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Master Thesis Behavioral Economics

The impact of self-setting phone nudges on sedentary behavior

A self-reporting study

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Abstract

The negative consequences of a lack of physical activity during a workday are already known for a long time. The temporary lockdown during the Corona crisis in 2020 in the Netherlands brought the existing sedentary behavior problem of workers in a new daylight. The period in which this thesis was written, seemed to be the right moment to investigate whether a toolkit with self-setting nudges could stimulate workers with a sedentary profession to have more physical activity during a normal workday. The toolkit, which consists of several phone nudges, has been developed together with Duwtje, a research- and consultancy firm in the field of behavioral change. Multiple behavioral techniques were applied: social norms, implementation intention, habit formation, active and passive reminders, role models and social commitment. Randomized controlled trials (RCT's) showed no significant (positive) effect of effect of using the toolkit on physical activity during a workday. Nevertheless, the insignificant effect was in the right direction. The additional qualitative analysis gives reasons to believe that replication of this study in the future, with minor modifications and a bigger sample size, might lead to finding significant (positive) effects of self-setting nudges on physical activity.

Key words: Physical activity, nudges, behavioral change, social norms, implementation intention, habit formation, reminders, role models, social commitment, RCT's.

Abbreviations used

Physical activity = PA

Randomized controlled trials = RCT's

Default mode network = DMN

Difference-in-difference = DID/did

Prior notice for reader: the three words "experiment", "research" and "study" are all used in this thesis to refer to (parts of) the process that has lead to the conclusions that have been drawn at the end of this thesis. The author is aware of the substantive difference in meaning of these three words, but has chosen to use the tree alternately in different parts of the thesis.

1. Introduction

During the Corona crisis in 2020, many people were forced to stop working physically at the offices of their employers, in an attempt to stop the virus spreading too quickly. The consequences of government interventions and their scientific advices to the citizens were that millions of people had to perform all their duties from their homes. This brought another, already existing problem, to the light. Sedentary behavior starts to become a bigger problem in several countries, especially in the Netherlands, where the author of this thesis resides. On average, Dutch employees sit about 10 hours per day, while sitting more than 4 hours is already unhealthy. The Dutch people sit more hours per day than any other country in Europe (TNO, 2016). According to a publication from De Gezondheidsraad (2017), the health council in the Netherlands, the advice is to have moderate-intensive physical activity (PA) during 30 minutes for at least five days a week. These days do not have to be consecutive days and the 30 minutes can be separated into three periods of 10 minutes. The difference between a workday and a non-workday is astonishing. According to research from Thorp and Dunstan (2009) under Australian retail, office-based and call-center employees, it turns out that these workers are 70% more sedentary on a workday than on non-workday. Besides, people with a sedentary job do not compensate this in non-workdays (Clemes, O'Connell & Edwardson, 2014). There are several reasons why employers and their companies can benefit from increased PA of employees during working hours. The grown sedentary behavior has already been found to be the instigator of increased risk to several of both physical and mental problems (Saunders, Chaput & Tremblay, 2014). More specifically, inactivity seems to be connected to higher absenteeism and work productivity, so an employer has plenty of reasons why it would be interesting to have means to stimulate his employees to be a bit more physically active during working hours.

As people do have space and opportunity to take breaks and consciously stretch their legs during work-time at the office, this lies somewhat differently when they are working at home. In the light of the forced working-at-home-situation in the Netherlands due to Covid-19, it seems to be the right time to investigate whether this behavioral can be changed somehow. It can be beneficial for several parties involved. Behavioral changes can be accomplished in multiple ways, but often the details can make the difference. According to an unpublished survey from behavioral research and consultancy firm Duwtje (2020), people are absolutely not unwilling to do more physical activity during work-time, but there are many reasons why people do not act according to their preferences and resolutions. This

study will show if people can be nudged towards more physical activity during workdays when working at home and will try to explain which elements are important when it comes to stimulating people to be more physically active.

The research question of this study is: *Can phone nudges increase physical activity of home-workers during workdays?*

To give an answer to this research question, first some literature will be reviewed to explain what the consequences of a lack of PA are and existing solutions will be discussed. Then an explanation will follow about how humans come to making a specific decision, why they can face so many problems on their way and how this can be affected. Subsequently is overview of how motivation works, why it is important how people are motivated and how role models can be of additional value here. Social norms are the next part to show if they can play a role in the solution of this problem. Afterwards, there will be showed what the core of the problem is, continuing with the experimental design of this thesis. RCT's will be used to test the created intervention. The results will be analyzed and a discussion and conclusion will be conducted. This thesis will end with limitations and future research possibilities.

2. Theoretical framework

2.1. Known risks & existing solutions for sedentary behavior

This first section will start by explaining why it is important to have enough physical activity during a day. What follows is an overview of already existing tools to decrease sedentary behavior.

2.1.1. Health consequences of (a lack of) physical activity

The negative impact that sedentary professions have on health, was already known by 1958, when Morris and Crawford made a comparison between sitting bus drivers and walking ticket cutters. The incidence of cardiovascular diseases was much larger for the first group. The same was confirmed later on when walking postal workers were compared with their sedentary colleagues. Later on, more studies were conducted to show the risks of sedentary behavior. A very large study in Australia elaborated on different kind of risks. 200.000 people were observed during three consecutive years. People who reported sitting less than 4 hours a day compared to those sitting between 8 and 11 hours a day had 15% decrease in all-cause mortality rate and even a 40% decrease compared to people who reported sitting more than 11 hours a day (van der Ploeg et al., 2012). The first mentioned study by Morris and Crawford was later on confirmed again. Even after controlling for leisure-time participation in moderate PA, increased risk of type 2 diabetes, weight gain and metabolic syndrome (amongst others) remained associated with excessive sedentary behavior. Also increased risk of breast, colon, colorectal, endometrial and epithelial ovarian cancers is linked those with higher sedentary behavioral exposure. Not all kind of cancers though (Biswas et al., 2015). In the domain of mental health, sedentary behavioral plays a negative role. Higher risk of mental illness and poorer mental health go together with higher levels of sedentary behavior (Hamer, Coombs, & Stamatakis, 2014; Kilpatrick, Sanderson, Blizzard, Teale, & Venn, 2013). Those in the highest category of sedentary behavioral have a 25% increased chance of getting depressions compared to those in the lowest category (Zhai, Zhang & Zhang, 2015). Also productivity seems not to be positively associated with sedentary behavior (Brown, Ryde, Gilson, Burton, & Brown, 2013). Important to mention is that most available evidence provided by studies show associations, not causality.

The brains are affected by physical behavior as well. When a person is in a resting state, compared to during cognitive tasks, certain brain regions show significantly more

activity (Callard & Margulies, 2014). This set of brain regions is called the default mode network (DMN). Most PA does not require a lot of cognitive attention, meaning that will stimulate the DMN. Activation of DMN is associated with experiencing 'free thoughts' and more creativity. Another effect of consecutive sedentary behavior is a reduction in cerebral blood flow. A recent study showed that walking for two minutes, every time after 30 minutes of sitting, increased brain blood flow a bit, compared to the start of a session (Carter et al., 2018). Why it is important to keep up the blood flow, is because it transports oxygen and nutrients to the brain, which is needed to perform everyday tasks. Reductions in the amount of blood flow can have a negative impact on cognition.

The mentioned negative effects of a lack of PA are mostly for the long term. On the other hand, some advantages of doing enough PA, are already noticeable on the short term. According to a study from Oppezzo and Schwartz (2014), walking increases creativity of people. They used a test which looks at the amount of alternative uses of a product someone can think of. People who were walking on a treadmill, could come up with significantly more alternative uses than people who were sitting. The average increase in creative output was 60%. Other research has shown that a five-minute walk while being surrounded by any kind of green nature, already leads to an increase in mood (or decrease in stress) and self-esteem (Barton & Pretty, 2010). Better mood was already linked to higher levels of productivity (Berger, Pargman & Weinberg, 2002). Interestingly, biggest improvements in mood and self-esteem were found with the smallest increments in exercise time (5 minutes).

2.1.2. Existing solutions for sedentary behavior

As the majority of the professions requires mostly sedentary behavior, an opportunity for employers is present, as they can stimulate employees to reduce the total daily sitting time. It starts already before the workday officially begins, when employees need to travel to their work. If they live close, they could possibly walk, but if it is too far away for walking, taking the bike would again be more active than taking the car. The Netherlands knows a system were a company can offer a bicycle to an employee in a financially attractive way, to promote cycling to work (Wet Loonbelasting 1964, artikel 13ter). Once the day has started, some activities could be considered to happen in a non-sedentary way, like meetings. They sometimes can take place while people stand up instead of sitting down (Knight & Baer, 2014). The more active step would be 'weeting', which is the official combination of walking

and meeting. There is even an official website that provides routes during talks[1]. During lunchtime, companies could offer a discount on food through a partnership with a food corner in the neighbourhood to stimulate some walking during breaks. These are just some examples that have probably already been implemented dozens of times in several companies.

These solutions are mostly executed at a company level. During a lockdown-like situation, the company level becomes a little more vague for home workers, as there is not physical difference anymore for people between work and living place. Restaurants are temporarily closed, people cannot have lunch with their colleagues in most cases and no travel to work is needed anymore, meaning less PA in general. Does that mean that the employer could not offer any handles to stimulate his employees anymore? Before digging deeper into that question, first some more information is necessary about the process of why people do what they do.

2.2. Behavioral processes

In this section will be explained how and why certain behavior is conducted, what the determinants of behavior are and how the systems that causes our behavior can be influenced.

2.2.1 Decision making by humans

The leading mechanism for decision making processes is the brain. According to Kahneman and Egan (2011), the dual-process model of the brain determines what choices people make. It consists of a twofold system, that apprehends the world in two completely different ways. System 1 is fast, intuitive, associative and automatic, which means it cannot be switched off. The operations of the system happen without any intentional control and are based on emotions and therefore impulses. This system is responsible for the absolute majority of the decisions people daily make, most of them focused on the short term. From now on we will call it the automatic system. System 2 is slow, deliberate and effortful. Its operations happen with conscious self-control: facts are leading for decision making. Only a minority of the decisions is made by this system on a daily basis and the focus lies on the

[1] https://www.weeting.nl/

long term. From now on it will be called the rational system. The automatic system sends signals to the rational system which processes them into beliefs.

Jolls, Sunstein and Thaler (1998) discuss three important 'bounds' of human behavior that makes real people different from the 'homo economicus', the fully rational person that maximizes his own satisfaction and utility. At first, people act according to their bounded rationality, meaning they respond rationally to their own limited cognitive abilities, as they are not infinite. The mental shortcuts people take to deal with the overflow of decisions they have to make, are called heuristics. While they are useful on average, they can lead to errors in particular situations. This all comes together when people may behave according to rational decision making, but still show different behavior than models would predict. In additional to bounded rationality there is bounded willpower. This reflects to situations in which human beings know that the decision they make is in contrast with their long-term interests. A famous example is smokers who say that really want to quit smoking, because they know it is better for their health in the future (and their finances), but cannot resist the temptation. As opposed to bounded rationality, bounded willpower is often recognized by people themselves ('I really want to stop smoking, but I simply fail every time I try'), which gives them an opportunity to mitigate its effects, although it still does not mean that people will always do so. Finally, there is bounded self-interest. This shows that people often act contrary to their own interest if they can help other people with doing so. Even more important is that their actions may depend on how they are treated by other people. This means that people can act nicer or more spiteful than models would predict a rational agent to do. Bounded self-interest will not be further discussed here.

