and vegetable intake. Thus, participants in pre-contemplative stage consumed less fruit and vegetables and more saturated fat compared to the ones in action stage.

Figure 2.3 The TTM questionnaire developed by Campell et al. (1994)



2.1.6 Summary of the Findings

In this chapter, we discussed goal setting and action planning and explored effective methods to apply them in real life.

Gros' study was our motivation to study goal setting with MCC and health indicator. Her findings showed us that people perceive health indicator as an effective decision-making tool while choosing recipes. However, there is no second condition (MCC without health indicator) in her study and there are some limitations. Therefore, further research is needed with two condition groups to test if there is any effect of health indicator on recipe choice.

Starting from Gros study, we reviewed the goal literature and explored Goal Setting Theory by Locke and Latham. As mentioned earlier, this theory states goals' important aspects such as difficulty, commitment and specificity. Locke and Latham assume that these aspects are critical for goal performance. This theory interests our research since different goal settings result in different goal performance. Since our aim is to find out a better way to design recipe recommendation systems, it is interesting to look for the effects of different goal settings. These goal settings can be in 3 dimensions. First, the goals can be either specific(concrete) or abstract. Second, the goals can be easy, moderate or difficult for a person. And finally, a person can commit the goal in different levels. These three aspects are valid for health goals as well as other goals. In our research we are interested in only health goals, more specifically healthy eating goals. Healthy eating goals can vary from specific to abstract and be difficult, moderate or easy. (*Commitment cannot be manipulated by design*).

Finally, we reviewed which methods work in real life to change behaviors. At this point, we explored clinical research studies done by Stanford University. These studies indicate that goal setting and action planning can work to change behaviors in difficult real life cases. Being motivated by the success of these studies, we decided to use this method with MCC and health indicator. Our first goal is to see if these methods can be applied with MCC and health indicator, and later to be used as an effective method to change eating behavior towards healthier one.

To sum up, our literature study leads us to do research on three important aspects:

- 1) To search if health indicator has a positive effect on food choice,
- 2) To manipulate people's food choice with different goal settings (abstract vs. specific (concrete); and difficult, moderate or easy goals)
- 3) To motivate people attain a healthier diet through goal setting and action planning

In the next chapter, our design and hypothesis will be discussed to investigate these three points.

Chapter 3

3. Research Question, Design and Methodology

This chapter explains our design for an experiment that tests how a recommender system can best be setup to give advices to its users. Based on our literature research, we have come up with two main research questions. The first section discusses these questions and our hypotheses. Later, our research methodology will be discussed with detail information on participants, materials, procedure and questionnaire.

3.1 Research Questions

Our literature research mentioned in previous chapter leads us converge our interest into two research questions. These research questions are below:

1. *Does health indicator have a positive effect on people's food choice?*
2. *If we can motivate people with different goal settings;*
 - 2.a *Can we motivate them better with concrete or abstract goal settings?*
 - 2.b *Can we motivate them better with easy or difficult goal settings?*

Gros' study showed us that health indicator helps participants to make healthier decisions. So, our hypothesis is;

Hypothesis 1: *Participants who are given MCC with health indicator will eat healthier recipes than the participants who are given MCC without health indicator*

The goal setting theory indicates that the specific (concrete) goals lead to better performances. Therefore, concrete goal settings should be more motivating for participants to reach their health goals. Corresponding hypothesis is below:

Hypothesis 2: *Concrete (specific) goal settings are more motivating for participants to reach their health goals than abstract goal settings*

The goal setting theory states that performances get better as the goal gets more difficult Thus, difficult goals should lead to better performances than easy goals. So; our hypothesis:

Hypothesis 3: *Difficult goal settings are more motivating for participants to reach their health goals than easy goal settings*

3.2 Research Design

All participants were asked to perform the goal setting and action planning tasks using the MCC cookbooks. Participants were randomly divided between two conditions: (1) concrete goal setting and action planning using MCC cookbook **with health indicator** versus (2) abstract goal setting and action planning using MCC cookbook **without health indicator**. The dependent variables are; 1) the number of times cooking per week, 2) the health scores of the meals that are chosen and 3) the goals participants were selected. The independent variable were; 1) the combination of the goal setting condition and 2) the type of MCC cookbook (with or without health indicator).

Table 3.1 shows the design of the study. Due to time restrictions and the difficulty to recruit participants for a three week trial, the intermediate condition with abstract goal setting when given a MCC with health indicators was left out of the experiment. In order to have reliable results regarding the achievement of the treatment, the measures on the dependent variables were obtained at each week in 3 weeks period.

As a remark, the goal difficulty was considered to be a controlled variable that means both groups were presented with 9 goals (3 easy, 3 moderate and 3 difficult goals). The difference between 9 goals was their specificity (being concrete or abstract). Thus, it is assumed that the goal difficulty did not vary between AG and CG.

Table 3.1 Design of the study

	MCC with Health Indicators	MCC without Health Indicators
Abstract Goal Setting (AG)	Not included in current trial.	Included in experiment (5 participants)
Concrete Goal Setting (CG)	Included in experiment (5 participants)	Not Possible

3.3 Methodology

3.3.1 Participants

10 participants (all female) were recruited for the study. Recruitment took place within a supermarket in Eindhoven and the network of the researcher. The main requirement was that participants reported that they had the motivation to eat healthier. Therefore, it was chosen to focus on females as they are usually more motivated to eat healthy and more often responsible for cooking at home. Another requirement was that participants were able to cook from a Dutch cooking book provided by the researcher for 3 weeks in a row.

During the recruitment, participants filled in an application form where they were asked who the main contributor to the planning, shopping and cooking of food in their household was. Participants were also asked if they live alone or with a partner, have children or not, and live in Eindhoven and surroundings. We required also having participants with a BMI between 19 and 27, to be in between 25 and 50 years old, high school graduates and not to be on a diet in the period of study.

Furthermore, participants were required to understand Dutch, since recipes are in Dutch. In addition, they should be able to speak Turkish. 4 participants were from a group of Dutch citizens, who were born in Netherlands but their families were emigrated from Turkey many years ago. The other 6 participants were born in Turkey, and came to Netherlands few years ago, either to study in the university or to work. These 6 participants were not fluent in Dutch, but managed to understand Dutch recipes. Since the researcher was not able to speak Dutch, interviews and all questionnaires were done in Turkish. This aimed at eliminating errors caused by possible communication problems. Later, interviews and questionnaires were translated into English by the researcher.

3.3.2 Materials

3.3.2.1 Questionnaires

The constructs were measured with a paper-and-pencil questionnaire. Major constructs were self-efficacy constructs (toward eating healthy, general self-efficacy and action planning self-efficacy), goal commitment questionnaire, goal setting, action planning, health indicator questions and MCC questions. (See Appendix for all the questionnaires)

3.3.2.2 MCC with Health Indicator



Figure 3.1 The cookbook version of My Cooking Companion (MCC)

5 participants were provided with a standard MCC cookbook (Figure 3.1). This version is designed by previous researcher in Philips research (Gros, 2009). The cookbook contained 217 recipes, which are chosen out of the 2000 recipe database. Based on a set of rules and rated by two independent raters, recipes are grouped into 5 categories. These categories are marked with colors. Red and orange are for unhealthy, yellow is for moderately healthy, green and light green are for healthy recipes.

Figure 3.2 - MCC with health indicator (above) and zoom into health indicator (below)



Figure 3.3- MCC without health indicator



3.3.2.3 MCC without Health Indicator:

5 participants were provided with a MCC without health indicator (See Figure 3.3).

3.3.2.4 Cameras

Participants were given disposable cameras. These were used to monitor the size of the meal portions.

3.3.3 Procedure

For each participant, the three week trial was both preceded and followed by an appointment. The initial appointment was on Day 1 and the last appointment was on Day 21 of the study. Both appointments took approximately 1 hour. Participants were invited to these meetings via email or telephone. According to their preferences, appointments took place either at their houses, at their work or elsewhere in Eindhoven.

The Initial Meeting

The first meeting included a presentation introducing MCC cook books. The participants were also explained about goal setting (i.e. choosing a weekly health goal) and action planning (i.e. selecting recipes accordingly, see Appendix). Firstly, participants were given their MCC cook

books. The ones who had MCC with health indicator were explained the purpose of health indicator.

Goal Setting Procedure

In the initial meeting, participants were involved in a goal setting session with the researcher. Here, participants were presented with nine goals that differed in the number of times cooking meals per week and the healthfulness of these meals. Participants who had given MCC cook books with health indicator were presented those concrete goals. The other participants who had given MCC without health indicator were presented abstract goals.

Afterwards, participants were asked to choose one of those nine goals and write down their chosen goals into a blank box that was provided by the researcher (See Appendix). Meanwhile, they were asked to repeat this goal setting session by themselves on Day 8 and on Day 15.

The Concrete Goal Set Design

The concreteness of the goal was defined by the health indicator. Each concrete goal differed from each other in the level for difficulty. The level for difficulty is defined by mean health score of the goal and amount of cooking per week. In order to quantify the mean health score of a goal, we gave points to each color (*Red= 1 point, Orange =2 points, Yellow=3 points and Green=4 points*) (See Table 3.2).

From Gros' study it is known that "cooking *green* meals *everyday* per week" is a hard-to-achieve goal for participants. Gros asked participants to cook everyday, and most participants quit the study. Therefore, we assigned the hardest goal as "cooking 5 green meals per week." Also, we assigned the easiest goal as "cooking 3 times per week. Since participants are motivated to eat healthy, cooking less than 3 would not be regarded as healthy and more than 5 may lead them to quit.

In between easy and hard goal, we needed to have a moderate goal level, because of the goal setting theory. In the moderate-goal level, participants are given to choose "cooking 4 times per week" and health scores are calculated as taking mean health scores in between.

Table 3.2 shows the choice set for concrete goal. (“Kırmızı” means Red, “Turuncu” means Orange, “Sarı” means Yellow, “Yeşil” means Green)

	First Option	Second Option	Third Option	Number of times cooking per week	Mean Health Score Of the Goal
Easy Goals				3	2, 3, 3.7
Moderate Goals				4	2.5,3.25,3.75
Difficult Goals				5	2.8,3.4,4

The Abstract Goal Set Design

The abstract goals were presented with **words** instead of color codes. Participants were asked to choose an abstract goal from written goals. (See Figure 3.4) Each abstract goal differed from each other in the level for difficulty. Here, it is assumed that the level of difficulty is a function of the *amount of cooking per week* and *abstract healthiness of the meals* (See Table 3.3). It is assumed that first abstract goal is the easiest one, while the ninth goal is the most difficult goal.

