



TAILORED FINANCIAL INCENTIVES THE SUCCESS TO A HEALTHIER SOCIETY?

A STUDY OF FINANCIAL INCENTIVES IN HEALTH BEHAVIOUR
AND THEIR ASSOCIATION WITH A VARIETY OF
DEMOGRAPHIC CHARACTERISTICS

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Abstract

Background: Financial incentives have been increasingly used in promoting healthy behaviour. At the moment, it is still unclear who precisely responds to what financial incentives. Different dimensions of incentives are used, deposit contracts, the timing of payout, the sequence, or introducing risk. Most previous studies compared financial incentives by assigning them to individuals, often randomly. It may be worthwhile to allow individuals to design or choose incentives themselves to improve autonomy. In addition, previous work in this area did not specifically focus on differences between demographic characteristics, which may be worth investigating.

Objective: This study aimed to contribute to knowledge about what financial incentives people design for improving their health behaviour and whether the preferences differ between demographic characteristics.

Methods: Data was collected via an online questionnaire distributed among a convenience sample and employees of Cardia, an elderly care organization in The Hague. One hundred forty-eight respondents were included in the study. Respondents were asked to design an incentive scheme that would motivate them in achieving their health goal. This structure could be tailored via a developed tool with questions about various options of incentives structures.

Results: The vast majority preferred to increase their physical activity as health behaviour improvement, while the preference for financial incentives appears to differ per person. There exist some differences in preferences between demographic characteristics in tailored financial incentives. It was found that highly educated people were more than five times more likely to choose a deposit contract than low educated. Besides, older people were more likely to choose a weekly payout structure than younger people. Last, there was a trend visible in older people being more likely to choose incentive schemes involving risks.

Conclusion: The type of incentives people designed for themselves differed between demographic groups. Interestingly, these preferences did not always match the effectiveness of particular incentive schemes in these demographic groups in previous literature. This raises questions as to whether more attention should be paid to what people want rather than what works for them.

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1. Introduction

Unhealthy behaviour is a common problem in The Netherlands and all over the world. Examples of such behaviour are heavy alcohol consumption, tobacco smoking or little to no physical activity (Cherfan et al., 2019). Of all the Dutch in the age category 25-70, 26% seems to be an intensive smoker. Also, heavy alcohol consumption is a widespread habit (40%), and more than half of the Dutch are overweight (51,6%) (André, Kraaykamp, & Meuleman, 2018). These unhealthy behaviours often lead to higher healthcare costs due to diseases resulting from these unhealthy habits (e.g., lung cancer due to smoking) (Madison, Volpp, & Halpern, 2011). Even though much effort is put into promoting a healthy lifestyle, unhealthy behaviour is still a common problem in developed countries (Giles, Robalino, McColl, Sniehotta, & Adams, 2014). As a result, there is a growing interest in programs designed to encourage such healthy behaviour, such as the use of financial incentives.

Financial incentives have been increasingly used in promoting healthy behaviour and preventive services (Adams, Giles, McColl, & Sniehotta, 2014; Lunze & Paasche-Orlow, 2013; Sutherland, Christianson, & Leatherman, 2008). These incentives can help to improve health behaviour, for example, in increasing physical activity (Mitchell et al., 2013), and it makes the desired behaviour more attractive through rewarding (Boderie et al., 2020). Containing healthcare costs and improving health is the hoped outcome of using these means (Oliver, 2009). Many studies have shown the effectiveness of such financial incentives (Giles et al., 2014; Mitchell et al., 2020). Therefore, financial incentives are increasingly used by companies to promote healthy behaviour. Even governments may have the intention to introduce it in promoting healthy behaviour (Sutherland et al., 2008).

The effectiveness of financial incentives, for example, in promoting smoking cessation, depends on several factors, such as when the incentive is provided or the way in which it is paid out (Boderie et al., 2020). Incentive programs can, for example, differ in their form, certainty, immediacy or schedule (Adams et al., 2014). First, the form describes the design of the financial incentive (Adams et al., 2014), examples used in this context differ from discounts on gym memberships or, like in the United Kingdom, cash rewards when achieving monthly weight goals (Lunze & Paasche-Orlow, 2013; Relton, Strong, & Li, 2011). Next, certainty is about how sure participants will receive their financial incentive, for example, by entering a lottery (Adams et al., 2014). The immediacy of incentives describes the time it takes before the participant receives the incentive. Last, a schedule can affect the payout process (Adams et al., 2014), for example, increasing the value of the reward during the progress (Roll, Higgins, & Badger, 1996). However, partly due to the significant differences in their designs, it is unclear what the best configuration is of each domain for an effective behaviour change

(Adams et al., 2014; Lunze & Paasche-Orlow, 2013). In addition, likely, they are not independent of each other (Adams et al., 2014).

Although multiple studies showed that financial incentives are effective, there is a lack of research about their long-term effects (Lunze & Paasche-Orlow, 2013; Sutherland et al., 2008). Without such information about long-term effectiveness, it is difficult to determine whether its use is cost-efficient (Etter & Schmid, 2016; Finkelstein, Brown, Brown, & Buchner, 2008; Van der Swaluw et al., 2018). Some studies suggested that the advantages of financial incentives are short-lived or that good health behaviour disappears once the financial incentives are gone (Etter & Schmid, 2016; Finkelstein et al., 2008; Van der Swaluw et al., 2018). Nevertheless, the short-term effects can also be effective, for example, pregnant women who must quit smoking during their pregnancy (Boyd, Briggs, Bauld, Sinclair, & Tappin, 2016).

1.1 Demographic differences

Although much research has been done on the (short-term) effectiveness of financial incentives (Giles et al., 2014), less attention has been paid to individuals' preferences for those incentives. Moreover, this also applies to the effectiveness of respondents' characteristics (Mitchell et al., 2020). At the moment, it is still unclear who precisely responds to what financial incentives (Paloyo, Reichert, Reuss-Borst, & Tauchmann, 2015). Several factors can influence the difference in preference; for example, differences between demographic groups may arise because a financial incentive is worth more to some than to others. For example, small amounts can be more valuable for low-income groups than high-income groups (Vlaev et al., 2019). Several small studies showed that financial incentives offered to low-income groups increased the use of preventive services (Lunze & Paasche-Orlow, 2013). Furthermore, young people appear to be more interested in financial incentives than older people (Giles et al., 2016). As a result, the effectiveness of a particular type of financial incentive may depend on socioeconomic circumstances (White, Adams, & Heywood, 2009).

Although effectiveness appears to depend on socioeconomic circumstances (White et al., 2009), it might not necessarily mean that financial incentives that appear to be effective in a particular group are also the most preferred ones. This uncertainty makes it interesting to study what financial incentives are preferred for specific demographic characteristics as income, age and educational attainment. It appears to be important to first know people's preferences before designing an intervention because preferences are related to autonomous motivation and, thus, behaviour change (Kullgren et al., 2016). By having more knowledge about this, it may become clear what financial incentives are most attractive for whom.