According to the earlier mentioned unpublished survey about PA amongst home-workers during quarantine times, from behavioral research and consultancy firm Duwtje (2020), results indicate that the theory discussed before applies to the practical world. Only 24.1% of the 144 respondents reported to have more than 30 minutes of low-intensive PA during working time. 72% indicates that they would like to be more physically active than they currently are. People argue that they simply forget about it, are too busy, take less breaks when they work at home, have to take care of their children and do not have motivation and routine. Directly referring back to something Daniel Kahneman said in an interview with Inc. Magazine: "The reasons people give for why they make a decision are not always the causes." One frequently reported reason for not being as physically active as preferred, is the lack of environment that facilitates PA. In case of a normal office day, people

often have to walk to different places: if people need to take a coffee they need to walk to the coffee machine; when employees arrive at a multilevel company building, they can take the stairs; during a lunchbreak, people can walk to or with colleagues; and people of course need to travel to their job, which often requires at least some form of PA. In their own home, people have less space to just walk and not reasons to walk as mentioned above either. This indicates that there are less triggers for people to walk during work time, or as one useful comment clearly states there are 'fewer automatic opportunities to move.' Together with the lack of routine and motivation, this might be one of the key problems that people face here.

2.2.2. Habit formation

People often fail in their plan to continue with behavioral changes, as they lose their motivation halfway. But why then is it so difficult to convert the will into an actual change of behavior? A lot of people start the new year hopeful, with a bunch of good resolutions. The share of resolutions that is being fulfilled is very small. 80% already failed by February (Ali, 2018). Reasons for this are unclear goals, feeling overwhelmed, feeling discouraged and not being ready to change. People say that they want to be more physically active, but there are several barriers that they encounter on their pathway. First of all, being more physically active is not a concrete goal. Second, people don't know when they will start. Then they are comparing the pros and cons to figure out whether it is worth executing. Lastly, adding up to the 'what', 'when' and 'why' is the 'where'. If it is ambiguous where people can be more physically active, this won't stimulate them. These four uncertainties do not make it easier for people to fulfill their resolutions.

The solution for this failure would be if there would not be any consciously thinking about making the decision anymore. When this state has been reached, it is called it a habit. Stop thinking, continue doing is what happens when people brush their teeth before they go to bed. There is no motivation needed anymore to convince people in doing so. From that moment on, System 1 is making the decision instead of System 2. Taking this specific example, there is an explanation for why this is happening with brushing teeth. There are three elements of the so-called habit 'loop': environmental cue, routine (or repetition) and reward (Duhigg, 2012). Before people go to bed, they often go to the bathroom to make themselves sleep-ready (the cue); brushing teeth is an important part of that. Parents already teach their kids to do it every day again and again (repetition makes it a routine). The result is that we have a fresh mouth again and that all stuck, annoying food leftovers are

vanished (reward). To eventually create a habit, all these three elements have to hold. To increase physical activity for home-workers, this will be the starting point when creating an intervention.

2.3. Motivation

This section will elaborate on the concept of motivation: the different types of motivation, how motivation is created, the most effective way to influence motivation and the value creation of role models when people want to maintain motivation.

2.3.1. Motivation strategies

According to Schroeder and Fishbach (2015) there are three broad strategies that people can use to increase motivation. First of all, feedback, which can be either positive or negative. Second, which Schroeder and Fishback call a classical one, goal targets. Lastly, there are incentives that can be used, which can be divided in immediate and delayed incentives again.

For the first one, feedback, they argue that in the beginning people perceive behavior at the beginning of their goal pursuit as commitment, while as the end approaches it is rather seen as progress. Positive feedback is more efficient if it provides a boost in commitment, where negative feedback works better if it indicates a lack of goal progress. Therefore, they advise to use positive feedback more towards the beginning of goal pursuit and negative feedback more towards the end.

Next, for goal setting they argue that the more concrete and the harder or the high the goal targets are set, the more often a tendency towards a higher level of task performance is present. Furthermore, they argue that the S.M.A.R.T. goal theory (Doran, 1981) works well for goal setting, as it stands for Specific, Measurable, Assignable, Realistic, and Time-related. For setting goals for the self, they recommend using implementation intentions. These can best be described as an if-then plan of how to achieve the goal. The most well-known example is something countless people execute daily: before, or better, if I go to bed, I brush my teeth first. The goal of this behavioral technique is habit formation. As the habit is formed, people don't have to think about it anymore, as it goes automatically. This means it does not cost any effort anymore, which makes the goal easier to be achieved. Elaboration on habit formation follows later on in this thesis. Locke and Latham (2006) identify four other conditions under which goal setting is working less effective. At first, if

there is no feedback, it is harder for people to track their progress. So, apparently the first two strategies that Schroeder and Fishbach (2015) mention are connected with each other. Next, without commitment, it does not work. People need to find the goal important enough. The same goes for the level of the task. If it is too difficult, a lack of knowledge acquisition needed to set appropriate goals may be result. Lastly, there can be situational constraint that may obstruct goal setting.

Returning to the third and last strategy that is mentioned by Schroeder and Fishbach (2015), incentives are mostly used to motivate people. Immediate incentives are direct rewards, that might be more attractive for people and therefore be preferred, but they can interfere with the long-term goals. Delayed incentives are decisions made for something one will obtain the reward in a future point of time. Discounted utility models go deeper into behavior, but will not be discussed in this thesis. Another element over which also a lot has already been written is certainty. People prefer incentives with certain outcomes, over uncertain outcomes, in the situations of gains. They finish the last strategy with something that needs additional explanation: intrinsic and extrinsic motivation.

2.3.2. Intrinsic and extrinsic motivation

People have trouble with changing their behavior if they do not have enough stimulus. Stimulus can be created in two ways; with extrinsic incentives or motivation an activity is mainly pursued as for the sake of the outcome; with intrinsic motivation the pursuit itself is the reason why the action is performed (Schroeder & Fishbach, 2015). This is the case when people like an activity and this is the reason why they exhibit certain behavior, not because they do look to gain something from it. Activities can also involve both kind of motivations. With jobs for example, the salary can be the extrinsic motivator, while it can be interesting and challenging as well, which is the intrinsic motivator. The danger of using extrinsic motivation, is that intrinsic motivation can be reduced. If a person is doing a certain activity because of intrinsic motivation, any added extrinsic motivation can shift the reason why this person is doing the original activity. It weakens the association between the activity and its intrinsic value. One personal example of the author is one of his best friends, who used to be a very talented soccer player. In his youth, it already became clear that he was one of the best players of everyone he played with and he really liked the game soccer a lot. He made it to the youth academy of Feyenoord, a professional soccer team in the Netherlands. He did not make it as a professional player, but is still active on a semi-

professional level, where players are paid salary. Although he is currently still in the world of soccer, he argued that the element of money made him like the game much less. The majority of the players is now motivated by the salary they play for, while the intrinsic motivator in the past, the fun of the game, has almost fully disappeared. This example illustrates why It is important to keep the risk of rewarding people in mind, when it comes to stimulating PA more during workdays. Especially from the moment that people have to keep track of it.

2.3.3. Role models and positive approach

The use of role models is not uncommon when using them to help aspirants achieving their ambitious goals. Gyms sometimes use them to motivate different kind of people to continue exercising. A fitness role model can help people imagining how they would look like if you sustain exercising (Rodriguez, 2009). This can be hard as potential health benefits are often only observable at the long term. As it is hard to stick to fitness routine as time passes, role models can help people being reminded about the importance of what they are doing.

According to Morgenroth, Ryan and Peters (2015), role models show people how to perform a skill and achieve goals, they show that people can attain the goal and they make the goal desirable. They are positive sources of social influence. In the Motivational Theory of Role Modeling, they classify role models in three different functions: serving as behavioral models, as representations of the possible and as inspirations. When it comes to serving as 'behavioral models', Lockwood, Jordan and Kunda (2002) showed that positive (successful) role models are most effective for people who are promotion focused (trying to achieve positive goals), while this is not the case for people who are prevention focused (trying to avoid negative outcome). Secondly, for serving as 'representations of the possible', role models can influence self-stereotyping "(through either decreasing negative self-stereotyping or increasing positive self-stereotyping) by evoking a shared social identity with the role aspirant" (Morgenroth, Ryan & Peters, 2015, p. 8). This is supported by the stereotype inoculation model of Dasgupta (2011). Crucial to their argument is that the potential role model that are used studies they use to argue why role models influence self-stereotyping, are always successful in a domain that is relevant to the aspirant (Morgenroth, Ryan & Peters, 2015). A professional soccer player will not be the best stereotype for someone that is missing two legs. Lastly, for serving as 'inspirations', a study by Schindler et al. (2013) suggest that role models might influence the value role aspirants associate with the

consequences of goal attainment through admiration. Morgenroth, Ryan and Peters (2015) suggest in addition that role models "need to be perceived as desirable" (p. 12), which is "the degree to which a role aspirant perceives a role model in a positive light" (p. 12). Three factors, that determine the desirability of a role model, are: sociability, morality and competence. These three factors have to apply when choosing the right role model. In addition, the author mention that there is no such a thing as a perfect role model.

In this particular situation of a lack of PA during workdays these insights might be useful when creating an intervention where a role model might give some extra motivation.

2.4. Social norms

In this section the power and effect of social norms will be explained. There are several ways of how social norms can be used to change behavior and it is important to understand how and when they work well. Key note is to understand is that the devil often lies in the details.

2.4.1. Social proof

When it comes to social proof, descriptive norms (the levels of others' behavior) and injunctive norms (the levels of others' disapproval), both require a different approach when desired results are tried to be reached. According to the Focus Theory of Normative Conduct, developed by Cialdini and colleagues (Cialdini, Reno, & Kallgren, 1990; Cialdini, Kallgren, & Reno, 1991), behavior will be determined by the focal norm, which is the norm that is made salient and on which attention is focused on. The theory further shows that "that any given social norm will only influence behavior when it is activated at the moment of the behavioral decision, that is, when that specific norm is made salient or when an individual's attention is focused on that specific norm while choosing their path of action" (Stok & de Ridder, 2019, p. 98). This is called normative focus.

In experiment 1 of the study of Cialdini, Reno and Kallgren (1990), they examined the effect of different ways of showing of social norms on littering in public. Subjects were analyzed after they found a typical handbill with promotional information under the wiper of the driver's side on their car, which was parked in a multilevel parking garage A descriptive anti-littering norm, showing a clean environment on signs, always lead to less littering than a descriptive pro-littering norm, showing a littered environment (14% and 32% respectively). When normative focus was added, and subjects saw someone else throwing litter on the ground, the difference became even bigger. In the clean environment there was even less

littering (6%), in the littered environment, the amount of litter increased to 54%. Although neither of the within environment was found to be significant, this was useful information for their theory. In a slightly different setting, they discovered that one piece of litter makes the descriptive norm even more salient, which decreased the amount of litter even more (Cialdini, Reno & Kallgren, 1990, Experiment 3).