Table 3.3 shows the choice set for abstract goals

	First Option	Second Option	Third Option	Amount of cooking per week	Mean Health Score Of the Goal
Easy Goals	Cook 3 times A little bit healthy	Cook 3 times Moderately Healthy	Cook 3 times Healthy	3	?
Moderate Goals	Cook 4 times A little bit healthy	Cook 4 times Moderately Healthy	Cook 4 times Healthy	4	?
Difficult Goals	Cook 5 times A little bit healthy	Cook 5 times Moderately Healthy	Cook 5 times Healthy	5	?

Action Planning Session

After goal setting session was completed, participants were asked to plan the recipes according to their self-chosen health goals. In order to make their plans, participants were provided with a blank schedule sheet, on which the participants could fill out their dinner plans for each day of the week. Here, they were asked to write down the page number of the recipes they chose from MCC cook book. Meanwhile, researcher left the room to allow participants some time to browse MCC cookbook and think carefully about their schedule for the following week. After 15 minutes, the researcher returned to the room to ask if participants were ready to proceed with paper-questionnaires.

Questionnaire Session

When the participants were done with the planning of the recipes, the researcher handed them paper questionnaires including TTM constructs, self-efficacy constructs towards eating healthy and cooking, etc. (see Appendix) In order to let participants fill in the questionnaires, researcher left the room again for 15 minutes.

Pictures and Cameras

Finally, participants were provided with disposable cameras. They were required to take the pictures of recipes from MCC cookbook, by using these disposable cameras.

Informed Consent Forms

Participants signed the informed consent forms at the end of this meeting. In addition, they received an information letter about the purpose of the study that stated their rights, such as quitting the study at the time they wished.

Follow-up Mails

Participants were contacted by e-mail, in order to remind them to repeat the goal setting and action planning for week 2 and 3. These emails were sent twice, on Day 8 and Day 15, (See Appendix). In addition, participants were asked to submit their goals and action plans to the researcher via email.

Additional Questions

During the study, some participants called the researcher to ask questions. These questions were mostly about to ask permission to use other ingredients than the ones given in MCC. Participants were required to cook as written in MCC, and told that this is important for the result of study. Another frequently asked question was about how to use the camera. Some participants were given permission to use their own cameras. Also, some participants called for asking if they can change their initial plans. They told some excuses not to cook on the day they planned so. The researcher replied them as they were free to do this.

One of the participants was given admission to stop for one week, because of sad personal circumstances. She continued her schedule the next week.

The Last Meeting

Participants received a gift voucher of 50 euro as an acknowledgement for their participation and given the questionnaires.

Questionnaire Session

Participants were asked to fill the paper questionnaires, including self-efficacy constructs, goal setting and action planning questionnaires, and MCC-effectiveness.

Interview Session

After the questionnaire session, participants were interviewed for half an hour. A guide (see Appendix) was developed to make it sure that all interviews had same topics and almost same questions. One of the topics was to investigate the hypothesis whether participants ate healthier during the experiment than before.

Chapter 4

4 Quantitative Data Analysis & Results

This chapter presents the quantitative data analysis and results. The first section deals with the pre-testing questionnaires. The second section presents the data collected by different types of questionnaires, which includes goal setting, action planning, health indicator, MCC, self-efficacy, goal commitment and TTM constructs. The third section shows the analysis to check our hypothesis. Finally, the last section is about new findings discovered during analyzing questionnaire data.

4.1 Pre-testing

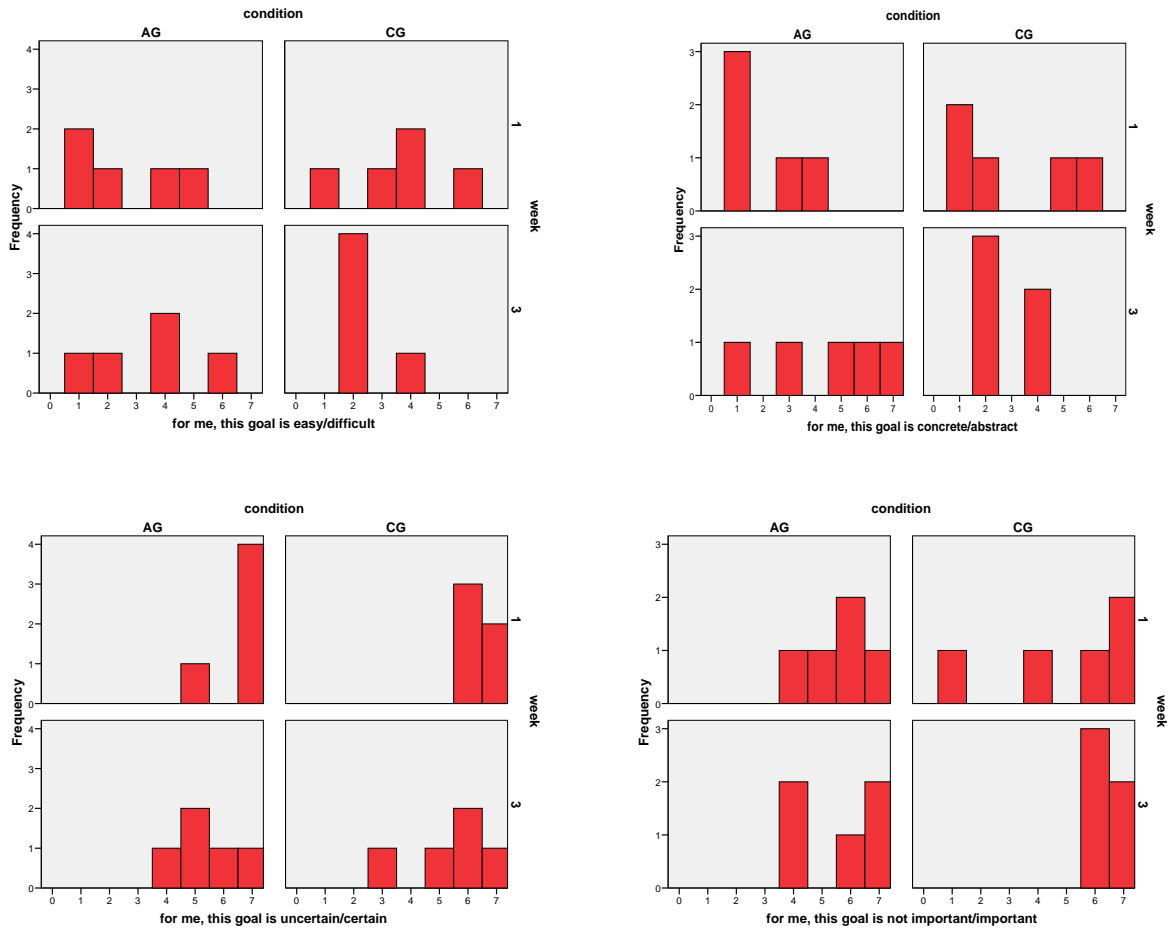
This section discusses differences in two condition groups; AG and CG. The aim of this section is to check if participants in AG and in CG have significant differences that might affect the dependent variables. In order to do that, we performed an independent samples t-test. Participants' age, marital status, number of children, BMI (body mass index), dietary situation, education level, number of times cooking per week, planning dinners or not were compared between two groups of conditions; abstract group (AG) and concrete group (CG). No significant difference was found (See Appendix) between the two groups of these demographics.

4.2 Questionnaires Analyses

4.2.1 Analyzing Goal Setting Questionnaire

In goal setting questionnaire, we asked participants in week 1 and again in week 3 to rate goal setting from 1 to 7, if it is “easy or difficult”, “concrete or abstract”, “important or unimportant” and “certain or uncertain” (See appendix for the constructs). Figure 4.1 shows the results in histograms. In order to check if any difference is significant, we employed one way repeated-measures ANOVA per question. No significant difference was found between AG and CG. However, we found a difference on question 4 (for me this goal is uncertain/certain) showing a reduction in certainty from week1 (M=6.5) to week3 (M=5.4) ($F(1, 8) = 11, p = 0,011$). Also, we observed marginally significant interaction effect of weeks and condition on the question 1 (for me this goal is easy/difficult), suggesting that the goals became slightly more difficult for AG (M=2.6 in week 1 versus M=3.4 in week 3) and slightly less difficult for CG (M=3.6 in week1, versus M=2.4 in week 3) ($F(1, 8) = 2.7, p = 0,139$).

Figure 4.1- Histograms for goal setting questionnaire (easy=1, difficult=7 (on upper left); concrete=1, abstract=7 (on upper right); not important=1, important=7 (on bottom left); uncertain=1, certain=7 (on bottom right); AG=abstract group, CG= concrete group).



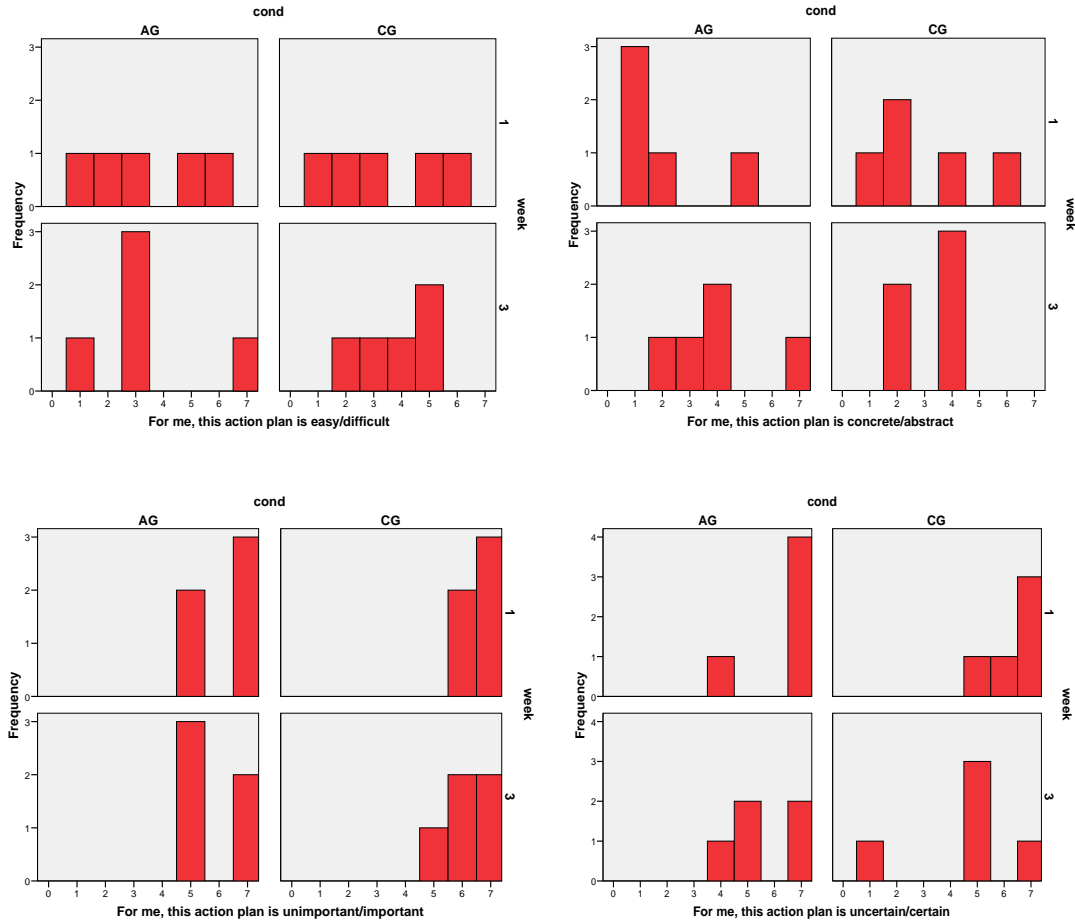
4.2.2 Analyzing Action Planning Questionnaire

In this section, we present the analyses of action planning questionnaire. Same as goal setting questionnaire, participants were asked to rate if they found action planning “easy or difficult”, “concrete or abstract”, “important or unimportant” and “certain or uncertain” (See appendix). In order to analyze the data, one way repeated-measures ANOVA was employed. In this analysis, the group condition was used as a between-participants factor and two levels were used to define within-participants factors; week 1 versus week 3.

