**MASTER THESIS EDUCATIONAL SCIENCES AND TECHNOLOGY**

# The effect of gain- and loss framing on the intention to change behaviour in an instructional video

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**Summary**

Research is lacking in providing effective guidelines for instructional video targeting the affective learning domain. One factor that has shown to be effective in targeting behavioural change, is message framing. In this study, two instructional videos were compared: gain-framed (i.e. emphasis on the advantages of complying) and loss-framed (i.e. emphasis on the disadvantages of not complying). The videos were compared using quantitative measures of intention to change behaviour, attitude and perceived control. Gain-framing was effective in positively influencing attitude, perceived control and intention to change behaviour. Loss-framing was only effective in positively influencing perceived control. A comparison of effects between groups showed that only perceived control was significantly more influenced by the gain-framing. In conclusion, there is a small but convincing difference in the effectivity of message framing in favour of gain-framing. Further research is necessary to establish more guidelines for instructional videos aimed at affective learning goals.

Keywords: *affective learning domain, behavioural change, message framing, instructional video*

## 1. Introduction

While there is much research that supports guidelines for instructional video for the cognitive learning domain (e.g. multimedia learning principles; Mayer, 2005) and the psychomotor learning domain (e.g. modeling; as first introduced by Bandura et al., 1961), guidelines for the affective learning domain are scarce (Miller, 2005). Simonson and Maushak (2001) stated that in mainstream instructional technology research, less than 5% of studies from 1979 to 2001 examined attitude variables. However, affective learning goals such as attitude and behavioural change can be essential for public health-related behaviours or in organizational change efforts. In health intervention research, there is some evidence that points towards the effectivity of video in reaching behavioural change (Tuong et al., 2014, Miller, 2005). This evidence encourages the notion that instructional video may be effective in the area of affective learning goals.

A framework to design for behavioural change can be found in the well established and empirically proven theory of planned behaviour (TPB) by Ajzen (1991). In this theory, it is established that factors such as the attitude and perceived control of someone can result in a certain intention to change behaviour. This intention has been found to correlate strongly with the actual behavioural change performed. To influence someone to change their behaviour, their attitude and perceived control have to be influenced.

One factor that shows to be promising in health intervention research aimed at behavioural change, is message framing (Tuong et al., 2014; Gallagher and Updegraff, 2011). It is estimated that the way arguments are presented can influence someone's attitude on the topic, even though the message contains the same information. This notion is in line with Tversky and Kahneman's (1981) finding that the way a message is presented, has implications on how people make decisions. Gain-framing entails messages with a focus on the advantages of changing the behaviour, as opposed to loss-framing which focuses on the disadvantages or dangers of not complying (O'Keefe & Jensen, 2007). Although there seems to be a slight preference for gain-framing in most health-related research (Tuong et al., 2014; Gallagher and Updegraff, 2011), advantages of gain- or loss-framing in instructional video are yet to be established. In an overview of Tuong et al. (2014), three videos that resulted in behavioural change and explained their message-framing strategy used gain-framing (Janda et al., 2007; Calderon et al., 2007; Carey

et al., 2008), whereas one used loss-framing (Solomon & DeJong, 1988). In line with this, Gallagher and Updegraff (2011) found that gain-framed messages encourage prevention behaviours more than loss-framed messages in a meta-analysis of message framing across multiple media sources (e.g. video, audio, print).

The current study aims to research if instructional video can be effective in influencing attitude, perceived control and intention to change behaviour positively. While doing so, it is important to research if message framing can be identified as a factor and a guideline can be established in favour of gain- or loss-framing. A gain-framed and a loss-framed video will be designed targeting the same behaviour: reducing screen time on mobile phones. Excessive mobile phone use can have detrimental effects physically (Yang et al., 2019), mentally (Thomée et al., 2011), and safety-wise (NHTSA, 2017). Meanwhile, they are hard to resist as they are integrated into the lives of the majority of young adults, with screen time reaching up to 4.5 hours per day (Mackay, 2019). Therefore, it is deemed a suitable topic to make an instructional video about. Scores for attitude, perceived control and intention to change behaviour are measured before and after the intervention to determine the effectiveness of both framing techniques. Through this study, a start is made in establishing guidelines for designing instructional video for the affective learning domain.

# 2. Theoretical framework

## 2.1 Instructional video and the affective learning domain

**Affective learning domain.** The affective learning domain contains forming attitudes, motivation and values (Smith & Ragan, 1999). An example of an affective learning goal in a school class on healthy diets as presented by Miller (2005), is recognizing the importance of a healthy diet and improving eating habits. Testing affective learning goals forms a challenge because they are often not directly observable. Smith & Ragan (1999) propose that affective learning outcomes can be expressed through statements of opinions of beliefs.

**Opportunities of using instructional video.** When designed specifically to produce certain attitudes or attitudes changes, mediated instruction is generally effective (Simonson & Maushak, 2001). Some opportunities of instructional video as a medium to reach affective learning goals are discussed.

Firstly, the same attitude instruction can be used by many groups (McDonald & Kielsmeier, 1970). An effective video could be designed and produced once, and then be used indefinitely. Secondly, short treatments have found to work better in reducing prejudice than longer treatments (McGregor, 1993). Therefore, an effective video might be a low-risk medium to start reaching an affective learning goal. Thirdly, McDonald and Kielsmeier (1970) found that for passive learners, mediated instruction may facilitate acquiring complex affective behaviours more than live demonstrations. Therefore, video offers opportunities for different kinds of learners, especially when combined with other interventions. Building on this, video has the potential to be combined with other interventions such as post video discussions to add to its effects (Simonson & Maushak, 2001). When combined with other interventions, learners get multiple opportunities to develop and express cognitive responses to newly presented information (Zimbardo & Leippe, 1991).

Also, there is some empirical evidence of successful videos that influenced affective learning outcomes significantly. Ball-Rokeach et al. (1984) found overwhelming results when they tested the effects of a persuasive half-hour television program. Viewers showed changes in attitudes toward race, gender, equality and environmental protection and behaviour supporting those values. Also, in health intervention research promising results are found (Tuong et al., 2014;

Gallagher and Updegraff, 2011) which will be discussed in the message framing section.

Instruction in the affective domain must be designed carefully. An example to illustrate this importance is the research of Alderfer et al. (1992) and Hood et al. (2001). They both found that the attitudes of certain groups worsened after a diversity training intervention. This shows the cruciality of establishing well-funded guidelines for the affective learning domain.

A related framework to the affective learning domain is the theory of planned behaviour (TPB) by Ajzen (1991). This theory comprises several learning theories and contains a well-established framework for establishing behavioural change. Therefore, this theory relevant to the current study.

### 2.2 Theory of planned behaviour

One of the most influential and empirically funded theories of behavioural change is the TPB by Ajzen (1991). In TPB, behavioural change is strongly related to the intention to change behaviour. Although the relationship between intention and actual behavioural change is not perfect, the correlation is strong and intention can be used as a proximal measure of behaviour (Francis et al., 2004). In TPB, the strength of one's intention to change behaviour is influenced by one's attitude, perceived behavioural control and subjective norm about a specific behaviour. The relative importance of each factor has shown to differ across topics (Ajzen, 1991). Because subjective norm (i.e. the perceived social pressure to change a specific behaviour) is difficult to influence with instructional videos, it will be left out of the current research. Relevant factors for instructional video as presented in Figure 1, are attitude, which is influenced by behavioural beliefs, and perceived behavioural control, which is influenced by control beliefs.

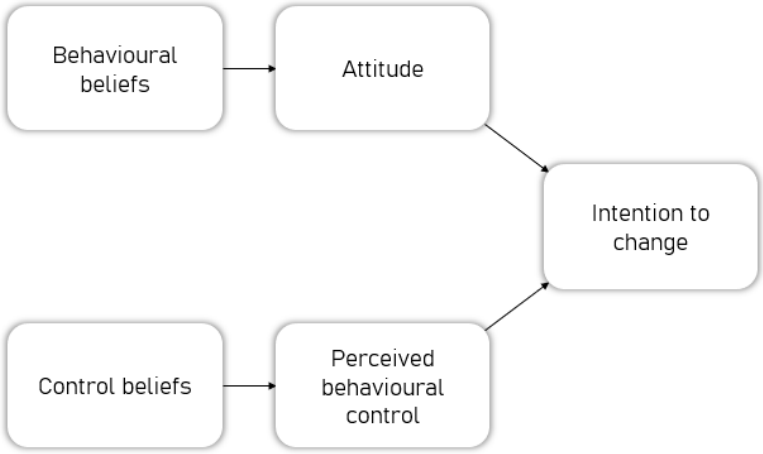


*Figure 1.* Factors of TPB by Ajzen (1991) that are deemed relevant to instructional video

**Attitude and behavioural beliefs.** Attitude is defined by Ajzen (1991) as the extent to which someone has a favourable or unfavourable evaluation of a specific behaviour. When someone believes a behaviour will lead to a positively valued outcome, they have a positive attitude to the behaviour. A more favourable attitude towards a behaviour influences the intention to change behaviour positively. Attitudes are formed by having certain behavioural beliefs and by giving a certain factor of importance to those beliefs. Behavioural beliefs are the beliefs an individual has by associating behaviour with certain attributes, characteristics and events to a behaviour. The strength of the influence of a behavioural belief on attitude depends on the actual belief (e.g. If I exercise, I will sleep better) and the perceived strength of that belief (e.g. If I sleep better, that is good/bad).

**Perceived behavioural control and control beliefs.** Perceived behavioural control refers to the perceived ease or difficulty of performing a behaviour (Ajzen, 1991). A strong sense of perceived control is assumed to relate to a stronger intention to change behaviour. The antecedent of perceived behavioural control is control beliefs. Control beliefs are the beliefs a person has about whether there are enough resources and opportunities to perform the behaviour. These beliefs form in many ways: past experience, second-hand information, and other things that increase or decrease the perceived difficulty of a behaviour. The influence of a control belief on the perceived behavioural control depends on the control belief (e.g. believing you do not have time to exercise) and the perceived power of control (e.g. the extent to which this belief hinders or aids the proposed behaviour of working out)

Taken together, the intention to change behaviour is influenced by attitude, perceived behavioural control and their antecedents behavioural beliefs and control beliefs. It can be assumed that if these factors are successfully targeted in an instructional video, a step towards the intention to change behaviour will be made.

### 2.3 Framing

One factor that possibly influences attitude and subsequently intention to change behaviour is message framing. The way a message is presented has implications for how humans perceive it and make decisions (Tversky & Kahneman, 1981). This is because human perception and human decision making are imperfect and not fully rational. Entman (1993) explains framing as selecting some aspects of a perceived reality and purposefully making them stand out more in communication. Two types of message framing are used in research: loss-framing and gain-framing. O'Keefe and Jensen (2007) stated that loss-framed messages emphasize the disadvantages of not complying, whereas gain-framed messages focus on the advantages of complying. Message framing has applications in many fields (e.g. marketing, politics, economy), but the field most related to the current research is the field of health behaviour research. In the field of health behaviour research, gain-framed messages seem to be slightly more effective, depending on the context.