Sometimes, serendipity by nature can surprisingly help getting to useful insights for experiments. The researchers of the litter experiment faced the problem of finding a way to focus people on clearly social disapproved littering a in experimental malleable field situation, where the descriptive norm of littering being common was present. During one of the sessions of experiment 1, the wind blew all the litter to a seemingly tidy line together. The anomaly of almost no subjects littering anymore, even though they saw someone throwing away a handbill, was noted. It dawned on the experimenters that (seemingly) swept litter might function as a clear disapproval cue for littering. So, with injunctive norms the opposite action was considered as appropriate compared to the situation with descriptive norms. This was again confirmed in an experiment where, with normative focus added (seeing a person who drops litter compared to just passing by litter), the amount of littering decreased in an environment with swept litter and increased in a situation with unswept litter (Cialdini, Reno & Kallgren, 1990, Experiment 4).

Cialdini et al. (2006) examined what the most effective intervention would be to decrease the amount of petrified wood that people steal from the Arizona's Petrified Forest National Park. Insights from the Focus Theory of Normative Conduct were tested in a 2x2 design with positive framing and negative framing combined with descriptive norms and injunctive norms they measured the changes in behavior of the forest visitors. The first environment had negatively worded descriptive normative information (''Many past visitors have removed the petrified wood from the park, changing the state of the Petrified Forest'') and was accompanied by an image of three visitors taking wood showed The second environment compared had a positively worded descriptive normative message (''The vast majority of past visitors have left the petrified wood in the park, preserving the natural state of the Petrified Forest'') and was accompanied by a picture of three visitors admiring the wood and taking pictures. The first environment lead to more wood theft. Although the difference what not found to be statistically significant, it was in the right, expected direction. For the injunctive message accompanied with the same picture, the difference was found to be the other way around and the difference was statistically significant. Positive worded

injunctive normative information (‘‘Please leave petrified wood in the park’’) in this case led to more wood theft compared to negative worded injunctive information (‘‘Please don’t remove the petrified wood from the park’’)

To conclude, negative framing drives people to focus mostly on the content of the message, which results in what is installed in the minds of the audience. The reason that it is better to prevent showing undesirable behavior, in case one wants to achieve behavioral change, is because it can lead to a status quo that is considered as prevailing (van den Putte et al., 2015). Why this has been discussed so extensively here is to show how important it is to think about details in framing and tone of voice when social proof is used.

2.4.2. Commitment

Commitment corresponds to the will of being consistent. Freedman and Fraser (1966) showed in classic experiment how effectively, the urge to follow the norm someone committed to, worked. In their experiment, they first asked people in a specific district in California to put a sticker on their car window with the text ‘Be a safe driver’. Almost everyone replied positively and placed the sticker. One week later, the same group was asked to place a very large sign with ‘Drive carefully’ in their front yard. A little bit against the expectations, a stunning 76% indeed complied with the request and placed the large sign in their front yard. The difference with the same request to a group, that was not asked to place a sticker on their car window before, was huge; only 1 percent of the control group placed the large sign. The difference in behavior shows that people who already showed commitment to a social norm - driving save is important - feel more involved than before. Another explanation is once a person agrees to a specific norm, their attitude towards it changes from that moment on.

Commitment fits well to the norm to be consistent. Who says A, should also do B. According to Cialdini (1993), people not only go out of their way to behave consistently, but that they also get a positive feeling by acting accordingly. Unpredictable people are less likely to be liked by others. Cialdini has also shown that is it more effective to make a commitment in public, compared to do it privately. In the Netherlands there is an example in which this worked really well: the BOB-campaign. People who are the BOB are the ones who commit themselves to driving a car, for example when going to a party, without drinking *any* alcohol. Although it is allowed to drink about two alcoholic consumptions and still go for a drive, most people are aware that the campaign states for a non-alcoholic norm. Crucial maybe, is

that this campaign has reached millions of people in the Netherlands and became very successful with an over 50% reduction of violators of alcohol limit in traffic (Stiva, 2018).

2.5. Core of the problem

This section will show results from pre-research by Duwtje will be discussed, so it becomes clear what exactly the reasons are that this current problem exists. An executive summary of brainstorming about finding the root of the problem is what basically has been written, so the reader gets more insights in how this process went. The research that has been done about stimulation physical activity so far will be reviewed. Finally, a hypothesis will be stated for this thesis.

2.5.1. Possible directions of an intervention

Research shows that 96% of the Dutch population finds PA important (TNO, 2007), but, as already discussed before, people often fail to fulfill their intention to be more physically active. It is especially hard during quarantine time, without any triggers and less automatisms available. On the question why people are not as physically active as preferred during working hours, a common answer given was: 'it does not feel good for people to have physical activity during working hours.' People feel responsible towards their boss and they want to be available every moment. At the same time, only 4.5% thinks that their boss has a negative attitude towards his employees going more outside during working hours (Duwtje, 2020). Interestingly, higher levels of PA are related to better overall job performance and a decline in decrements of the quality of the work delivered of sedentary workers (Pronk et al., 2004). Another thing that stands out, it that most of the reasons people give for why they are not as physically active as they prefer, point towards not a reason for walking being available anymore (Duwtje, 2020). We cannot direct connect a conclusion to this finding, but it seems that most people are not motivated to walk aimlessly. If people walk, there is at least some underlying goal that the walking leads towards, like doing groceries, or going to work, the gym etc. According to Sniehotta, Scholtz and Schwarzer (2005), being physically active is one of the largest intention-behavior gaps. They argue that if the against-arguments of being more physically active outweighs the in favor-arguments, the less likely it is that the intention is translated into (a change of) behavior. From the unpublished Duwtje survey (2020), it seems that it may not even be the existing against-arguments that cause the status

quo of PA, but the absence of in favor-arguments. People have not specific reason or automatism to have PA, with an underlying target.

The direction to choose will partially depend on what people themselves think that will stimulate them to have more PA. Extensive research in the Netherlands showed that the different groups that were surveyed all choose walking as second preferred option, if they had to choose how to increase their PA (Jans, de Kraker, Hildebrandt, 2004). They were asked for factors that could stimulate them. Help with learning to fit more PA in the daily routine and support from people in their close neighbourhood were mentioned by 60-80% of the participants. Another important factor that would help stimulating people would be to have 'exercise buddy', so they could do the PA together

In a situation where people do make a specific choice, but actually prefer to make another choice, nudging could bring a solution. According to Thaler and Sunstein (2008, p. 6), nudging is "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives." An important feature of nudging is that people do not feel restricted in the choice they make. Sometimes a nudge makes the right decision just easier, as it becomes more obvious, or a default. In the case of PA, the nudge should be activated on a decision-making point, meaning on a moment that people can actively chose for sedentary behavior or for PA. In order to respond on the results from the unpublished Duwtje survey, it seems that a tendency towards going for a returning daily choice. The question becomes: what are people working at home doing every day, or very often, during their work-time? As direct communication between colleagues is not possible anymore, and everybody works from home, people need another communication method. That means people need to have meeting online through video calls, or normal calls every day. For practical reasons, it is arguable that it is difficult for video calls to walk at the same time. This is not the case for normal calls. A lot of people will recognize that during some calls they feel the urge to walk around. While it will not be suitable for all calls, this might be the perfect opportunity for a self-initiating nudge.

2.5.2. Previous research about stimulating physical activity

There has already been some research about stimulating PA. Prestwich, Perugini and Herling (2010) tested whether pairing implementation intentions with goal and plan reminders would increase brisk walking behavior. They already found out in a previous

experiment that the combination of the two, worked much better than implementation intentions or goal and plan reminders alone (Prestwich, Perugini & Herling, 2009). In the brisk walking experiment, they asked participants to write down a plan in which they would connect brisk walking to a specific moment. This was required in the following way: "When I'm in situation X, I will do Y". The Y in this case was brisk walking for at least five times a week, the X was to be chosen by the participant, but prior approval of it was required. Furthermore, the participants could choose days and time on which they would receive a text message reminder. Results showed that this significantly increased brisk walking behavior for 5 days a week at least, without significantly reducing other types of physical behavior. The text message reminder increased the recall of the implementation intentions of the participants. This could mean that the reminders strengthen the relationship between the stimulus and the response, meaning habit formation becomes easier.

There has also been quite a lot of research about workplace intervention. This will not be discussed, as this study focusses on people working at home. Workplaces may not be suited for the kind of interventions that have been researched so far. Furthermore, a global situation in which the majority of the people was forced to work primarily at home for a significant period of time has never happened before. At the time of creating an intervention for this thesis, the advice to work at home for employees in the Netherlands was still expected not to change for a while (April 2020).

2.5.3. Hypothesis

According to the reviewed literature and the brainstorm about the direction of the intervention, the following hypothesis has been formulated:

Hypothesis 1: *A phone intervention (nudge) that includes positive descriptive (social) norms, an implementation intention, commitment, a role model and a repetition of reminders will increase the average number of steps taken by people during a workday.*

3. Methodology

This section will show what experimental design has chosen to be used during this experiment. Next, the experimental procedure and the data collection process will be discussed. Then, the variable description will be given and additionally, some remarks about the sample size will be explained. Last, but not least, the author will explain how the obtained data will be analyzed.

3.1. Experimental design

After extensively analyzing the previous summed-up information and carefully thinking about an effective way to measure the effects of an intervention, a coherent combination of means is chosen for an apparent suited intervention. The aim of the intervention is to make 'walk while talk', as it is colloquially called, a new habit. The behavioral techniques that are used will all be discussed first.

As people may have to call several times a day for work, a phone is a perfect instrument for nudging. Although there is the tension to assume that most people know already something about the advantages of more PA, the first step of the intervention will be to provide people with a factsheet that shows some surprising and stimulating facts. Information overload will not give additional value, so especially small details will be given. To start with, some specific advantages of walking are stated: "*walking… enhances creativity; increases productivity; provides relaxation*." It is important here to keep in mind what insights from the study by Cialdini, Reno and Kallgren (1990) have provided about descriptive norms. If people are presented some information about the norms of PA during working at home, it is more effective to frame is in a positive way. So instead of choosing for "32% of the home-workers has less then 10 minutes of physical activity per day during work-time", for example, the next part is framed as "*72% of the home-workers would like to be more physically active than they currently are*." To make it feel like a small step, this is followed by: "You take about 100 steps per minute. So, with 10 minutes of walking while calling, you have already taken 1,000 steps." Then, the more surprising and appealing facts follow: "People who keep track of their steps take an average of 2,500 more steps each day; Walking has the same effect as wine or chocolate; By walking you feel younger; and with a half hour of walking, you burn 150 calories, which is three Bastogne cakes." The whole factsheet can be found in appendix A.1.