The results showed that there is no difference from week1 to week 3 on question 1, 2 and 3 between AG and CG. However, a difference is found on question 4(for me the action plan is certain/uncertain) from week1 (M=6.4) to week3 (M=5.1) ($F(1, 8) = 4, 57, p = 0,065$).

Figure 4.2 shows the results in histogram graphs.

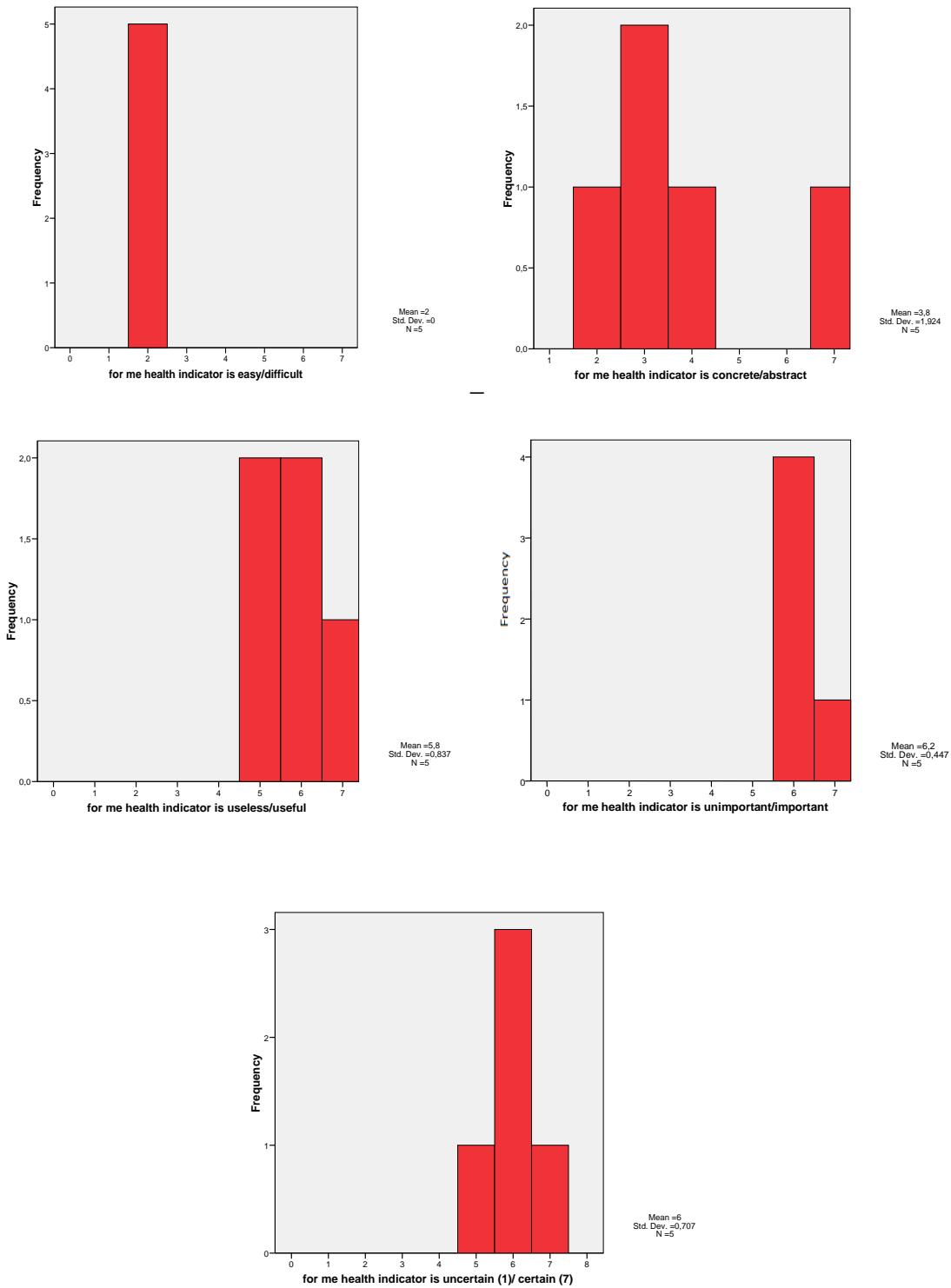
Figure 4.2- Histograms for action planning questionnaire (easy=1, difficult=7 (on upper left); concrete=1, abstract=7 (on upper right); not important=1, important=7 (on bottom left); uncertain=1, certain=7 (on bottom right); AG=abstract group, CG= concrete group).



4.2.3 Analyzing Health Indicator Questionnaire

Only participants in concrete group answered this questionnaire at the end of trial. Five participants were asked if they found the health indicator “easy or difficult”, “concrete or abstract”, “important or unimportant”, “useful or useless” and “stressful or not stressful”. Figure 4.3 shows the results on histograms. The histograms indicate that *almost all* participants found health indicator easy ($M=2$, $SD=0$), important ($M=6.2$, $SD=0.45$), useful ($M=5.8$, $SD=0.8$), certain ($M=6$, $SD=0.7$) and concrete ($M=3.8$, $SD=1.9$).

Figure 4.3-Histograms for health indicator questionnaire (easy=1, difficult=7(on upper left); concrete=1,abstract=7 (on upper right), unimportant=1, important=7(on middle left); uncertain=1, certain=7(on middle right); useless=1,useful=7(on bottom)).



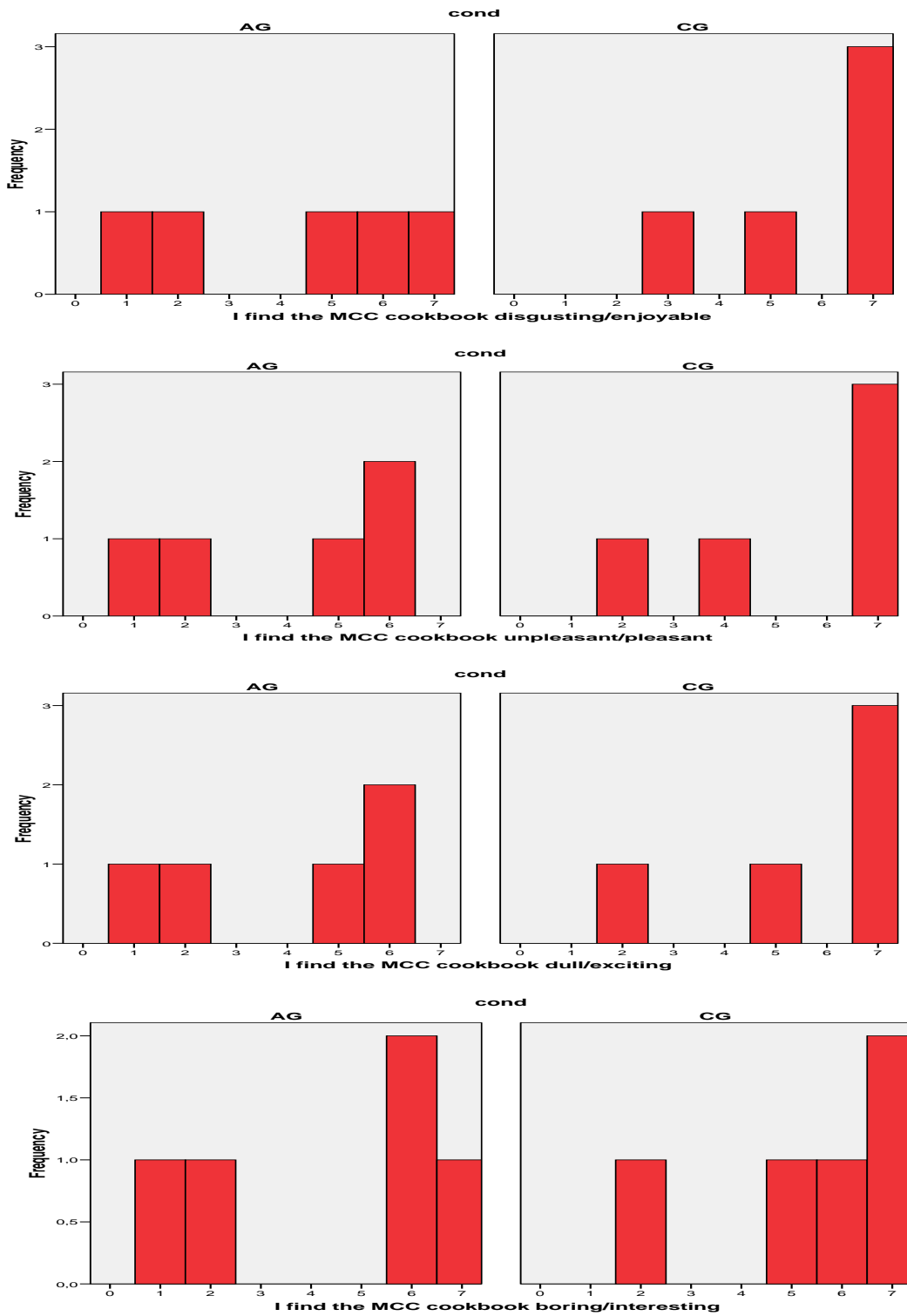
4.2.4 Analyzing MCC Questionnaire

In order to test the MCC experience, we presented a questionnaire with 4 constructs. These constructs measured if MCC was “pleasant”, “exciting”, “enjoyable” and “interesting”.