Gallagher and Updegraff (2011) performed a meta-analysis, focusing on the effects of health message framing on attitudes, intentions and behaviour. However, this analysis was not focused solely on video as a medium. Regarding prevention behaviours, they found a small advantage for gain-framed messages on attitudes and intentions, and a significant effect on actual behaviour. For illness detection behaviours, they found a minor effect in favour of loss-framed messages. Salovey et al. (2002) found the same difference regarding prevention and detection and, in line with prospect theory of Kahneman and Tversky (1979), argue that loss-framing may be more motivating when contemplating risky actions such as detection behaviours, whereas gain-framing might motivate more for low-risk behaviours such as prevention behaviours. The persuasive power of a gain- or loss-framed message seems to be influenced by the type of behaviour targeted. More experimental research in different contexts can help to be conclusive.

Tuong et al. (2014) performed a meta-analysis on video-based education and its effectiveness in changing health behaviours. The study contained twenty-eight

studies and found that video interventions were variably effective. Overall, prevention behaviours seemed positively influenced by videos, but addiction behaviours were not. Tuong et al. (2014) found nine studies that resulted in changes in behaviour. Of those nine studies, four studies explained their message-framing strategy. Three of them used gain-framing (Janda et al., 2002; Calderon et al., 2007; Carey et al., 2008) and one of them used loss-framing (Solomon & DeJong, 1988). Therefore Tuong et al. (2014) pointed at message framing theory as a possible factor in determining the effectiveness of videos in changing behaviour. The effective studies that elaborated on a message framing strategy are briefly discussed.

Janda et al. (2002) researched the effectivity of video in encouraging breast self-examination (BSE). One group received video instruction and filled in a questionnaire, whereas the other group only filled in a questionnaire. The video was gain-framed as it focused on the possibilities of early detection and the benefits of performing the behaviour and included a woman modeling the behaviour to the watcher. The frequency of BSE behaviour and confidence level regarding the behaviour were measured before the intervention and three months after the intervention. The BSE performance of both groups and their confidence increased significantly after three months. The participants in the video condition performed BSE significantly more than the control group, whereas the confidence in performing the behaviour for both groups was not significantly different.

Although not mentioned in the overview of Tuong et al. (2014), Aponovitch et al. (2003) researched the effectiveness of gain- and loss-framing videos to motivate participants to test for HIV. They measured to which extent women were sure of test outcome (i.e. women who thought they were sure of the results of the test compared to women who were unsure of the outcome) and evaluated the effectivity of the videos by asking if they had gotten tested for HIV six month later. For the women that were sure of the outcome of the test, the gain-framed video was significantly more effective. For those who were unsure about the outcome, both messages were significantly effective, although the loss-framed message showed an advantage that was not significant. This is in line with prospect theory, which anticipates that high risk is associated with loss-framed effectiveness is associated with high-risk behaviours whereas gain-framed effectiveness is associated with low-risk behaviours (Kahneman & Tversky, 1979).

As a follow-up, Carey et al. (2008) used the gain-framed video of Aponovitch et al. (2003) and compared its effectivity with stage-based behavioural counselling by a nurse. The effectivity of the interventions was measured by whether the patients, who initially declined testing, agreed to be tested for HIV. Both the video intervention and the stage-based behavioural counselling were effective in increasing the acceptance to be tested, but counselling was found to be more effective than a video.

Furthermore, Calderon et al. (2007) used a gain-framed video that focused on providing information and discussing the benefits of testing, reporting and partner notification. They aimed to increase the willingness of patients coming to the emergency department in off-hours to be tested for HIV. They created a pretest counselling video and compared its effects with face-to-face counselling. The intervention was seen as effective when people got tested. They found that the group that watched a video was overwhelmingly more successful in getting tested (92.6%) than the group receiving face-to-face counselling (4.5%). However, it must be noted that the video group was able to get tested immediately whereas the counselling group had to return another day.

Taken together, gain-framed videos seem to be effective (Janda et al., 2002; Aponovitch et al., 2003; Carey et al., 2008; Calderon et al., 2007) in establishing behavioural change, and occasionally more effective in establishing behavioural change than loss framing (Aponovitch et al. 2003). However, loss-framing seems to be used less often as a framing method than gain framing. A reason may be that the use of fear in health communications is controversial (Solomon & de Jong, 1988) or even unethical because fear appeal can be seen as limiting one’s objective range of responses to a health threat (Green & Witte, 2006).

In a study by Solomon et al. (1988), a loss-framed video was used and found to be effective in increasing the return of men with gonorrhoea to the clinic for their test-of-cure examination. One group received a video instruction prior to a consultation with a disease intervention specialist and a nurse, whereas the other group only went to the consultation. Loss-framing was used because according to Solomon et al. 1988) discussions of unpleasant health outcomes can be effective when combined with credible suggestions for action. It was found that significantly more patients of the video-intervention group returned for their test-of-cure examination.

### 2.4 Current study

The current study aims to research if an instructional video can be effective in influencing attitude, perceived control and intention to change behaviour positively. While doing so, it is important to research if message framing can be identified as a factor and a guideline can be established in favour of gain- or loss-framing. Two videos are established around the goal of reducing screen time on mobile phones: one with gain-framed messaging, one with loss-framed messaging. In order to research this topic, scores for attitude, perceived control and intention to change behaviour are measured before and after the intervention.

The limited evidence points towards gain-framed messaging as more effective for health-related behaviours. Also, reducing screen time fits the status of preventive behaviour more than a high-risk behaviour, and some studies found a benefit for gain-framing in convincing for preventive behaviours (Salovey et al., 2002; Aponovitch et al., 2003). Therefore, it is anticipated that the gain-framed condition will be more effective in influencing attitude, perceived control and intention to change behaviour.

This study will allow practitioners to know what works for instructional videos that target affective learning goals and what does not. More light will be shone upon the aspect of convincing people of the importance of instruction. This can be of help in various settings that are not limited to the current topic of reducing mobile phone use. For example, it could help design instructional videos for organizational change efforts, safety education, health interventions or with emphasizing the importance of a step in a procedure.

## 3. Research question and hypotheses

In continuation of the problem statement and theoretical framework, this study aims to shine a light on the effectivity of instructional video in influencing intention to change behaviour and its precedent constructs. Specifically, the gain- and loss-framing of an instructional video will be compared. The main research question that will be answered in the current research is "*Which message-framing technique is more effective in establishing an intention to change behaviour after watching an instructional video?*"

To examine this question, two videos will be designed and its results will be compared: one with gain-framed messaging, one with loss-framed messaging. The instructional goal of the video will be to encourage and enable participants to reduce their screen time. Both ways of message framing are hypothesized to be effective in influencing attitude, perceived control and intention to change behaviour. It is hypothesized that the effect of gain-framing will be larger.

### Within-group effects

H1. The gain-framing condition scores significantly higher on measures of attitude, perceived control and the intention to change behaviour after the video intervention;

H2. The loss-framing condition scores significantly higher on measures of attitude, perceived control and the intention to change behaviour after the video intervention;

### Between-group effects

H3. The effect of the gain-framed video on attitude is significantly larger than the effect of the loss-framed video;

H4. The effect of the gain-framed video on perceived control is significantly larger than the effect of the loss-framed video;

H5. The effect of the gain-framed video on the intention to change behaviour is significantly larger than the effect of the loss-framed video;

# 4. Methods

## 4.1 Research design

To answer the research questions, a quasi-experimental study was designed. This research focuses on the difference within groups as well as the differences in effects between groups. One group watched an instructional video about reducing mobile phone use with gain-framed messaging, while the other group watched one with loss-framed messaging. Before and after the instructional video, questions were asked regarding attitude (direct measures before and after, indirect measures only after), perceived control (direct measures before and after, indirect measures only after) and intention to change behaviour (direct measures before and after). Like this, it can be analyzed if the video intervention has an effect on the intention to change behaviour and its precedent constructs in the gain-framing group (H1) and in the loss-framing group (H2). Furthermore, this setup will determine which condition has a stronger effect on the intention to change behaviour (H5) and two of its related constructs: attitude (H3) and perceived behavioural control (H4). This data will be collected through a survey using direct (for attitude, perceived control and intention to change behaviour) and indirect questions (for attitude and perceived control).

## 4.2 Participants

The population of focus was young adults (age 18-30) that own an iPhone. Participation was online and the participants were found through convenience sampling in one of three ways: firstly the friends, family or connections of the researcher, secondly psychology or communication science students participating through the SONA-system and lastly through the recruitment of random students at university in several buildings with the incentive of a bar of chocolate. Since a very large part of each of these groups consists of university students, the participants were relatively homogeneous. The assignment to test condition was random. The gain-framing group had 43 participants, whereas the loss-framing group had 38 participants. Demographical data of participants per group are presented in Table 1.

Table 1

*Demographical data per group*

| | Gain-framing group | Loss-framing group |
|---|---|---|

| | | |
|---|---|---|
| **Age *M* (SD)** | 21.77 (3.02) | 23.16 (3.28) |
| **Gender** | | |
| Male | 12 (27.9%) | 19 (50.0%) |
| Female | 31 (72.1%) | 19 (50.0%) |
| **Nationality** | | |
| Dutch | 19 (44.2%) | 19 (50.0%) |
| Other European Countries | 23 (53.5%) | 14 (36.8%) |
| Countries outside of Europe | 1 (2.3%) | 5 (13.2%) |
| **Screen time per day*** | | |
| 1-2 hours | 3 (7.0%) | 7 (18.4%) |
| 2-4hours | 26 (60.5%) | 18 (47.4%) |
| 4-6 hours | 12 (27.9%) | 11 (28.9%) |
| >6 hours | 2 (2.7%) | 2 (5.3%) |

*Self-reported

### 4.3 Instrumentation

#### Survey

A survey was made based on the instructions of Ajzen (2006) and Francis et al. (2004), who provided detailed instruction about TPB survey construction. The full survey can be found in Appendix B. The survey before the intervention contains demographic questions (i.e. age, gender, nationality, level of education, study programme, time spent on iPhone). All items had a 7-point Likert scale, as suggested by Ajzen (2006). The TPB-survey that the current survey is based on is used widely and has proven to be reliable and valid (Ardian et al., 2018; González et al. 2012).

**Direct measures.** The questions for direct measures were adaptations of the examples of Francis et al. (2014) in their TPB-survey manual. Therefore, barely any risk was posed for the validity of the survey. To make sure the participants knew what was meant by screen time, the first time the word was used it was explained. Also, before the survey parts of the experiment, a box was presented with ‘Note: screen time refers to the time you spent looking at or interacting with your mobile phone’ to ensure construct validity. A pilot test of three participants showed no

unclarities in the direct questions. The participants knew what was meant and the survey is deemed valid.

***Attitude*** For measures of attitude, five items were used that reflected instrumental attitude (whether the behaviour is deemed useful), experiential items (how the person would feel while performing the behaviour) and overall evaluation. An example item of instrumental attitude is: 'Reducing my screen time would be… *very harmful – very beneficial*'. An example item of experiential attitude is 'Reducing my screen time would be… *very pleasant (for me) – very unpleasant (for me)*'. The item that covers overall evaluation is 'Reducing my screen time would be… *good – bad*'. The measures for attitude were deemed internally consistent. For attitude measured pre-intervention, Cronbach's α = .74. Post-intervention, Cronbach's α = .86.