To create the habit that people start walking when they have to call, an implementation intention has to be created. People have to make a connection between walking and calling. In the setup of the experiment, people that will undergo the treatment will be asked to change the contact name in their phone of some colleagues, friends or family they frequently call with into '*name of colleague* (walking!)' In this way, we want people to create an automatism for themselves. Every time when they want to call this colleague they are actively reminded by the addition of 'walking' which is visible in the name of the contact. This works in the same way as they are called by this colleague. The implementation intention that is tried to be created, is: every time I have a call (with this person) I will walk during the call, if possible. Important here is that people are told that it is not obligated to always walk, but that they can choose to do it. As sometimes people need to combine it with working on their laptops for example, it will not always be possible to do so. Therefore, people should have the feeling that they have the freedom of choice to do so. An example of how it looks like can be found in appendix A.2.

To share this 'commitment', as it might be considered, people are offered a WhatsApp template they can easily share with their colleagues. A picture together with a message will be offered, which can be shared with people that are chosen for the walk & talk: "I will do my next call with you, while I am walking #TALK&WALK,! Are you participating? Tip: Add: '= walking' to my name in your contact list as a reminder when I show up on your screen." This sharing and commitment message has been chosen for two reasons. First, because research has shown that people like to do exercising together. Although it is physically harder to walk together with you colleagues for example, this might still be a way to create a similar feeling of doing something together. Even more important is that if people send this message to another person, they actually promise that this is the behavior they will conduct from that moment on, as if they specify the social norm for themselves to someone else. This sharable commitment can be found in appendix A.3.

To strengthen the implementation intention and add an extra reminder, people will be provided with two pictures of a potential role model and some accompanied text that shows why these persons are associated with walking. One of the well-known people that was a great fan of walking while calling and explicitly expressed this at some moment in time was Steve Jobs. He is widely considered as an inspirational person that is responsible for some of the biggest progressions in the tech industry. The work he did was mostly sedentary, so people might be able to identify with him. Furthermore, increase walking during work-

time can be considered as something positive. Therefore, Steve Jobs can be perceived as a good role model (Morgenroth, Ryan & Peters, 2015). The other option that was offered was Barrack Obama. As the first black president of the United States, he certainly was and still is a role model for many people. He is considered as charismatic, calm and motivational. In his case, the focus was more on walking after work time, but at least causing more PA. Although walking during work-time will be optimal, if people decide to end their working day with a walk (maybe combined with a phone call), this will all be considered as a positive, significant development. People are asked to set one of these pictures as a default background picture on their phone, so they will be triggered to think about walking while calling every single time they use their phone. Although there was a preference of having people choose between several role models, both male and female, there was consensus that no other good candidates to add extra value to this intervention was suited. The background picture with role models can be found in appendices A.4. and A.5.

In addition, people are also provided with a picture that shows two feet and the text 'walking' combined, that people can set as a default background picture that shows up when they get a call from a person that they have chosen to do the walk & talk with. Although this will only show up when they get a call (and not when they make a call), it is an extra reminder when they are not the ones initiating the call. An example can be found in appendix A.6.

The three elements of the habit loop are filled as following way: first, the environmental cue will be every time people use their phone, as they will see the background picture that reminds them of walking during a meeting ; second, the routine comes in when people start calling, when they will stimulate themselves to walk during the call, as they see the motivating message in the name of the contact they start calling with; last, the reward will mostly be on the short them, as people might notice more brain activity in terms of creativity and productivity, they have been physically active without actually really thinking about it during the activity and at the same time no time has been spilled. As showed before, people normally use System 2, according to the theory by Kahneman and Egan (2011) if they make the decision to walk somewhere or not. With calling and walking together transforming into a habit, this could change to using System 1 as the conduct has been automatized. If people use a pedometer to keep track of the number of steps taken a daily basis, they could see an increase in the number of steps, which might further intrinsically motivate these people into pursuing the combination of walking and calling.

To sum up, the intervention consists of four separate elements with multiple behavioral techniques. The factsheet that includes social norms; implementation intention, habit formation and an active stimulus through adding 'walking' to phone contact names of people with who participants frequently call; a constant reminder by having a role model as background picture on a phone and a passive occasional reminder through seeing a background picture with footsteps while getting a call by one of the chosen contacts; and a WhatsApp template that can be shared with the earlier mentioned contact to share the change in behavior that the participant wants to accomplish, which can function as social commitment. This whole intervention has been created together with the firm Duwtje, meaning they have all rights and ownership.

3.2. Experimental procedure and data collection

The participant recruitment is done on firm level, which will later on be explained. Through several personal connections, companies received an email from Duwtje which shortly explains why the company received the email. Within the email, a link to a webpage was found. A webpage has been created to enthuse potential companies that want to participate. The page does not give away any content of the intervention, but starts with the goal of the project: more physical activity without losing any time. It shows how the habits of walking during office hours have vanished due to the forced lockdown in the COVID-19 crisis in the Netherlands and therefore Duwtje has created an intervention that can help people just to have a little bit more physical activity without a lot of effort. Then it will explain upfront what is expected from participants during the experiment and what it yields for them by participating. The experiment will function as a pilot. When it turns out to be successful, it might be tested on a larger scale. At the same time, it will support charity fund 'Het Vergeten Kind' (The Lost Child). Then people can click on a button that leads them to the subscription page.

The subscription page will function twofold. In the first place, employers can subscribe and leave some information to be contacted. If they do so, it shows that Duwtje will contact them to tell more about the intervention that has been created, to make sure that the employers understand the science behind the intervention. During a phone call, all the elements of the intervention will be discussed, if the employer wants to know it. Then, they will then be asked to request their employees to participate in 'Duwtje Fit', which is how

the pilot is called. In the second place the subscription page will be the place where these employees can subscribe to participate in our experiment.

Once enough companies had subscribed, their names were placed next to each other in a line, each company got a number, and a coin was flipped to determine which company would be in control group and which one would be in the treatment group. If head showed, all odd number companies (1, 3, 5, etc.) will be in the treatment group, if tails showed, all even number companies will be in the treatment group. In this way, the chance of each company being in either of the groups is 50-50 at the starting point. Furthermore, this creates in situation in which it is more likely that the two groups do not differ significantly in size from each other. Automatically that means the other companies will be in the control group. In this experiment, convenience sampling is used and Duwtje does not target a specific population although the aim is to have a balanced demographical sample. This does not mean that all subjects will be useful for the results. Certain control questions will make sure outliers will not bias the results.

Once the randomization was completed, the companies received an email stating they could send an email to their employees, including a link leading to the subscription page of the experiment and the date before which people should have subscribed to participate. This final date was Sunday June 28. Here, the people have to fill a list of questions (see appendix B.1.). Based on the company name they fill in, a final message showed up that tells the participant in which group he will be during the experiment. Independent of in which group the participant is placed, all participants are given instructions about the process of the experiment. They were be asked to download a pedometer before the start of the experiment (Monday June 29). Furthermore, they are requested to make sure they try to have their pedometer always charged during daytime (on their smartphone, Fitbit, Apple Watch, etc) and have it with them to register the number of steps as much as possible. As it is not possible to make sure people always do this, control questions after the measurement periods will filter out outlying days that need to be controlled for. How this works will be explained in the results. Finally, both groups were told when they would receive which questionnaire and when they would get access to the toolkit, which makes it easier for them to have more PA during workdays. For both groups the pre-treatment period was from Monday, June 29 until Friday, July 3. On Monday, July 6, they both received the questionnaire of that first week (see appendices B.2. and B.3.). The treatment group received access to the toolkit on Friday, July 3, by receiving a link, to the webpage where the toolkit could be found,

through a personal email. Then, the post-treatment period was from Monday, July 6 until Friday, July 10. On Monday, July 13 both groups received the questionnaire of that second week (see appendices B.4. and B.5.).

After filling in this last within-experiment questionnaire, the control groups also gained access to the toolkit, in the so called post-experiment period. This is how it was promised up front to the control group, to make sure they were motivated enough to finish both questionnaires and to minimize dropouts, as only then it will be useful data. To check whether the whole process was correctly understood and if participants correctly used the toolkit, control questions were asked to all participants during the questionnaires, to distinguish between the impacts of the different parts of the toolkit. 2 or 3 days after the groups received each questionnaire, a reminder email was sent to maximize the number of finished questionnaires before the final data was collected. The final data was collected on Tuesday July 21. Two weeks after the questionnaire of the second week, both groups received a lost short questionnaire where they were asked about the remaining effects of the toolkit (see appendix B.6.). All questionnaires are created in Typeform and could be answered by using a computer, tabled or smartphone.

The reason that there has been chosen randomize subjects at a firm level, instead of an individual level, is that this has minimized the chance that someone from the treatment group would share his commitment of walking while calling with someone else in the control group. As the control group got access to the toolkit after two weeks of reporting their daily number of steps taken during workdays, they could have been influenced by getting such a message. With randomization at a firm level, colleagues of the same firm could have shared their commitment easily with each other, without any risks of biasing the research, as they were all together in the treatment group.

3.3. Variable description

This study tries to find out whether there are variables that are affecting the amount of PA during a workday of a person with a sedentary profession. In this section, all the variables that were included in the study are described. First the control (dependent) variables are described, then the independent variable is described.

Control variables:

- Period *(time).* This dummy variable indicates whether an observation is pre- or post-treatment. It has a value of 1 when the observation is post-treatment

- Treatment *(treated).* This dummy variable indicated whether an observation is getting the treatment or not. The value is independent of the period in which the observation takes place. This means that an observation in the pre-treatment period will get the value 1 if it takes the treatment in the post-treatment period. Naturally, the observation of the same individual also gets the value 1 in the post-treatment period.
- Difference-in-difference *(did).* This interaction term of time*treated will show the effect of the treatment at the end.
- Gender *(male).* This dummy variable indicates whether on observation is male or female. It has a value of 1 when the observation is male.
- Age *(age).* This continuous variable indicates the age of an observation.
- Attractiveness of neighbourhood *(environment).* This dummy variable indicates whether an observation lives in a neighbourhood that they find attractive for walking. It has a value of 1 when the neighbourhood is attractive, and a 0 when is neutral, or not attractive.
- Living space *(m2cat).* This categorical variable categorizes how big the living surface of an observation is. There are 3 categories: 50m2 or less, between 50m2 and 100m2 and more than 100m2. It gets the value 25 for the first category, 75 for the second category and 100 for the last category.
- Frenquency of work calls *(callcat).* This categorical variable categorizes how often an observation calls per week on average during a workweek. There are 2 categories: 1 call per day, or less and several calls per day. It gets the value 7 for the first category and 21 for the second category.

Dependent variable:

- Number of steps taken *(steps).* The one and only dependent variable is the average number of steps taken daily. This is calculated by adding up the number of steps taken each day during the measurement period, which was a week for everyone. This does not mean that it is based on all the five days during a workweek, as some could be a day off, and some days cannot be taken into account if they significantly deviate from the common number of steps someone takes. For this reason, there has also be chosen to measure it during a whole workweek, to have some buffer. Since the pre-treatment week and the post-treatment week are compared to each other, there was a preference for comparing the average of the number of steps taken based on exactly the same days. Since there was no unlimited time for this research, the author and the company agree about the method chosen and are able to

argue why there has been chosen for this method. It will not affect the trustworthiness of the outcomes.