1.2 Tailored financial incentives

Most previous studies compared financial incentives by assigning them to individuals, often randomly. Hence, individuals are not allowed to exert any influence on the type of incentive they receive. It may be worthwhile to allow individuals to design or choose incentives themselves, as improving autonomy has been argued to increase motivation for sustained healthy behaviour (Kullgren et al., 2016; Lipman, 2020; Patel et al., 2018; Volpp et al., 2008). In this thesis, as in Lipman (2020), self-chosen or designed incentives are referred to as tailored incentives. So, the main focus will be on the use of those tailored incentives.

Lipman (2020) has previously studied tailored incentives among Dutch university students in achieving weight loss. Individuals could design their own incentive for exercise to satisfy a weight loss goal freely in four dimensions. First, pre-commitment, in which individuals were asked if they are willing to commit personal finances, with a possibility to lose the commitment if the exercise goals were not achieved. Second, timing is about the choice of payout structure. This structure can vary between receiving weekly payments (for each week in which the exercise goals were reached) or receiving the full payment at the end of a predetermined duration. Third, the sequence of payments, which only applied when choosing weekly payouts. Individuals had the possibility of receiving rewards in a decreasing, increasing or constant payout structure. Last, they had the choice of introducing a risk, where the value of the reward increases by taking a higher risk.

In this study, no significant association or variation among demographic groups was found (Lipman, 2020). Besides, Wright, Saelens, Fontes, and Lavelle (2019) wrote an article investigating preferences for incentives in parents of children with obesity. Here also, no significant association was found (Wright et al., 2019). Although these two studies suggest that the incentives preferred did not differ between groups, their studies did not mainly focus on such differences between groups. Furthermore, they recruited specific subsamples in their studies, e.g., either only students (Lipman, 2020) or only parents were included (Wright et al., 2019); these groups might be less representative of the general population.

Another limitation of the study by Lipman (2020) was that individuals were all asked to imagine a goal of weight loss instead of allowing individuals to focus on their own set goals of health promotion. Previous research has shown that changing complex behaviour is more successful when interventions will link to life goals and values (Kullgren et al., 2016).

Therefore, in this thesis, these two limitations in earlier work are addressed by offering a more varied sample of respondents to choose of desired health behaviour improvements. Whereas Lipman

(2020) focused on students and Wright and colleagues (2019) on parents, this thesis will focus on a broader sample, all adults 18 years or older. When tailored financial incentives better indicate what individuals' preferences are and improve sustained behaviour change, strategies of delivering financial incentives to insurers, employers, and governments could be transformed (Kullgren et al., 2016). Furthermore, the possibility is offered to choose between different hypothetical health improvements like reducing alcohol consumption, quitting smoking, or improving physical activity.

1.3 Objective and research question

This thesis aims to contribute to knowledge about the preferences for adults' financial incentives for health improvements for different demographic characteristics. In this way, it might become clear whether the preferences for financial incentives are associated with specific demographic characteristics. Further, it adds to whether the effects of financial incentives within different groups correspond or differ with the preferences for these incentives. Such information could help with the implementation of healthy behaviour incentives. Besides, individuals will choose their own desired health behaviour improvement. By allowing individuals to design the incentives themselves for a behaviour they aim to improve, autonomy might be improved. Therefore, the research question in this thesis is formulated as:

“What financial incentives do adults design for themselves (i.e., tailor) to positively change the unhealthy behaviour of their own choice, and how is this associated with their demographic characteristics as age, income, and educational attainment?”

The following sub-questions will support this central question:

1. What type of health behaviour do individuals want to improve?
2. Are there any differences between groups with different educational attainment in their tailored financial incentives?
3. Are there any differences between income groups in their tailored financial incentives?
4. Are there any differences between age in their tailored financial incentives?

1.4 Reading guide

First, the main concepts financial incentives and tailored incentives are explained in *Chapter 2: Theoretical framework*. Also, the relationship with demographic characteristics is highlighted in this

chapter. Moreover, several economic factors that could influence the preference for these financial incentives are introduced. After that, in *Chapter 3: Research methods*, the methodology used in the thesis is illustrated, and the study design and respondents' selection will be outlined. There will also be a description of the data collection methods and the statistical analysis. Next, in *Chapter 4: Results*, the results of the statistical analysis are presented and explained. Last, in *Chapter 5: Discussion and conclusion*, the thesis' results are compared with the theoretical background, which finally outlines an answer to the research question. The chapter also includes the strengths and limitations of this thesis, and future research recommendations are discussed.

2. Theoretical framework

2.1 Health behaviour

Although many individuals have a good idea of what constitutes healthy behaviour, as discussed before, few individuals meet the government's guidelines for a healthy lifestyle (CBS & RIVM, 2020). Those guidelines are: no smoking, drinking one glass of alcohol per day or less than that, and moderate-intensity exercise for at least 150 minutes per week, such as walking and cycling, spread over several days. In addition, the right amount of muscle and bone-strengthening activities is twice a week. Besides, this should be combined with balance exercises for the elderly (CBS & RIVM, 2020).

Satisfying these guidelines in many cases requires effort in the short term, for instance, quitting smoking, to be healthier in the long term. Hence, some willpower or motivation might be needed for individuals to engage in such behaviour (Kullgren et al., 2016). One influential theory of understanding individuals' motivation is self-determination theory, an approach that aims to understand and adapt human behaviour (Kullgren et al., 2016). This theory addresses issues as the impact of social environments on behaviour, motivation and self-regulation (Deci & Ryan, 2008). It states that people have three innate psychological needs: autonomy, competence and connectedness (Deci & Ryan, 2000). When these needs are supported, people are more likely to internalise their values and aspirations in a way that promotes their personal behaviour (Kullgren et al., 2016). The self-determination theory distinguishes different types of motivation based on reasons or goals that give rise to action (Deci & Ryan, 2000). One of these distinctions involves the difference between intrinsic and extrinsic motivation. Intrinsic motivation is about doing something because it is inherently attractive or pleasant. In comparison, extrinsic motivation refers to doing something because it leads to a separable result (Deci & Ryan, 2000).

2.2 Incentives and health behaviour

Since merely intrinsic motivation primarily is not for everyone sufficient for a healthy lifestyle (Thirumurthy, Asch, & Volpp, 2019), extrinsic motivations such as financial incentives are often implemented to supplement the intrinsic ones. Research has shown that financial incentives are even more effective than medical or behaviour programs in improving health behaviour (Thirumurthy et al., 2019). Besides, higher valued or larger incentives mostly lead to better results. Thus, a financial reward of €5 a week will be less effective than a €10 reward (Barte & Wendel-Vos, 2017).