***Perceived control*** Perceived control consists of four items, separated in two constructs: capacity (the belief they could change their behaviour) and autonomy (if performing the behaviour is in their control). An example item for capacity is '*I am confident that I can reduce my screen time*'. An example item for autonomy is '*Whether I reduce my screen time is entirely up to me*'. The measures were deemed internally consistent. Pre-intervention, Cronbach's α = .81. Post-intervention, Cronbach's α = .78.

***Intention to change behaviour*** Intention to change behaviour consists of three items, all measuring the same. The measures for intention to change behaviour were deemed internally consistent. For intention measured pre-intervention, Cronbach's α = .94. For intention post-intervention, Cronbach's α = .96.

**Indirect measures.** Two additional measures were presented to the participants: indirect attitude and indirect perceived control. The survey was made by following Francis et al.'s (2004) guidelines for an elicitation study. In total, 32 young adults that use smartphones participated in an elicitation study to establish indirect measures. The indirect questions were not asked pre-intervention because the length of the survey would then risk respondent fatigue and response bias. However, due to reliability issues of both measures and validity issues of the indirect perceived control measure, the indirect measures were left out of further analysis. The elicitation study and some further reason for rejection of the measures are presented in Appendix A.

## Instructional video.

### Topic of instruction

The behaviour of interest in the instructional video is reducing screen time on mobile phones. More and more research shows the detrimental effects of (excessive) mobile phone use. Thomée et al. (2011) found that young adults who have a high frequency of phone use are more at risk of developing mental health problems. They called for public health prevention strategies to help young adults set limits for accessibility. Another problematic development is related to sedentary behaviours. Yang et al. (2019) found that adults and adolescents sedentary technology-related activities are increasing, while these behaviours have been found detrimental for longevity (Diaz et al., 2017). Korpinen and Pääkkonen (2009) researched self-reported symptoms associated with using mobile phones and other electrical devices. The symptoms extended from physical to mental health symptoms and accidents. The highest frequency of comments was related to eye symptoms, the ergonomics of devices and mental load at work and in leisure time. Smartphone use has also been related to work-home interference and recovery after work. Derks and Bakker (2014a) found that smartphone use is related to work-home interference. Derks et al. (2014b) also found that smartphone use has a negative relationship with recovery after work. Moreover, phone use is related to car accidents. Gliklich et al. (2016) found that cell phone reading and typing while driving are common activities amongst the population of the United States. The national highway traffic safety administration (NHTSA) of the United States found that in 2017, there were more than three thousand people killed in crashes with distracted drivers (NHTSA, 2017). Mobile phone use was identified as an important distraction, with texting being the most alarming one.

Taken together, excessive mobile phone use can have detrimental effects physically, mentally and safety-wise. Mobile phones have proven to be very hard to resist, with top mobile phone users spending around 4.5 hours per day on their phones (Mackay, 2019). Therefore, it is a relevant and present-day topic to make an instructional video about.

**Design**. The videos were made using existing guidelines and theories about instructional design, behavioural change and persuasion. The full scripts for both conditions and the videos are presented in Appendix C.

***General setup*** For the general setup of the video the TPB of Ajzen (1991) is the base, as the video is designed to target behavioural beliefs and control beliefs. Therefore both videos follow the build-up of introduction first, then arguments why the participant should reduce screen time (targeting behavioural beliefs) and then ways how to reduce screen time (targeting control beliefs). In total, the video consists of three arguments to decrease mobile phone use, and five methods to achieve decreased mobile phone use. The general setup and a description of the arguments and methods can be found in Table 2.

Table 2

*Table of content*

| **Topic** | **Content** |
|---|---|
| Introduction | Introduction of topic and content |
| Why | Argument 1:<br>**Gain** You will be prepared to deal with the addictive nature of the smartphone.<br>**Loss** You are unprepared to deal with the addictive nature of the smartphone<br>- Explanation of argument<br>- Presentation of relevant related research<br>- Conclusive sentence |
| | Argument 2:<br>**Gain** You will learn to focus better<br>**Loss** Your focus will decline<br>- Explanation of argument<br>- Presentation of relevant related research<br>- Conclusive sentence |
| | Argument 3:<br>**Gain** You will learn to recharge yourself better<br>**Loss** You are draining your energy<br>- Explanation of argument<br>- Presentation of relevant related research<br>- Conclusive sentence |

| | |
|---|---|
| How | How 1: Turn off notifications<br>- A brief recap of why taking this action is good<br>- Video modeling the action on a phone screen<br>- Three-second pause to enable the learner to pause the video and take action |
| | How 2: Use do not disturb<br>- A brief recap of why taking this action is good<br>- Video modeling the action on a phone screen<br>- Three-second pause to enable the learner to pause the video and take action |
| | How 3: Create a distraction-free home screen<br>- A brief recap of why taking this action is good<br>- Video modeling the action on a phone screen<br>- Three-second pause to enable the learner to pause the video and take action |
| | How 4: Delete apps<br>- A brief recap of why taking this action is good<br>- Video modeling the action on a phone screen<br>- Three-second pause to enable the learner to pause the video and take action |
| | How 5: Use app limits<br>- A brief recap of why taking this action is good<br>- Video modeling the action on a phone screen<br>- Three-second pause to enable the learner to pause the video and take action |
| Summary | Summary of video |

**Influencing in video.**

*Gain versus loss-framing.* The two videos differed in message framing. A comparison of visual support is presented in Figure 2. For example, in the gain-framing video an argument is presented in the narration as '*You should reduce your screen time because you will learn to focus better'* whereas the same argument in the loss-framing video is presented as '*You should reduce your screen time because*

*your focus declines if you do not'*. To apply message framing, the argument was framed differently for the entire 'why' section and part of the 'how' section. In Table 3 its is presented how the main argument, relevant research and conclusion of a 'why' section argument are framed.

Table 3.

*Example argument 'why' section*

| | **Gain-framed argument** | **Loss-framed argument** |
|---|---|---|
| **Argument** | The second reason to use methods to reduce screen time is that you will learn to focus better. | The second reason to use methods to reduce screen time is that your focus declines if you do not |
| **Presentation of relevant related research** | Smartphones are very successful in distracting you from your goal activity. So much, that just removing your phone from your sight, is related to focused attention and task performance. | Smartphones are very successful in distracting you from your goal activity. So much, that if you have your phone in sight, that is related to decreased focused attention and task performance. |
| **Concluding sentence** | In conclusion: if you use methods to reduce your screen time, your focus is almost guaranteed to improve. | In conclusion: if you don't use methods to reduce your screen time, your focus is almost guaranteed to decline. |

For the how-section, a gain-framed introduction for a method is: '*If you turn off notifications then you will not be tricked into spending time on your phone'*. For loss-framing, that same introduction is: '*If you do not turn off certain notifications, you will be tricked into spending time on your phon*e'.

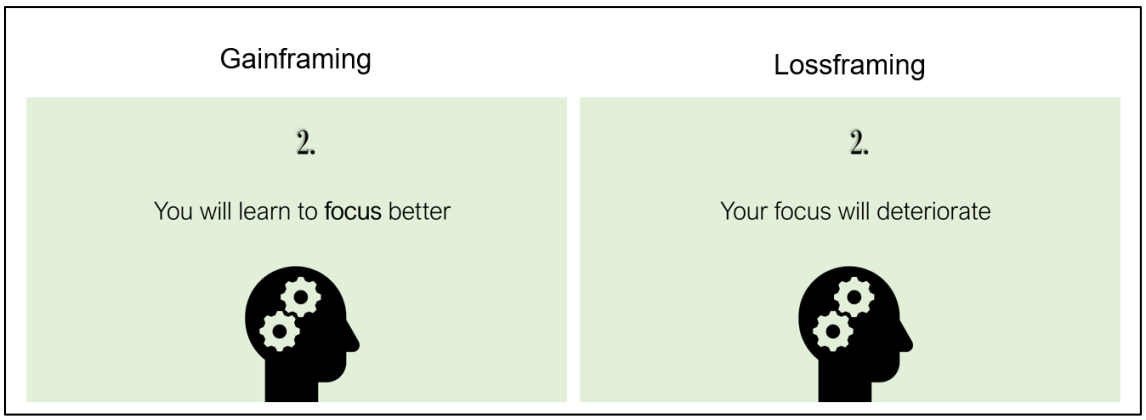


*Figure 2.* Visual representation of message framing

***Design Principles*** In order to ensure the quality in terms of instructional video design, the guidelines of the multimedia design of Clark and Mayer (2016) and minimalism of Van der Meij (1995) were followed. A brief overview including examples is presented.

*Multimedia Principles.* Originated by Mayer (2005), Clark and Mayer (2016) describe empirically proven instructional design principles for multimedia.

To start, the multimedia principle. Knowledge should be presented in more than one way, using a combination of relevant graphics, audio narration and/or explanatory text. Using video, a combination of audio narration and relevant graphics is the most dominant.

Then, the contiguity principle. Media should be presented contiguously. The nature of an animation video allows this principle to be reached very well. The spoken text, as well as the occasional written text, was presented contiguously with the graphics.

The next principle of interest is the modality principle. According to this principle, words are preferably presented as auditory narration. A related principle is the redundancy principle. To explain visuals, spoken text or written text should be used, but not both. The narration was present during the whole video. As illustrated in Figure 3, written text was only presented to emphasize the start of a new category or an important scientific correlation.


*Figure 3.* Written text only while emphasizing or introducing a topic

Then, the coherency principle: extraneous words and pictures should be kept to a minimum. To keep the video short and informative, this was done as much as possible. However, it is arguable which words and graphics would be considered extraneous to different audiences.

Next, the segmentation principle. According to this principle, content should be broken into smaller pieces. The video was divided in a clear introduction, three separate arguments and five separate methods. An example can be found in Figure 4. These separations were audibly and visibly made clear to learners.

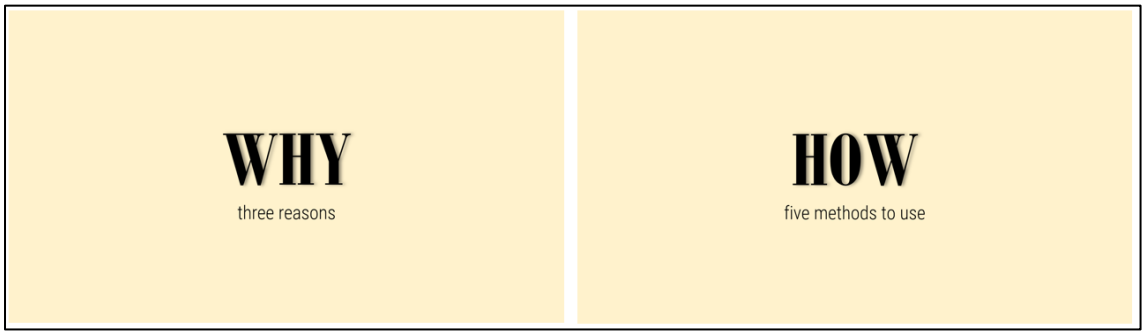


*Figure 4.* Example of the start of different segments

Lastly, the personalization principle. Narration should be polite in wording and use a conversational style. This guideline was followed while recording the audio narration, using a friendly tone. For example, before modeling the first method the following was said: "*Let´s try it out together. Take your phone and follow my steps. Pause the video if you need to.*"

*Minimalism.* Although primarily intended for novice learners who become acquainted with a new tool, Van der Meij's (1995) principles and heuristic for designing minimalist instruction provide guidelines to optimize any instruction.