In order to assess the differences between AG and CG, we applied one way ANOVA. The result indicated no significant difference between two groups. However, means scores indicate that participants in CG found MCC more pleasant, more exciting, more enjoyable and more interesting to use than participants in AG. (pleasance: **CG:** M=5.4,SD=2.3, **AG:**M=4,SD=2.3,excitement:**CG:**M=5.6,SD=2.2,**AG:**M=4,SD=2.3,enjoy:**CG:**M=5.8, SD=1.79, **AG:** M=4.2,SD=2.6; interest: **CG:** M=5.4,SD=2,**AG:**M=4.4,SD=2.7).

Figure 4.4 shows the results in histograms.

Figure 4.4 Histograms for perceived enjoyment (disgusting=1, enjoyable=7 (on first row); unpleasant=1, pleasant=7 (on second row); dull=1, exciting=7 (on third row); boring=1, interesting=7 (on fourth row)).



4.2.5 Analyzing Self-efficacy Questionnaire

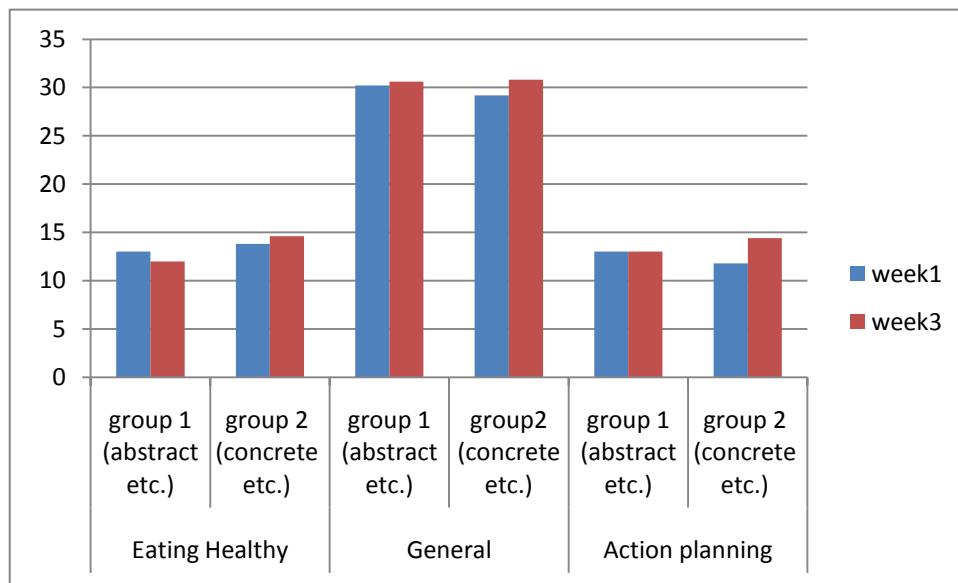
Participants were asked to rate their self-efficacy at the beginning and at the end of study. Three types of self-efficacy constructs (See Appendix) were measured; 1) self-efficacy for eating healthy, 2) self-efficacy for action planning and 3) self-efficacy in general. Having analyzed these self-efficacy constructs, it is found out that participants had an increase self-efficacy towards eating healthy and action planning over time. This increase is seen to be higher in CG than in AG.

Two way repeated-measures ANOVA with 2 (number of week) x 3 (type of self efficacy) on self-efficacy scores was employed to assess the difference over time. The group condition was used as a between-participants factor. Two levels were used to define within-participants factors; week 1 versus week 3. Three levels were used to define the type of self-efficacy (healthy eating, action planning or general).

The results showed that in CG self-efficacies towards eating healthy, action planning and general self-efficacy increased slightly from week 1 to week 3 (See Figure 4.5), while in AG they varied (i.e the self-efficacies towards action planning remained same, the self-efficacies towards eating healthy decreased, and the general self-efficacies increased slightly over time. None of these changes were found significant).

Also, the analyses showed that between participants effect of condition ($F=0,044, P=0.838$) was not significant nor the within participants effects of weeks ($F= 1,066, P= 0,332$). Also, no interaction effect of weeks and condition was found ($F=1.727, P=0,225$).

Figure 4.5 summarizes the self-efficacy differences between two groups over time



4.2.6 Analyzing Goal Commitment Questionnaire

The goal commitment is measured by a questionnaire at the beginning and at the end of study. In order to assess the change in commitment over three weeks, we applied a repeated measure analyses. The results showed that there is no significant change in commitment over time ($F(1, 8) = 0.17, p = 0.7$). **At week1** participants in AG rated their commitment higher than participants in CG (AG: $M = 2.8, SD = 4.2$, CG: $M = 2.4, SD = 4.7$), while **at week 3** participants in AG rated their commitment slightly lower than participants in CG (AG: $M = 1.6, SD = 3.2$; CG: $M = 3, SD = 3.16$). However, the interaction effect was observed to be insignificant between weeks and condition ($F(1, 8) = 1.54, p = 0.25$).

In addition, we applied an independent t-test to assess if there is a difference between AG and CG for week1 and week3. The results were non-significant ($F(1, 8) = 0, 398, p = 0.546$).

4.2.7 Analyzing TTM Construct

TTM construct is used to test if the participant is ready for a change in her diet. As the literature points out, people who are at the **action stage** make action plans more easily and people who are at the **pre-contemplation stage** are less prone to making it.

In our study, 2 participants were in the contemplation stage. Of these 2 participants, one of them dropped out of the experiment and the other cooked a small number of meals in total. 3 participants were in preparation stage and 5 participants were in action stage.

In order to see difference between these groups, we compared mean health scores. The results showed that participants in action stage (AS) chose healthier recipes than participants in pre-contemplation (PC) and preparation stage (PS) (AS: $M = 1.88, SD = 1.2$; PS: $M = 1.76, SD = 1$; PC: $M = 1.56, SD = 1.5$).

4.2.7.1 Hypothesis Check

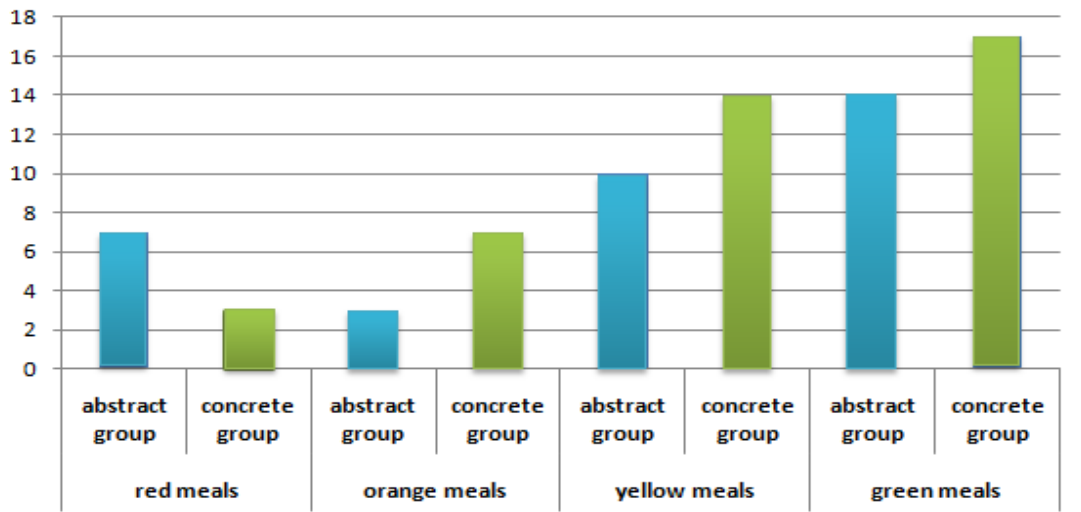
In the following section the results of the data analysis will be reported per hypotheses.

Hypothesis 1: *Participants who are given MCC with health indicator will eat healthier recipes than the participants who are given MCC without health indicator*

An independent t-test is used to test this hypothesis. A composite total health score was constructed as dependent variable by multiplying number of meals in a group with a weight (red=0, green=3) and summing these 4 scores per participant. The results showed that the mean health score is higher in concrete group than abstract group (CG: $M = 2.1, SD = 0.94$, AG: $M = 1.91, SD = 1.16$), although the difference was found non-significant ($t(73) = 0.764, p = 0.448$).

The figure 4.6 shows the distribution of red, orange, yellow and green labeled meals between AG (abstract group) and CG (concrete group). It is seen that CG cooked green, yellow and orange labeled meals 'more' than AG, while AG cooked red labeled meals 'more' than CG.

Figure 4.6 shows the distribution of red, orange, yellow and green labeled meals between AG (abstract group) and CG (concrete group)



Hypothesis 2: *Concrete goal settings are more motivating for participants to reach their health goals than abstract goal settings*

In order to check how often participants reached their goals, we calculated the percentage of completing their action plans. Zero point is given to the worst performance; that meant no adherence to the weekly plan. One hundred is given to the best performance; that required 100% adherence to the weekly plan. Then, we performed an independent t-test. The mean scores showed that CG performed better to reach their health goals than AG (AG: $M=75$, $SD=38.7$, CG: 83 , $SD=24.6$). However, the mean difference between two groups was not significant.

Hypothesis 3: *Difficult goal settings are more motivating for participants to reach their health goals than easy goal settings*

In order to check this hypothesis, first we checked for each participants which goals they chose. Later, the difficulty of their goals was rated from one to nine. The easiest goal received one point, while the most difficult goal received nine points. We found out that easy goals were chosen 23 times, while moderate goals were chosen only 2 times and difficult goals were chosen none. So, we could not make a comparison to assess the difference between goal difficulty and goal achievement.

4.2.7.2 Other Findings

Time for Cooking

It was found out that participants with concrete goal set chose the recipes that took more time to cook compared to participants with abstract goal set.

Having performed an independent sample t-test, a significant difference was found between two groups with $t(66) = -3.190, p=0.002$ (two tailed). The result indicates that the abstract group chose the recipes that took less time to cook (AG: M=20.2, SD=6.72, CG: M=32, SD=18.33).