Although extrinsic motivation can supplement intrinsic motivation, it may also create the danger of motivation not continuing when extrinsic motivation disappears (e.g., when financial

incentives are removed) and only the intrinsic motivation remains (Promberger & Marteau, 2013). An example of this could be when smokers rather participate in an intervention for the money than having the actual will to quit smoking (Hey, Perera, & Cahill 2008). Furthermore, the reward must not be extremely high that it completely exceeds the intrinsic motivation and ultimately has a negative influence (Gneezy & Rustichini, 2000).

The effectiveness of such extrinsic motivation as financial incentives appears to differ in every form of health behaviour. For example, quitting smoking through the use of financial incentives seems complicated for smokers; according to Kim, Kamyab, Zhu, and Volpp (2011), smokers are often less interested in smoking cessation incentives. In particular, low-educated are less interested in interventions with financial incentives in smoking cessation (Hoddinott et al., 2014). On the other hand, several studies show that when financial incentives are used, they promote smoking cessation (Higgins et al., 2012; Volpp et al., 2006). Furthermore, with these addictive substances, to be effective, the value of the incentive must be high enough to compensate for tobacco withdrawal symptoms. When the incentive is large enough, people with a low income become most interested in these financial incentives (Etter & Schmid, 2016).

In the case of alcohol consumption, by treating heavy alcohol drinkers, financial incentives proved to be effective in reducing alcohol consumption (Dougherty et al., 2014). In interventions linked to improving physical activity, financial incentives appear to help, mainly when there is a financial reward (Barte & Wendel-Vos, 2017). Especially interventions based on increasing the walking activity among older adults show great efficacy. Within this group, people with a low income are more likely to respond to the financial incentives in increasing physical activity (Finkelstein et al., 2008).

2.3 Different types of financial incentives and their link with economic preferences

Although it appears that the types of incentives that are effective for different groups differ, it is not clear to what extent the type of incentive offered or the way in which they are framed, influences their effectiveness. There are many different types of financial incentives, which have been compared in some studies (Finkelstein, Tham, Haaland, & Sahasranaman, 2017; Volpp et al., 2008; Wright et al., 2019). Within this thesis, preferences for four variants for financial incentives will be included and compared: pre-commitment, the timing of payout structure, sequence of this structure and the option for introducing a risk by participating in a lottery (Boderie et al., 2020; Halpern et al., 2015; Yancy et al., 2018).

Economic factors could support a specific financial incentive's choice related to the different types of incentives; pre-commitment, timing, sequence and risk, as explained. Lipman (2020) explored

several of those economic factors that could influence the preference for financial incentives: time discounting, present bias, probability weighting, and loss aversion illustrated in the paragraphs below.

2.3.1 Incentives framed as losses

Earlier work has shown that incentives that are either framed as losses or in which individuals can actually lose some of their own money effectively promote healthy behaviour (Chokshi et al., 2018). For example, Volpp and colleagues (2008) and Halpern and colleagues (2015) investigated the effectiveness of deposit contracts, in which people deposit some of their own money that they only get back if they reach their goals, as a powerful mechanism for a behaviour change. These authors state that these types of incentives may work well because they are based on loss aversion. Loss aversion implies that individuals are more sensitive to losses than proportional gains (Abdellaoui, Bleichrodt, Haridon, & Van Dolder, 2016). Someone who loses €10 will lose more satisfaction than someone who gains satisfaction from €10 as a windfall. Thus, it seems that programs where some feeling of loss is invoked, in the event of the participant's failure, might be more motivating than just rewarding with an amount (Vlaev et al., 2019). Finkelstein and colleagues' (2017) article show that programs with participants who put their own money at risk have been more effective than programs that only offer rewards. Interestingly, in a study by John and colleagues (2011), participants continued to contribute to monthly deposit contracts even when they did not attain their health goals. However, later research by Burns and Rothman (2018) claim that deposit contracts are not more effective than direct cash rewards in increasing physical activity.

However, it is not clear if individuals find such incentives attractive. According to Wright and colleagues (2019), the most preferred payment structure seems to be a gain-framed payment rather than a loss-framed payment, as is the case with deposit contracts. Halpern and colleagues (2015) also indicated that a deposit contract is not the most popular form. In contrast, Lipman (2020) concluded that pre-commitment or deposit contract, where people put their money at risk and lose their commitment if they are unsuccessful in achieving the desired health improvement, seemed popular.

2.3.2 Incentives with different chances of winning

It is shown by Yancy Jr. and colleagues (2018) that a lottery offers variable reinforcement, which is demonstrated to be more effective in reinforcing behaviour than fixed reinforcement. Also, Vlaev and colleagues (2019) speak of financial incentives based on a lottery as an effective intervention. Such lottery incentives may work when they are based on probability weighting (Giles et al., 2016; Wright et al., 2019). This probability weighting states that preferences among risky perspectives are non-linear in probabilities (Abdellaoui, Bleichrodt, & Paraschiv, 2007; Kahneman & Tversky, 1979). The

effectiveness of lotteries arises because individuals may overestimate the probability of unlikely events (Cawley & Price, 2013). Probability weighting predicts differences between probability weighting for gains and probability weightings for losses (Abdellaoui et al., 2007; Kahneman & Tversky, 1979). It seems that those incentives are also effective in changing health behaviour (Yancy Jr. et al., 2018).

However, it turns out that lotteries are not the most preferred option (Cawley & Price, 2013). In fact, Giles and colleagues (2016) claim that there is a strong negative preference for financial incentives based on a lottery. This claim is supported by Lipman's (2020) study, where very few people preferred a low chance of winning. Moreover, within the odds of winning in the lottery, no differences in preference were found (Wright et al., 2019).

2.3.3 Incentives with rewards at different points in time

Incentives may be structured such that monetary rewards are paid out at different points in time. Such design deserves careful considerations as an individual's value of a reward decreases the further in time the reward will be collected (Mitchell et al., 2020; Vlaev et al., 2019). Time discounting describes how the value of a person's reward decreases with delay to its receipt. It will link to the impulsiveness of decision-making and the behaviour of delaying gratification (Barlow, Reeves, McKee, Galea, & Stuckler, 2016). Present bias captures that individuals prefer small immediate rewards rather than high rewards later (Marteau, Ashcroft, & Oliver, 2009). These concepts demonstrate that the immediacy of financial incentives positively influences several health improvement programs. By immediately rewarding, individuals' tendency to, for instance, exercise may increase (Mitchell et al., 2013; Mitchell et al., 2020; Vlaev et al., 2019). Warner and Murt (1984) suggested that periodic rewards as weekly payouts could be more effective than payouts at once. Thus, a consistent incentive program would support behaviour change (Jochelson, 2007). Further, Roll and colleagues (1996) claim that increasing the reward's value results in maintained behaviour progress and a more sustained change. However, it is not clear how effective a weekly payout is in contrast to a fixed payment (West et al., 2020).

Lipman (2020) found in his research few differences in the preferences between a weekly payout or a payout at once. However, it was clear that students preferred an increasing rather than a decreasing sequence payout structure.

Although earlier work has shown that individuals prefer different incentives, it is still not clarified why (Lipman, 2020). In particular, Lipman (2020) explored the role of economic factors that could influence the preference for financial incentives discussed above, i.e., loss aversion, probability weighting and discounting. However, Lipman (2020) measured these concepts but found no association between these economic concepts and the incentives individuals preferred. For example, no significant differences were found in choosing a pre-commitment, loss aversion or probability

weighting (Lipman, 2020). Therefore, it is not clear yet what incentives people design when that chance is given to them.

2.4 Tailored financial incentives

Everyone is motivated by something; the most challenging thing is to find by what (Lovewell, 2003). A possible tool to get a clear picture of this might be using tailored financial incentives. These incentives are designed by the individuals themselves and based on their preferences (Lipman, 2020).

The benefits of such incentives are also visible in other areas where behavioural improvement is desired, for instance, in meeting the psychological needs of employers at work (Lovewell, 2003). In this area, the importance is identifying what keeps employers maintaining interest in their work. When people are motivated by something, for example, a specific salary, they will work harder (Lovewell, 2003). This assumption may give rise to the expectation that someone is willing to work harder to improve their health behaviour when this motivation is composed according to own preferences. The same applies to employer-sponsored health activities (Bernstein et al., 2020). In which employers tailor their incentive plans as much as possible to their population's characteristics and need to stimulate participation and have thereby the broadest impact on health (Bernstein et al., 2020). Therefore, tailoring aims to personalise the incentive rather than standardise it (Kullgren et al., 2016). This personalization is essential in fulfilling one of the psychological needs, autonomy, discussed in the self-determination theory (Deci & Ryan, 2000).

Since Lipman (2020) found no clear association between tailored financial incentives and economic preferences, this ambiguity suggests that other factors could influence the choice of financial incentives. In this thesis, this line of research is continued by including demographics instead. Besides being an essential source of differences between people, these characteristics are associated with the economic preferences Lipman (2020) studied, such as discounting, present bias, loss aversion, and probability weighting (Barlow et al., 2016; Higgins, Silverman, Sigmon, & Naito, 2012; Johnson, Gächter, & Herrmann, 2016).

2.5 Demographics

The extrinsic motivation resulting from financial incentives appears to differ between demographic groups. For example, the effectiveness of these incentives may depend on socioeconomic status (White et al., 2009). Therefore, demographic characteristics can potentially influence the interest in financial incentives for a change in health behaviour. For example, it seems more complicated to live a healthy lifestyle for low-income people because they appear to be more susceptible to unhealthy

behaviour. Therefore, they may likely have more difficulties achieving set goals (André et al., 2018; Lunze & Paasche-Orlow, 2013; Madison et al., 2011). For instance, people with higher socioeconomic status have better access to healthy food and opportunities to exercise (Lunze & Paasche-Orlow, 2013). This higher socioeconomic status facilitates a change in their health behaviour and meeting the financial incentives' agreements (Vlaev et al., 2019).

According to Madison and colleagues (2011), individuals with lower educational attainment face more challenges in earning rewards due to the difficulties of understanding the actions or activities undertaken to benefit. Paloyo and colleagues' (2015) research about the effects of financial incentives between different groups in weight loss showed minor effects between subgroups. In this research, low and high-educated people were involved. In another study by Haff and colleagues (2015), no extensive relations were found between the effectiveness of financial incentives and demographic characteristics such as age, income, and education.

Furthermore, differences between demographic characteristics and economic factors are visible. For example, the extent of present bias seems to be negatively related to income or educational attainment (Higgins et al., 2012). On the other hand, time discounting appears more common among young people, people with lower socioeconomic status, and less educated people (Barlow et al., 2016). Also, young people seem to be less loss-averse than the elderly, and those with higher incomes show a more significant loss aversion (Johnson et al., 2016). Meanwhile, for low-income groups, a pre-commitment, the decision to commit personal finances, might be a barrier because it is a payment out-of-pocket, with a chance of losing it (Sutherland et al., 2008). Lastly, young people appear to take more risks in the area of probability weighting, and this tendency seems to diminish with age (Harbaugh, Krause, & Vesterlund, 2002). Hence, it could be expected that systematic differences exist in the incentives individuals design based on their age, income, or educational attainment.

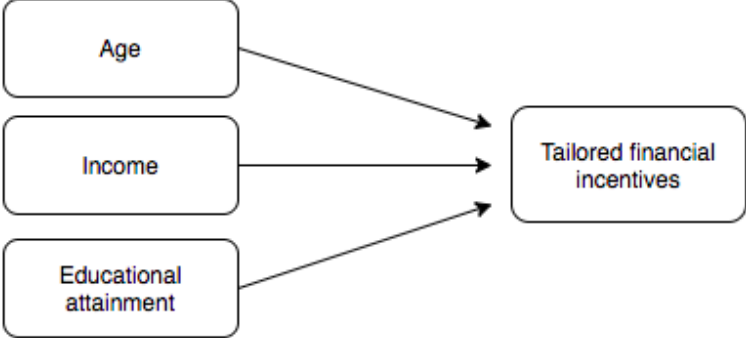
2.6 Conceptual model

As earlier explained, financial incentives appear to work differently in demographic groups. For example, financial incentives would be more effective in low-income groups than high-income groups (Vlaev et al., 2019). Besides, young people would generally be more interested in financial incentives than older people (Giles et al., 2016). Meanwhile, little is known about the effectiveness of financial incentives and differences between educational attainment. Haff and colleagues (2015) found hardly any difference in educational attainment.

Although there is some evidence about what financial incentive works best for which group, little is known about the preferences of these groups. André and colleagues (2018) argue, confidence

in institutions offering financial incentives is lower among the low-educated. Besides, younger people prefer incentives over older people (Giles et al., 2016). However, Lipman (2020) and Wright and colleagues (2019) found no significant differences between groups. To further substantiate these various findings in the existing literature, this thesis will continue to explore tailored financial incentives and their association with demographic characteristics. The conceptual model below gives a graphical representation of this exploration.

Figure 1. Conceptual model



3. Research methods

3.1 Study design and sample size

To answer the main research question, quantitative research with data collected via an online questionnaire has been conducted in the Netherlands. This online questionnaire was based on Lipman's (2020) online tool, implemented in Shiny by the thesis supervisor. This tool enabled respondents to tailor their financial incentive by compiling a unique combination of incentives.

The intended sample size was based on the formula of Tabacknick and Fidell (2013, p.123). They state that the sample size should be at least $N > 50 + 8M$, with M as a number of independent variables. With three independent variables, age, income, and educational attainment, this amounts to a minimum of 74 respondents. Over the course of three weeks, 148 respondents completed the questionnaire entirely.

3.1.1 Study population and inclusion

The target population consisted of adults aged 18 years or older, of which a convenience sample was drawn with the goal of obtaining a reasonable spread in demographics. In order to reach people with different demographics, the questionnaire was distributed to employees of the organisation Cardia in The Hague. Cardia is a Christian elderly care organisation in the Haaglanden region. More than eight hundred employees are associated with this organisation, from managers to housekeepers. Thus, it was assumed that considerable differences in education and income existed among the employees within this organisation. Hence, even though a convenience sample was used, it was expected that respondents of the low-income group and the low-educated group were reached. The following message was used to recruit respondents:

For my master's thesis, I am investigating the relationship between financial incentives and health behaviour. An online questionnaire has been drawn up, and I am looking for respondents who want to improve their health 18 years and older.

Only fully completed questionnaires were included in the study; if the questionnaire was aborted halfway, the results were not saved. Besides, people under the age of 18 were not included in the study. Moreover, the questionnaire was only intended for people who wanted to improve their health. It was not suitable for others who did not want to improve their health. Based on those criteria, 148 respondents were included in the study, 96 were female, and the average age was 42.95 years ($SD = 17.26$).

Before distributing the questionnaire on a large scale; first, a pilot study was conducted among five people to solicit feedback on the clarity of the questionnaire. Based on the feedback received, the questionnaire was revised and adapted. The revised questionnaire was handed out to family, friends and posted on social media websites Facebook and LinkedIn. In addition, the link was distributed by the team leaders of Cardia's household caregivers by mailing their employees. An introductory text was added to the emails with information about anonymity when participating and reliable data use. Besides, the link was placed in the monthly employee newsletter for all employees.

3.2 Measurement instruments

In the questionnaire, first, questions about demographic characteristics were asked, i.e., respondents' age, annual household income, and educational attainment. Among these variables, age has been measured through respondents' year of birth. Second, income has been measured by the annual household income divided into eight categories, based on established household income groups in the Netherlands by CBS (2020). Third, educational attainment was divided into five categories: low (maximum primary school), lower secondary (vmbo), higher secondary (MBO/havo/vwo), and high (HBO) and (WO) (Bruggink, 2009; SCP, 2020). Besides, questions about weight, height and sex were asked. Also, the following questions about health behaviour were asked:

How many cigarettes do you smoke per week?

How many glasses of alcohol do you drink per week?

How many days of the week do you do physical activity (such as running, exercising or fitness)?

After that, respondents chose their desired health behaviour improvement. The respondents could choose from quitting smoking, reducing alcohol consumption, and improving physical activity. Then they could also indicate, based on health improvement choice, how they would improve this behaviour. For instance, for someone who drinks fifteen glasses of alcohol a week and indicates a willingness to improve it. An answer to improving this alcohol reduction could be specified by a self-selected number of glasses (e.g., seven).

Next, the respondents were introduced to propose a hypothetical scenario in which the employer is willing to offer a financial reward for achieving their chosen health goal. After this introduction, the respondents were asked to design a structure that would motivate them in achieving their health goal. This tailoring process involved four dimensions: pre-commitment, timing, sequence, and risk. Table 1 describes the framing of these four dimensions. In choosing weekly payouts, the respondents had five options in the payout sequence. The lottery option provided options between a

1% and 100% chance of winning. For example, a respondent decided on the pre-commitment option of €100 in weekly payouts. When choosing weekly payouts, the option for sequence appeared. The respondent chose an increasing payout structure, resulting in a reward of €10 in the first week, increasing to €30 in the last. The respondent was very risk-averse, and thus opted for a certain incentive with a 100% winning chance.

Respondents could automatically see what the incentive would look like in a table on the same page when choosing their available options (the link to the tool/questionnaire is available in the Appendix). After designing and confirming their preferred tailored financial incentive, respondents were asked two follow-up questions regarding their choice and other comments about the questionnaire. It was not mandatory to answer all the questions; respondents could leave some questions open.

Table 1. Overview of dimensions for tailoring incentives

Dimension	Framing	Options
Pre-commitment	You can decide to pre-commit €100 as a deposit contract, and €100 will be added by your employer. You will receive €200 if you attain your goal, but you will lose your €100 deposit if you do not achieve it.	No Yes
Timing	You will be rewarded for every week you attain your goal. When you attain six out of ten weeks, 60% will be rewarded. You can choose to receive the full payout at the end of the period or receive parts of this amount on a weekly basis.	One payout Weekly payout
Sequence	When you decide to choose a weekly payout structure, these payouts can be fixed for each week, starting high and decreasing or starting low and increasing.	Strongly increasing Increasing Constant Decreasing Strongly decreasing
Risk	You can choose to receive the payout in the form of a lottery, instead of receiving a sure payout. Choosing a lottery results in the higher the risk, the higher the reward.	1% - 100%

3.3 Statistical analysis

The questionnaire's results are analysed in IBM SPSS Statistics version 27. Multiple descriptive statistical analyses were performed to clarify the individuals' demographic characteristics and give an overview of the chosen tailored incentives. Moreover, by exploring what type of health behaviour people would like to improve, descriptive statistics were used to get insights into the chosen improvements. Further, paired-samples t-tests were conducted to get more information about the difference between the current behaviour and the desired behaviour goal.

Next, it was explored whether the respondents' demographic characteristics affected the tailored incentive's dimensions. To this end, analyses for simple comparisons were used that fit the measurement level of the demographics and dimensions. For example, it was explored with chi-square test for independence whether the demographic characteristics as income and educational attainment differed for pre-commitment, timing and sequence separately. Further, independent-samples t-tests were conducted to explore the differences in risk in educational attainment and income, and the differences in pre-commitment, timing and sequence, and age. Moreover, a correlation analysis was conducted to explore the relationship between risk and age.

When all the demographic characteristics were combined, a set of regression analyses was run to estimate the effect of all demographics on each dimension as shown in Figure 1. The type of regression analysis depended on the measurement level of the incentive's dimension (see Table 2). Since a convenience sample was used, in advance it was uncertain whether there would be enough observations in each category. Hence, it could only be decided after collecting the data which regression analysis could be used for sequence.

First, logistic regression analyses were performed for pre-commitment and timing combined with the demographic characteristics of age, income and educational attainment. The last analysis was a Standard multiple regression analysis and performed for risk combined with age, income and educational attainment. In these performed regression analyses, Two-sided p values $< .05$ were considered to be significant. Table 3 shows an overview of the respondents' characteristics in the quantitative research. Before starting the regression analyses, the data was explored for outliers and violations of normality.

Table 2. Overview of regression analyses

Dimension	Analysis	
Pre-commitment	Logistic regression	0 = No, 1 = Yes
Timing	Logistic regression	0 = Once, 1 = Weekly
Sequence	Regression	1 = Strongly increasing, 2 = Increasing, 3 = Constant, 4 = Decreasing, 5 = Strongly decreasing
Risk	Multiple regression	1 - 100

Table 3. Operationalization of the variables

Variable	Measurement level	
Educational attainment	Categorical	Maximum primary school; lower secondary; higher secondary; high (HBO); high (WO)
Age	Continuous	
Income	Categorical	< 10.000; 10.000 – 20.000; 20.000 – 30.000; 40.000 – 50.000; 50.000 – 100.000; 100.000 – 200.000; > 200.000

4.Results

Table 4 gives an overview of the four dimensions of the tailored incentives and their distribution. A slight minority chose a pre-commitment and about a third chose a weekly payout structure. Within the group who chose a weekly payout, precisely half of them preferred incentives with another sequence than the constant payout. Notable, strongly in- and decreasing structures were least popular. Last, most respondents chose the safe option of a 100% chance of winning, though a few chose the highest risk option with a 1% chance.

Table 4. Descriptive statistics for tailored incentive selection

Dimension	Options	Count (%)
Pre-commitment (<i>n</i> = 148)	No (84)	56.8%
	Yes (64)	43.2%
Timing (<i>n</i> = 148)	Once (102)	68.9%
	Weekly (46)	31.1%
Sequence (<i>n</i> = 46)	Strongly increasing (2)	4.3%
	Increasing (13)	28.3%
	Constant (23)	50%
	Decreasing (7)	15.2%
	Strongly decreasing (1)	2.2%
Risk (<i>n</i> = 148)	1% (highest risk)	6,1%
	2–9%	0%
	10–39%	4.7%
	40–69%	14.2%
	70–99%	14.2%
	100% (no risk)	60.8%

The most preferred behavioural change option is improving physical activity, as visible in Table 6. Further, most smokers (eleven out of sixteen) chose to quit smoking. Another small group chose to reduce their alcohol consumption. Table 5 shows the mean scores of the current health behaviour of

all respondents. A paired-samples t-test was conducted to get more information about the difference between the current behaviour and the improvement goal. A statistically significant increase was found in the current number of days of physical activity and the improvement goal ($t(116) = -13.66, < .01$) (see Table 6). This result indicates that people would like to exercise more than one day extra, on average. In contrast, no significant decrease in alcohol consumption was found ($p = .122$).

Table 5. Descriptive statistics for health behaviour

Health behaviours	<i>n</i>	<i>M</i>	<i>SD</i>
Cigarettes (week)	148	3.11	12.57
Alcohol (glasses/week)	148	4.63	4.77
Exercise (days/week)	148	2.61	1.76

Table 6. Differences in mean scores on current behaviour and improvement goal

Preferred behaviour change (<i>n</i> = 148)	Current	Improvement goal	
Quitting smoking (11)	<i>M</i> = 4.63, <i>SD</i> = 4.77	0	7.4%
Reducing alcohol consumption (15)	<i>M</i> = 7.08, <i>SD</i> = 4.29	<i>M</i> = 5.08, <i>SD</i> = 3.23	10.1%
Improving physical activity (122)	<i>M</i> = 2.33, <i>SD</i> = 1.43	<i>M</i> = 3.99, <i>SD</i> = 1.42	82.4%

Table 7 shows the characteristics of the respondents. The demographics were, unfortunately, not distributed equally or representatively. For example, more females than males responded and the educational attainment is skewed towards high educated individuals. Some of the variables had to be adapted to facilitate further statistical analyses. First, educational attainment was divided into two instead of five categories and merged into; low/middle (*vmbo/havo/vwo/mbo*) and high (*HBO/WO*) educational attainment groups. Second, income was dichotomised into low and high income due to heterogeneity in the groups. This division is based on a yearly household income below and above €50.000. This amount is roughly equal to the average household income of the Dutch (CBS, 2020). Moreover, age was divided into four quartiles for descriptive purposes and to provide a better overview of the age distribution in the sample.

Table 7. Descriptive statistics for demographic characteristics

Characteristics	Options	Count (%)
Sex ($n = 148$)	Male (52)	35.1%
	Female (96)	64.9%
Income ($n = 107$)	Low (56)	52.3%
	High (51)	47.7%
Educational attainment ($n = 142$)	Low/middle (33)	23.2%
	High (109)	76.8%
Age ($n = 146$) <u>($M = 42.95, SD = 17.26$)</u>	18 – 26 (41)	28.1%
	27 – 43 (32)	21.9%
	44 – 60 (41)	28.1%
	> 60 (32)	21.9%

4.1 Educational attainment

First, the difference in educational attainment and the tailored incentive dimensions was explored (see Table 8). It was determined whether choosing a pre-commitment differed between low/middle and high educated. A significant difference was found between these groups ($\chi^2(1, n = 142) = 3.87, p < .05$). However, the $\phi = .18$, which, according to Cohen (1988), is suggested as a small effect between the two variables ($\phi < .30$). After that, the difference in educational attainment and timing was explored. There was no statistically significant difference found between educational attainment and timing ($p = .129$). Next, the difference in educational attainment and sequence was explored. First, sequence had to be dichotomised to in/decreasing and constant since the distribution of respondents within the other categories than constant was too low (see Table 4). After conducting the test no significant difference was found for low/middle and high educated respondents ($p = .826$). Last, it was determined whether there was a difference in choosing a risk for low/middle and high educated (see Table 9). There was no significant difference found within these groups ($p = .753$).

Table 8. Distribution of choices over incentive dimensions by demographic characteristics

	Pre-commitment		Timing		Sequence	
	No	Yes	Once	Weekly	Constant	In/decreasing
Educational attainment						
Low/middle	24 (72.7%)*	9 (27.3%)*	19 (57.6%)	14 (42.4%)	6 (42.9%)	8 (57.1%)
High	56 (51.4%)*	53 (48.6%)*	80 (73.4%)	29 (26.6%)	15 (51.7%)	14 (48.3%)
Income						
Low	31 (55.4%)	25 (44.6%)	40 (71.4%)	16 (28.6%)	6 (37.5%)	10 (62.5%)
High	25 (49.0%)	26 (51.0%)	39 (76.5%)	12 (23.5%)	6 (50%)	6 (50%)

Note: * $p < .05$ (two-tailed)

Table 9. Differences in mean scores on risk

	Risk		
	<i>n</i>	<i>M ± SD</i>	t-value
Educational attainment			.32
Low/middle	33	80.52 ± 33.59	
High	109	78.58 ± 30.06	
Income			.42
Low	56	79.14 ± 30.51	
High	51	76.61 ± 32.16	

4.2 Income

Next, the difference in pre-commitment between low- and high-income groups was explored (See Table 8). There was no significant difference found between these groups ($p = .644$). Thereafter, the difference between low and high income and timing was analysed. Here, also no significant difference was found ($p = .710$). Next, the difference within sequence (dichotomised) was explored. Here also no significant differences were found between low- and high-income groups ($p = .783$). Last, the difference in income and risk choice was explored (see Table 9). Additionally, no significant difference was found in risk choice for people with a low or high income ($p = .677$).

4.3 Age

Subsequently, the difference in age and pre-commitment was explored. There was no significant difference found between the mean scores in not choosing a pre-commitment and choosing a pre-commitment ($p = .426$). Next, the difference in age and timing was explored. Here, also no significant difference was found between a payout at once and a weekly payout structure ($p = .301$). Further, the difference in age and sequence (dichotomised) was explored. For sequence also no significant differences were found between a constant payout structure and an in- or decreasing payout structure ($p = .307$). Last, by analysing the relationship between age and choosing a risk, a significant negative correlation was found between the two variables ($r = -.18$; $p < .05$). According to Cohen (1988), this result is suggested as small ($r = .10$ to $.29$). This negative correlation indicates that an older person is more likely to choose a higher risk.

Table 10. Distribution of choices over incentive dimensions by age

	Age		
	<i>n</i>	<i>M ± SD</i>	<i>t-value</i>
Pre-commitment			.80
No	83	43.94 ± 17.61	
Yes	63	41.63 ± 16.84	
Timing			-1.04
Once	100	41.92 ± 17.05	
Weekly	46	45.13 ± 17.72	
Sequence			-1.03
Constant	23	42.43 ± 17.64	
In– or decreasing	23	47.83 ± 17.78	

4.4 The relationship between demographics and pre-commitment

Next, a Logistic regression analysis was performed to assess the combined impact of age, income and educational attainment on the likelihood that respondents would have chosen a pre-commitment. The full model containing all the predictors was statistically significant ($\chi^2 (3, n = 105) = 7.94, p < .05$). The model explained 9.7% of the variance in pre-commitment according to the Nagelkerke R Square and correctly classified 52.4%. As visible in Table 11, only high educational attainment significantly contributed to the model, with a predictor of 5.62. The recorded odds ratio was 5.17, which indicates that high educated people are more than five times more likely to choose a pre-commitment than

low/middle educated people. The other variables did not significantly contribute to the model ($p > .05$). This indicates that income and age do not significantly predict choosing a pre-commitment and that there are no differences between low or high income and age.

Table 11. Logistic regression Predicting the Likelihood of choosing a pre-commitment

Variables	B	S.E.	Wald	Sig.	Exp (B)
High educational attainment	1.63	.69	5.62	.018*	5.17
High income	.05	.42	.01	.905	1.05
Age	-.00	.01	.04	.849	.99

4.5 The relationship between demographics and timing

Second, a Logistic regression analysis was performed to assess the combined impact of age, income and educational attainment on the likelihood that respondents would have chosen a weekly payout structure. The full model containing all the predictors was found statistically significant ($X^2 (3, n = 105) = 10.50, p < .05$). The model explained 13.9% of the variance in the payout structure according to the Nagelkerke R Square and correctly classified 73.3%. As visible in Table 12 below, only age was a significant predictor, including an odds ratio of 1.04. This result indicates that as age increases by one year, the odds of choosing a weekly payout increases with 4%. The other variables did not significantly contribute to the model ($p > .05$), indicating that education and income do not significantly predict choosing a weekly payout.

Table 12. Logistic regression Predicting the Likelihood of choosing a weekly payout.

Variables	B	S.E.	Wald	Sig.	Exp (B)
High educational attainment	.81	.69	1.40	.238	2.26
High income	-.75	.50	2.19	.139	.48
Age	.04	.01	8.91	.003*	1.04

4.6 The relationship between demographics and sequence

Since sequence had to be dichotomised a Logistic regression analysis was performed to assess the likelihood of choosing an in- or decreasing sequence structure. Due to the low number of respondents within the sequence group, the results were difficult to interpret. Eventually, no statistical significance was found for the full model containing all the predictors ($p = .174$).

Table 13. Logistic regression Predicting the Likelihood of choosing a sequence

Variables	B	S.E.	Wald	Sig.	Exp (B)
High educational attainment	-21.21	20096.45	.000	.999	.00
High income	.00	.82	.000	.997	1.00
Age	-.00	.01	.001	.981	.99

4.7 The relationship between demographics and risk

Last, standard multiple regression analysis was performed to predict risk from combined age, income and educational attainment. After performing the multiple regression analysis, it was shown that these variables did not significantly predict risk ($p = .255$). This result indicates that age, income and educational attainment do not influence choosing risk. However, a trend is visible due to the marginally significant result for age ($p < .10$). This result could indicate that older people are more likely to opt for risk than younger people, yet this effect is not statistically significant. In Table 14 the results of the analysis are shown.

Table 14. Multiple regression analysis to predict the risk

Variables	Risk ($n = 105$)		
	β	t	Sig.
Educational attainment	4.33	.50	.619
Income	-.60	-.09	.926
Age	.18	-1.79	.077
Model summary			
R^2	.04		
F	1.38		

5. Discussion and conclusion

This thesis aimed to contribute to knowledge about the preferences for adults' financial incentives for health improvements for different demographic characteristics. By providing the opportunity to tailor incentives, more insights were gained into people's preferences in financial incentives. This insight created the possibility to investigate whether preferences matches with what works for people.

In this thesis, the respondents could pick the health behaviour improvement of their own choice. As clearly visible in the results, the vast majority preferred to improve their weekly physical activity. The other respondents choose to quit smoking or reduce their alcohol consumption. Further, the current number of physical activity per week was compared with the improvement goal, the same for alcohol consumption. A significant increase was found in physical activity. Individuals wanted to improve this from 2.3 days to almost four a week. Because the respondents could choose their health improvement goal, they may have linked this to their motivation. On the other hand, for some respondents, more importance was on reducing heavy alcohol consumption or quitting smoking to meet those guidelines instead of improving physical activity. This raises whether respondents opted for the most necessary improvement or the most desired.

Many studies showed the effects of financial incentives for increasing physical activity (Barte & Wendel-Vos, 2017; Finkelstein et al., 2008; Mitchell, 2013). As a result, a similarity is found in what works for people and what they seem to prefer. In contrast, no significant differences were found in reducing alcohol consumption. In the literature, little was found about the effects of financial incentives in reducing alcohol consumption; only positive effects for treating heavy alcohol drinkers were found (Dougherty et al., 2014). Besides, for smoking only the option for quitting smoking was given, so no choice was offered for a quantity. Notable, not all smokers chose quitting smoking as health behaviour improvement, which might show a similarity with previous research where is stated that smokers are often less interested in smoking cessation incentives (Kim et al., 2011). Furthermore, it seemed that the value of the incentive must be high enough to compensate for tobacco withdrawal symptoms (Etter & Schmid, 2016). More research on the preferences about reducing alcohol consumption and quitting smoking is needed to conclude from this.

Next to self-choosing a health behaviour improvement, respondents could also tailor their financial incentive. The results showed that a slight minority preferred a pre-commitment structure. This finding supports the willingness to pre-commitment by Lipman (2020) and contradicts the findings on the unpopularity of Halpern and colleagues (2015) and Wright and colleagues (2019). In addition, the majority preferred to receive the payouts at once at the end, but there has also been some preference for the weekly payout structure. In contrast, in Lipman (2020) few differences were found

in preference in payout timing. In this thesis, mainly the strongly increasing and strongly decreasing structures as sequence were not popular. This finding supports Lipman (2020); in this study, few preferences were found for these structures. Moreover, since more than half of the respondents choose the option 'no risk', certainty seemed desired in receiving the rewards. This also corresponds with Lipman (2020); very few people preferred choosing a risk. Besides, in studies by Cawley and Prince (2013) and Giles and colleagues (2016) also incentives based on lotteries were not preferred.

Further, the differences between demographic characteristics were investigated. A significant difference was found for pre-commitment. It is shown that highly educated people were more than five times more likely to choose a pre-commitment than low/middle educated people. Lipman (2020) also studied preferences among highly educated students and found that the majority preferred a pre-commitment. That majority Lipman (2020) found, could result from a stronger preference for pre-commitment among the highly educated, resulting in a specific group interested in pre-commitment incentives. The fact that highly educated people prefer a pre-commitment could mean that they have more awareness of their limited self-control and be more inclined to commit themselves to future goals through a deposit. According to the literature, it is clear that pre-commitment is an effective incentive structure (Halpern et al., 2015; Volpp et al., 2008). However, little was found about the differences between low and high educated and the effectiveness. Madison and colleagues (2011) stated that low educated people would face more challenges in earning rewards due to difficulties understanding the actions or activities undertaken to benefit. Hence, they may have been less inclined to pre-commit personal funds.

For age, a significant difference was found in the timing of the payout structure. It seemed that as age increased by one year, the odds of choosing a weekly payout increased by 4%. In contrast, nothing was found about this difference in the previous literature. Moreover, a negative correlation was found between risk and age which indicates that an older person is slightly more likely to choose a higher risk. Also, a trend was visible in the multiple regression analysis for people with a higher age in opting for a risk. However, caution is advised, and more research will be needed to determine this. In contrast to these findings, based on the literature, young people appeared to take more risks in the area of probability weighting (Harbaugh et al., 2002). This behaviour might indicate that they would have been more likely to take a risk. Given this study, it is surprising that the opposite in this thesis was found.

In addition to the significant results, no significant differences in educational attainment in preference for a weekly payout were found. In contrast, time discounting appeared to be more pronounced among less-educated people (Barlow et al., 2016), indicating that they may prefer a weekly payout. Additionally, no significant differences were found between low and high-income

groups in any of the dimensions in financial incentives, which differs from the literature, in which differences in effectiveness were found between these groups. Such as, that financial incentives especially seem effective for low-income groups (Lunze & Paasche-Orlow, 2013). This effectiveness could be due to the greater effect of smaller amounts on low-incomes than high-incomes (Sutherland et al., 2008; Vlaev et al., 2019). However, in this thesis, a hypothetical fixed amount was offered to all respondents, so no difference could be found. Next, according to Sutherland and colleagues (2008) a pre-commitment, might have been a barrier for low incomes due to the payment out of pocket with a chance of losing it. However, this assumed barrier was not found in this thesis. A cause that no differences were found could be that no real money was at stake and, therefore, people with a low income felt less pressure of losing money. Further, no significant differences in age were found in choosing a pre-commitment. Given the literature, it seemed that young people were less loss-averse than the elderly (Johnson et al., 2016), suggesting that they would prefer a pre-commitment over older people, which contradicts the results of this thesis. However, Lipman (2020) found no association between loss aversion and choosing a pre-commitment.

5.1 Strengths and limitations

Tailored financial incentives have not been used much before; therefore, it added value to extend the research on this topic. A strength of this thesis was the broadening of the scope to all adults instead of one target group. This broadening allowed more knowledge about differences in demographic characteristics. A unique element of this thesis was that the respondents could tailor their health behaviour improvement program. They could choose the desired behaviour, and they could design their financial incentives fully themselves.

Next to the strengths of this thesis, there were also some limitations. For example, the tool was still in an exploratory phase and was only used once before. In addition, some questions had to be adapted, causing that the validity was uncertain (Bolarinwa, 2015). Next, the sample was not entirely representative of the target group since some demographic characteristics were underrepresented, and there was some heterogeneity. Therefore, external validity could not be fully achieved (Findley, Kikuta, & Denly, 2021). This under representativeness is mainly due to the low numbers of low/middle educated people, therefore, the response was skewed towards the highly educated.

Furthermore, outcomes may have been questionable because this study was based on hypothetical financial incentives, and people did not receive a tangible reward. Because of this, people may have felt less pressure and some feeling of loss to, for example, pre-commit because they knew

beforehand not to lose their money. Outcomes, therefore, could have been different when real money was at stake.

Moreover, the online questionnaire was based on a self-report base. As a result, no supervision was available by filling in the answers. When questions were perceived as unclear, no questions could be asked to a supervisor, so some might have been completed without understanding it. Besides, based on the results, there is missing data on income for 28% of the sample. This missing data could result from not knowing the household income or the sensitivity of the question. Missing data might increase the standard errors and reduce the generalizability of the findings (Dong & Peng, 2013).

Therefore, it is recommended that a broader sample with an even spread among the respondents is used in future research. Thus, more knowledge will be gained about whether the preferences for financial incentives are associated with demographic characteristics. Besides, it should be investigated whether the financial incentives, tailored according to preferences, also work when a real reward is achieved instead of a hypothetical one. Moreover, completing the questionnaire and using the tool under supervision is desirable for more reliable results.

5.2 Conclusion

Unhealthy behaviour is still a common problem worldwide and has many adverse effects. However, the best way of promoting healthy behaviour is not there yet. Financial incentives seem to play an effective role in promoting this healthy behaviour. This thesis tried to answer what financial incentives adults design for themselves (i.e., tailor) to change the unhealthy behaviour of their own choice positively and how this is associated with their demographic characteristics as age, income, and educational attainment.

An unequivocal answer to this question seems complicated. This thesis showed that financial incentives and their preferences differ per person. However, in some dimensions, significant differences were found between specific groups. This indicates that there exist differences in preferences between different groups. These preferences between different groups must be taken in mind by, e.g., policymakers when implementing a financial incentive since some incentives are more preferred in some group than in another. For example, introducing a pre-commitment for low or middle educated, while this is preferable for the highly educated, should be considered carefully. This preference may subsequently influence the motivation for achieving a result and, therefore, a financial incentive's effectiveness.

In the literature, some findings of the effectiveness of financial incentives contradict the preference within groups. When it turns out that there are differences between what people want and

what might work for them, it is necessary to consciously examine which of the two should be of more importance. It is unlikely that empirical evidence only can support policy-makers in answering this question. Therefore, besides more research into the effectiveness of tailored financial incentives is desirable, it should also be explored if individuals would rather choose themselves or be assigned to something that e.g., a policymaker or researcher believes works best for them. In this way, it might become clear whether financial incentives, based on preferences, can also increase health behaviour improvement effectiveness.

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7. Appendix

7.1 Questionnaire

The full questionnaire is available at: <https://referencepoints.shinyapps.io/ScriptieMerel/>