3.4. Sample size

To determine the number of participants that is needed to make a valid claim about the effects found in this research, a power calculation is used.[2] The power calculation shows that 42 observations are needed, at least, in both the control group, as in the treatment group to have a statistical power of 80%. This is the minimum amount of power that is considered to get reliable results out of a statistical analysis. In this experiment, the total sample size of the control group is 29, while to total sample size of the treatment group is 15. This means the minimum requirement for the number of observations that has been calculated by the power calculation will not be satisfied in this experiment. This will affect the power of the final outcome and needs to be discussed later on.

3.5. Analysis of obtained data

3.5.1. Parametric test

In this experiment, physical activity is measured in average daily number of steps taken. When selection bias is likely to appear, a good method to use is the Difference-in-Difference (DID) method. Selection bias will disappear in the DID estimation, since randomization has been applied. This method takes the difference of the difference between the average daily number of steps taken in the pre- and post-treatment period of the control group and the treatment group. The expected outcome is that the average number of steps for the treatment group in the post-treatment period (“B”) will be higher than the average number of steps for the control group in the post-treatment period (“D”). The difference is expected because of the treatment group using the toolkit in the post-treatment period. Furthermore, the average number of steps taken by the treatment group in the pre-treatment period (“A”) will be similar to the average number of steps taken by the control group in the pre-treatment period (“C”).

In this way, the real difference between the treatment and control group can be estimated by the following formula:

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[2] n = 2*(tα/2 + tβ)^2*(σ/δ)^2 -> α: 0,05, β: 0,2, δ: 0,2, σ: 0,5 -> n = 2*(1,96/2 + 0,84)^2*(0,5/0,2)^2 = 2*(1,82)^2*(2,5^2)= 41,41 = 42

(B-A) – (D-C) = effect of the toolkit

This effect was examined by conducting a linear regression that included three dummy variables: treated (value = 1 if subject was in treatment group), time (value =1 if subject was in the post-treatment period) and the interaction of treatment*time. The interaction term (*did)* is called the Difference-in-Difference estimator. Some other control variables (gender, age, attractiveness of the neighbourhood of living, living surface and average number of calls during a workday) are added in the model, as they could influence the true effect of the toolkit. Finally, the following multiple linear regression model was estimated to find the effect of the DID estimator on the average number of steps taken on a workday:

$$steps = \beta_0 + \beta_1 treated_i + \beta_2 time_j + \beta_3 did_{ij} + \beta_4 male + \beta_5 age + \beta_6 environment + \beta_7 75.m2cat + \beta_8 100.m2cat + \beta_9 21.callcat + \varepsilon_{ij}$$

If a parametric test is used to analyse the obtained data, four assumptions need to be met, before reliable results can be obtained: first, the population should be normally distributed.; second, the observations should be independent; third, the two groups that are analyzed, should have the same variance (or homoscedasticity): meaning that randomization has been applied).; and lastly, the variables must be measured in an interval or ratio scale. Likely, the most problematic assumption in this case is the normal distribution. As there are not that many observations, there is reasonably some uncertainty about the validity of this assumption in this study. Therefore, a non-parametric test, which does not need that assumption, could help to obtain a more reliable conclusion for this research.

3.5.2. Non-parametric test

Non-parametric tests can be used without meeting all the before-mentioned assumptions. The only assumptions that need to hold are: the independency of the observations and homoscedasticity. The DID-technique can only be used when a parametric test is executed. To make the data suitable for a non-parametric test, the dependent variable *steps* is transformed into the difference in average steps per week between the pre- and post-treatment period. In fact, a new dataset is created. It shows 44 observations, instead of 88, as the observations are now next to each other instead of below each other. For simplicity, this new independent variable will be called *differencescore*. The *differencescore* variable is created by taking the average number of steps taken by a subject in the post-

treatment period and subtracting the average number of steps taken by this same subject in the pre-treatment. To execute this subtraction, variable *steps* is renamed into *steps1* (for the pre-treatment period) and *steps2* (for the post-treatment period).

As there are two independent samples and two groups (periods), the test that will be used is a Wilcoxon rank-sum test.

4. Results

This section will report the results of the analysis that is applied for the collected data. First, the descriptive statistics will be given. Then, there will be a test to show if the randomization method worked properly. Next, the formulated hypotheses will be tested for acceptance by analyzing the data. A parametric test and a non-parametric test are executed and will be discussed. At the end, the scope of this research will be expanded by taking a look at other, qualitative findings.

4.1. Descriptive statistics

First, the response rate, the variables of interest and the control variables will be discussed. For the 'Duwtje Fit' experiment 15 companies were approached by the author of this thesis and several colleagues of Duwtje. The companies that have been chosen to be approached all have many employees that will do mainly sedentary work during their workdays, to make sure only people with a sedentary profession are included. Understandably, sportsmen or women and construction workers are not the target group as they could negatively affect the outcomes of this research. 6 companies reacted positively and sent emails to their employees to invite them to participate in the research. The other companies did not react or refused to participate for some reason. 1 company subscribed without having received an email about Duwtje Fit. As employees of this company execute their duties mostly in a sedentary way, there was no reason to exclude them from the research. Originally, 84 people subscribed to participate. Due to privacy issues, one company asked Duwtje to delete all the data about that company, while offering all the employees a second opportunity to subscribe, with reporting more private information instead of business information[3].

In total, 70 people subscribed and started in this research. Of the 70 people that started, 28 were randomly assigned to the treatment group, opposed to 42 to the control group. 15 observations were deleted as these participants did not fill in the first questionnaire. 6 observations were deleted as these participants did not fill in the second

[3] It turned out that according to the privacy law in the Netherlands, officially a company should offer a processing agreement when it wants to collect data from another company. This agreement was not made before the person in charge of this company forwarded the link to the employees. The company that is collecting the data has the responsibility to take care of this data. Although the person responsible for forwarding the subscription page was not aware of these privacy regulations, the best solution was to accept their request to delete all subscriptions saved so far. Fortunately, still 23 of the original 37 respondents of this company subscribed again.

questionnaire. 4 observations were deleted, as these participants indicated that they their pedometer registered significant more or less steps on 4 or more days that week (meaning: too many outliers) compared to an average week. Finally, 1 observation was deleted as this participant installed the toolkit after the start of the treatment period. The reason these observations could not be used are that they would negatively affect the true effect of using the toolkit that has been created.

The following statistics are about the observations that finished the experiment. 65,9% of the participants was male. The average age of the total population was 41,3 years. 9 out of 44 participants indicated that their neighbourhood was neither attractive, nor unattractive for walking, as all other participants found it attractive. The great majority of all respondents, 81,8%, calls several times a day, while the rest calls 1 time per day or less. Finally, respondents were asked about the square meters of living surface. The majority of the respondents, 54,5%, lives in a big house or apartment of more than 100m2.

Variable	**Obs.**	**Mean**	**St.Dev.**	**Min**	**Max**
Male	88	0,6591	0,4767	0	1
Age	88	41,3182	13,7076	20	65
Environment	88	0,7955	0,4057	0	1
Variable	**Freq.**	**Percent**	**Cum.**	-	-
m2cat_25	12	31,64	13,64	-	-
m2cat_75	28	31,82	45,45	-	-
m2cat_100	48	54,55	100	-	-
callcat_7	16	18,18	18,18	-	-
callcat_21	72	81,82	100	-	-

Table 1: Descriptive statistics of independent variables

4.2. Randomization test

To test whether the randomization method has caused a well balanced distribution of the observations (homoscedasticity), a Wilcoxon rank-sum test was conducted. This Wilcoxon test will test if there is a significant difference between the medians, of one of the demographic variables of the participants, age, within the treatment and control group. In this case, it tests if the two samples, control and treatment group, are drawn from

populations with the same distribution. The WIlcoxon rank-sum test has a p-value of 0,6554. This result indicates that the medians are not statistically different at any level smaller than 65.54%. In other words, the median test fails to reject the null hypothesis that there is no difference between age in the group that tested the toolkit and the group that did not test the toolkit. Therefore the conclusion will be that the used randomization method has worked properly.

4.3. Hypothesis testing

The hypothesis that has been tested is the following:

Hypothesis 1: *A phone intervention that includes positive descriptive (social) norms, an implementation intention, commitment and a repetition of reminders will increase the average number of steps taken by people during a workday.*

4.3.1. Parametric test: Multiple linear regression

To test this hypothesis a Difference-in-Differences analysis was conducted. As explained in the methodology section, a multiple linear regression was conducted with three dummy variables: *treated*, *time* and treated*time (*did*) and *steps* as a dependent variable. Furthermore, five covariates were added (gender, age, attractiveness of the living neighbourhood, living surface and average number of calls per week during a workday). The results are shown in the table below.

Independent variables	***Steps***
treated	905.600
	(855.206)
time	-191.672
	(720.161)
did	900.556
	(1158.594)
male	-2,234.974**
	(900.842)
age	142.554***
	(34.094)

environment	48.057
	(781.018)
75.m2cat	1,301.778
	(1001.963)
100.m2cat	909.869
	(984.347)
21.callcat	-497.322
	(812.829)
Constant	1,381.687
	(1479.736)
Observations	88
R-squared	0.267

(Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1)

Table 2: Summary for multiple regression analysis for variables predicting the average daily number of steps taken.

As can be seen in table 2, there is a positive relationship between the Difference-in-Difference estimator and the dependent variable *steps.* However, this relationship is not significant ($p > 0,1$). So, no valid claim about a significant effect of the toolkit on the daily number of steps can be made, although the direction of the effect is positive. With on average 900 more steps than an average of 6700 steps per day, is size is still encouraging though. Most important reason for not having found a significant effect will undoubtably be the number of observations, which is far below the minimum required according to the power calculation. There has been found a significant effect of both gender and age though. On average, men are expected to take 2235 steps less than females on a daily basis, ceteris paribus ($p < 0,05$). Furthermore, a person is expected to take 143 more steps on a daily basis, on average, for every year increase in age, ceteris paribus ($p < 0,1$). The attractiveness of someone neighbourhood, the living surface and the average number of calls per week have not turned out the affect the average daily number of steps taken significantly.

4.3.2. Non-parametric test: Wilcoxon rank-sum test.

When examining the data for this research, one notices that the sample size is not very big. Although the outliers have been removed before executing the multiple regression, there is still an increased vulnerability to violation of assumptions. A nonparametric test can in this case show more reliable results as it needs less observations (the sample does not have to be normally distributed. However, it should be noted that a non-parametric test has less power in general. To increase the statistical strength and robustness of this research, a Wilcoxon rank-sum test is used. The final results of this research will be more reliable as both tests both show a significance or an insignificant effect of the toolkit.

The Wilcoxon test that is used for this study will test if there is a significant difference between the medians of the difference-score of *steps1* and *steps2*, within the treatment and control group. The WIlcoxon rank-sum test has a p-value of 0,1090. This result indicates that the medians are not statistically different at any level smaller than 10,90%. In other words, the test fails to reject the null hypothesis that there is no difference between the difference-score of *steps1* and *steps 2* in the group that tested the toolkit and the group that did not test the toolkit. Therefore, the conclusion of this test will be that no significant effect of the toolkit on the average numbers of steps taken has been found.

In all, this means that hypothesis 1 cannot be accepted, but there is also no evidence that there is no effect present (or that a negative effect exists). More research is needed to draw better conclusions. This will be discussed in the last section of this thesis.