4.2.8 Summary of Quantitative Study

From the analyses of questionnaires we found out that;

- ✓ AG and CG have no significant differences in terms of age, marital status, number of cooking per week, etc.
- ✓ For participants in both groups, their goals became more uncertain from week 1 to week3.
- ✓ For participants in AG, the goals became slightly more difficult from week 1 to week 3 while they became slightly less difficult for CG from week 1 to 3.
- ✓ Similar to goals, the action plans also became more uncertain for participants in both groups from week 1 to week3.
- ✓ *Almost all* participants found health indicator easy, important, useful, certain and concrete.
- ✓ Participants in CG found MCC slightly more pleasant, more exciting, more enjoyable and more interesting to use than participants in AG.
- ✓ Participants in CG had slightly increased their self-efficacy in action planning, eating healthier and in general. Meanwhile, in AG only general self-efficacy was found to increase slightly.
- ✓ There was no significant difference between AG and CG in terms of goal commitment from week 1 to week3. However, **at week1** participants in AG rated their commitment higher than participants in CG, while **at week 3** participants in AG rated their commitment slightly lower than participants in CG.
- ✓ Participants in action stage chose slightly healthier recipes than participants in pre-contemplation and preparation stage

The analyses of hypothesis showed that;

- 1) CG chose more green labeled meals in total compared to AG. Similarly, CG chose red labeled meals less often than AG. Although this difference was not found to be non-significant (See *the hypothesis 1*).
- 2) Participants in CG had higher goal achievement than participants in AG (*see the hypothesis 2*).

- 3) Finally, we checked if participants who selected difficult goals have higher success than participants who picked easy goals. However, there was no participant who picked difficult goals, and only 2 participants picked moderate goals. Therefore, we could not make a comparison to check the hypothesis (*see the hypothesis 3*).

Besides; it was found out that;

- ✓ Participants in CG chose recipes which took slightly longer time to prepare compared to the recipes participants in AG chose.

Chapter 5

5 Qualitative Study

5.1 Previous Eating Habits

9 participants reported the number of days they ate healthy in the past two weeks before study. These participants reported that they eat healthy dinners 3 days per week ($M=3.28$, $SD=2.47$). Furthermore, participants are asked to rate (out of 7) how much they cooking. The findings showed that their attitudes toward cooking are quite positive ($M= 4.78$, $S.D. =1.71$)

Fruit and Vegetable Consumption

All participants report to consume at least half cup of vegetables ($M=1.1$, $SD=0.42$) and one portion of fruits per day ($M=1.94$, $SD=0.91$) (Table 5.3). Participant 5 and 6 were notified as outliers since they reported to consume substantial more vegetables than the rest of the group. (See the table in Appendix, pg.)

Cooking Techniques

In general, participants reported to use boiling (47%), grilling (17%), oven (12%), or eating salad (%6). Frying (6%) was not preferred.

5.2 TTM Construct

The 4 TTM constructs were analyzed. The findings showed that 5 participants were in *Action* stage, 3 participants were in *Preparation* stage and 2 participants were in *Contemplation* stage (See Appendix).

5.3 Eating Questionnaire

The first question was why participants consider eating healthy. The most common reasons were to have a healthy life and body, to take care of their weight, to feel better and to prevent from illnesses.

The second question was to learn about participants' opinions on healthy dinners. Participants reported 13 different definitions for eating healthy. These were 1) to eat regularly, 2) to eat varied, 3) to eat vegetables and fruits, 4) to eat fish, 5) to get enough vitamins and minerals regularly, 6) to have small snacks in between the meals, 7) to get enough fluids regularly, 8) to eat after certain time, 9)to eat healthy food and beverages, 10) to eat hormone free,11) to have a balanced diet, 12) not to eat too much meat, 13)to eat frequent and varied.

In the third question, participants were asked for the disadvantages of eating healthy. Participants reported that the disadvantages of eating healthy is not to eat things that they like (7%), eating less delicious meals (7%), sacrifice from beautiful tastes (7%), cooking needs more time (15%),

cooking needs more energy (7%), sacrifice from the pleasure of eating unhealthy snacks (7%), becoming fat(7%), to be more careful and watch what you eat (7%) and nothing (29%).

In the forth question, the advantages of eating healthy were investigated. Participants told the advantages of eating healthy is to feel more energetic (19%), not to gain weight (14%), to become healthier (5%), to feel better (14%), to take vitamins that body needs, to prevent from illnesses (14%), to have a fit (5%) and healthy body (5%), to feel comfortable and relaxed (5%) , to feel lighter (5%), to do something nice for oneself (5%)and to preserve health (9%).

Finally, participants were asked what might help them to eat healthier. Participants answered that paying attention to what they eat (19%), putting more effort (9%), eating more vegetables, fruits and yogurt (9%),using less fat in meals (9%), cooking healthy (9%), eating less(9%), making plans (9%),having regular life with regular meal times (9%), changing mindset towards eating healthier(9%) and creating more time for cooking (9%).

5.4 Interviews

In this section the results of the interviews will be reported. The findings were grouped by the type of information being discussed. Information were analyzed by 7 main headlines which are self-efficacy, health indicator, goal setting, action planning, behavior change, general attitude towards MCC cookbook, food decision factors and recommendation systems.. The interviews were held in Turkish and later translated to English.

5.4.1 Self- Efficacy

The aim was to investigate if participants have an increased self-efficacy after the study. 2 out of 10 participants could not be interviewed for this question since no time has left.

8 participants, who finished 3 weeks trial, were asked if the study helped to increase their motivation and self-efficacies. 4 participants (3 from AG and 1 from CG) gave positive answers to the question. The first participant reported an evident increase in her confidence towards cooking and eating healthy. However, she felt a decrease in her motivation towards planning (when she could not realize her plans and felt angry with herself). The second participant agreed on the increase for cooking, however she did not mention any other change on motivation. The third participant talked about general motivation increase. Furthermore,1 participant in CG reported a change in her motivation towards eating healthy.

On contrary, there were two participants out of 8 who did not feel any positive change. They said the study was not helpful for motivating them.

As a conclusion, the findings for self-efficacy change did not offer support for (or against) hypothesis 1. Remarkably, participants who continued the study till the end responded more positively compared to two participants who quitted.

5.4.2 Health Indicator

The benefits of health indicator were also assessed during the interviews. In the concrete group, participants were asked if they took the health indicator into account while choosing what to cook. 4 out of 5 participants replied positively. These participants were keeping the health indicator (and color codes) in mind when decided on what to cook. The health indicator was beneficial to point out the healthy recipes. Furthermore, the health indicator prevented them from eating unhealthy, as one participant mentioned: *“Some recipes seemed super delicious but they were red colored. I said: Let’s do not cook this one. Let’s search for another one.”*

The participants in the abstract group were asked to imagine what would happen if the health indicator was present in their MCC cookbooks. 4 out of 5 participants in abstract group emphasized the need for such an indicator. They told a MCC with health indicator would be ‘more efficient’, ‘more beneficial’, ‘more participative and ‘more scientific’. Participants mentioned that they would choose ‘healthier’, ‘easier’ and ‘faster’ if they were given a MCC with the health indicator.

On contrary to these findings, 2 participants did not agree with the rest of the group. 1 participant in the concrete group reported not to use health indicator while making decisions. This participant found the health indicator ‘non-attractive’ and ‘useless’, since she mostly looked at the pictures to pick a recipe. This participant explained that she was very picky for food and knew already which recipes are healthy. Therefore, she preferred deciding on the pictures that give clues for the familiarity of food. The other participant (who quitted the study) stated not to believe in the benefit of such an indicator. This participant found it similar to counting for calories and quoted as: *“I used to calculate the calories. I was paying attention not to have more than 2000 calories per day. Then, I quitted”*

As a summary, the benefits of the health indicator were mentioned by almost all the participants (8 out of 10). Some participants found the health indicator ‘important’ since it showed them healthy food can be delicious as well. Some participants told that the health indicator was ‘very informative’. They said they would not ?be able to? guess if a recipe is healthy or not without health indicator. One of the participants also mentioned about that color codes were enough to mark the healthy recipes and more information would be information mess. Another participant told that she become ‘more conscious’ because of the health indicator. In both groups, there were some participants being surprised with the colors marked on some of the recipes.

5.4.3 Action Planning

10 participants were asked for their opinions on action planning.

Results indicated that 5 participants hold negative attitudes towards action planning. These participants found action planning ‘not flexible’ and something ‘not very easy’ to do. They mentioned having limited time and therefore could not obey their plans. One participant (ppn6) stated that planning is beneficial for eating healthy. However, she could not obey her plan since she was in the exam period. (See Appendix for the comments)

The rest of the group varied in their opinions. 2 out of 5 participants emphasized that they followed their plans more than they would do normally. They told they feel more responsible since they knew this was a study. The other 3 participants were more positive on action planning.

5.4.4 Goal Setting

Participants were asked if they found the goal setting beneficial. Results indicated a difference on attitudes between the concrete group and the abstract group. It was seen that participants in the concrete group found goal setting more beneficial than the participants in the abstract group. For instance, concrete group participants commented on goal setting as ‘beneficial’, ‘important’ and ‘easy to do’. However, abstract group participants did not state such things. Only 1 participant in abstract group found goal setting beneficial and revealed that she would be confused without goal setting. One of the participants who quitted the study told that she already did goal setting in real life. The other 3 participants were less positive about goal setting. 2 participants said that they did not like goal setting and 1 participant said she would not follow her goals in real life (See Appendix for the comments on goal setting).

5.4.5 Behavior Change

In order to assess behavior change, participants were asked if they experienced any change in their diets after 3 weeks. 6 participants (4 concrete and 2 abstract) reported a positive change in their diets and feeling healthier. Some of these participants gave credits to MCC cookbook since they learnt how to cook ‘delicious’ and ‘healthy’ recipes. 2 participants reported that they stopped gobbling (or snacking) after they cooked and felt satiated. One participant mentioned that she used to eat lots of fries, but her consumption decreased after the study. This participant stated to feel lighter now. Another participant reported to have high cholesterol level, but she was not able to maintain a healthy diet. In this study, she had the opportunity to try new recipes and learnt 5-6 healthy options that she really liked. Therefore, she reported to become motivated for cooking and eating healthier. Finally, some participants disclosed their wishes to own a MCC cookbook in the future. These participants mentioned about cooking again from MCC recipes.

On the other hand, 4 participants (1 concrete and 3 abstract) did not feel any positive change in their diets. 2 participants who quitted the study told that the meals in MCC do not fit with their food taste. One of these participants stated that she was expecting more recipes in MCC that she would like to cook. Another participant thought she already eats healthy enough and does not need to have any change in her diet. The third participant stated MCC was beneficial to teach her couple of recipes but did not lead to any change in her diet. 1 participant (from concrete group) had examinations during the study, and therefore was not able cook. This participant claimed that her diet got even worse, because of this reason.

5.4.6 General Attitudes for MCC Cookbook

10 participants were asked for their opinions about MCC cookbook. 6 of them said they found most recipes ‘nice’, ‘delicious’, ‘varied’ and ‘easy to cook’, while 4 participants did not like the taste of the recipes. 3 of these participants were expecting to find traditional Turkish food in MCC. Also, these participants found the cookbook Dutch oriented. The fourth participant was not satisfied with MCC since she thought MCC did not contain sufficient options from other

cuisines. This participant said she would like to try all kinds of cuisines from different cultures. Furthermore, 2 participants mentioned about the unfamiliar vegetables inside the recipes. They said these unknown vegetables limited their decisions.

