Cardiovascular disease (CVD) is a major health threat. Although it can be treated or prevented, an estimated 17.1 million people die due to CVD each year (WHO, 2011). A number of modifiable risk factors have been identified such as following a healthy diet, stopping smoking, increasing physical activity and maintaining a healthy body weight. In specific, reductions in saturated fat intake have been found to predict good health outcomes. Dietary behaviour change involves a series of different steps from the development of an awareness of the risks associated with unhealthy behaviours, to the formation of an intention to change and the learning of skills to adopt the desired behaviour.

This thesis describes a series of proof of principle studies designed to test the short-term effects of different motivational and volitional strategies to improve health behaviours. These strategies have focused on changing risk perceptions (motivation based strategies) as a way of enhancing intentions and also on the use of plans (volition based strategies) as a way of promoting saturated fat intake reductions. The second part of this thesis investigates the role of a number of underlying social cognitive mechanisms that help in the translation of intentions into behaviour.

The application of the Health Action Process Approach model in saturated fat intake

The Health Action Process Approach (HAPA) model was the theoretical model forming the basis of this thesis. It suggests a distinction between the motivational and volitional phase of behaviour change. In the motivational phase three variables are perceived to influence an individual’s intention to change. First comes an individual’s belief about the likelihood and probability of experiencing a health problem (risk perceptions), then the positive and negative consequences of carrying out a behaviour (outcome expectancies) and ones confidence in changing (action self-efficacy). On the volitional phase of behaviour change a set of self-regulatory strategies are necessary such as confidence in maintaining the behaviour (maintenance self-efficacy) and the use of specific plans to carry out the target behaviour (planning).
Effects of different risk formats on CVD risk perceptions

Risk communication is important in creating more accurate risk perceptions that are closer to an individual’s true risk for disease. A number of different risk formats exist including frequencies, population figures, percentages and also more recent risk analogies such as the Heart-Age and Lung-Age. Heart-Age presents an individual’s future CVD risk in the format of an age score. This age score corresponds to the age of an individual with the same sex and CVD risk but with normal risk factors. Though % risk is one of the most commonly presented risk formats, a number of studies have found that it can falsely re-assure individuals on their 10 year CVD risk. Chapter 2 describes a randomised controlled trial, in which we compared a web-based traditional % CVD risk score against a web-based Heart-Age risk score. A total of 413 individuals at risk of developing CVD were recruited such as smokers and/or obese adults aged 30-60 years old. Heart-Age was superior to the % CVD risk format in communicating risk, especially for those individuals at higher actual risk. We found no difference between the two risk scores regarding the intention to change diet, physical activity or stop smoking. Furthermore, individuals with higher perceived risk were more likely to worry and form an intention to change their lifestyle. The latter finding highlights the importance of feelings in the decision making process.

Use of CVD risk communication and planning at reducing saturated fat intake

In the next proof of principle study (Chapter 3), we combined the Heart-Age risk score with a web-based planning tool. The web-based planning tool helped individuals identify a number of tempting situations and link these situations with a specific solution on how to reduce their high saturated fat intake. The solutions included behaviours such as choosing a lower fat option, putting off the behaviour until later, choosing smaller portion sizes of these foods and distracting oneself.

The Heart-Age risk score tapped on the motivational phase of behaviour change with the aim of boosting intentions to change, while planning tapped on the volitional aspect of behaviour change focusing on the translation of good intentions into saturated fat intake reductions. Saturated fat intake as an outcome measure was assessed with a) a two item self-perceived scale and b) a food frequency questionnaire.
recalling intake of 63 different foods items. In this randomised controlled trial at week 1 we recruited a sample of 1187 obese individuals aged 30-60 years (mean = 46.89). At week 2, all 781 participants, who returned to the website, were randomised into one of four conditions: a) control group, b) Heart-Age risk message, c) planning and d) planning and Heart-Age risk message. The study was conducted online over a period of 5 weeks. Planning led to greater reductions in saturated fat intake (TIS) than the control group. Risk perceptions in those receiving the Heart-Age risk score were more realistic than among those who did not receive the Heart-Age risk message. Contrary to our expectations, the combination of the Heart-Age and planning did not lead to greater reductions in saturated fat intake than the control group.