4.4. Other findings

The main purpose of this thesis is to show the quantitative approach of this research. Nonetheless, it would not do justice if no attention was paid to to the obtained qualitative results. Participants within the treatment group where asked several questions about the usage of the different elements of the toolkit. It is important to get at least some information about whether they correctly used every specific part of the toolkit. One of the things stood out, was that half of the participants indicated that the active reminder and implementation intention of putting “walking” behind a contacts name was the most effective way to get more steps every day. All the people that indicated changed the name of several phone contacts, with a range that varied between 2 and 5 contacts. The other answers about the most effective personal part of the toolkit were scattered more over all the other tools within

the toolkit. Some people did not even change one name within their contact list. It is hard to predict the exact reasons for this behavior. Some commented that they already used to walk during phone calls, meaning the toolkit was probably not very useful for them in stimulating more PA. On the other side, some people indicated that they did not know which part of the intervention was most effective for them, or that the package itself was most effective. The most reported other comments, showed that participating with the experiment itself also increased the consciousness of the importance of walking enough during a working day. Summarizing all these answers, the conclusion is that the implementation intention through an active reminder was the easiest way to increase the average daily number of steps taken by people.

Some (18) of participants also reacted to a last short questionnaire, which was available two weeks after the questionnaire about the second week. About half of the respondents indicated they still used the toolkit. Only a few indicated that walking during a call did not became a habit. The other participants reacted (most partially) positive to the question about habit formation. No single participants indicated to have been less physically active since the experiment ended, although the majority still had the same level of PA. Furthermore, most participants kept using the toolkit. Calling the intervention a 'toolkit', caused some criticism. Several participants expected more something like an application due to this designation. Some were a bit disappointed and expected more than only some 'tips & tricks' or 'ideas'. A few participants said the toolkit did not work for them, but mostly because they could not combine walking and calling, because they needed a computer screen during calls to make notes. Still, the majority of the participants liked the initiative and became more aware of the importance of PA during a workday. One quote from a participant created good summary: "the tools had little effect for me personally, while the research/thinking about it did it for me".

5. Conclusion & discussion

In this chapter, the results of this study will be discussed. Limitations and implications will be evaluated and suggestions for future research will be given.

5.1. Discussion

This study aimed to find out whether PA during a workday could be stimulated through using a toolkit that included several techniques that have already been proven to be successful in the field of behavioral changes. The original reason for starting this study was the temporary lockdown during the COVID-19 crisis in the Netherlands, that forced the majority of all workers to work at home, instead of from their offices and other common workplaces. Primary research showed that a lot of people struggles with combining PA with working at home. The research started with collecting and analyzing literature about the problems that a lack of PA causes. The thesis continued with describing how the human decision-making process works and explaining how habit formation works. Then, an elaboration about motivation and social norms is given. Subsequently, the insights from these two key elements of behavior are used in figuring out the core of the problem. Finally, brainstorming about the potential solutions lead to the four elements of the developed toolkit.

No monetary amount was used to trigger people to participate in this research experiment. Instead, there has been responded to the intrinsic motivation of people. Therefore, no reason has been given to people to lie about their daily number of steps, although all participants had the opportunity to do so. Therefore, there is the assumption that all transmitted data is correct, except from a margin of error due to mechanical failure , forgetting to wear a pedometer, or accidentally manually misreporting the numbers of steps taken. To take this into account as much as possible, all questionable data was excluded from the study.

The composed hypothesis stated there would be a positive relationship between using the toolkit and to amount of physical activity on a working day. This was measured in number of steps with a pedometer on a smartphone, Fitbit, Apple Watch or other device. No significant effect has been found, although the direction of the effect was in the expected direction. This means that, on average, people from the treatment group, who used to toolkit, indeed have taken more steps in the treatment-period, than the people in the control group did in that same week. The direction of the effect cannot be considered as a fully

reliable result of the intervention, but gives reason for further research. On the other hand, a lot of people that participated in the research indicated that participating in such an experiment and seeing and using the toolkit already helped them becoming more aware of the importance of enough PA during a working day.

It turned out that the active reminder (‘*contact name’* + walking) felt as most effective for most participants. This result is in accordance with a study from Prestwich, Perugini and Herling (2010). In their experiment, they showed that an implementation intention to increase PA worked well with an active reminder in the moment that the execution the desired behavior was planned to happen. In their study, people received a text message to remember people they had to walk to their offices. In this study, the active stimulus (calling with someone) was seeing the planned action (‘*contact name’ +* walking) and was very closely connected to the implementation intention (“when I have a phone call with person X, I will walk during this call”). Apparently, this combination worked well. There was no unanimity about the effectiveness of the other tools, neither could their partial effect be measured in this experiment. As almost none of the participants used the commitment sharing, it looks like not everyone found this way of goal setting, or this task, important enough. Locke and Latham (2006) already indicated that if one of the four conditions to make goal setting work effectively was commitment. If there is no commitment, people do not find the task important enough. In addition, on other condition is probably a second case of doubt. Although two of the conditions are satisfied for sure (the task is easy and people can see feedback through seeing the number of steps that their pedometer has tracked), the fourth condition, situation constraints, could certainly have played a significant role. Some participants indicated that they could not walk during a call with a colleague, as they needed to be in front of their computer screens.

5.2. Limitations

The conducted research has some serious limitations, that will be discussed here. As already indicated, the results that has been found was not statistically significant, which is likely due to a lack of observations. It comes as no big surprise that the observed effect is not statically significant. With the short amount of time available for this research, mostly due to COVID-19, without any budget and with an extra constraint - only being able to do the experiment at a company level - it was very hard to gather enough participants. If this experiment could be run a second time, a larger acquisition period should be taken. Also, if

the commitment part (sharing with other people that you will walk during a call with them) of the experiment was left out, this would have made it a lot easier to gather way more participants. The implication would have been that the randomization method could have been used on a personal level, meaning much more people could have been asked to participate. Another limitation of this study is the range of both pre-treatment period as post-treatment period. Because there was 'only' one week for every period, and only a weekend between receiving and applying the toolkit, it was very difficult to make sure every participant in the treatment group started on time in the second week. The consequence was that a lot of people only started from Tuesday on, so Monday could not be used as data in the post-treatment period. Furthermore, it would have been more reliable to have two or three weeks in both periods to compare with each other, to get a more stable average, with a lower standard deviation.

5.3. Future research

Further research should be conducted to analyze whether the positive effect that has been found really gives a significant change in the amount of PA during a workday. As the qualitative results showed, it is still uncertain if only specific parts of the toolkit work well together, or that only separate parts of the toolkit have caused a (positive or negative) effect. Several treatment groups with different combination of tools from the toolkit, with enough participants in each group, should be tested to conclude what works best. Also renaming 'toolkit' into something else, might even affect participants, as in this research, at least some resistance against the name was remarked. Although it may sound very serious, one important step in finding a way to finally maintain a higher level of PA is to do research about 'relapse prevention'. Some participants might stop using the tools after the experiment has finished. Some part of a future toolkit might encounter this issue, to make sure the positive effects are not only temporarily. To overcome the limitations that are discussed, a new experiment should last for at least one month, including some time (a week for example) to apply the toolkit.

5.4. Conclusion

This study has failed to proof that a combination of behavioral mechanisms can significantly increase the amount of physical activity of workers with a sedentary profession. However, there are enough signs to believe that a certain combination of behavioral

elements might help workers with a sedentary profession in having more PA on a working day. Further research is needed to find to best combination of behavioral techniques that are useful in nudging people to permanently change their sedentary behavior.

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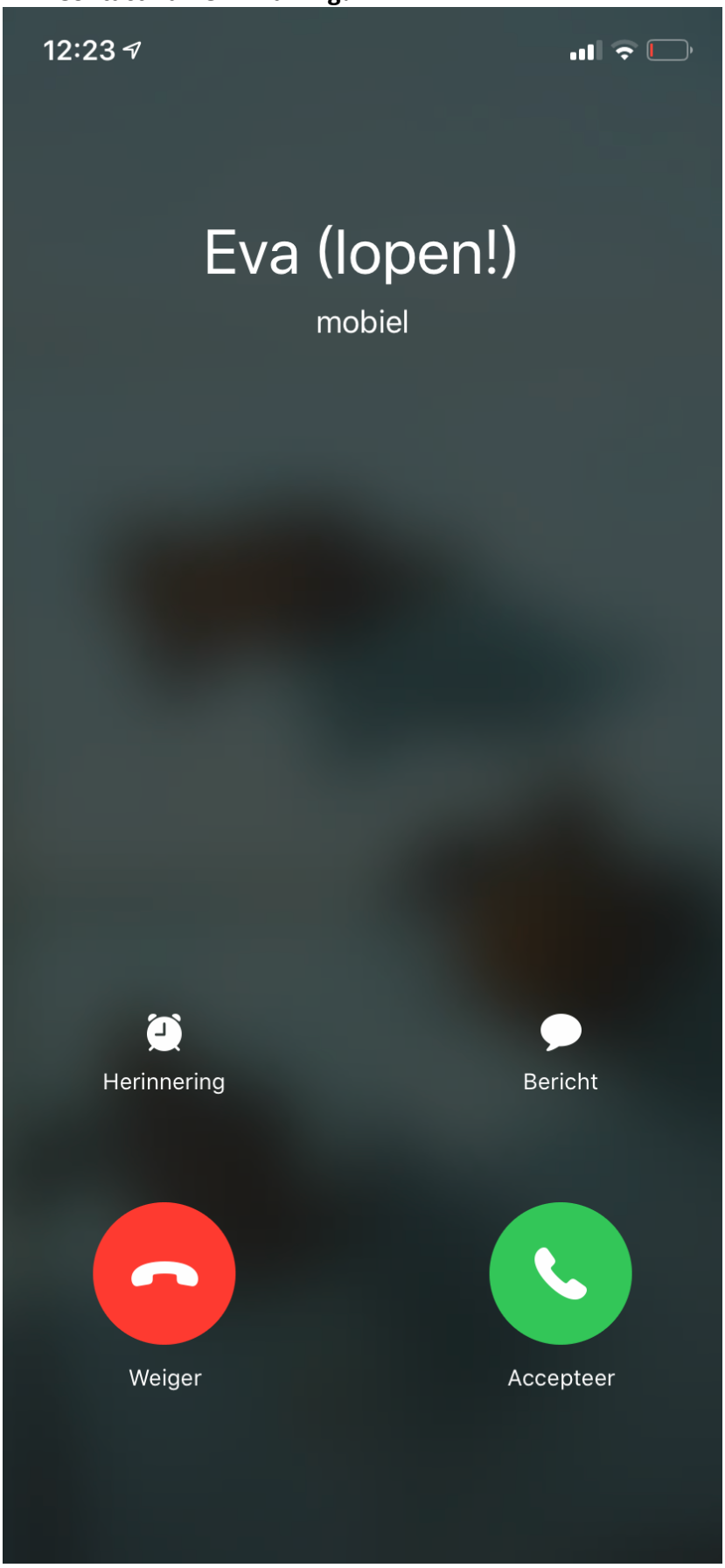
Appendices

Appendix A: Tools of the toolkit

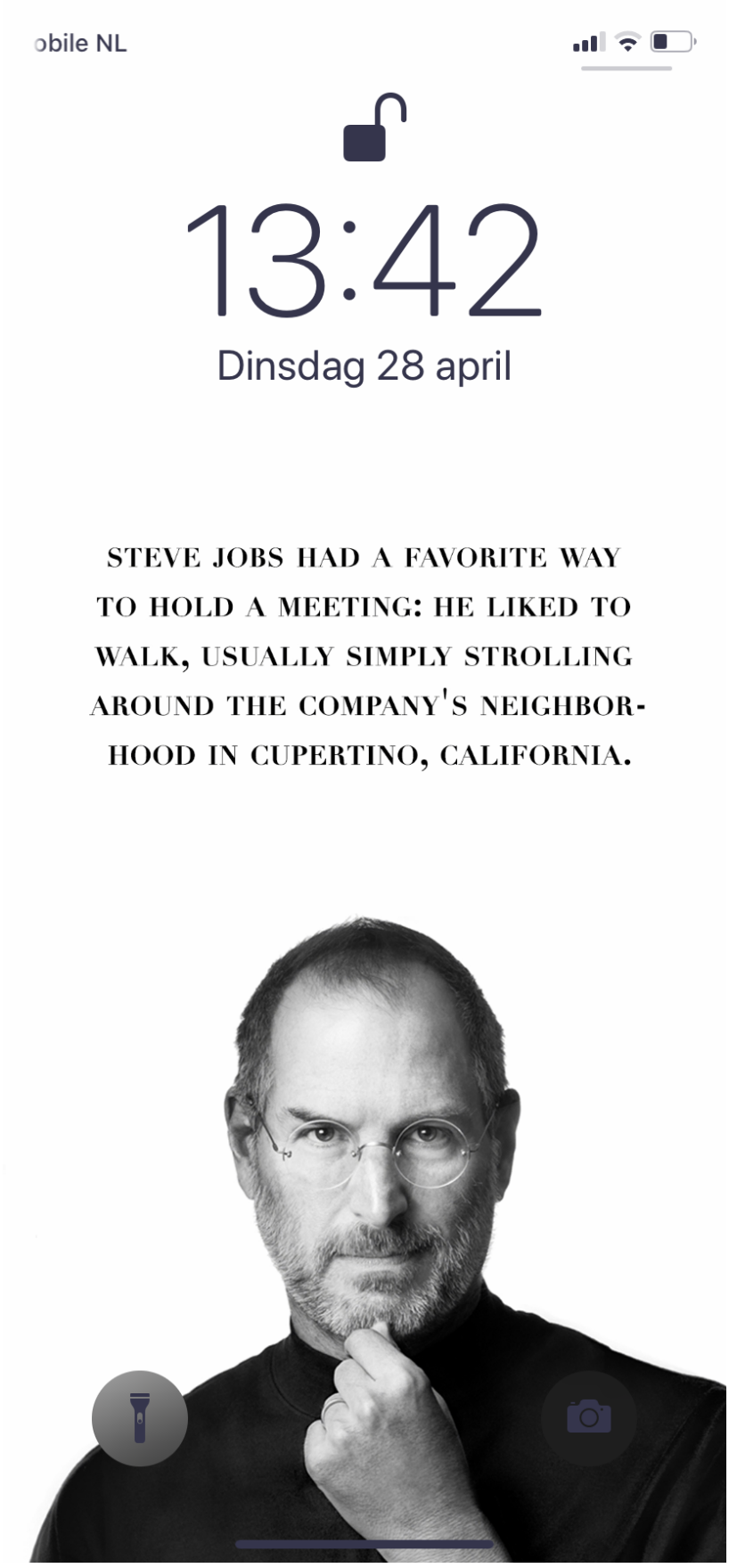
A.1. Factsheet walk while talk

A.2. Contact name + 'walking!'



A.3. Commitment sharing

A.4. Background picture role model Steve Jobs



A.5. Background picture role model Barack Obama

PRESIDENT BARACK OBAMA OFTEN ENDED HIS WORKING DAY BY WALKING AROUND THE WHITE HOUSE GROUNDS WITH HIS CHIEF OF STAFF, DENIS MCDONOUGH.

A.6. Background picture of contact with footsteps + 'Walking!'

Appendix B: Typeform questionnaires

B.1. Subscription questions employers and employees

* 4 Wat is de grootte van je woning?

- minder dan 25m2
- 25-50m2
- 50-75m2
- 75-100m2
- meer dan 100m2

5 Wat is je hoogst behaalde opleiding?

- Basis onderwijs
- Middelbaar onderwijs
- MBO
- HBO
- WO

* 6 Vind je jouw buurt een aantrekkelijke omgeving om in te wandelen?

- Ja
- Nee
- Niet aantrekkelijk, ook niet onaantrekkelijk

* 7 Hoe vaak bel je gemiddeld voor je werk?

- Meerdere keren per dag
- Eén keer per dag
- Een paar keer per week
- Eén keer per week of minder
- Nooit

* 8 Wat is je werk-emailadres?

* 9 Bevestig alsjeblieft nogmaals je werk-emailadres!

jumps to 11


* 10 Wat is de naam van je werkgever?
- Strict
- Universiteit Leiden (Faculteit Governance & Global Affairs)
- Greenhome
- -
- Elfa
- Schiphol (ITCP)
- Aardoom & de Jong
- Curio
jumps to B C
* 11 Leuk dat je geïnteresseerd bent! We nemen zo snel mogelijk contact met je op. Wat is je naam?
comes from 1 9
* 12 Wat is de naam van het bedrijf waar je werkt?
* 13 Wat is je telefoonnummer?
* 14 Wat is je e-mailadres?
A Bedankt, je hoort snel van ons!

B Leuk dat je meedoet!

Om mee te doen aan het onderzoek vragen we je bij deze **een stappenteller app op je smartphone te downloaden als je deze nog niet hebt, of een andere stappenteller** (FitBit, Apple Watch, etc.) **te gebruiken.** Welke stappenteller je gebruikt maakt niet uit, dus je bent vrij om er zelf een te kiezen.

Let op dat je je telefoon of stappenteller zo veel mogelijk bij je hebt en je telefoon opgeladen is, zodat de stappenteller je stappen goed kan meten. De meting begint op [maandag 22 juni], dus voor die tijd moet je de app geïnstalleerd hebben.

De komende weken zien er als volgt uit:
- Maandag 29 juni: Start stappen tellen
- Zaterdag 4 juli: Eerste vragenlijst invullen
- Zaterdag 11 juli: Tweede vragenlijst invullen & **toegang tot gratis tool**

De vragenlijsten mailen wij je toe.
Bedankt voor je deelname en veel succes!

Ps. Nog vragen over bijvoorbeeld de stappenteller? Mail of bel Marijn van Duwtje! marijn@duwtje.com | 06-36428865

C Leuk dat je meedoet!

Om mee te doen aan het onderzoek vragen we je bij deze **een stappenteller app op je smartphone te downloaden als je deze nog niet hebt, of een andere stappenteller** (FitBit, Apple Watch, etc.) **te gebruiken.** Welke stappenteller je gebruikt maakt niet uit, dus je bent vrij om er zelf een te kiezen.

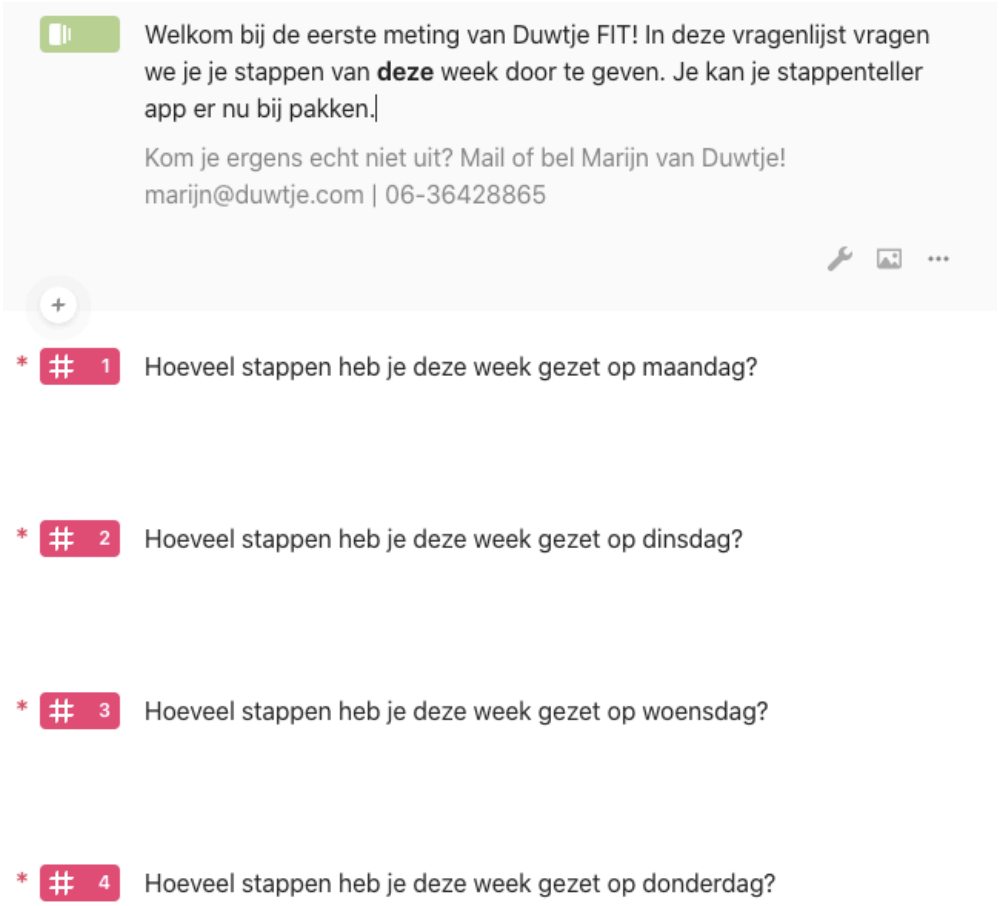
Let op dat je je telefoon of stappenteller zo veel mogelijk bij hebt en je telefoon opgeladen is, zodat de stappenteller je stappen goed kan meten. De meting begint op [maandag 22 juni], dus voor die tijd moet je de app geïnstalleerd hebben.

De komende weken zien er als volgt uit:
- Maandag 22 juni: Start stappen tellen
- Zaterdag 27 juni: Eerste vragenlijst invullen **& toegang tot gratis tool**
- Zaterdag 4 juli: Tweede vragenlijst invullen

De vragenlijsten mailen wij je toe.
Bedankt voor je deelname en veel succes!

Ps. Nog vragen over bijvoorbeeld de stappenteller? Mail of bel Marijn van Duwtje! marijn@duwtje.com | 06-36428865

B.2. Questionnaire Control Group Week 1



* 5 Hoeveel stappen heb je deze week gezet op vrijdag?

* 6 Hoeveel dagen heb je deze week op een andere locatie dan thuis gewerkt?