Principle 1 encourages to choose an action-oriented approach because people are eager to act. By including a three-second break that allows the learner to pause the video (illustrated in Figure 5), the instruction allows the learner to take action immediately.

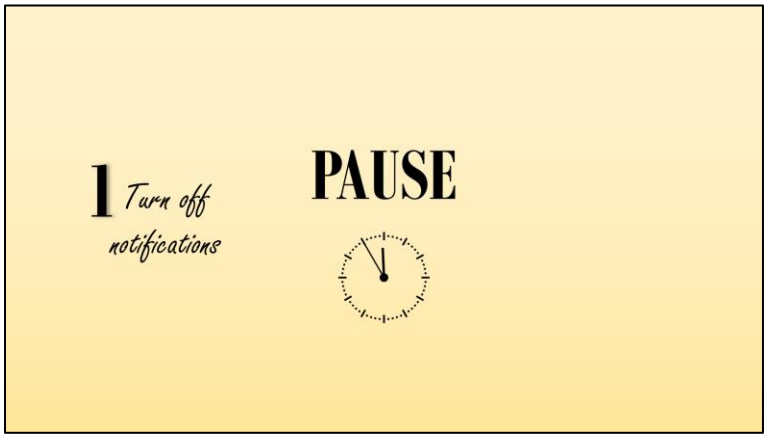


*Figure 5.* A break is included after every method so learners can take action

Principle 2 states to anchor the tool in the task domain. A large part of the video is the presented five methods. These methods are clear, action-oriented tasks that the learner can do (e.g. '*turn off notifications', 'use app limits').*

Principle 3 states to support error recognition and recovery. The current instruction did not need much error recognition and recovery as the learners were not novices and were deemed as tech-savvy.

Principle 4 states to support reading to do, study and locate. It is emphasized to not spell out everything. Since the learners are deemed to be quite knowledgeable about the topic already, the methods were presented in a fast manner. For example, instead of an elaborate description such as: '*Tap on the circular button on the bottom of your phone, this is your home button. Now, you are at your home screen. Tap on settings, the grey button with two gears. Scroll down and tap notification centre*' the instruction stated: '*Go to your notification centre in your settings'*. Furthermore, it is advised to provide closure for chapters. After each argument, a concluding sentence was given as presented in Figure 6. After presenting all the methods, a summary was given as a conclusion as presented in Figure 7.

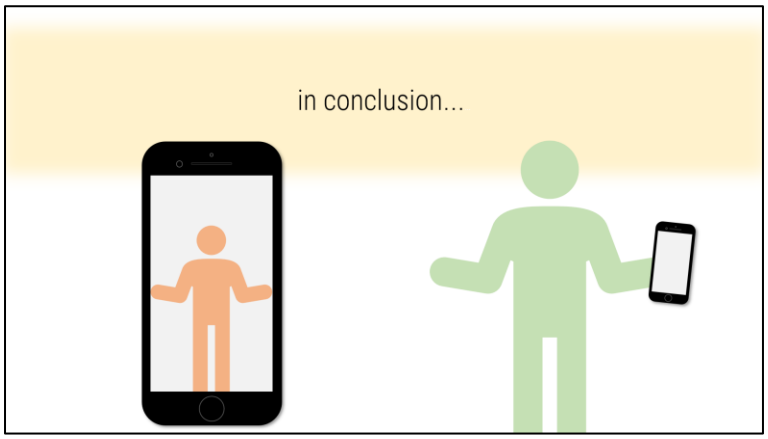


*Figure 6.* Concluding slide after each argument

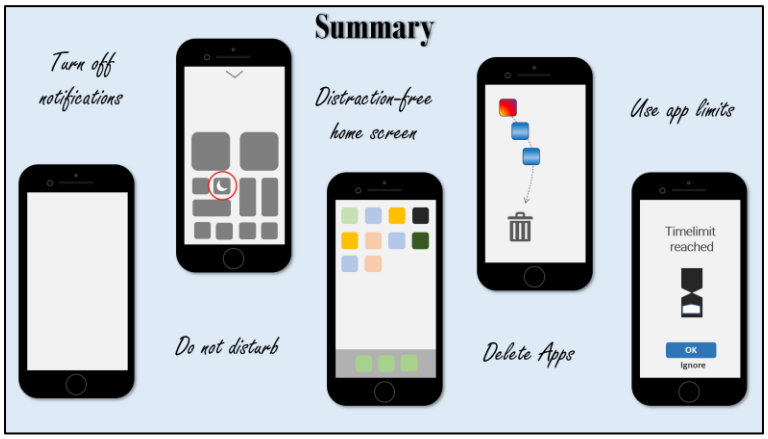


*Figure 7.* Summary of all methods

*ARCS model.* Some aspects of Keller's (2010) ARCS model of instruction were found to be an addition to the already presented guidelines. The ARCS model aims to motivate learners by taking into account the attention, relevance, confidence and satisfaction of the learner concerning the topic. To stimulate attention, the instruction should be perceptually arousing. This can be done by including changes in voice level, intensity or surprising information. In the video, certain words were emphasized in sentences (i.e. *if you turn **off certain** notifications, you will not be **tricked** into spending time on your **phone***).

Also, the instruction should be relevant to the learner. A specific way to do this is to incorporate modeling of the desired behaviours. By showing a screen recording of the different methods to reduce screen time, this was achieved. An example of this is shown in Figure 8.


*Figure 8.* A screen recording was used to show the learner how to use the presented method

*Persuasion*. Cialdini (1993) established seven principles that proved to be effective in constructing a persuasive message: giving a reason why, reciprocation, consistency, social proof, liking, authority and scarcity. Of these principles, giving a reason why and authority were usable in terms of instructional video and will be discussed.

Firstly, giving a reason why to a request increases the success rate. This is in line with the general setup of the instructional video, in which an argument is always given before presenting methods. In Figure 9, the introductory visual for the arguments “why” is presented.

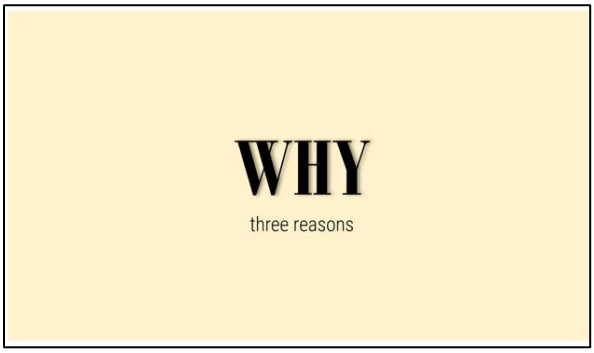


*Figure 9.* Three reasons why they should reduce screen time were presented to the learners

Secondly, the principle of authority. When someone is perceived to be an authority, people are more likely to comply. Although getting an authoritative figure was not within the possibilities of the current video, authority was established as

much as possible by basing the whole video on scientific research. Every argument that was presented, had a scientific base that was made clear to the learner. Figure 10 shows a visual example of this.

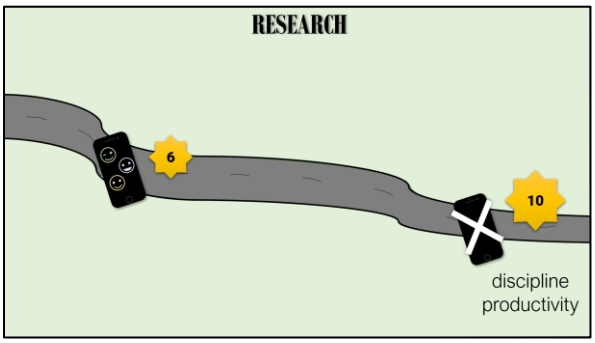


*Figure 10.* A constant link with research is made to establish the authority of the information

Although research on persuasion in instructional videos is scarce, some more guidelines were found. Rothman, Salovey, Turvey & Fishkin (1993) found that encouraging personal responsibility, as opposed to the responsibility of others, was more convincing. The video was aimed at convincing and enabling the learner to take action. Personal responsibility was made clear by the formulation of all arguments and method introductions, for example: '*If you use methods to reduce your phone use, you will sleep better*'. All the methods that were provided in the video, were things that the learner could choose to do or not.

Lastly, Miller, Maruyama, Beaber & Valone (1976) found that videos were more convincing when it was delivered forcefully rather than subtly. These guidelines were followed by emphasizing certain words and phrasing conclusions in a direct, forceful manner. For example '*If you don't reduce your screen time, your phone will* ***control you*** *instead of you controlling your phone'*. It can be estimated that the loss-framing condition has somewhat more forceful manners of convincing because the arguments in that condition were naturally phrased more as a threat than as an opportunity.

### 4.4 Procedure

Participants could participate from anywhere, as long as they had a working internet connection. They were randomly subjected to a condition by giving them the choice of one of two hyperlinks. The participants filled in a nickname and entered the

Graasp environment. After reading an informed consent document, they filled in their full name as an indication of their approval. The nature of the condition was not explained, as that could have influenced the answers of participants (i.e. the terms gain- and loss-framing were not used). Participants were asked to answer six demographic questions and twelve questions as a pre-intervention survey with direct measures of attitude, perceived control and intention to change behaviour. Then, an eleven-minute video was presented. After watching the video, another forty-two questions were asked to measure direct and indirect attitude, perceived control and intention to change behaviour. Lastly, the participant was thanked for their participation. Information about the nature of the conditions was provided and participants were asked to fill in their e-mail address if they wanted to receive a summary of the results of the study.

### 4.5 Data analysis

For the between-group tests of attitude, perceived control and intention to change behaviour, the difference of pre and post-intervention scores were calculated into a new variable. This allowed the comparison of the differences within groups, rather than only the post-intervention scores. Using visual inspection and a Shapiro-Wilk test, all variables were tested for normality. If the data were normally distributed, the accompanying t-test was executed. If this was not the case, a Mann-Whitney *U* test was done for independent samples and a Wilcoxon Signed Rank test was done for paired samples. An alpha level of .05 is deemed statistically significant. The test between groups is done two-tailed. The effect size of significant effects will be reported using Cohen's *d* for parametric tests and Pearson *r* for nonparametric tests. For Cohen's D, effect sizes between -.19 and .19 were interpreted as negligible, effect sizes between .20 and .49 as small and effect sizes between .50 and .79 as medium-sized. For Pearson *r*, values between 0.10 and 0.30 were seen as small.

## 5. Results

In this section, the results of the data analysis will be presented. The earlier presented hypotheses are tested and their results will be shown.

### 5.1 Effect of the videos within groups

The attitude (*n* = 42), perceived control (*n* = 43) and intention to change behaviour (*n* = 43) of the gain-framing group was positive pre-intervention (see Table 1). The attitude (*n* = 34), perceived control (*n* = 38) and intention to change behaviour (*n* = 38) of the loss-framing group was also positive pre-intervention. Post-intervention, both groups scored higher on all measures (see Table 1).