Planning and text reminders targeting reductions in saturated fat intake

The above mentioned findings (Chapter 3) led to the study described in Chapter 4, in which we used the same measures of saturated fat intake and also investigated the self-perceived portion size changes of 11 items high in saturated fat. The aim of this study was to boost the short-terms effects of web-based planning on lowering saturated fat intake by incorporating the use of text reminders. In this randomised controlled trial 1013 participants were assessed for their eligibility to take part in the study. Eight hundred and fifty eight overweight and obese participants between the ages of 30-60 years (mean= 46.0) were randomised into one of three conditions: a) control group, b) planning and c) planning and text reminders. The study was conducted over a period of 4 weeks. Participants allocated to both the planning and planning combined with text reminders conditions reported lower consumption of high saturated fat foods than the controls. The use of text-reminders was particularly effective for portion size reductions. Coping planning (i.e. I now have a plan how to avoid high-risk situations) but not action planning (i.e. I now have a plan when to eat a healthier diet) was identified as an effective strategy used more by the planning conditions rather than the control group.

Mechanisms of health behaviour change

In Chapters 5 and 6 we explored the mechanisms of health behaviour change within the Health Action Process Approach model, which was the theoretical framework of
our three studies. The main aim of this part of our thesis was to understand how individuals translate their “risk perceptions into an intention to change” (Chapter 6) or their “intentions into behaviour” (Chapter 5).

In Chapter 5 we used data from the study conducted in Chapter 3. We tested planning, age, self-efficacy and intentions as underlying mechanisms being implicated in the translation of intentions to lower saturated fat intake. In line with our hypothesis, we found that planning was instrumental in turning good intentions into action. Individuals with higher levels of intentions & self-efficacy were more likely to report higher levels of planning to reduce their saturated fat intake. Younger individuals were also more welcoming than their older counterparts to use planning to reduce their saturated fat intake. This may be due to the fact that they lead more hectic lives than their older counterparts, who may have more regular eating patterns.

In Chapter 6 we tested participant’s reactions to the intervention (i.e. feelings, intervention judgements) as mechanisms being involved in turning perceived risk into an intention to adopt a healthier lifestyle using data from chapter 2 and 3. Feelings included an individual’s levels of worry and vigilance (i.e. found the information to be a wake-up call). Intervention judgements included items relating to interest, personal relevance and credibility of the received information. We found that individuals who reported higher levels of worry, vigilance and found the information to be more interesting, relevant and credible were more likely to perceive themselves as being at greater risk and were more motivated to change their eating and physical activity patterns. For intention to stop smoking, those individuals who were emotionally impacted by the CVD risk message were more likely to show higher risk perceptions and a higher intention to stop smoking.

Drawing upon the HAPA model in Chapter 7 we tested and confirmed the applicability of this model on saturated fat intake in an obese population. Constructs such as worry, currently outside the realm of most theoretical behaviour change models, was found to be a useful extension of the model linking risk perceptions with intentions to change saturated fat intake.
General discussion

In Chapter 8, we critically discuss the findings of our studies and present recommendations for future research and practical implications. As part of future research we recommend:

1. the inclusion of more objective measures of saturated fat intake and assessment of portion sizes;
2. the investigation of different ways of combining motivational and volitional strategies to successfully target behaviour change;
3. the examination of the long-term effects of web-based planning and CVD risk communication.

A number of practical implications for clinical practice and theory development are further discussed. The creation of a ‘behaviour change toolbox’ is recommended, in which a number of techniques are identified; their ways of working is defined in detail so that it is easier for researchers to replicate them in future studies. In this toolkit, risk analogies such as the Heart-Age risk message can be of great value in those individuals, who have higher levels of CVD, in helping them create more realistic risk perceptions and thus help them in their consultations with doctors. Worry and emotional vigilance may also be used in health promotion campaigns in helping individuals, who perceive a higher susceptibility to disease to more readily form an intention to quit smoking, eat healthier and take up physical activity. Use of web-based planning can be another effective self-regulatory strategy part of this ‘behaviour change toolbox’ in helping motivated individuals to reduce their saturated fat intake in the short-term. The incorporation of new technologies such as the use of text message reminders can boost the effects of web-based plans. We need to tailor interventions to specific subgroups that are most likely to benefit. For example, confident, highly motivated and younger individuals can be a target group with immediate positive effects in relation to planning interventions. However, it is also important that future researchers focus their attention on those harder to reach and change populations such as those with low levels of self-efficacy and low intentions to change their dietary behaviours. Lastly, the Health Action Process Approach model, the theoretical basis of this thesis, was found to be a good framework in relation to testing saturated fat intake in an obese population; its use and further testing is therefore recommended.