* 7 Zijn er deze week dagen waarop je stappenteller app veel meer of minder stappen heeft geregistreerd dan normaal of correct?

Voorbeeld veel meer: je bent een lange wandeling gaan maken die je niet wekelijks maakt. Voorbeeld veel minder: Je bent je stappenteller een dag(deel)vergeten. Twijfel je? Vink de dagen waarover je twijfelt aan en vul in de volgende vraag in wat de reden is dat je twijfelt.

- Maandag
- Dinsdag
- Woensdag
- Donderdag
- Vrijdag
- Er is geen enkele dag waarop ik aanzienlijk meer of minder heb bewogen dan normaal

jumps to 9 8

* 8 Je hebt aangeven dat je stappenteller app op ✓ Zijn er deze week dage... × veel meer of minder stappen heeft geregistreerd dan normaal. Wat is/zijn hiervoor de reden(en)?

comes from 7

* 9 Wat is je werk-emailadres?

Vul hier hetzelfde emailadres in als de andere keren. Alleen dan kunnen we de vragenlijsten aan elkaar koppelen en zo het effect van de toolkit meten.

comes from 7

A Bedankt voor het invullen van de eerste vragenlijst!

Volgende week ontvang je de tweede vragenlijst. Nadat je die hebt ingevuld krijg je toegang tot de Duwtje toolkit! Veel plezier!

B.3. Questionnaire Treatment Group Week 1

* 5 Hoeveel stappen heb je deze week gezet op **vrijdag?**

* 6 Hoeveel dagen heb je deze week op een andere locatie dan thuis gewerkt?

* 7 Zijn er deze week dagen waarop je stappenteller app veel meer of minder stappen heeft geregistreerd dan normaal of correct?

Voorbeeld veel meer: je bent een lange wandeling gaan maken die je niet wekelijks maakt. Voorbeeld veel minder: Je bent je stappenteller een dag(deel)vergeten. Twijfel je? Vink de dagen waarover je twijfelt aan en vul in de volgende vraag in wat de reden is dat je twijfelt.

- Maandag
- Dinsdag
- Woensdag
- Donderdag
- Vrijdag
- Er is geen enkele dag waarop er veel meer of minder stappen zijn geteld

jumps to 9 8

* 8 Je hebt aangegeven dat je stappenteller app op ✓ Zijn er deze week dage... × veel meer of minder stappen heeft geregistreerd dan normaal. Wat is/zijn hiervoor de reden(en)?

comes from 7 jumps to 9

* 9 Wat is je werk-emailadres?

Vul hier hetzelfde emailadres in als de andere keren. Alleen dan kunnen we de vragenlijsten aan elkaar koppelen en zo het effect van de toolkit meten.

comes from 7 8

A Bedankt voor het invullen van de eerste vragenlijst! Vanaf nu heb je toegang tot de Duwtje toolkit! https://duwtje.com/fit-toolkit/

Over een week ontvang je weer een vragenlijst over je gezette stappen en je mening over de toolkit. Daarna is het onderzoek afgerond. Veel plezier!

B.4. Questionnaire Control Group Week 2

* # 5 Hoeveel stappen heb je deze week gezet op vrijdag?

* # 6 Hoeveel dagen heb je deze week op een andere locatie dan thuis gewerkt?

* ✓ 7 Zijn er deze week dagen waarop je stappenteller veel meer of minder stappen heeft geregistreerd dan normaal of correct?

Voorbeeld veel meer: je bent een lange wandeling gaan maken die je niet wekelijks maakt. Voorbeeld veel minder: Je bent je stappenteller een dag(deel)vergeten. Twijfel je? Vink de dagen waarover je twijfelt aan en vul in de volgende vraag in wat de reden is dat je twijfelt.

- Maandag
- Dinsdag
- Woensdag
- Donderdag
- Vrijdag
- Er is geen enkele dag waarop ik aanzienlijk meer of minder heb bewogen dan normaal

jumps to 9 8

8 Je hebt aangeven dat je stappenteller app op ✓ Zijn er deze week dage... × veel meer of minder stappen heeft geregistreerd dan normaal. Wat is/zijn hiervoor de reden(en)?

→ comes from 7

* 9 Wat is je werk-emailadres?

Vul hier hetzelfde emailadres in als de andere keren. Alleen dan kunnen we de vragenlijsten aan elkaar koppelen en zo het effect van de toolkit meten.

→ comes from 7

10 Heb je nog vragen of opmerkingen over het onderzoek die je kwijt wilt?

* 11 Zouden we je over een aantal weken nog een keer kunnen benaderen voor enkele vervolgvragen? Het beantwoorden van deze vragen zal slechts een paar minuten in beslag nemen.

A Bedankt voor het invullen van de tweede vragenlijst en je deelname aan het Duwtje Fit onderzoek!

Vanaf nu heb je toegang tot de Duwtje toolkit! https://duwtje.com/fit-toolkit/.

We hopen dat je hiermee in de toekomst makkelijk net even wat meer kan gaan bewegen tijdens een werkdag!

B.5. Questionnaire Treatment Group Week 2

* 1 Hoeveel stappen heb je deze week gezet op **maandag**?

* 2 Hoeveel stappen heb je deze week gezet op **dinsdag**?

* 3 Hoeveel stappen heb je deze week gezet op **woensdag**?

* 4 Hoeveel stappen heb je deze week gezet op **donderdag**?

* 5 Hoeveel stappen heb je deze week gezet op **vrijdag?**

* 6 Hoeveel dagen heb je deze week op een andere locatie dan thuis gewerkt?

* 7 Zijn er deze week dagen waarop je stappenteller veel meer of minder stappen heeft geregistreerd dan normaal of correct?

Voorbeeld veel meer: je bent een lange wandeling gaan maken die je niet wekelijks maakt. Voorbeeld veel minder: Je bent je stappenteller een dag(deel)vergeten. Twijfel je? Vink de dagen waarover je twijfelt aan en vul in de volgende vraag in wat de reden is dat je twijfelt.

- Maandag
- Dinsdag
- Woensdag
- Donderdag
- Vrijdag
- Er is geen enkele dag waarop er veel meer of minder stappen zijn geteld

jumps to A 8

* 8 Je hebt aangeven dat je stappenteller app op ✓ Zijn er deze week dage... × veel meer of minder stappen heeft geregistreerd dan normaal. Wat is/zijn hiervoor de reden(en)?

comes from 7 jumps to A

A Er volgen nu een aantal vragen over de tools.

comes from 8 7

* 9 Bij hoeveel contactpersonen in je telefoon heb je 'lopen' toegevoegd?

* 10 Heb je als achtergrond van een van je contactpersonen ingesteld dat als je gebeld wordt, je een afbeelding van voetstappen plus de tekst ‘lopen’ ziet?

- Ja, bij 1 contactpersoon
- Ja, bij meerdere contactpersonen
- Nee, bij geen enkele contactpersoon

* ✓ 11 Ben je ook door een van deze personen gebeld (ipv dat jij hen alleen hebt gebeld)?

- Ja, door 1 persoon
- Ja, door meerdere personen
- Nee

* ✓ 12 Heb je deze week met een of meerdere van deze contactpersonen gebeld?

- Ja, met 1 contactpersoon
- Ja, met meerdere contactpersonen
- Nee

jumps to 13 16

* ✓ 13 Heb je deze week tijdens een van de gesprekken met deze contactpersonen gelopen terwijl je belde?

- Ja, met 1 contactpersoon
- Ja, met meerdere contactpersonen
- Nee

comes from 12 jumps to 14 16

* 14 Heb je via WhatsApp gevraagd aan deze contactpersonen om met je mee te lopen??

- Ja, met 1 contactpersoon
- Ja, met meerdere contactpersonen
- Nee

comes from 13 | jumps to 15 16

* 15 Hebben de contactpersonen die je via WhatsApp hebt gevraagd aangegeven dat zij met je mee gingen lopen?

- Ja, 1 contactpersoon heeft dit aangegeven
- Ja, meerdere contactpersonen hebben dit aangegeven
- Nee, geen enkel contactpersoon heeft dit aangegeven

comes from 14

* 16 Heb je als achtergrond van je telefoon de afbeelding met Steve Jobs of Barack Obama + tekst ingesteld?

- Ja, ik heb Steve Jobs als achtergrond gekozen
- Ja, ik heb Barack Obama als achtergrond gekozen
- Ja, ik heb beiden als achtergrond gekozen
- Nee, ik heb geen van beiden als achtergrond ingesteld

comes from 12 13 14

* 17 Heb je ook nog gelopen tijdens het bellen met andere contactpersonen?

* 18 Welke van de tools hebben je het meest geholpen voor je gevoel bij het meer bewegen onder werktijd?

- Het toevoegen van 'lopen' achter een of meerdere contactpersonen
- Het delen van de tools met contactpersonen, zodat ik met mensen kon delen dat ik tijdens het bellen met hun zou gaan lopen
- Het instellen van voetstappen + 'lopen' als achtergrond van een of meerdere contactpersonen die zichtbaar werd op het moment dat ik gebeld werd
- Het instellen van Steve Jobs en/of Barack Obama als achtergrond
- Allemaal even veel
- Weet ik niet

* 19 Zou je de tools die je hebt gekregen aanraden aan andere mensen?

* 20 Heb je nog opmerkingen of vragen of het onderzoek die je kwijt wilt?

* 21 Wat is je werk-emailadres?

Vul hier hetzelfde emailadres in als de andere keren. Alleen dan kunnen we de vragenlijsten aan elkaar koppelen en zo het effect van de toolkit meten.

* 22 Zouden we je over een aantal weken nog een keer kunnen benaderen voor enkele vervolgvragen? Het beantwoorden van deze vragen zal slechts een paar minuten in beslag nemen.

A Bedankt voor het invullen van de tweede vragenlijst en voor je deelname aan het Duwtje Fit onderzoek.

We hopen dat het je heeft geholpen om net even iets meer te bewegen gedurende een werkdag!

B.6. Questionnaire 2 weeks after the experiment

Welkom bij de nameting van Duwtje FIT! We zijn benieuwd of je nog (positieve) effect hebt ondervonden van je deelname aan het onderzoek!

* 1 Gebruik je nog steeds één of meerdere onderdelen van de tool om meer te bewegen onder het thuiswerken? Je mag bij 'other' eventueel invullen waar je nog gebruik van maakt.

- Ja
- Nee

* 2 Is lopen tijdens het bellen een gewoonte geworden?

- Ja
- Nee
- Een beetje

* 3 Beweeg je op dit moment meer tijdens het thuiswerken nog, dan dat je hiervoor deed?

- Ja, meer.
- Nee, minder.
- Nee, ik beweeg nog evenveel als voor het onderzoek.

* 4 Heb je, indien je bent doorgegaan met lopen tijdens het bellen, dit nog met andere mensen gedeeld?

- ja, ik ben doorgegaan en heb het met andere mensen gedeeld.
- nee, ik ben doorgegaan, maar heb het niet met anderen gedeeld.
- nee, ik ben niet doorgegaan en heb het niet met andere gedeeld

5 Heb je nog opmerkingen of vragen of het onderzoek die je kwijt wilt?

A Bedankt voor het invullen van deze vragen! (Kan nog iets anders bij evt)