The proportion of healthy and unhealthy recipes in MCC

8 participants were asked if MCC cookbook should contain only healthy recipes. 4 participants agreed to want both healthy and unhealthy options (all colors) in MCC. These participants said they eat not only healthy food but also unhealthy sometime. (See appendix for the comments on this topic) Other 2 participants found it beneficial to have only healthy options (only green labels), since they can have more options for healthy food. Finally, there were 2 participants who would like to see moderately and healthy options (yellow and green labels) in MCC.

5.5 Food Decision Factors

Several food factors that affect food decisions were noticed in the interviews. These factors were taste, ingredients, family, satiety, time, explanation, culture, familiarity, personality, variety, translation, equipment and occasions.

Taste

The taste of the recipes was one of the mostly mentioned factors in food decisions. 9 participants gave comments on the taste of recipes they cooked. Accordingly, 4 participants said that they found the taste of recipes delicious. Some of these participants mentioned that they would cook these recipes again. However, 4 other participants did not like the recipes. The main reason was the recipes did not fit with their cooking style and taste. 1 participant was undecided. Although she said she did not like the recipes, she changed her opinion later on. (See Appendix)

Ingredients

Another important criterion for food decision was the ingredients. Almost all participants mentioned about some ingredients they did not like to eat. These ingredients largely affected their decisions and avoid them from cooking the recipe. There were also favorable ingredients that affect the decision positively. Participants immediately decide on cooking the recipe with favorable ingredients.

Another important factor on decisions was whether participants have the ingredients at home. Some participants found it 'difficult' and 'aversive' to go shopping to buy extra ingredients.

Time

Time was the most important criteria for participants as it was mentioned by all of them. Participants told that if a recipe takes a lot of time, even though they like it, they prefer skipping it. One participant said: *"For instance, one recipe was taking more time than the other, so I cooked the one which was less time consuming"*. Another said: *"Time was an important criterion for me. If I had limited time, I chose a simple recipe"*

The favorable recipes were the ones that are prepared quickly. For instance, one participant mentioned that: *"Also, some recipes were both healthy and quick. Those were my favorites"* It is

also noticed that time affects the preference for food quality. Some participants prefer to have better food if they spend time on cooking. One participant said: *“I’d prefer to cook something worthwhile, a proper hot meal, if I spend my time on cooking”*

Family

The participants who live with family (husband, boyfriend or parents) told that family members’ preferences affect their decisions. These preferences sometimes affect participants’ decisions in a negative manner. For instance, one participant said: *“In fact, I do not use butter for other meals. Actually, I would like to use olive oil but my husband does not like it”* It is also observed that family can increase the motivation for cooking, as one of the participants pointed it: *“I tried once to cook alone and ate. That is not motivating anymore. I like someone accompanies me when I cook a meal”*. Also, it is noticed that children have a big impact on mothers’ decisions. Some participants told that they cook only what their kids like.

Habits

It is observed that the habits of participants affect their food decisions strongly. Eating fast food, snacking and skipping meals were the most reported (bad) habits among the participants. It is also observed that some participants hold habits which are healthy such as eating salad at dinners.

Mood

Mood was also an important factor for cooking and eating. Participants’ moods affect their eating plans strongly. For instance, if they feel tired after work, they usually tend to skip cooking as pointed by a participant: *“I’m exhausted on Monday when I’m back from work or I do not feel like cooking that day, then I gobble something and say well I will cook tomorrow”*

Satiety

Satiety was mentioned by 2 participants. One participant said when the dinner is not fulfilling; her husband can eat other stuff at night. Another participant mentioned the same point. She said she usually gobbles later night if she does not feel full at dinner.

Occasions

Some occasions like holidays, having guests, etc. affected participants’ decisions. Participants mentioned that they were not able to cook in those days and consumed more unhealthy food. One participant told that:
“Yesterday, we arrived to Dusseldorf Airport. On the way back to Eindhoven, we got hungry and searched for somewhere to eat. Then, we saw a fast food restaurant. Since we did not have any other option, we entered there, being sad, really sad.”

Culture

Participants’ cultures have a big impact on their food decisions. Cultures can create prejudices for particular food. Most participants reported to have prejudices against healthy food before the study. Some participants mentioned: *“In Turkey, we have a misconception that healthy food is boring, it is eating grass. However, I liked the taste of green recipes in this book”*

Immigration

Immigration influences all aspects of food decisions. It is seen that participants who were immigrated to Netherlands many years ago were more likely to choose traditional Turkish food than the ones who did not immigrate to Netherlands but came for studying purposes. These participants (who immigrated) also hold strong beliefs against eating pork.

Variety

Variety was an important criterion for some participants. 5 participants reported to love trying different recipes and new tastes. Also, these participants were welcoming new cuisines from all over the world. One participant mentioned: *“I would like to have all kinds of cuisines from all over the world. I would not like to have only Turkish recipes”*.

Another participant told that: *“I learnt from this book that I can have different tastes with the combination of different stuff. For instance, one of the meals had cinnamon inside. That cinnamon gave a great taste which I could not have imagined it before.”*

Familiarity

Familiarity of the food was another criterion. Most participants reported to search for recipes that were familiar to them. Some participants mentioned that they did not choose unfamiliar food since it is a problem for them to get used to different tastes.

Durability

One of the participants mentioned that it was an important criterion for her to be able to eat cooked food later days. She said: *“It is important for me to let the meals wait for the other day”*

Personality

Personality was also an important criterion for food decisions. ‘Picky’ participants restrict their food decisions largely and decreased the variety of their diets. Also, ‘impatient’ participants were likely to quit long term diets, since they easily get bored.

Interest

Healthy eating is also a matter of interest. One participant quitted the study told that she had no interest for healthy food.

Language

During the study, language became an issue for some participants. The participants who were not native Dutch speakers experienced difficulties while translating the recipes. Some participants could not understand the ingredients and explanations. Mostly, they used a dictionary or asked someone who knows Dutch. But, when nobody was around, it was difficult for them to understand the recipes.

Explanations

It was important that the explanations of recipes were not confusing and easy to understand. Some participants complained about the explanations in MCC, saying that they were confused with mistaken explanations.

Equipments

Having proper equipments affected participants' decisions as well. Although some participants aimed at cooking healthy recipes (like fish recipes), they could not manage to do, since they did not have the required equipment (like an oven).

Units

The units used in the explanations were critical for cooking as well. Some participants had difficulties to deal with units, etc. grams.

5.6 Recommendation Systems

Participants were also interviewed about recommendation systems offering recipes to them. Almost all participants (7 out of 9) found such a system 'useful'. Participants disclosed diverse opinions about recommendation systems.

In general, participants seem to like cooking. However, time consumed for cooking was important for them. Therefore, they would love to use a system that makes their job easier and faster at kitchen, as mentioned by one participant: *"That should reduce the time I spent before coming to kitchen, not only in the kitchen, but helped me to get rid of from the thoughts what I should cook today?"*

Some participants wished to see a system that can make interesting combinations. For instance, a participant was open to buy new ingredients and try to cook new recipes, but she did not know how to combine them. Another participant agreed with her; saying that she would love to have a system with lots of variety and combinations.

Some participants reported to need a system that presents a shopping list of ingredients to buy. These participants thought this saves them going to supermarket. However, a system which recommends recipes based on the ingredients in the fridge would be limited in terms of variety. Therefore, she thought the system should better tell her what to buy beforehand. *"The system first presents a shopping list; I buy the ingredients in the list and put them to the fridge. Later, the system can combine those ingredients and offer me some recipes"*

Another participant wanted to have such a system that she can interact with the system by entering data about food she has at home, etc. She thought such a system would be super if it could offer her some recipes based on the time and amount of calories per portion.

Most participants mentioned about the role of recommendation systems to suggest new recipes. Participants agreed on some point that recommendation systems would be beneficial for them if the system gives them information on how to cook a recipe healthier. One participant gave an example, such that: *"If you put eggplant into fat, it absorbs the fat, gets bigger and heavier. However, if you have a book or system, you can learn from it how to fry the eggplant or how to cook it in a way it becomes lighter"*

Two participants said the system would be beneficial if it gives scientific information on how to cook in a healthy way. They thought the system should give remarks on healthier ways to cook (e.g. cooking with healthier oils). Finally, one participant wanted to have a system that can compare the pros and cons of recipes.

A participant thought that such a system would not be useful for her since she already knows what healthy is or how to cook. This participant would not like to be dependent on a system that she always needs to follow. She believed it would be boring to follow such as system. Rather, she would like to produce her own recipes in mind.

2 participants said they would use such a system only if the recipes would be Turkish.

5.6.1 How to Motivate for Eating Healthy?

Participants discussed if a recommendation system can motivate for eating healthy. There were diverse ideas on how to motivate for eating healthy.

A participant said the system should not contain any unhealthy recipes. She believed it would make more sense if the aim is eating healthy. Afterwards, recipes could be filtered out by the time and ingredients. This participant quoted as: *“I can use a normal cooking book if I would like to see unhealthy recipes.”*

Another participant mentioned that she would like to have something motivates her. She said the system should lead her in a positive way, without being strict. It could be motivating by showing some tips to make food both delicious and healthy. *“I think there should be something that tricks me. For instance, I do not eat boiled broccoli alone, even if it is super healthy. But, if you add some olive oil, a light sauce, or add some spice and give some taste, then I can eat. I need to have something that appeals me, that is both healthy and delicious which can motivate me”*. This participant also mentioned that presenting alternatives to unhealthy food with similar tastes would be beneficial for motivation. She mentioned: *“There was a meal in MCC, where eggplant is not fried but boiled, cooked with oil later. This way, you use less fat. I liked this a lot, because the eggplant absorbed one fifth of the fat I normally used to. I ate again eggplants in a similar way, but it presented me an alternative, which I did not know it before”*

5.6.2 Goal Setting and Action Planning Function

Finally, participants were asked to imagine how to implement goal setting and action planning into such a system. One participant said she would like to set her own goal and would not need such a system to set her goals. However, she thought if she has health problems, the system can decide on behalf of her. *“If I have a heart disease, it is better to have a system that decides for me. But, right now, I can set my own goals .In the future, the program can decide.”*

Another participant mentioned that such a system would be marvelous if it does planning for dinners. She said: *“I already spent all my life with planning. When you study or you work, you have to do it. In addition to them, planning for your private life is a trouble.*

Chapter 6

6 Conclusion

This chapter presents the conclusions of the study. The first section discusses the results. The second section mentions about the limitations of the study. The third section gives recommendations on how to develop MCC and other recipe recommendation systems based on our findings. Finally, the last section will discuss future work that emerges from this study.