For the gain-framing group, the paired-samples t-test showed that the attitude of participants changed significantly after the intervention and this effect was medium sized, $t(41) = 3.84$, $p < .001$, $d = .59$. The effect on perceived control was significant and small, $t(42) = 6.83$, $p < .001$, $d = .25$. Lastly, the effect on intention to change behaviour was significant and small, $t(42) = 3.73$, $p < .001$, $d = .40$

For the loss-graming group, the paired-samples t-test showed that the effect of the video was not significant, $t(33) = 1.34$, $p = .191$. There was a significant difference between perceived control before and after the video, although negligible in terms of effect size, $t(37) = 4.01$, $p < .001$, $d = .15$. Lastly, for the intention to change behaviour the difference was not statistically significant, $t(37) = 1.52$, $p = .137$.

Taking the total of the participants, the paired-samples t-test showed that the attitude of participants (*n* = 76) changed significantly after the intervention and this effect was small, $t(75) = 3.80$, $p < .001$, $d = .34$. The effect on perceived control (*n* = 81) was significant and small, $t(80) = 7.60$, $p < .001$, $d = .21$. Lastly, the effect on intention to change behaviour (*n* = 81) was significant and small, $t(80) = 3.87$, $p < .001$, $d = .27$.

Table 1

*Within-group differences on before and after video on attitude, perceived control and intention to change behaviour*.*

| | Attitude M (SD) | | Control M (SD) | | Intention M (SD) | |
|---|---|---|---|---|---|---|
| | Before | After | Before | After | Before | After |
| Gain-framing (*n* = 43) | 5.20 (.68) | 5.61 (.76) | 4.97 (1.22) | 5.26 (1.09) | 4.84 (1.01) | 5.27 (1.16) |
| Loss-framing (*n* = 38) | 5.36 (.92) | 5.49 (1.02) | 5.27 (.93) | 5.41 (.89) | 5.11 (1.03) | 5.24 (1.18) |
| Total (*n* = 81) | 5.27 (.80) | 5.56 (.88) | 5.11 (1.09) | 5.33 (1.00) | 4.96 (1.02) | 5.25 (1.16) |

*Scale value: 1 (fully disagree) – 7 (fully agree)

### 5.3 Comparison of effects on attitude

As can be seen in Table 3, the difference in attitude was larger for the gain-framing condition (*M* = .41) than it was for the loss-framing condition (*M* = .14).

Table 3

*Results Attitude*

| | *Attitude* | | |
|---|---|---|---|
| | M (SD) Before | M (SD) After | M (SD) Difference |
| *Gain-framing* | 5.20 (.68) | 5.61 (.76) | .41 (.69) |
| *Loss-framing* | 5.36 (.92) | 5.49 (1.02) | .14 (.59) |

A Mann-Whitney *U* test showed that there was no significant difference between the effects of gain-framing (*n = 42, Mean Rank* = 41.65) and loss-framing (*n* = 34, *Mean Rank* = 34,60) on attitude, *U* = 581.50, *z* = -1.39 (corrected for ties), *p* = .164, two-tailed.

### 5.4 Comparison of effects on perceived control

As can be seen in Table 5, the difference in perceived control was larger for the gain-framing condition (*M* = .33) than it was for the loss-framing condition (*M* = .14).

Table 5

*Results Perceived Control*

| | *Perceived Control* | | |
|---|---|---|---|
| | M (SD) Before | M (SD) After | M (SD) Difference |
| *Gain-framing* | 4.97 (1.22) | 5.26 (1.09) | .33 (.27) |
| *Loss-framing* | 5.27 (.93) | 5.41 (.89) | .15 (.20) |

A Mann-Whitney *U* test showed that there was a significant difference between the difference of scores of gain-framing (*n = 43, Mean Rank* = 46.88) and loss-framing (*n* = 38, *Mean Rank* = 34.34) regarding perceived control, *U* = 564, *z* = -2.52 (corrected for ties), *p* = .012, two-tailed. The effect that was found can be described as small (*r* = .29).

**5.5 Comparison of effects on intention to change behaviour**

As can be seen in Table 6, the difference in intention to change behaviour was larger for the gain-framing condition (*M* = .43) than it was for the loss-framing condition (*M* = .13).

Table 6

*Results Intention*

| | *Intention* | | |
|---|---|---|---|
| | M (SD) *Before* | M (SD) *After* | M (SD) Difference |
| *Gain-framing* | 4.84 (1.01) | 5.27 (1.16) | .43 (.76) |
| *Loss-framing* | 5.11 (1.03) | 5.24 (1.18) | .13 (.53) |

A Mann-Whitney *U* test showed that there was no significant difference between the effects of gain-framing (*n = 43, Mean Rank* = 45.12) and loss-framing (*n* = 38, *Mean Rank* = 36,34) on intention to change behaviour, *U* = 640, *z* = -1.71 (corrected for ties), *p* = .09, two-tailed.

# 6. Discussion

This study researched if an instructional video can be effective in influencing attitude, perceived control and intention to change behaviour. Specifically, a comparison was made between the effectivity of gain-and loss framing the instructional video. The outcomes and implications of the hypotheses are discussed in the following sections. Limitations are discussed and implications for practice and research are presented.

## 6.1 Effectivity of gain-framing

In line with previous studies (Janda et al., 2007; Calderon et al., 2007; Carey et al., 2008) the gain-framed instructional video was effective in positively influencing intention to change behaviour. Also, attitude and perceived control were influenced positively and significantly by the gain-framed instructional video. Given that behavioural change is complex and difficult to establish (Ajzen, 1991), it is promising that an instructional video on its own has caused a significant change. The significant change may have been reached by effectively using well-established design principles (e.g. Mayer, 2005; Van der Meij, 1995), a convincing structure based on Ajzen's (1991) theory of planned behaviour (as presented in Table 2) and the effective use of gain-framed messaging.

The findings have to be interpreted with some caution as the effect of the video on attitude was medium-sized and the effect sizes of perceived control and intention to change behaviour were small. The medium to small effect sizes may be inherent to the general effectivity of the medium of instructional video for this purpose. While a video may inform and convince significantly on its own (Ball-Rokeach et al., 1984), it may be too small of an intervention to reach a large behavioural change in most situations. Miller (2005) states that a combination of activities such as video and post video discussion gives students multiple opportunities to develop a cognitive response. A gain-framed instructional video combined with other interventions may reach larger effects.

Taken together, the first hypothesis is accepted. Gain-framed instructional video had a significant positive influence on attitude, perceived control and intention to change behaviour. The findings are in line with previous research and no reason to doubt the validity and reliability of the measures is provided. The results imply that when designing an instructional video aimed at affective learning goals, gain-framing

is effective. In order to make the instruction more effective, it may be useful to combine instructional video with other interventions.

### 6.2 Effectivity of loss-framing

It was hypothesized that the loss-framed instructional video would be effective in influencing attitude, perceived control and intention to change behaviour. The analysis showed that loss-framed instructional video was effective in influencing perceived control, but not in influencing attitude and intention to change behaviour significantly. The effect on perceived control has to be interpreted with caution, as the effect size was negligible.

The fact that only perceived control was influenced can partly be explained when looking at the video design. The part of the video that was aimed to influence attitude (i.e., the “why” in table 2) was influenced more by message framing than the part of the video that was aimed to influence perceived control (i.e. the “how” in table 2). In both conditions, the main part of the “how”-section consisted of modeling of methods, which has been established to be an effective method for instructional video design (Miller, 2005; Smith and Ragan, 1999, Tuong et al., 2014). The only difference for this part, was the argumentation around using the proposed methods to reduce screen time. For example, before modeling the method of turning off notifications, in the gain-framing condition it was narrated that ‘*If you turn off certain notifications, you will not be tricked into spending time on your phone*’ whereas in the loss-framing condition the narration was ‘*If you do not turn off certain notifications, you will be tricked into spending time on your phone*’. The video modeling that followed to display the method, was identical in both conditions. Since learners were presented the same tools to gain control over their phone use, it can logically be explained that perceived control was the only construct significantly influenced by the loss-framed instructional video. Thus, learners may be made aware of the control they have of using methods, but not be convinced to use them.

While loss-framed messaging has been effective in convincing occasionally (Solomon et al., 1988), its effects were often not competitive in comparison to gain-framing (Aponovitch, 2003; Tuong et al., 2014; Gallagher & Updegraff, 2011). One explanation of why loss-framing may be less effective can be found in the social judgment theory of Sherif and Hovland (1961). This theory states that a new attitude is more likely to be accepted when it falls into one’s “latitude of acceptance”. Thus, a

change in attitude may be established better when a message is moderately persuasive than extreme because it has higher chances of being accepted by the learner. The loss-framing condition uses a more threatening and extreme tone, which might raise resistance to the learner.

Another reason why loss-framing was not effective in changing attitude and intention to change behaviour, can be found in prospect theory. Previous research indicates that loss-framing can be effective for high-risk behaviours such as testing for HIV when one is uncertain about the outcome of the test (Aponovitch et al., 2003). Design for affective learning goals, especially those related to education, often does not resemble such a high-risk situation. Thus, it is more likely that loss-framing is not effective for a topic like reducing screen time.

Taken together, the second hypothesis is not accepted. Loss-framed instructional video has a significant influence on perceived control, but no influence was found on attitude and intention to change behaviour. However, the findings can be explained through video design and previous research. The current research combined with previous research may provide enough reason to establish the preference of gain-framing over loss-framing as a guideline for designing video instruction for (non-risk) behavioural change. No reason to doubt the validity and reliability of the measures is found.

### 6.3 Comparing effects of gain-framing and loss-framing

The gain-framing video was effective in establishing a change in attitude, perceived control and intention to change behaviour. The loss-framing video was only effective in establishing a significant change in perceived control. When comparing the pre- and post differences between both groups on attitude, perceived control and intention to change behaviour, all results were in favour of gain-framing. However, only the preference for perceived control was statistically significant. This implies that message framing might be more essential in convincing people why they should change their behaviour than in illustrating how people can change their behaviour, as both videos had a significant positive influence on perceived control. Regarding influencing perceived control, the video modeling strategy has proven to be effective. As many other health behaviour videos have used video modeling as well (Tuong et al., 2014), this strategy can be seen as essential in guiding for behavioural change and specifically in influencing perceived control.

Although gain-framing seems to be the preferred method of message framing when designing instructional video for the behavioural change, the difference is subtle. Some explanations are now presented.

The video was roughly eleven minutes long in both conditions. It is unclear if the video would have had a larger or smaller impact if it was longer or shorter. McGregor (1993) reported that attitude change decreased when intervention length increased, while Ball-Rokeoch et al. (1984) researched a video that was overwhelmingly effective that was half an hour long. It may be more beneficial to spend extra time on other activities than on a longer video. While a video has shown to be capable of informing and convincing significantly on its own (Ball-Rokeach et al., 1984; Calderon et al., 2007), it may generally be too small of an intervention to reach a large behavioural change in many situations. To establish a larger effect, a gain-framed instructional video can be combined with other interventions. Multi-instructional training has been argued to be more beneficial in terms of cognitive learning (Bezrukova et al., 2012) and the same may be true for affective learning. Some suggestions for additional learning activities are made.

Firstly, post video discussions have been proven to be helpful for affective learning goals. In their research for empirically funded guidelines for affective learning design, Simonson and Maushak (2001) found that providing post-instruction discussion or opportunity for critique is beneficial. For example, Allison (1966) compared the effectivity of motivational films when combined with different activities: the discussion of multiple-choice questions that were distributed before the video, discussion led by the investigator, discussion led by classroom teachers or no activity at all. A significant change in attitude was found for the group that discussed the multiple-choice questions and the group that discussed the video with the investigator. These effects were not found for groups that had no activity or a discussion led by a classroom teacher. Also, Wade and Pool (1983) researched educational television combined with written or spoken follow up activities, a combination of both, or no follow-up. The group that engaged in either spoken or written follow-up showed greater potential for attitude change and the group that followed an extensive follow-up (both written and spoken) reported the largest potential.

Other guidelines that may add to the effect of the video, are the elicitation of purposeful emotional involvement and the demonstration of the behaviour by a

respected role model (Simonson and Maushak, 2001). Miller (2005) presents a case that uses these guidelines, in which a teacher wants his students to understand the importance of participation in democracy. In his class, he starts by presenting information that elicits an emotional response (i.e. how recently women in the U.S. became part of the democracy), then he showed a video that showed role models for the students (i.e. the efforts of both black and white college students to make a difference) and then discusses what has been seen.

Taking the proposed learning activities together, Miller (2005) concludes that instruction should contain an emphasis on cognitive outcomes, then show a persuasive media message and conclude with a discussion session. Like this, students are challenged with multiple opportunities to develop and express their attitude and intention of behaviour (Zimbardo & Leippe, 1991) The current research adds to this finding, by showing that a well-designed instructional video can serve well as a persuasive message and that this video should preferably be gain-framed.

### 6.4 Limitations

The measurement of the constructs was heavily based on the guidelines of Ajzen (1991) and Francis et al. (2004). Surveys of the theory of planned behaviour have proven to be reliable and valid many times, and analysis of internal reliability showed no warning signs. The topic of interest was operationalized clearly, leaving little possible issues regarding validity.

A limitation of the study was the construction and use of indirect measures. The reliability and validity of these measures could not be accepted. Also, because the effects within groups were relatively small, measuring indirect attitude only after the intervention was not sufficient. Future research should recreate indirect measures through another elicitation study and include indirect measures pre-intervention as well as post-intervention to establish valid results.

Another possible limitation to the study is the homogeneous participant group. While all young adults were invited to participate, the participants consisted mainly of university students. This makes generalizing the results hard. Ansolabehere et al. (1993) suggest that educated people are less likely to accept new information because they are better equipped to counter-argue. Therefore, results might have looked more promising if a more heterogeneous participant group was reached.

Also, the setting of the study has to be discussed. The setting of the study was similar to previous research (i.e. individually watching a video), only this study was online from the participant's preferred time and location. Participants might have been distracted while watching the video, which could influence the reliability of the data.

Lastly, although the survey was deemed reliable and valid, only quantitative data was gathered and participants self-reported. Self-report studies are inherently victim to some bias. Participants may have exaggerated or underestimated their beliefs or interpreted questions differently.

### 6.5 Implications

**Practical Implications.** The current research implies when designing instructional video for behavioural change a preference is given to a gain-framed messaging strategy. This is in line with previous research and applicable to most instructional videos targeting affective learning goals. It is safe to say that it is recommended for this type of video to use gain-framed messaging. Previous research shows that an exception must be made for stimulating high-risk behaviours such as detention of illness: in those cases, loss-framing has shown to be a worthy competitor to gain-framing.

A gain-framed instructional video has effects on attitude perceived control and intention to change behaviour that range from small- to medium-sized. In order to increase effect size, an important consideration to be made is the combination of instructional video with other interventions. For example, post-video discussions, quizzing, role play and appealing to emotions have all been found to add to the effect of video for attitudinal change.

**Theoretical implications**. Although more empirical studies regarding gain-framing and loss-framing in instructional videos would be of value, the notion that gain-framing generally is more effective for instructional video is largely confirmed.

A more interesting topic of research is enlarging the effect of instructional video for affective learning goals. For example, a gain-framed instructional video can be combined with a post-viewing discussion, demonstrations by respected models or role-playing. This could be done in different situations, ranging from different target groups such as primary schools or organizations to different topics such as alcohol consumption or diversity training.

Furthermore, future research should focus on empirically establishing other guidelines for designing instructional video for affective learning goals. For example, since much research in the field of health research does not explain the type of video used a comparison can be made between video types. For example, animated video (like the current study), talking head video (found effective by Aponovitch et al., 2003) and scenario-based video (found effective by Solomon et al., 1988).

## 7. Conclusion

The question that was aimed to be answered in the current research was “Which message-framing technique is more effective to establish an intention to change behaviour in an instructional video?”

The current study showed that instructional video can be a useful medium to influence affective learning goals such as intent to change behaviour. The current study also found that when designing a video for such a purpose, gain-framed messages are preferred over loss-framed messages. This is in line with previous research on the matter.

The current study was one of few studies that establishes a guideline for designing video instruction targeting the affective learning domain. More research is necessary to confirm and elaborate on the advantages of gain-framing over loss-framing in different settings. Also, more research must be done to establish more guidelines that fit designing instructional video for affective learning goals.

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## Appendix A

Indirect measures

Only categories with 5 or more occurrences in the answers are presented.

Q1: What would be the advantages of reducing phone screen time for you?

Advantages for reducing screen time: Categories and occurence, ordered on number of occurence.

| Category | Example | Number of Occurences |
|---|---|---|
| More time (in general) | “I would do more creative stuff like painting and drawing”, “It would save me time” | 16 |
| Productivity | “More time to study”, “I can focus more on my goals” | 13 |
| Being more present | “I could be more present in the real world instead of virtual world” “Just being in the moment” | 8 |
| Rest for the eyes | “Less eye strain” | 8 |
| Better rest | “Relax more”, “Better sleep perhaps” | 7 |
| More time (for friends and family) | “I would have more time for other things like friends and family” | 7 |
| Less flooded mind | “Not cook my brain with imagery/input”, “Less busy in your head because of all the impulses” | 7 |

Q2: What would be the disadvantages of reducing phone screen time for you?

| Category | Example | Number of Occurences |
|---|---|---|

| | | |
|---|---|---|
| Being less connected to friends/family | ‘Missing stuff my friends send me’ | 16 |
| Practical reasons | Efficiency of tasks. I rely on my phone to manage my calendar, emails and communication. | 7 |
| Less connected to news/the world | ‘Being less informed and "connected (updated) with what is happening in the world"’ | 6 |
| Boredom/inconvenience/less fun | ‘Be bored as you don’t know what to do in waiting times’, ‘Less entertainment from social media’ | 5 |
| Fear of missing out | ‘Sometimes having the feeling I am missing out on something’ | 5 |
| None | ‘I don’t think there would be any disadvantage’ | 5 |

Q3: What factors or circumstances make it difficult or impossible for you to reduce your phone screen time?

| Category | Example | Number of Occurences |
|---|---|---|
| Social expectations to be reachable | ‘Sometimes, having the feeling I need to respond to every needs/demand from external world’ | 14 |
| Dependency in daily life | ‘I need my phone for important things like work, timeschedules, my agenda etc. I need these things to function normally.’ | 10 |
| Boredom | ‘Boredom while commuting’ | 6 |

**Analysis of indirect measures**

***Indirect attitude.*** Indirect attitude consists of the combination of two constructs: behavioural beliefs (e.g. If I reduce my screen time, I will be more productive) multiplied by the strength of behavioural beliefs (e.g. Being more productive is…). The behavioural beliefs construct as well as the strength of behavioural beliefs showed to have a poor internal consistency, respectively Cronbach's α = .562 and Cronbach's α = .529 . However, this is understandable as participants might very reasonably hold opposable beliefs (Francis et al., 2014). A bivariate correlation between direct attitude and indirect attitude was run. This correlation positive and medium strength, $r(72) = .57$, $p < .001$. A pilot analysis with two participants showed one unclarity in formulation: 'I will experience practical inconvenience'. This was edited to be more clear by providing examples on the base of the elicitation study: 'I will experience practical inconvenience (e.g. receiving messages too late, missing meetings)'. However, since there was no way to establish reliability for the measures, the measure was rejected.

***Indirect perceived control.*** Indirect perceived control consists of two constructs: control beliefs (e.g. I am dependent on using my phone in daily life) multiplied by the strength of control beliefs (e.g. Being dependent on using my phone in daily life makes it … to take measures to reduce my mobile phone use). The internal consistency of control beliefs as well as strength of control beliefs showed to have a very poor internal consistency, respectively Cronbach's α = .173 and Cronbach's α = .384. A bivariate analysis showed that direct and indirect measures of perceived control did not correlate significantly, $r(79) = .03$, $p = .804$. Based on this, validity cannot be assumed. Francis et al. (2014) state that low correlation may be a result of not covering the breadth of the construct. There was no indication that the indirect perceived control measure was a valid or reliable measure. Furthermore, the scale only consisted of four items, indicating possible low validity.

## Appendix B

Survey

MESSAGE FRAMING AND INTENTION TO CHANGE BEHAVIOUR

Welcome to this experiment. I am Nina de Vries, an Educational Science & Technology master student at the University of Twente. I will be leading this research.
The experiment consists of watching an 11-minute video and filling in a questionnaire. Taken together, it will cost you roughly half an hour to complete.

Before participating, you are asked to agree to the **informed consent form** below. Please read the form, and agree with the terms by **filling in your full name (first and last).**

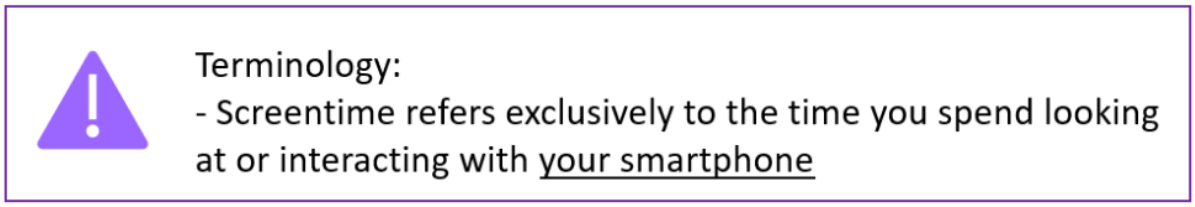
| | |
|---|---|
| Fill in your full name (front and last) to confirm your informed consent: | |

You are now asked to fill in some demographic questions

| | |
|---|---|
| What is your age? | e.g. 18, 22, 29 |
| What is your gender? | e.g. Female, Male, Other |
| What is your nationality? | e.g. Dutch, German, Indian |
| What is the highest level of education you have followed or are currently following? | ☐ Primary school<br>☐ High school<br>☐ Bachelor's degree<br>☐ Pre-master<br>☐ Master's degree |
| What study programme did you follow or do you currently follow? | |

| | |
|---|---|
| How many hours per day do you estimate you spend looking at or interachting with your iPhone? (If your screen time settings on your iPhone are on, you can find this by going to Settings → Screen time → See all activity → Past seven days) | ☐ < 1 hour per day<br>☐ 1-2 hours per day<br>☐ 2-4 hours per day<br>☐ 4-6 hours per day<br>☐ > 6 hours per day |

You are now asked five questions regarding your opinion on reducing your screen time on your phone.




Construct: Direct measures Attitude

| Reducing my screen time is… | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Very harmful ☐ | Harmful ☐ | Somewhat harmful ☐ | Neutral ☐ | Somewhat beneficial ☐ | Beneficial ☐ | Very beneficial ☐ |
| | Very bad ☐ | Bad ☐ | Somewhat bad ☐ | Neutral ☐ | Somewhat good ☐ | Good ☐ | Very Good ☐ |
| | Very unenjoyable ☐ | Unenjoyable ☐ | Somewhat unenjoyable ☐ | Neutral ☐ | Somewhat enjoyable ☐ | Enjoyable ☐ | Very enjoyable ☐ |
| | Very unpleasant for me ☐ | Unpleasant for me ☐ | Somewhat unpleasant for me ☐ | Neutral ☐ | Somewhat pleasant for me ☐ | Pleasant for me ☐ | Very pleasant for me ☐ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Very worthless ☐ | Worthless ☐ | Somewhat worthless ☐ | Neutral ☐ | Somewh at useful ☐ | Useful ☐ | Very useful ☐ |

Construct: Direct measures Perceived control

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| I am confident that I can reduce my screen time | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewh at agree ❒ | Agree ❒ | Strongly agree ❒ |
| For me to reduce my screen time is easy | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewh at agree ❒ | Agree ❒ | Strongly agree ❒ |
| The decision to reduce my screen time is in my control | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewh at agree ❒ | Agree ❒ | Strongly agree ❒ |
| Whether I reduce my screen time is entirely up to me | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewh at agree ❒ | Agree ❒ | Strongly agree ❒ |

Construct: Direct Measures Intention to change behaviour

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| I expect to reduce my | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewh at agree ❒ | Agree ❒ | Strongly agree ❒ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| screen time | | | | | | | |
| I want to reduce my screen time | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewh at agree ❒ | Agree ❒ | Strongly agree ❒ |
| I intend to reduce my screen time | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewh at agree ❒ | Agree ❒ | Strongly agree ❒ |

Tab 2: Part 1

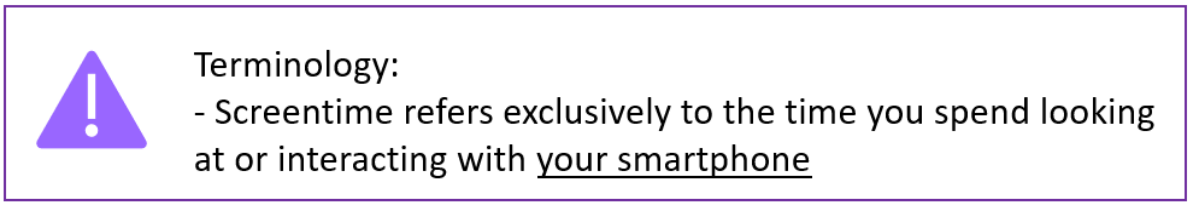
Please watch the following video. You are recommended to put the video in full screen mode. You can follow the instructions in the video if you want: you are not obliged to.

(Full videos are shown in Appendix C)

**You can now proceed by clicking 'Part 2' in the upper left corner. This page will save automatically. Please do not return to this page after proceeding to the next part.**

Tab 3: Part 2

You are now asked to fill in this survey. It consists of 42 questions, all using a Likert scale.




Construct: Indirect measures attitude – behavioural beliefs

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| If I reduce my screen time… | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| … I will have more time for other activities | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |
| … I will be more productive | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |
| … I will be more present in the moment | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |
| … I will experience less eye strain | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |
| … I will rest better | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |
| … I will have more time to spend with friends and family | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |
| … my mind will be less overwhelmed | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |
| … I will be less connected to my friends and family | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |
| … I will experience practical inconvenience (e.g. receiving messages too | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| late, missing meetings) | | | | | | | |
| … I will be less up to date to current news and events | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |
| … I will experience more boredom | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |
| … I will fear that I am missing out | Very unlikely ❒ | Unlikely ❒ | Somewhat unlikely ❒ | Neutral ❒ | Somewhat likely ❒ | Likely ❒ | Very likely ❒ |

Construct: Indirect measures attitude – outcome evaluations

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Having more time for other activities is… | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |
| Being more productive is… | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |
| Being more present in the moment is. | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |
| Experiencing less eye strain is… | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |
| Resting better is… | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Having more time to spend with friends and family is… | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |
| My mind being less overwhelmed is… | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |
| Being less connected to my friends and family is… | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |
| Experiencing practical inconveniences (e.g. receiving messages too late, missing meetings) by reducing screen time is… | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |
| Being less up to date to current news and events is… | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Experiencing more boredom is… | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |
| Having a fear of missing out is… | Very undesirable ❒ | Undesirable ❒ | Somewhat undesirable ❒ | Neutral ❒ | Somewhat desirable ❒ | Desirable ❒ | Very desirable ❒ |

Construct: Direct measures Attitude

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Reducing my screen time is… | | | | | | | |
| | Very harmful ☐ | Harmful ☐ | Somewhat harmful ☐ | Neutral ☐ | Somewhat beneficial ☐ | Beneficial ☐ | Very beneficial ☐ |
| | Very bad ☐ | Bad ☐ | Somewhat bad ☐ | Neutral ☐ | Somewhat good ☐ | Good ☐ | Very Good ☐ |
| | Very unenjoyable ☐ | Unenjoyable ☐ | Somewhat unenjoyable ☐ | Neutral ☐ | Somewhat enjoyable ☐ | Enjoyable ☐ | Very enjoyable ☐ |
| | Very unpleasant for me ☐ | Unpleasant for me ☐ | Somewhat unpleasant for me ☐ | Neutral ☐ | Somewhat pleasant for me ☐ | Pleasant for me ☐ | Very pleasant for me ☐ |
| | Very worthless ☐ | Worthless ☐ | Somewhat worthless ☐ | Neutral ☐ | Somewhat useful ☐ | Useful ☐ | Very useful ☐ |

Construct: Indirect measures perceived control – control beliefs

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| I feel that others | Strongly disagree | Disagree ❒ | Somewhat disagree | Neutral ❒ | Somewhat agree | Agree ❒ | Strongly agree |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| expect me to be accessible through my phone | ❒ | | ❒ | | ❒ | | ❒ |
| I am dependent on using my phone in daily life | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewhat agree ❒ | Agree ❒ | Strongly agree ❒ |
| Boredom is a strong trigger for me to use my phone | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewhat agree ❒ | Agree ❒ | Strongly agree ❒ |

Construct: Indirect measures perceived control – strength of control beliefs

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Feeling that others expect me to be accessible through my mobile phone makes it … to take measures to reduce my mobile phone use. | Much less likely ❒ | Less likely ❒ | Somewhat less likely ❒ | Neutral ❒ | Somewhat more likely ❒ | More likely ❒ | Much more likely ❒ |
| Being dependent on using my phone in daily life makes it … to take measures to reduce my mobile phone use. | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewhat agree ❒ | Agree ❒ | Strongly agree ❒ |

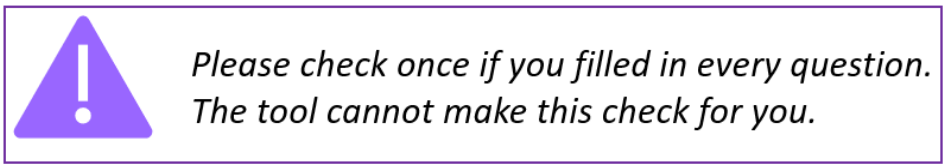
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Being triggered by boredom to use my phone makes it … to take measures to reduce my mobile phone use. | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewhat agree ❒ | Agree ❒ | Strongly agree ❒ |

Construct: Direct measures Perceived control

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| I am confident that I can reduce my screen time | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewhat agree ❒ | Agree ❒ | Strongly agree ❒ |
| For me to reduce my screen time is easy | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewhat agree ❒ | Agree ❒ | Strongly agree ❒ |
| The decision to reduce my screen time is in my control | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewhat agree ❒ | Agree ❒ | Strongly agree ❒ |
| Whether I reduce my screen time is entirely up to me | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewhat agree ❒ | Agree ❒ | Strongly agree ❒ |

Construct: Direct Measures Intention to change behaviour

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| I expect to reduce my screen time | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewh at agree ❒ | Agree ❒ | Strongly agree ❒ |
| I want to reduce my screen time | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewh at agree ❒ | Agree ❒ | Strongly agree ❒ |
| I intend to reduce my screen time | Strongly disagree ❒ | Disagree ❒ | Somewhat disagree ❒ | Neutral ❒ | Somewh at agree ❒ | Agree ❒ | Strongly agree ❒ |




**You can now proceed by clicking 'Part 3' in the upper left corner. This page will save automatically. Please do not return to this page after proceeding to the next part.**

Part 3

You have reached the end of the experiment. **Thank you** for participating!

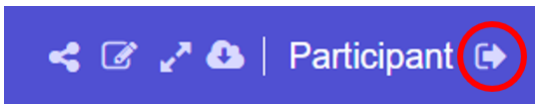
As stated in the informed consent, you will now be briefed about the conditions. In this study, it was researched if gain- or loss-framing was more effective in an instructional video targeting the intention to change behaviour. Therefore, in one condition the video was framed with emphasis on what you would lose by not changing your behaviour, whereas the other condition emphasized what you would gain by changing your behaviour.

If you have any questions, comments or if you would like to withdraw your initial consent, do not hesitate to e-mail me: n.s.devries@student.utwente.nl.

If you would like me to send you a summary of the results of this study, leave your e-mail address here:

If you have any comments for me, leave them here:

**You can now log out by clicking on this button next to your name in the top right corner:**



**Appendix C**

Full script gain- and loss-framing

| | Gain-framing | Loss-framing |
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| Introduction | The smartphone. Everything we want and need is in there. No wonder that a lot of people have a hard time putting it down. This video will teach you why and how you can reach a more balanced and conscious smartphone use, using insights from scientific articles, news and other content. | The smartphone. Everything we want and need is in there. No wonder that a lot of people have a hard time putting it down. This video will teach you why and how you can reach a more balanced and conscious smartphone use, using insights from scientific articles, news and other content. |
| Why | Let's start with three reasons why should consider to use methods to reduce your screen time. | Let's start with three reasons why should consider to use methods to reduce your screen time. |
| Why-1 | The first reason, is that you will be more prepared to deal with the addictive nature of your phone<br><br>Apps are designed very carefully to keep you engaged, because your eyes on the screen equals money for the app.<br><br>Think about autoplay to the next video, infinite scrolling without end, a constant stream of | The first reason, is that if you do not take action, you are unprepared to deal with the addictive nature of your phone<br><br>Apps are designed very carefully to keep you engaged, because your eyes on the screen equals money for the app.<br><br>Think about autoplay to the next video, infinite scrolling without end, a constant stream of |

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| | notifications and pulling a page up to refresh like a slot machine. These design choices impact your individual control and make you feel really good, because it is a source of instant gratification. These are optimal circumstances for addictive behaviour.<br><br>Research confirms that people are sensitive to this. Completing a task on the phone like answering an e-mail, takes us four times longer than we intended because of distractions within the phone This multitasking between media has shown to have a poor effect on attention control and cognitive resources. Also, while we think we have a good reason to check our phones like checking the time, it is often a more emotional sensation that we are after, like the thrill of new notifications.<br><br>In conclusion, your phone is designed to be addictive, prepare yourself, and control your phone instead of having your phone control you. | notifications and pulling a page up to refresh like a slot machine. These design choices impact your individual control and make you feel really good, because it is a source of instant gratification. These are optimal circumstances for addictive behaviour.<br><br>Research confirms that people are sensitive to this. Completing a task on the phone like answering an e-mail, takes us four times longer than we intended because of distractions within the phone This multitasking between media has shown to have a poor effect on attention control and cognitive resources. Also, while we think we have a good reason to check our phones like checking the time, it is often a more emotional sensation that we are after, like the thrill of new notifications.<br><br>In conclusion, your phone is designed to be addictive, if you don’t prepare yourself, your phone will control you instead of you controlling your phone |

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| Why-2 | The second reason to use methods to reduce screen time, is that you will learn to focus better.<br><br>Imagine the time available in your day to be productive. Now add the inevitable interruptions of other people, meetings and urgent things. Now add the times you check out your phone, taking the average of 40 times per eight hours. There is very little time left for concentration.<br><br>Now imagine a situation on that same day in which you control your screen time more. Here is the time, the interruptions and your phone use. If you do this, there is more time left for deep concentration.<br><br>Doing this is hard, because your phone gives you small, immediately available rewards that make you feel good but research has shown that less smartphone use leads to being better at delaying rewards. And delaying those rewards, is | The second reason to use methods to reduce screen time, is that your focus declines if you do not<br><br>Imagine the time in your day in which you control your phone checks. Here is the time, here are the inevitable interruptions of other people, meetings or breaks. Now the controlled times you check out your phone. There is quite some time you could use for concentration.<br><br>Reality is more like this. Your time, the inevitable interruptions, and your phone use would look something like this, taking the average of 40 times per 8 hours. There is very little time, if any, for prolonged periods of focus.<br><br>Doing this is hard, because your phone gives you small, immediately available rewards that make you feel good but research has shown that smartphone use leads to being less good at delaying rewards. And if you cannot delay those |

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| | exactly what is necessary for achieving a disciplined and productive mindset. Moreover, smartphones are very successful in distracting you from your goal activity. So much, that just removing your phone from your sight, is related to focused attention and task performance.<br><br>In conclusion: if you use methods to reduce your screen time, your focus is almost guaranteed to improve. | rewards, you cannot reach a disciplined and productive state of mind. Moreover, smartphones are very successful in distracting you from your goal activity. So much, that if you have your phone in sight, that is related to decreased focused attention and task performance.<br><br>In conclusion: if you don't use methods to reduce your sreentime, your focus is almost guaranteed to decline. |
| Why-3 | The third and last reason is that you will learn to recharge yourself better<br><br>If you are feeling anxious and overwhelmed sometimes, you are not the only one<br><br>Your life may already be filled with things to do. If you reduce the constant stream of stimuli of your phone, you will find valuable time to recharge.<br><br>First of all, you will recharge better because of better sleep | The third and last reason you should use methods, is that you are draining your energy<br><br>If you are feeling anxious and overwhelmed sometimes, you are not the only one<br><br>Your life may already be filled with things to do. If you don't reduce the constant stream of stimuli of your phone, you will have no time to recharge yourself.<br><br>First of all, you will drain your energy because of worse sleep |

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| | quality. If you remove bright and blue lights in the evening, as well as the psychological arousal that comes with being on your phone, sleep quality will increase.<br><br>You will also recharge better by choosing more activities that replenish your energy. The phone has found a way to replace a lot of activities, but your phone is very different from hobbies and quality time.<br><br>While occasionally using your phone in your down time is nothing to worry about, you could trade it for more time. More time to be with friends and family, more time for lost hobbies and more time to simply be and do nothing for a moment.<br><br>Like this, you will avoid less pleasant elements of phone use. For example, the constant calls for you attention, the exposure to glorified lives of other people and a never ending stream of news and opinions. | quality. If you don't remove bright and blue lights in the evening, as well as reduce psychological arousal that comes with being on your phone, your sleep quality will decline.<br><br>You will also drain your energy by choosing less activities that replenish your energy. The phone has found a way to replace a lot of activities, but your phone is very different from hobbies and quality time.<br><br>By not reducing your screen time, you will expose yourself to less pleasant elements of phone use. For example, the constant calls for you attention, the exposure to glorified lives of other people and a never ending stream of news and opinions.<br><br>While occasionally using your phone in your down time is nothing to worry about, you are missing out on valuable time. Time to be with friends and family, time for lost hobbies and time to simply be and do nothing for a moment. |

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| | In conclusion: If you use methods to reduce your phone use, you will sleep better and spend your free time in a way that recovers you. | In conclusion: If you don't use methods to reduce your phone use, you will sleep worse and be constantly tempted to spend your free time in a way that drains you. |
| How | So how do we create a more balanced environment? You are now presented five methods that you are advised to use to use on your phone. After every step, you can pause the video to take action. | So how do we create a more balanced environment? You are now presented five methods that you are advised to use to use on your phone. After every step, you can pause the video to take action. |
| How-1 | Method 1.<br>One, turn of notifications If you turn off certain notifications, you will not be tricked into spending time on your phone. A good guideline is to turn off notifications that are not from people that are directly trying to reach you.<br>Let´s try it out together. Take your phone and follow my steps. Pause the video if you need to. | Method 1.<br>One, turn of notifications. If you don't turn off certain notifications, you will be tricked into spending time on your phone. A good guideline is to turn off notifications that are not from people that are directly trying to reach you.<br>Let´s try it out together. Take your phone and follow my steps. Pause the video if you need to.<br>Go to settings and tap |

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| | Go to settings and tap notifications. Select an app, for example Instagram. Disallow notifactions and disallow sounds. Also disallow badges, the red circular notifications on your home screen. Now you will only check out this app, when you choose to. This is a crucial step if you are serious about reducing screen time. Repeat this process for every app. Pause the video if you want to do this now. | notifications. Select an app, for example Instagram. Disallow notifactions and disallow sounds. Also disallow badges, the red circular notifications on your home screen. Now you will only check out this app, when you choose to. This is a crucial step if you are serious about reducing screen time. Repeat this process for every app. Pause the video if you want to do this now. |
| How-2 | Method 2.<br>Two, use do not disturb. If you use the do not disturb feature in a smart way, you can consciously create moments in which you say ‘no’ to your phone. Let’s explore the options right now.<br><br>Take your phone and swipe up from anywhere to reach the control panel. Tap the moon icon to enable do not disturb. You will not receive calls or notifications, until you enable again. Tap and hold the icon. Choose schedule to go to settings. This will allow you for instance, to set a scheduled time to not be | Method 2.<br>Two, use do not disturb. If you don’t use the do not disturb feature in a smart way, you cannot consciously create moments in which you say ´no´ to your phone. Let´s explore the options right now.<br>Take your phone and swipe up from anywhere to reach the control panel. Tap the moon icon to enable do not disturb. You will not receive calls or notifications, until you enable again. Tap and hold the icon. Choose schedule to go to settings. This will allow you for instance, to set a scheduled time to not be disturbed. For example, set a time in which you |

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| | disturbed. For example, set a time in which you should be resting such as 11 in the evening until 8 in the morning. If you still want to be accessible to some people, allow calls from favourites. In your calling center you can add these favourites on the most left tab.<br>Pause the video if you want to do this now. | should be resting such as 11 in the evening until 8 in the morning. If you still want to be accessible to some people, allow calls from favourites. In your calling center you can add these favourites on the most left tab.<br>Pause the video if you want to do this now. |
| How-3 | Method 3.<br><br>Three, create a distraction free home screen. If you rearrange your home screen to include only your essentials for everyday life, you will be less tempted to be on your phone longer than you intended.<br><br>To do this, go to your home screen and rearrange apps. Keep apps that you need on the regular, move the apps that suck you into their content . For example, keep your agenda and navigation tools, but move e-mail and social media to the next page. | Method 3.<br><br>Three, create a distraction free home screen. If you don’t rearrange your home screen to include only your essentials for everyday life, you will be tempted to be on your phone longer than you intended.<br><br>To do this, go to your home screen, tap and hold, and rearrange apps. Keep the apps that you need on the regular, move the apps that suck you into their content. For example, keep your agenda and navigation tools, but move e-mail and social media to the next page. |

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| | Pause this video if you want to do it now. | Pause this video if you want to do it now. |
| How-4 | Method 4<br>Four, delete apps. If you delete an app, you remove the frictionless experience of apps. You can still visit the website, it is just a little less easy and therefore less tempting.<br>Take your phone and go to the home screen. Rearrange apps. Delete especially those apps that suck you into them by their autoplay or infinite scrolling.<br>Pause the video if you want to do this now. | Method 4<br>Four, delete apps. If you don't delete apps, you keep the frictionless experience of apps. You can still visit the website, it is just a little less easy and therefore less tempting.<br>Take your phone and go to the home screen. Rearrange apps. Delete especially those apps that suck you into them by their autoplay or infinite scrolling.<br>Pause the video if you want to do this now. |
| How-5 | Method 5<br>Five, use app limits. If you set app limits, you will become aware of how much time you want to spend on apps compared to how much you do in reality. You will be made aware when you pass your own limit.<br>Let´s try it out together. Go to screen time in settings and tap app limits, tap add limit and select a category or extend categories for specific apps and websites. Select one or more apps, add a time and there is | Method 5<br>Five, use app limits. If you don't set app limits, you will be unaware of how much time you want to spend on apps compared to how much you do in reality. You will be made aware when you pass your own limit.<br>Let´s try it out together. Go to screen time in settings and tap app limits, tap add limit and select a category or extend categories for specific apps and websites. Select one or more apps, add a time and there is your limit. You can repeat this for several apps, |

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| | your limit. You can repeat this for several apps, or tap edit list to include more apps in your current limit.<br><br>When you reach the limit, you will be notified and asked to tap OK to not open the app, or tap to ignore the limit for a while.<br><br>Pause the video if you want to do this now. | or tap edit list to include more apps in your current limit.<br><br>When you reach the limit, you will be notified and asked to tap OK to not open the app, or tap to ignore the limit for a while.<br><br>Pause the video if you want to do this now. |
| Summary | Summarized, there are five things that you can very easily do to balance your screen time. Be very critical in what kind of notifications you allow; use do not disturb; create a distraction free home screen; delete apps; and use app limits.<br><br>These methods can help you in order to reach a balanced and intentional smartphone use. You are encouraged to try out all of them. | Summarized, there are five things that you can very easily do to balance your screen time. Be very critical in what kind of notifications you allow; use do not disturb; create a distraction free home screen; delete apps; and use app limits.<br><br>Not using these methods may hinder you in order to reach a balanced and intentional smartphone use. You are encouraged to try out all of them. |

Video 1.

Instructional video about reducing screen time – condition: gain-framing

Video 2.

Instructional video about reducing screen time – condition: loss-framing