6.1 Discussion of the Results

Having studied goal setting and action planning with MCC, we found several interesting results. First, it was determined that action planning and goal setting method is feasible with cooking book version of MCC. Our longitudinal study let us observe that people are able to set goals for themselves and plan in accordance to these plans with MCC cookbook. This is an important finding since MCC can be used as a support tool for setting goals, planning on these goals and adopting healthier diets over time.

In addition, it was seen that the health indicator assisted the participants to make their decisions more easily. One reason for this might be that the health indicator lessens the cognitive load for the participant. In order to determine the healthy meals, the participants in the abstract group need to read the ingredients and preparation techniques and compare them to the other recipes. However, this task is more demanding and requires more cognitive effort and time. The health indicator helps to lessen this burden. In the interviews conducted, this fact was expressed explicitly. The participants in the abstract group have emphasized that such a health indicator would be very helpful.

However, it is not possible to conclude the effect of concrete (specific) goal set, since one condition was absent (the abstract goals and an MCC with a health indicator). In the interviews and the post-questionnaires, no significant difference was found between two conditions. However authors' opinion is that the concrete goal set is more effective than the abstract goal set. In future studies, this case must definitely be investigated.

As mentioned in the literature chapter, goal commitment, goal difficulty and goal specificity are three key factors which affect a person's goal performance. Locke states that goal commitment has positive effects on a person's performance. People, who are strongly committed to their goals, demonstrate higher performance. Another important criterion which affects performance is goal difficulty. As goal difficulty increases, performance increases linearly. People who set more difficult goals work harder towards their goals and therefore achieve higher performance. The third factor is goal specificity. Performance decreases in accordance to a goal's vagueness. As people set more specific goals, the obtained results improve.

In this study, these criteria were determined to be important for a person to consume a healthy diet. The findings indicate that there was no significant difference between abstract and concrete group in terms of goal commitment. However, at week1 participants in AG rated their commitment higher than participants in CG, while at week 3 participants in AG rated their commitment slightly lower than participants in CG. For the second criteria, goal difficulty, we checked if participants who picked difficult goals have higher success than participants who

picked easy goals (hypothesis 3). Nevertheless, there was no participant who picked difficult goals, and only 2 participants picked moderate goals. Therefore, we cannot conclude if the participants who had set more difficult goals exhibited a better performance compared to the participants who had set easier goals. For the third criterion, which is goal specificity, it was observed that specific goals affected performance positively. Hypothesis 2 supports this claim since it is found out that participants in CG had higher goal achievement than participants in AG.

Another finding was that using color codes made the goals more specific. Therefore, it was observed that the participants achieved their goals more easily. The reason is that, the participants in the CG made their decisions based on the color code associated with each recipe. For most participants in the CG color codes is the most important factor when determining a goal. This issue was clearly expressed in the interviews. As for the AG, due to the absence of color coding, the participants considered the pictures of the meals and preparation time, when making their decisions. Consistent with this, the participants in the AG chose meals which have a shorter preparation time.

Another important finding concerns action planning. Most of the participants found action planning beneficial yet difficult. It was already known that people do not like to make plans beforehand. A reason for this might be that the desire to eat a certain meal may change with the mood the individual is in. As earlier studies have shown, women especially use eating as a way of compensating for their emotions. An indicator of this situation is the increase in their sugar consumption when they are unhappy. Eating serves as a coping mechanism in this case. Making plans are contradictory to this mechanism. No one can know how he/she will feel in 3 or 4 days from now. That is why an “emotional eater” may not enjoy making action plans for dinners.

Another finding is related to the TTM construct. As the literature points out, people who are at the action stage make action plans more easily and people who are at the pre-contemplation stage are less prone to making it. This is also observed in our experiment. 2 participants who were at the contemplation stage exhibited poor performances in the experiment. Of these 2 participants, one of them dropped out of the experiment and the other cooked a small number of meals in total. On contrary, participants who were at the preparation and actions stages obtained more successful results.

In addition, we observed positive effects on most participants’ attitudes towards healthful eating. Prior to this experiment, some participants thought eating a healthy diet is boring. After the trial, they expressed that their views had changed, since they also enjoyed green labeled meals in MCC.

There were also some unexpected findings, like no significant change was observed in self-efficacies. This is contrary to what was anticipated. The reasons for this might be that planning is viewed as a difficult task and the participants who were not able to accomplish this task suffered from loss of confidence.

In conclusion, in this study we have observed that it is possible to change the eating behavior of individuals with the MCC cookbook. In the CG this positive change was observed more clearly than the AG for the duration of 3 weeks, as was originally expected. On average, the participants in the CG have made more healthy choices. Participants revealed the reasons as the increase in regularly preparing dinners and the realization that healthy meals are also tasty. As a result of this, fewer snacks are consumed, the feeling of satiety after a meal is increased and less fried foods are consumed.

6.2 Limitations of this Study

This experiment has some limitations. The first limitation is the number of participants. Due to the fact that 3 weeks is a long time, it was not possible to recruit sufficient number of participants. The researchers had to ignore some necessary conditions due to this reason. This issue makes drawing conclusions from the results more difficult. Furthermore, observing the difference between the CG and AG is more difficult because of the lack of power.

Another limitation is that the experiment was conducted with non Dutch individuals. More specifically the experiment was conducted with Turkish women. These Turkish women sometimes had difficulty understanding the recipes. This difficulty may have affected the decisions they made. Additionally it is rational that these women who had a different cultural background did not always enjoy the Dutch recipes.

Finally, the translation would make a difference on the meanings of constructs, while the constructs were translated from English to Turkish. For instance, question 4 in goal setting and action planning questionnaire might be misunderstood by the participants.

6.3 Recommendations on Future Work

This study has made way for many new experiments. However, new experiments should be repeated with more participants and the experiment duration must be shortened. Also, it is advised that nationality be an important factor when the participants are being chosen. Eating habits vary according to culture and some nationalities are very loyal to their own cuisine such that the behavior of the participants from those nationalities are more difficult to change.

6.4 Advice for MCC and Recommendation Systems

The start point for this study was to make recommendations on how to develop MCC. First, we wanted to check if users can adopt a healthier diet by using MCC as a decision support tool. From the results, we concluded that MCC with health indicator can be used as a support tool for its users, while choosing recipes, preparing them, as well as setting weekly goals and making action plans in accordance with these goals.

In addition, it was observed that concrete goal sets were more useful to support its users while setting goals than abstract goal sets. This is because specific goals do not allow many variations in the outcome, while abstract goals do. Thus, MCC should use concrete goal settings (if it presents its users some goals to pick) which might increase the success ratio of goal achievement.

Furthermore, we explored from the goal setting theory that the goal difficulty has an effect on the goal performance. Unfortunately, we could not confirm it in our study. However, we believe that people make more efforts on difficult goals and become more successful. Therefore, we think MCC should consider the goal difficulty as a factor while presenting goals to the users.

In addition, MCC should tailor its recommendations with the habits, tastes and culture of its users. Our study showed that different tastes lead some participants to quit the study immediately. Some users simply do not enjoy tasting new recipes. Thus, they cannot make

sudden changes in their diets. These people might not appreciate having advices on trying new tastes. Therefore, it is important to be careful with those users while giving advice about new recipes. Also, it is very important to make recommendations tailored to the user's culture. For example, Muslims do not eat pork, and recipes including pork can result in dismissing the advice.

Furthermore, we advise that a meal recommendation system should have a planning functionality. In this experiment it was observed that the participants had more difficulty with planning and organizing the meal than actually cooking the meal. A system which makes planning easier may be more motivating for users. Definitely, this issue needs more research in the future.

Another important issue for participants is the ingredient list. Most participants want a list that is prepared automatically before going to shopping. The recommendation systems which will be designed in the future must take this into consideration. For instance, the system might be connected to the fridge, when the user wants to go to shopping, the user can ask for a list and the list can be sent to her (by phone or email) automatically.

In addition, we believe the number of healthy recipes in MCC should be considered carefully. While some participants revealed that it would better to have only healthy recipes, some of them did not like this idea at all. Our recommendation is to lessen the number of red recipes from MCC and increase the number of green recipes.

Finally, pictures are very important when presenting recipes. Most participants select their recipes according to the pictures. A couple of participants mentioned in the interviews that some green recipes looked unhealthy on the pictures; and therefore they did not prefer those recipes. We believe charming pictures of healthy recipes would definitely increase the consumption of healthy recipes.

Chapter 7

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Chapter 8

8 APPENDIX

8.1 Questionnaires

8.1.1 TTM Constructs

1. **In the past 1 month, (including now),** have you done anything to eat healthier?
 - 1 Done a lot
 - 2 Done some
 - 3 Done few
 - 4 Done nothing

2. **In the past 12 months, not including this month,** have you done anything to eat healthier?
 - 1 Done a lot
 - 2 Done some
 - 3 Done few
 - 4 Done nothing

3. Have you done that continuously for **6 months or longer** (in the past 12 months)?
 - 1 Yes
 - 2 No

4. Are you planning to do something to eat healthier in the **next 1 month**?
 - 1 Seriously planning
 - 2 Somewhat planning
 - 3 Not planning

8.1.2 Self-Efficacy for Action Planning

Please indicate how true it is for you the following states:

- I believe I can realize my action plan, when I am tired.
Strongly disagree 1 2 3 4 5 strongly agree
- I believe I can realize my action plan, when I am in a bad mood.
Strongly disagree 1 2 3 4 5 strongly agree
- I believe I can realize my action plan, when I feel I do not have time.
Strongly disagree 1 2 3 4 5 strongly agree
- I believe I can realize my action plan, when I am on vacation.
Strongly disagree 1 2 3 4 5 strongly agree

8.1.3 Self-Efficacy for Eating Healthy

Please indicate how true it is for you the following states,

- I can manage to stick to healthful foods, even if I need a long time to develop the necessary routines.
1 Not at all true
2 Barely true
3 Moderately true
4 Exactly true
- I can manage to stick to healthful foods, even if I have to try several times until it works.
1 Not at all true
2 Barely true
3 Moderately true
4 Exactly true
- I can manage to stick to healthful foods, even if I have to try several times until it works.
1 Not at all true

- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- I can manage to stick to healthful foods, even if I have to rethink my entire way of nutrition.

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- I can manage to stick to healthful foods, even if I do not receive a great deal of support from my family and relatives.

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- I can manage to stick to healthful foods, even if I have to make a detailed plan.

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

8.1.4 General Self-Efficacy

Please indicate how true it is for you the following states

- I can always manage to solve difficult problems if I try hard enough

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- If someone opposes me, I can find means and ways to get what I want.

- 1 Not at all true

- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- It is easy for me to stick to my aims and accomplish my goals.

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- I am confident that I could deal efficiently with unexpected events.

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- Thanks to my resourcefulness, I know how to handle unforeseen situations.

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- I can solve most problems if I invest the necessary effort.

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- I can remain calm when facing difficulties because I can rely on my coping abilities

- 1 Not at all true
- 2 Barely true

- 3 Moderately true
- 4 Exactly true

- When I am confronted with a problem, I can usually find several solutions.

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- If I am in trouble, I can usually think of something to do.

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- No matter what comes my way, I'm usually able to handle it.

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

- I can always manage to solve difficult problems if I try hard enough

- 1 Not at all true
- 2 Barely true
- 3 Moderately true
- 4 Exactly true

8.1.5 Action Planning Questionnaire

- While answering the questions below, please compare it with 3 weeks ago.

For me, action planning is:

- easy 1 2 3 4 5 6 7 difficult
- concrete 1 2 3 4 5 6 7 abstract
- unimportant 1 2 3 4 5 6 7 important
- uncertain 1 2 3 4 5 6 7 certain
- bad 1 2 3 4 5 6 7 good
- negative 1 2 3 4 5 6 7 positive
- unpleasant 1 2 3 4 5 6 7 pleasant
- useless 1 2 3 4 5 6 7 useful
- irresponsible 1 2 3 4 5 6 7 responsible
- unwise 1 2 3 4 5 6 7 wise
- harmful 1 2 3 4 5 6 7 harmless
- stressful 1 2 3 4 5 6 7 stress-less

8.1.6 Goal Setting Questionnaire

For me, goal setting is ‘now’;

- easy 1 2 3 4 5 6 7 difficult
- concrete 1 2 3 4 5 6 7 abstract
- unimportant 1 2 3 4 5 6 7 important
- uncertain 1 2 3 4 5 6 7 certain

8.1.7 Goal Commitment

- Please indicate how true it is for you the following states, if you do action planning in the future,

- It is hard to take this goal seriously.

Strongly disagree 1 2 3 4 5 strongly agree

- Quite frankly, I don't care if I achieve this goal or not.

Strongly disagree 1 2 3 4 5 strongly agree

- I am strongly committed to pursuing this goal.

Strongly disagree 1 2 3 4 5 strongly agree

- It wouldn't take much to make me abandon this goal.

Strongly disagree 1 2 3 4 5 strongly agree

- I think this is a good goal to try for.

Strongly disagree 1 2 3 4 5 strongly agree

- I m very determined to achieve this goal.

Strongly disagree 1 2 3 4 5 strongly agree

8.1.8 MCC Questionnaires

- I find the MyCookingCompanion:

Disgusting	1	2	3	4	5	6	7	Enjoyable
Unpleasant	1	2	3	4	5	6	7	Pleasant
Dull	1	2	3	4	5	6	7	Exciting
Boring	1	2	3	4	5	6	7	Interesting

8.2 Interviews

Questions for the ones who quitted the study

1. Why did you quite the study?
2. Which factors below affect you to quit the study?
 - my family
 - lack of motivation
 - lack of time
 - I did not like most recipes
 - I did not like the idea of action planning and goal setting
 - other factors
3. What would change your mind to continue with the study?
4. Do you think the study promotes healthy eating? Why?
5. What is your opinion about recipe book?
6. Are you satisfied with MCC? If you could, what would you like to change in MCC?
7. Do you think MCC was informative to lead you choose healthy recipes?
8. Do you think MCC was sparking to lead you choose healthful recipes?
9. Are you still motivated to eat healthy? If yes, what is your plan in the future to continue eating healthy?
10. Do you want to add any comments or ideas on MCC?
11. Did health indicator change your idea on action planning and goal setting? How?
12. If you would be given a MCC with health indicator, would you do action planning and goal setting?
13. Do you think a MCC with health indicator can promote healthy meals? How?
14. Would you like to see another indicator in MCC instead of health indicator?
(calorie, fat ratio, minerals and vitamins, etc.)

8.3 Quotations

8.3.1 Action Planning Quotations

Negative Comments

“Planning is not flexible and something not very easy to do” (ppn2)

“You’d like to do plans, but you cannot obey them forever” (ppn4)

“I cannot follow my plan when I do not have enough time. Therefore, I do not know whether I need planning” (ppn5)

“It was easy to do, but difficult to obey” (ppn6)

“I think it is difficult to plan for once and say: “I will cook these meals for one week. I mean to focus only one meal.

That day, I can wish to eat something else” (ppn9)

Positive Comments

I did follow my plans more than I would do normally, since I knew that this was a study. (ppn1)

I do my shopping for 5 days on Saturday and decide what to cook for each day. (ppn3)

People cannot follow “whatever they want” on time, because of life conditions. They might not be able to do them. But, it is beneficial in theory. (ppn7)

Well, I think planning is necessary for sure. I did not use to plan before. Here, since you plan, you had to think beforehand what to cook. You say: I will cook this today, and another thing in 2 days. So, you can decide better in between.” (ppn8)

I cannot say it motivated me to eat healthier but I felt like I should obey it. I feel responsible. (ppn10)

8.3.2 Goal Setting Quotations

In the concrete group:

I did not set a goal this week and ate at Burger King tonight (ppn2)

I think goal setting is beneficial as well. It is necessary (ppn5)

No, I did not use these goals. I set my own goal. (ppn6)

The reporter: In terms of eating healthy, goal setting is...? Beneficial (ppn7)

I think we do it already in our lives. Maybe, we do it unconsciously, but we set some goals in our minds. For instance, every night before going to sleep, I think about tomorrow, what I will do tomorrow. I think this is similar to goal setting like in this study (ppn7)

We thought we should obey these goals if we set. Therefore, I started with the second goal and finished with the third one. It was important that it was healthy, but also implement it. I did not want to set a goal that is not doable (ppn10)

In the abstract group:

Ppn1 did not comment particularly on goal setting

I already do goal setting on Saturdays (ppn3)

The reporter: Do you think goal setting is beneficial for you? No, I do not think so. (ppn4)

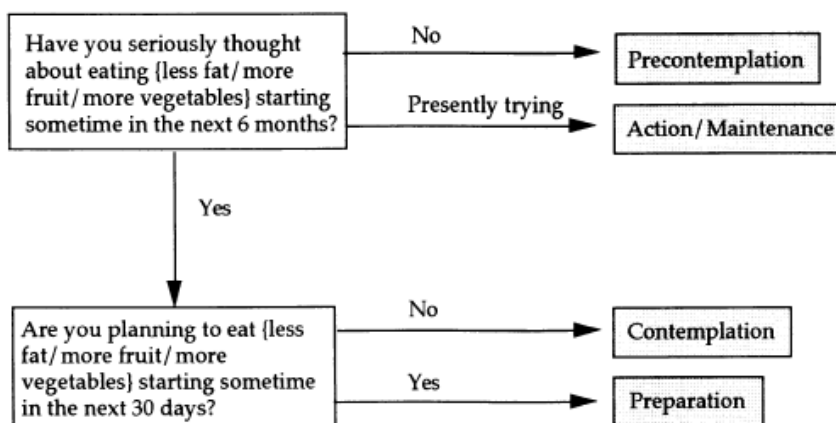
Goal setting is beneficial since it leads you. Without a goal, you can be confused. First of all, it would be more difficult to decide. Secondly, the result would be worse. Without my goal, I would not say I will eat healthy for 3 days; I would cook only 1 time or not. I could quit easily when I was tired. But since I had a goal, I wished to reach it. I pushed myself (ppn8)

The reporter: Did you like the goal setting? Eeee... a little... (ppn9)

8.4 Models

TTM Construct Model

Figure 8.1 shows the stages of dietary behavior change (Campbell et.al, 1994)



8.5 Tables

Table 8.1 shows participants' stages of changes.

	<u>Stages of Change</u>
Participant 1	Action
Participant 2	Action
Participant 3	Action
Participant 4	Contemplation
Participant 5	Action
Participant 6	Contemplation
Participant 7	Preparation
Participant 8	Preparation
Participant 9	Action
Participant 10	Preparation

Table 8.2 shows the number of fruits and cups of vegetables participants reported to consume per day before study

	Portions of Fruits	Cups of Vegetables
Participant 1	2	1-2
Participant 2	2-3	0.5-1
Participant 3	1-2	depends on what I cook
Participant 4	Little	1
Participant 5	3	2-3
Participant 6	3	4
Participant 7	1	1
Participant 8	1	0-1
Participant 9	at least 2	0-2
Participant 10	2	0.5

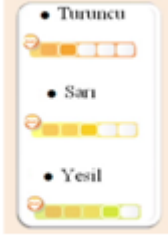
Table 8.3 Participant Demographics

	cond	N	Mean	Std. Deviation	Std. Error Mean
Age	0	5	30,00	4,359	1,949
	1	5	25,60	2,702	1,208
marital_status	0	5	1,40	,548	,245
	1	5	1,60	,548	,245
Children	0	5	,60	,894	,400
	1	5	,40	,548	,245
in kg	0	5	2,20	1,304	,583
	1	5	2,80	,837	,374
below 18.5 is underweight, 18.5-24.9 is normal weight, above 24.9 is overweight	0	5	23,48	3,093	1,383
	1	5	23,02	2,537	1,135
on_diet	0	5	,00	,000	,000
	1	5	,20	,447	,200
Education	0	5	5,60	2,881	1,288
	1	5	4,20	1,304	,583
how_often_cook	0	5	4,00	1,414	,632
	1	5	3,60	1,342	,600
Planning	0	5	,40	,548	,245
	1	5	,80	,447	,200

8.6 Examples of Goal Setting, Action Planning and Meal Pictures

8.6.1 Concrete goal set and action planning

PPN5's first week goal is:



PPN5's first week action plan is:

1. Hafta Sağlıklı Beslenme Planım:

Hazırlayan:
Ad TarihGulten Kaya..... 11- / -10- / 2010.....

	Sağlıksız	Az sağlıklı	Orta Karar Sağlıklı	Sağlıklı
Pazartesi				
Salı				
Çarşamba				
Perşembe			129	
Cuma				
Cumartesi				53
Pazar				73
03.01.2011				2

**Ppn5's first week meal pictures:
Number 129:**



Number 53:



Number 73:



8.6.2 Abstract Goal Set and Action Planning

Ppn8's first week goal

“I will cook 3 times this week. I will pay attention to have them **healthy**”

PPN8's first week action plan

1. Hafta Sağlıklı Beslenme Planım:

Hazırlayan: -----Beste Eris----- -----10--/--10--/-----2010-----
Ad Tarih

	Sağlıksız	Az sağlıklı	Orta Karar Sağlıklı	Sağlıklı
Pazartesi				
Salı				33
Çarşamba				
Perşembe			62	
Cuma			109	
Cumartesi				
Pazar				

03.01.2011

2

Number 33:



Number 62:



Number 109:

