

# Free money? Why not?!

## Using a letter experiment to explain non-take-up of the Dutch supplementary grant

Aanvullende beurs

Het bedrag is afhankelijk van het inkomen van uw ouders.

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### **Statement of Originality**

This document is written by Leon Prins who declares to take full responsibility for the contents of this document. I declare that the text and the work presented in this document are original and that no sources other than those mentioned in the text and its references have been used in creating it. Radboud University is solely responsible for the supervision of completion of the work, not for the contents.

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## Abstract

Literature distinguishes three major reasons for non-take-up of social benefits: (i) a lack of information, (ii) (perceived) complexity of application and (iii) psychological costs like stigma and (perceived) risks. This thesis uses an RCT to analyze whether these factors play a role for non-take-up of the Dutch supplementary student grant. We have tested whether sending emails that contained sentences designed to decrease perceived complexity and risks increase application rates compared those that received no email or a basic info mail without these specific sentences. Our results show that all interventions significantly increased take-up of the supplementary grant by up to 4.7pp compared to when no email was sent. This implies that there might have been some lack of information. Furthermore, only the combination of interventions had a significantly bigger impact of 2.0pp on application rates than the basic info mail. This could imply that either the population was too small to show significance for the separate effects or there is an interaction effect in place, which means a certain information threshold should be passed to convince students to apply. Furthermore, a questionnaire revealed that underlying perceptions did not change, suggesting that our interventions only have short-term behavioral effects and do not change perceptions.

## 1. Introduction

A large share of social benefits do not end up where it is supposed to as a lot of people fail to apply for the benefits they are entitled to. This seriously compromises the main objectives of social assistance benefits which in many cases are to financially support the lesser-of (Bargain et al., 2012). Aside from these direct effects, there are also indirect effects of so-called non-take-up. Non-take-up of benefits that incentivize labor market activation, for example, might have long-term effects on unemployment and poverty (Ramnath & Tong, 2017) and non-take-up of health benefits can negatively affect health (Finkelstein & Notowidigdo, 2019), which in turn has negative economic effects (Dubois & Ludwinek, 2014). Furthermore, non-take-up makes it harder to accurately anticipate costs regarding reforms (Hernanz et al., 2004), it might have negative consequences for trust in institutions (Dubois & Ludwinek, 2014) and there are signs that high non-take-up is accompanied by relatively high take-up of non-eligible people (Matsaganis et al., 2010). Non-take-up thus seriously endangers multiple policy goals.<sup>1</sup>

When looking at levels of non-take-up, a recent study of the Dutch Ministry of Finance finds so called non-take-up rates of more than 10% for national benefits regarding health care, housing and children (Ministerie van Financiën, 2019), while studies on local benefits indicate these exceed 50% (Tempelman et al., 2011). These Dutch figures seem quite high but fade away when looking at figures of other countries. Non-take-up for the Earned Income Tax Credit (EITC), the largest anti-poverty program in the US, has been estimated at around 25% (Plueger, 2009) and the similar British Working Tax Credit (WTC) has a non-take-up rate of 37%. Likewise, the British Child Tax Credit shows non-take-up of 17% (HM Revenue & Customs, 2017) and the French Revenu de Solidarité Active (RSA), which covers basic income support, has a non-take-up rate of around 30% (Chareyron, 2014)<sup>2</sup>.

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<sup>1</sup> See Dubois & Ludwinek (2014) for a full list of 11 downsides of non-take-up.

<sup>2</sup> For more figures on non-take-up of different social benefits in the US and the UK see the literature review by Currie (2004). For more international figures see Dubois & Ludwinek (2014).

This study will focus on non-take-up of the Dutch supplementary grant. This benefit reduces costs of education and thus stimulates investment in human capital, which in turn leads to productivity gains and economic growth. This policy goal will only be achieved if students actually apply for these grants, however, which often is not the case. Recent research shows that 34% of all eligible first year-students do not take up their grant and this number is still 31% for second-year students (Konijn, 2020). Non-take-up of student grants has some serious negative effects. One negative effect that is associated with non-take-up of student grants is lower participation in education (Bettinger et al., 2012). It also appears that students who do not take up student grants conduct more labor than their counterparts who do take up their grants (Herber & Kalinowski, 2019), which in turn has negative effects on the time spent on studying (Oosterbeek & van den Broek, 2009). Although these students work more hours to compensate for their lower income, research also suggests that non-take-up leads to significant income differences between students that do and don't take-up their student grants (Herber & Kalinowski, 2019). Students that do not take up their benefits might also face more financial stress, which can decrease academic results and delay study completion (Heckman et al., 2014).

The understanding of non-take-up in economic literature has been rising lately, especially since the rise of behavioral economics. While early studies mainly look at levels of non-take-up and try to model these (e.g. Van Oorschot, 1991), a recent stream of behavioral literature extends older cost-benefit analyses with behavioral insights or tests hypotheses empirically via randomized controlled trials (e.g. Bhargava & Manoli, 2015). The interest in experimenting with different schemes or communication has been accompanied with a rise in interest from policymakers, which fits in the wider image of increased interest of policymakers in behavioral insights and evidence-based policymaking (Strasheim et al., 2014). Due to resource restrictions of governments, behavioral insights from literature are often applied directly without testing possible effects. Examples of this implementation before testing regarding non-take-up are the Dutch municipalities Maastricht and Utrecht, where measures to increase take-up were not tested before implementation (Donker, 2018; Paes, 2016) or in the US where only a combination of multiple interventions was tested (Ideas42, 2016). This could be one of the reasons why experimental studies on non-take-up remain scarce, even though there is a surge in evidence-based policymaking.

From current literature, it seems that the main reasons for non-take-up are a lack of knowledge, complexity of the application and psychological costs (e.g. Bhargava & Manoli, 2015; Currie, 2006; Dubois & Ludwinek, 2014; Hernanz et al., 2004). Like Currie (2006) noted, however, non-take-up of social benefits remains a continuing puzzle, with advanced experiments as a way to find solutions. This thesis will contribute to a solution of this puzzle, in particular for non-take-up of student grants and non-take-up in a Dutch context. In order to do so, I designed a randomized controlled trial (RCT) in collaboration with the Dutch Ministry of Education, Culture and Media and DUO, the executor of the Dutch supplementary student grant. Similar to an earlier experiment with the EITC (Bhargava & Manoli, 2015), we will assess the relevant factors for non-take-up of the Dutch supplementary student grant and test whether communication that aims at decreasing the influence of these factors will increase take-up.

More specifically, we have tested four interventions, which we have sent via email. A first intervention was constructed using several behavioral techniques in order to increase knowledge about the supplementary grant. A second email contained two extra sentences that encourage to apply when one has difficulties of calculating eligibility and state that DUO

will examine eligibility itself. By adding these sentences, we have tried to decrease perceived complexity of application. In a third intervention, we have added information on risks regarding an application to the basic information email in order to reduce perceived risks. A last group received a mail with a combination of these interventions. Take-up rates of all students receiving these different letters were compared to take-up of students that did not receive a message. After one month, we have also send a questionnaire to measure whether perceptions on the supplementary grant had changed as a result of our intervention.

Results of the interventions show that sending a proactive mail results in significantly higher take-up. The average eligibility of people that were convinced to apply by these interventions is not significantly different from the control group. Furthermore, the mails that tried to reduce perceived complexity and risks did not show significantly different results than the basic info mail. While these effects are not significant for this experiment, there are indications that these effects exist. A combination of interventions does show a significant higher take-up, which might imply either an addition of two separate effects or an interaction effect. Either way, extra information tends to increase take-up in this study. Results from a questionnaire that was done afterwards tells that these effects are not the result of shifting perceptions about the supplementary grant.

This thesis is structured as follows. First, I will give a short overview of the Dutch system of student financing after which a literature review covering non-take-up of social benefits in general will follow. This literature review focusses at the three main causes of non-take-up and applies them to the Dutch supplementary grant after which for every cause an intervention is proposed. After this, the methods of the RCT and the questionnaire will be explained after which the results will be dealt with. We will end with a conclusion where we interpret the results and a discussion in which implications of the results for further research are stated and policy recommendations will be done.

## **2. Dutch system of student financing**

Before diving into literature on non-take-up, I will first give a short overview of the Dutch system of student financing. This system consists of two types of financing: income transfers and loans. Also, there are some differences between the three main educational levels, which are academic education (WO), the Dutch equivalent to universities of applied science (HBO) and practical education (MBO). WO requires students to have followed the secondary school level VWO, which takes six years to complete and HBO requires HAVO, which takes five years and MBO requires VMBO, which takes four years. HBO and WO together are also called higher education (HO) as they experience similar rules. This study focuses mainly on higher education as this study focusses on secondary scholars above the age of 18, who are not likely to study MBO.

There are three types of income transfers: the basic grant, supplementary grant and travelling product. The basic grant is only available for MBO-students and is unconditional on parental income. The supplementary grant is available for all students and its height depends on the number of siblings and whether they go to school, student debt of biological parents and the income of the biological parents of two years ago. The traveling product is available for all students, is to ensure cheap public transport for students. Of these income transfers, only the basic grant is an unconditional gift for some students. All other income transfers have the condition that a student graduates within ten years of applying, which has resulted in it being called a performance grant. A look into data of the Ministry of Education learns that

about 88% of the amount of these performance grants is transformed into a gift, which means that a vast majority of students actually graduate within ten years.

### 3. Non-take-up

Literature on non-take-up of social benefits is divided in two strands. The earliest literature focuses on qualitative analyses of different dimensions of non-take-up and is based on early work of Van Oorschot (1991). This type of analysis is qualitative and looks at different actors that might play a role for a possible application for social benefits. Most contemporary research makes use, however, of quantitative cost-benefit analyses (e.g. Anderson & Meyer, 1997; Riphahn, 2001). The reason this latter type of analysis is so popular, is that it is able to explain a large share of non-take-up (Tempelman & Houkes-Hommes, 2016). Cost-benefit analyses are done by using quantitative analysis to predict non-take-up levels. Differences in non-take-up rates between groups or benefits are explained by focusing on the relative value of benefits and costs of applying.

Older cost-benefit analyses mainly consider monetary costs of applying (Duclos, 1995), which has resulted in critiques on this type of research. Dubois & Ludwinek (2014), for example, argue that monetary cost benefit analyses do not explain why for example the poorest people, who are eligible to the highest benefits and can most easily estimate possible eligibility, tend to show a relatively high non-take-up (Chareyron & Domingues, 2018). Furthermore, monetary cost-benefit analyses might also cause policymakers to think that non-take-up is not a problem as this analysis assumes that people rationally assess costs and benefits of benefits and non-take-up thus would be one's own choice (Dubois & Ludwinek, 2014).

Recently, cost-benefit analyses extended with experimental evidence that looks if changes in information supply affect take-up rates (Bhargava & Manoli, 2015). Another way how this type of analysis is extended is by broadening the types of costs. This is most explicitly done by behavioral public administration literature that uses the term administrative burden (Moynihan et al., 2015). This literature hypothesizes that the degree in which services like social benefits are accessed, policy is successful, and perceptions of government are formed, is greatly dependent on three types of costs. These are learning costs, compliance costs and psychological costs. Learning costs, according to the authors, are costs that need to be incurred to inform oneself about existence or possible eligibility. Compliance costs, on the other hand, are costs that occur when one wants to meet all necessary conditions like documentation and completing applications. Psychological costs are costs that citizens face when they face stigma, loss of autonomy or increase in stress arising from program processes (Moynihan et al., 2015). Economic literature points out similar costs that result in non-take-up: costs to gather information, costs of application and costs resulting from interaction between an individual and society, such as stigma (Bhargava & Manoli, 2015; Currie, 2006; Dubois & Ludwinek, 2014; Hernanz et al., 2004).

Information or learning costs, compliance or application costs resulting from complexity and psychological costs are thus the main three types of costs that result in non-take-up. For all these three reasons, I will first give a theoretical background from literature, after which I give an overview empirical literature on non-take-up. Then I will see in what sense it is applicable to the Dutch supplementary grant, after I will suggest some changes in communication with hypotheses.

### 3.1 Lack of knowledge

#### **Theoretical background**

Lack of knowledge about benefits is an important determinant for non-take-up as a result of two reasons: people might not know the benefit at all or people might not know their eligibility (Van Oorschot, 1991). Two factors might play a role for having a lack of knowledge about the existence of benefits. These are financial literacy, as a proxy for general financial knowledge, and peer effects, which means a high degree of information-sharing within an in-group. Not knowing about eligibility instead of existence might be caused by complexity of schemes which may induce uncertainty about possible eligibility.

An indication for a possibly high non-take-up of student grants is the finding that students have a relatively low financial literacy, as it limits their ability to make sound financial decisions (Chen & Volpe, 1998). This finding has been confirmed by a more recent literature study that also found that this low financial literacy may impact financial decisions such as arrangement of social securities as retirement (Lusardi, 2011). It is hard to actually increase financial literacy using education (Duflo & Saez, 2003), especially for lower income families, but it can be increased if people are informed at a ‘teachable moment’ (Kaiser & Menkhoff, 2017). This means that information that is directly linked to actions is observed better. Aside from educating, it also seems, that the behavior that one tries to achieve by this education, which is to make informed or financially sound decisions, can also be achieved by making it easier to make these sound decisions (Lusardi et al., 2008). These findings might imply that the goal of an intervention should not be to educate students with our interventions, but to actively steer students in the right direction. Aside from making sound financial behavior easier, it also seems that peer effects play a role for financial literacy (Duflo & Saez, 2003). This means that information sharing within an in-group or by, for example, an employer can improve financial decisions.

While making schemes of benefits less complex might increase the chance of financially sound decisions, it might also affect uncertainty about a possible eligibility. More about the impact of this complexity is covered in paragraph 3.2.

#### **Empirical background**

As already stated, there are two main reasons how a lack of knowledge about benefits can result in non-take-up: because of a lack of knowledge about either existence of a benefit or about possible eligibility. An empirical example of the former is that in 1999 almost 35% of the eligible population had never heard of the EITC, the biggest cash transfer program in the US (Ross Phillips, 2001). The latter reason is often given to explain relatively high non-take-up of people with higher incomes (Dubois & Ludwinek, 2014), homeowners (Bargain et al., 2012; Bruckmeier & Wiemers, 2012) or the working poor (Domingo & Pucci, 2014)<sup>3</sup>.

While most empirical evidence about the effects of knowledge is found in macro data, there are also experiments where extra information provision increases take-up. From these experiments, it appeared that only supplying information does not have large behavioral effects. Both in a natural experiment where employers were legally forced to show information on the EITC (Cranor et al., 2019) as in a field experiment where researchers supplied extra information on the EITC (Chetty & Saez, 2009), just supplying information did not affect take-up. Similar results were found in experiments with student grants (Bergman et al., 2019; Oreopoulos, 2019).

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<sup>3</sup> For more information on take-up levels between different groups, see Appendix A

In order to have an actual effect, results from experiments with student grants indicate that information should be presented at a relevant timing, such as the beginning of a (second) study year (Castleman & Page, 2016) or right before the application deadline (Ideas42, 2016), to a specifically targeted group that is likely to be eligible (Dynarski et al., 2018), with an action-oriented message (Dynarski et al., 2018), at young children to get them acquainted with student grants at a young age (Dinkelman & Martínez, 2014; Oreopoulos & Dunn, 2013) or to parents (Ideas42, 2016). Results for these kind of interventions mainly show to be effective for students with the biggest informational lag, like first-generation students and students with poorer parents (Bird et al., 2017).

Aside from specifically targeting interventions, it can also help to put some essential knowledge in general communication which decreases uncertainty about eligibility. An example of this is the finding that students in the third income decile showed a significant increase in take-up when there was a message that said 'one in four students are eligible' (De Lombaerde, 2018). This message might have decreased uncertainty about possible eligibility for children from families with these incomes.

While communicational interventions show to be effective in the short run, future behavior is often not affected (Guyton et al., 2016; Manoli & Turner, 2017). While the interventions have a short effect, this effect could be repeated as there are indications that sending a reminder to the same group every year does not affect the yearly effect of these reminders (Guyton et al., 2016). Another interesting finding in the area of long or short run effects is that sending two reminders within two weeks does not have different effects as one reminder (Guyton et al., 2016).

Aside from the presentation of information, the total number of eligible people for one benefit is also a factor that influences take-up as an increase in the number of eligible people increases the number of applications relatively more (Chetty et al., 2011; Ramnath & Tong, 2017). This effect might be the result of peer effects of information sharing within neighborhoods (Bobba & Gignoux, 2016) or language calculating groups (Bertrand et al., 2000). A notable group that show a lot of these peer effect are migrants, that in most inquiries know less about existence of benefits (e.g. Ametépé & Hartmann-Hirsch, 2010; Berkhout et al., 2019), but also tend to share information more in their in-group (Aizer & Currie, 2004; Borjas & Hilton, 1996), which may lead to higher levels on non-take-up.

There are indications, however, that these previously found peer effects result from a differing quality of local institutions. Institutions in one place could, for example, speak more languages or prioritize reducing non-take-up more than institutions elsewhere (Aizer & Currie, 2004). That institutions also play a role for non-take-up has been confirmed by other research. It appears, for example that people who go to an institution to apply for one benefit, get information on other benefits as well (Tempelman et al., 2011) and it also seems that people who already applied for other benefits show lower non-take-up levels (Bargain et al., 2012; Domingo & Pucci, 2014).

Aside from peer effects and institutions, the spread of knowledge can also be increased by involving market-oriented actors. Non-take-up is reduced, for example, if there are economic incentives for intermediaries to increase take-up (Aizer, 2003). Furthermore, it can help to connect benefits to market-products like housing and childcare. This incentivizes these parties to point their customers at these benefits as these benefits make their products more affordable (Ministerie van Financiën, 2019).

Aside from costs of gathering information, the perceived benefits of applying for a benefit also influence knowledge about social benefits. This attractiveness of a benefit is a

combination of the height of the amount, the duration of the period that benefits are paid, the number of conditionalities and whether the benefit is already in place for a long time (Dubois & Ludwinek, 2014). If the height of the amount increases, a benefit attracts more attention as relative costs of gaining knowledge and applying decrease (Tempelman & Houkes-Hommes, 2016) and economic incentives to apply increase (Chetty et al., 2011). Increases in economic incentives tend to decrease non-take-up very little, however, as take-up is quite inelastic (Bargain et al., 2012). The duration of a benefit has a similar effect, as benefits that last multiple years are more valuable than one-time payments. The number of conditionalities increases complexity of benefits and will be dealt with in the next section. Whether a benefit is already in place for a long time and has not been changed much also contributes to public knowledge about benefits as knowledge about the benefits is more integrated into society this way (Dubois & Ludwinek, 2014).

While these findings suggest that actual values matter for attractiveness of benefits, there are signs that perceived values, which are influenced by communication around benefits, play a more important role. Bhargava & Manoli (2015) have tested the effects of different forms of information provision on take-up of the EITC and it appeared that take-up increased 8% if the maximum possible benefit was displayed. Furthermore, raising perceived gains has also been seen to be more effective if possible gains of applying were framed as losses if one does not apply (Bertrand et al., 2006).

### **Lack of knowledge in the context of the supplementary grant**

In order to see whether an informational intervention has potential to reduce non-take-up, we first need to know whether a lack of knowledge is also a problem in the Dutch context of the supplementary grant. This is one of the items that is partly investigated recently in a policy review of ResearchNed (van den Broek et al., 2020). This review investigates the levels of take-up and self-reported reasons why students did not apply. A main finding of the former study is that there were differences between take-up of students with regard to the educational level of their parents. It appeared that students with parents with a higher educational background showed lower take-up than students with parents without this background, which could be because these parents might have higher income and assume their children are not eligible. Another result was that if the educational background was unknown, there was also a substantially lower take-up (80% vs. 90%). This last finding could point at migrants showing higher non-take-up as there is less information on their education. This would be in line with previously mentioned literature finding that migrants may have less information on benefits, which could lead to higher levels of non-take-up.

While the questionnaire did not specifically ask for knowledge, results of the questionnaire indicated that 2-6% of all students did not take up their supplementary grant as a result of a lack of knowledge (Van den Broek et al., 2019). The questionnaire was held among students that said they were eligible but did not apply, which makes it hard to reach strong conclusions. Another interesting result of the questionnaire was that 26% of students in higher education said they were eligible, while the actual percentage of students in higher education that is eligible for the supplementary grant is 40% (Konijn, 2020). This difference could result from differences between the interviewed population and the actual population. It could, however, also indicate that 14% of students say they are not eligible while they actually are, which means they do not know about eligibility.

### **How to increase knowledge about the supplementary grant?**

In order to test whether an increase in knowledge can lead to higher take-up for the supplementary grant, we have designed an intervention based on the lessons that other informational interventions teach us. One of these is a relevant timing, which we try to achieve by sending the interventions the day our participants know whether they graduated and thus know if they are able to study next year. Furthermore, we specifically target a group that is possibly graduated, and the mail is thus relevant for nearly all of the receivers of our mailing. Furthermore, the email is personalized in the sense that there is a personal salutation and end of the mail. Another important characteristic of our mailings is that the tone is very activating: there is a clear goal of the mail, which is to let people apply for the supplementary grant. The last important aspect of the formatting of our mail is that it is short and does not contain too many information that students possibly do not need.

The information that is presented in our mailings is the maximum amount, the share of eligible students, the main conditions of the supplementary grant and the steps to take to apply. By showing the maximum amount and by explicitly stating the amount is paid every month, we try to increase the perceived attractiveness of the benefit (Bertrand et al., 2006; Bhargava & Manoli, 2015). We also explicitly mention that there is a group that misses out on it, which aims at triggering loss aversion (Bertrand et al., 2006). By stating the share of eligible people, we try to decrease uncertainty of possible eligibility (De Lombaerde, 2018). By sending this mail, we achieve to increase take-up, which leads us to the first hypothesis:

*Hypothesis 1: Sending a nice formatted mail with basic information about the supplementary grant on a relevant timing increases take-up significantly compared to a situation in which no mail is sent.*

### 3.2 Complexity of the application

A second factor that influences take-up is the complexity of the application, which increases the necessary effort to apply for benefits or as previously mentioned, the effort to know about eligibility. Duclos (1995) has quantified that intangible costs like time necessary to gather information, filling in forms, queue and entitlement uncertainty could seriously reduce net benefits. And then there are tangible costs like the requirement of valid ID-cards, passport photographs or travel expenses which might increase these transaction costs even further. Not only the exact values of these costs matter, however, also how people perceive these costs. Research indicates that (perceived) complexity of application explains a non-take-up of US federal student grant of 36-40% with low income families in the US (Holzer & Baum, 2017, p.111-112).

### **Theoretical background**

There are several mechanisms that play a role for perceived complexity, one of which is cognitive overload. Cognitive overload is described as an overload of our cognitive abilities as a result of high information supply and demand, the need to deal with multitasking and interruption and chaotic environments in which we need to process information (Kirsh, 2000). The problem of an overload of information supply, according to Kirsh, is that there is so much information easily available that the share of qualitatively good information is relatively low and thus harder to find. This, while people are expecting to put in less effort to find information. Consequences of this cognitive overload could be that people delay important decisions or believe that the costs of gathering and processing information exceed the benefits of this information (Waddington, 1997). Research has suggested that cognitive or

emotional overload in a context of financial decisions tend to be relatively high for financial illiterate people (Agnew & Szyckman, 2010).

Another mechanism that affects perceived complexity is the present bias, which means many people treat immediate costs or benefits disproportionately in regard to future costs or benefits. This idea is based on early literature that indicates that people base intertemporal decisions not on exponential discounting, like standard economics suggests, but on hyperbolic discounting (Loewenstein & Prelec, 1992). This means that people have a disproportional taste for having money now instead of with interest in the future. This present bias could discourage people to apply for social benefits as perceived immediate costs outweigh future benefits, which might cause them to not apply (Bertrand et al., 2006). These immediate costs are perceived to be higher when there is a choice-overload that increases the burden on mental resources (Baicker et al., 2012).

This present bias is shown to have diminishing effects if the amounts to be received in the future are higher. This is called the magnitude effect (Thaler, 1981). The existence of this effect might imply that stating the overall benefits of the supplementary grant, which are higher than the monthly amount and thus less sensitive to the present bias, might increase take-up. Such an intervention may also result in higher perceived risks, however. Recent research states that the present bias mainly results from the effect of not being able to possess certain thing right now. It found out that exponential discounting cannot be ruled out if this short-term effect is taken as a fixed cost (Benhabib et al., 2010). This suggests that the perceived immediate costs of application are very important for a decision to apply.

### **Empirical background**

Factors that influence (perceived) complexity of the application of social benefits are possible automatic enrollment, the number of institutions where one has to apply for different benefits, the number of conditions and, similar to the previously discussed increase of knowledge, targeted information supply at the right time at the right location.

Automatic enrollment seems pretty logical as it does not require citizens to apply at all and it also proves to be the most effective way to reduce non-take-up (Currie, 2006). It is difficult for institutions, however, to acquire all information needed to automatically enroll citizens for means-tested benefits (Goldin, 2018; Tempelman & Houkes-Hommes, 2016). One needs privacy-sensitive information like income, assets and sometimes expenses. Even when this information can be shared between institutions, it requires high functioning institutions to manage and use all this information properly (Matsaganis et al., 2010).

Another factor that influences complexity is the number of institutions where citizens need to apply for benefits. When it is possible to apply for a benefit in the tax return, for example, where one has to fill in a lot of income information, non-take-up rates a way lower than for when separate application is needed (Currie, 2006). This same intervention has also shown to be effective in the context of the FAFSA, an American student grant (Bettinger et al., 2012).

A third factor that influences complexity is the number of conditionalities. In both the Netherlands as in Great-Britain, there are child benefits that are income-dependent and that are independent of income. These latter benefits show a significantly lower non-take-up than income-dependent benefits (HM Revenue & Customs, 2017; Ministerie van Sociale Zaken en Werkgelegenheid, 2018). The requirement to fill in less information reduces both the effort and time needed to fill in application forms, which might reduce non-take-up.

The presentation of information can also influence the perceived complexity of an application. In an experimental setting, it appeared that complexity of information notices and

filling forms reduces take-up by 9%-points (Bhargava & Manoli, 2015). These authors also found that stating that filling in the form only costs 15 minutes reduced take-up as it might have caused people to think it is complicated. They also found that an extra flyer with a lot of extra information reduced take-up, implying that information should be short and to the point. This indicates that not only the actual complexity matters, but the perceived complexity has a similar effect. This notion has been confirmed by research that found out that increasing awareness of free tax preparation tools leads to a lower perceived complexity of tax filings (Goldin, 2018). These tools already existed and thus made applications less complex, people just did not know yet.

Not only the complexity of the presented information matters. The supply of specifically targeted information at the right time and location and targeted at the right people might also reduce complexity by reducing procrastination. Reminders of small steps in an application process or the supply of information at the right place and time might reduce a choice-overload. An example of this is an experiment in which a series of emails with explicitly mentioned deadlines is sent explicitly mentioned (Ideas42, 2016). In these emails, students were encouraged to discuss the financial situation with their parents and a to-do list was added.

A final notion on this topic is that complexity of the application of one benefit influences non-take-up of other benefits via spillovers. It seems, for example, that reducing complexity of one program significantly increased the chance of also applying for other benefits as well (Yelowitz, 1996). This indicates that people are discouraged when one application is very complex, resulting in less applications for other benefits as well.<sup>4</sup>

### **Complexity in the context of the supplementary grant**

Applying for the supplementary grant is fairly easy. It only requires students to log in on DUO's online environment and after a few clicks, one can apply for the supplementary grant by clicking on a check mark. DUO will find out itself whether you are eligible and for which amount and will report this eligibility back to the applying student within a day around 70% of the time. One thus does not have to fill in incomes of parents and after a few clicks, everything is sorted out automatically.

The same policy review that reported that knowledge plays a role for non-take-up of the Dutch supplementary grant, found, however, that problems with calculating parents' income explained self-reported non-take-up for 3-9% of all students and problems with application procedure for 2-7% (van den Broek et al., 2020).

### **How to decrease perceived complexity of the supplementary grant?**

There is thus a wide array of interventions that might prove effective in reducing non-take-up. These include making application easier, combining multiple separate benefits into one, information sharing between institutions and pro-active reminders on the basis of this information. Possibly the most effective intervention would be to automatically enroll people. These interventions would require institutional change, however, which is not possible for this experiment. Aside from this reason, there is also a possibility that the grant turns into a debt, which makes it unethical to automatically enroll students. Complexity should thus be lowered in a sense that the perceived complexity decreases by sending only an email with information.

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<sup>4</sup> For an in-depth analysis of complexity of the EITC see Goldin (2018)

We try to decrease this perceived complexity in three ways: by sending the mail at a relevant timing which helps with time management (Bertrand et al., 2006), by adding a to-do list that explains all steps to take to apply for the supplementary grant, similar to a previously mentioned experiment of Ideas42 (2016) and by adding a sentence that states that when one has difficulties to assess eligibility, one should apply anyway, because DUO will calculate itself whether one is eligible or not. This latter sentence is added in the line of reasoning by Goldin (2018) stating that take-up can be enhanced by decreasing perceived complexity. We do not have the ability to test all different measures that reduce complexity separately. Because earlier research suggested that people get stuck in the application process, we think that mentioning that DUO will examine eligibility itself will have most impact in reducing perceived complexity. This is the only sentence that is added to the basic information email to test the impact of complexity. This leads us to the following hypothesis:

*Hypothesis 2: By adding a sentence to reduce perceived complexity to a mail with basic information, take-up of the supplementary grant will be significantly higher than in a situation where only the basic information is presented.*

### 3.3 Psychological costs

Psychological costs are the third category that might cause non-take-up. These psychological costs consist of stigma, loss of autonomy and increases in stress arising from program processes (Moynihan et al., 2015). Examples how stress or loss in autonomy might manifest are that people might think that they won't get the benefit anyway, there might be a perception that institutions might misuse privacy sensitive information, people do not apply as a form of protest against the government, or people might not know they can appeal to decisions or they do not trust that this appeal will be dealt with accordingly (Dubois & Ludwinek, 2014). For the supplementary grant, an important factor that might arise psychological costs in the form of stress is a possible risk that one has to repay the supplementary grant if one does not graduate within ten years.

### Theoretical background

The notion that stigma plays a role in non-take-up comes from another notion that poverty often goes together with shame about this situation (Sen, 1983). The effects of stigma on non-take-up were first modelled by Moffitt (1983). When looking at economic literature, there is some evidence that people are more likely to claim benefits if people around them do so as well, which confirms this early literature (Bertrand et al., 2000).

As noted before, the chance that the supplementary grant turns into a debt is only 12%. While this chance is only small, the financial damage can be severe if one has to repay a maximum of 22,000 euros of supplementary grant. This large possible damage, especially for a student, can cause people to not rationally assess risks. This is the reason behavioral economists call the risk that is dealt with by people the perceived risk. This perceived risk is determined in two stages: first there is a stage where one assesses the actual risk and then there is a second stage where this risk estimation is used to make a decision (Burns et al., 2010; Fox & Tversky, 1998). Both of these stages might suffer from irrational behavior.

In the first stage, the availability bias and ambiguity might play a role. The availability bias encompasses the notion that people base chances on earlier observations, even if these do not affect the actual chances (Tversky & Kahneman, 1973). In this case, the availability bias

might cause people that have heard horror stories about massive debts to assess the chance of not graduating within ten years to be greater than they actually are.

Theory on ambiguity aversion states that perceived risks are lower when risks are known than when they are not known. This idea comes from an old experiment by Ellsberg (1961), who showed that people prefer known risks to unknown risks. While most evidence for ambiguity aversion is found in contexts where two odds are compared (Fox & Tversky, 1995), recent research has also found that it plays a role in a consumer context (Outreville & Desrochers, 2016). This might imply that ambiguity aversion might also affect perceived risks of applying to social benefits, where risks are also unknown.

The second stage, where probabilities are translated into decisions, might also trigger irrational behavior. This is because people tend to overweigh small chances with large impacts in their decisions. This effect is postulated in the cumulative prospect theory (Tversky & Kahneman, 1992). In the case of social benefits, this means that people might overweigh the chance of having to pay the benefit back in their decision of applying even if they know the actual chance.

Aside from irrationalities in the area of probability weighing, prospect theory also mentions irrationalities when similar situations are framed differently. An example of this is loss aversion. This means that framing an exactly same chance from either a loss or a win perspective showed different behavioral results (Tversky & Kahneman, 1989). People give more extreme reactions when confronted with losses than if the same situation is seen from a winning perspective. This would thus suggest that stating 9 in 10 sees its supplementary grant converted into a gift has better reassuring effects than saying 1 in 10 has to pay it back.

A form of loss aversion could arise when thinking about loans which is called debt or loan aversion. In the basis of this specific form of loss aversion lies the fact that there are some risks associated with being indebted as there might be a possibility one cannot repay their debts. This debt aversion mainly appears in poorer families, who are more afraid that they cannot afford to repay their debt (Scott-Clayton, 2013) and has especially consequences for decides of children to go to college (Callender & Jackson, 2005).

### **Empirical background**

When looking at empirical studies testing the effects of psychological costs on non-take-up, evidence is inconclusive. A quantitative study on self-reported stigma shows that people who need benefits feel stigmatized when applying for these benefits and people who now don't depend on benefits say they might not apply for them if they do depend on them in the future as a result of stigmas (Baumberg Geiger, 2016). Experimental evidence, however, contradicts these notions, as changing to non-stigmatizing use of words did not seem to have any effect (Bhargava & Manoli, 2015). This contradiction might exist because people behave differently than they report themselves or because different communication in letters does not reduce stigma. Other psychological reasons for non-take-up that appeared from questionnaires on reasons why people do not apply for social benefits are that vulnerable parents that need benefits might fear that their children will be taken away from them (Warin, 2014) or that migrants won't apply because they fear of losing citizenship (Kayser & Frick, 2001).

Furthermore, stress can arise from benefits with certain conditions on for example income. These conditions might lead to fears of not meeting the necessary conditions and thus having to repay the received benefits. This mainly plays a role when these conditional benefits are paid in advance (Tempelman et al., 2011). Increasing income might then lead to non-eligibility in retroactivity, and thus to the obligation of having to pay the received amounts

back. It has been found that this type of stress might lead to non-take-up (Ministerie van Financiën, 2019).

When looking at characteristics of people that experience these psychological costs, it seems that students from lower income families tend to have a higher debt aversion (Burdman, 2005). This might be rational as these students face a higher dropout chance and earn less in their future jobs than other borrowers (Burdman, 2005). Furthermore, students from low-income families struggle more to calculate manageable student debt levels than more privileged families (Holzer & Baum, 2017), which might lead to higher perceived risks. Other research has shown that psychological application costs tend to increase if one is less financially literate (Bertrand et al., 2006). These people tend to estimate risks higher and tend to experience more stress than their counterparts if this stigma is reinforced through language in a message (Adkins & Ozanne, 2005). It also appears that an overestimation of risks is greater for people that score high on a fear index, calculated by using fears for certain animals and other fear triggers (Hengen & Alpers, 2019). Also, there is an, albeit disputed indication, that women are more risk-averse than men (Eckel & Grossman, 2008), which could affect debt aversion as well.

### **Psychological costs in the context of the Dutch supplementary grant**

There are currently no indications that stigma or a lack of trust in authorities play a role for the supplementary student grant. There is little research available on the topic, however. We will test the possible influence of stigma on non-take-up with a questionnaire which is sent after our mail intervention in which we will ask people about shame, pride, feelings of injustice and trust in DUO.

There has been some research that indicated that fears of having to pay the supplementary grant back reduce take-up. The same questionnaire that indicated that a lack of knowledge or high perceived complexity was reason for non-take-up, also showed that a fear of having to pay the amount back resulted in non-application for 17-18% of all students and 32%-39% says they just do not need the money (van den Broek et al., 2020). This, aside from other reasons, may indicate pride or fear, which falls under psychological costs. Whether this is the case is tested in the questionnaire.

Another interesting finding of this questionnaire is that of 18% of students with practical education that report to be eligible does knowingly not apply for the supplementary grant, while this figure is only 7% for HO-students (van den Broek et al., 2020). This might be the result of a relatively high loan-averseness of practical education-students, which was found in previous inquiries (Van den Broek et al., 2018). This loan-averseness may affect take-up as the supplementary grant has to be repaid if one does not graduate within ten years.

### **How to decrease perceived psychological costs of the supplementary grant?**

A way to reduce fear for repayment could be to base benefits on income from previous years, which ensures that conditions for benefits were already met and people thus have no reason to fear changing eligibility (Ministerie van Financiën, 2019). This is already done in case of the supplementary student grant.

As we use a letter intervention, a solution might be found in framing. Field (2009) found, for example, that framing plays a role in take-up of grants that will be converted into a gift when certain conditions are fulfilled. When this grant is called a loan that is paid for under a certain there were 36-45% less people that chose to meet this condition than when same

grant was described in a way that their study was paid for under this condition. Avoiding the word 'loan' thus seems to reduce debt aversion.

Another experiment found that the name of a loan matters. When a loan was called an income-contingent contract, there was an 8% higher chance of choosing the loan than when it was called a loan, even though the features of the contract were the same (Caetano et al., 2019). An income-contingent contract is a loan that is paid back as a percentage of one's income instead of fixed payments. The authors conclude from these results that most debt-aversion is due to labeling.

When trying to decrease perceived risks, ethics play an important role, because "Policymakers cannot know if any particular decision is a mistake for the individual making it" (White, 2017, p.232). This same author states that if there are doubts that decisions are mistakes, extra or clearer information might help, but this information should be presented in a neutral way in order to let the consumer make his own decision. As non-take-up seems to be irrational, an intervention is justified, but it must be done in an as neutral as possible way. To meet these ethical standards, we add in every mail a sentence that the supplementary grant is only a gift if one graduates within ten years and we do not push them to apply, we just present extra information on which scholars are can make a better-informed decision.

Taking findings on stigma effects in mind, we try to avoid stigmatizing language and mention that the grant is for students with parents with an income that does not exceed a certain threshold instead of 'low incomes'. To decrease perceived risks, we have added a sentence that the supplementary grant is a gift to the vast majority of students, which is the case as 88% of the amounts of performance grants is transformed into a gift. Furthermore, following the evidence that states that naming loans income-contingent contracts, we state that if one does not graduate within ten years, the grant only has to be repaid if one's future income is high enough. To test the influence of perceived risks, only these last two sentences are added to a mail with basic information. By adding these sentences, we expect the following:

*Hypothesis 3: Adding sentences to reduce perceived risks to a mail with basic information increases take-up significantly more than a mail without these sentences.*

We will also test the effects of a basic info mail with a combination of the described interventions, and as this intervention contains most behavioral techniques, we expect the following:

*Hypothesis 4: Adding sentences to reduce perceived risks and to reduce perceived complexity to a mail with basic information increases take-up significantly more than a mail without these sentences.*

*Hypothesis 4a: This effect is expected to have the biggest impact of all interventions.*

#### **4. Methods**

Chapter two showed three major factors play a role for non-take-up in general and also seem to play a role for the supplementary grant. This thesis tests whether an intervention in communication addressing these factors increases take-up of the supplementary grant. The method used to test this is a randomized controlled trial (RCT), where a population of last-year students in secondary education will receive similar letters where different sentences

regarding three the major reasons for non-take-up are added. This thesis will thus test the effects of changes in communication around the program, not altering the program itself. This chapter will provide information on the exact interventions, timing, randomization and what information we will analyze.

#### 4.1 Experimental design

This experiment is similar to the experiment of Bhargava & Manoli (2015), who tested both the effect of different information provision and different application forms. This experiment only focuses on information provision as application forms could not be changed. The total population of this experiment consists of 22,558 scholars. This is the total group of scholars in the last year of their secondary school, that did not yet apply for the supplementary grant and receive the WTOS (Wet Tegemoetkoming Onderwijsbijdrage en Schoolkosten). This WTOS can be applied for by students that are older than eighteen year old and currently follow secondary education. It compensates for the loss of child benefits.

This group is very likely to study next year as these students are in the last year of their secondary education and 85% of Dutch secondary scholars will study after graduation (Bolhaar et al., 2020). This makes this group suitable for an experiment with the supplementary grant. While it would be nice to extent the population to all secondary scholars, this was not possible as a result of COVID-19 and its impact on customer contact at DUO. The group WTOS-receivers that is targeted already got several more emails, compared to non-receivers.

These participants in this experiment have already got some information on student finances in other letters, but none of this communication contained specific information about the supplementary grant. This is the first time these students get an email which is especially aims scholars to apply for the supplementary grant. One email, however, contained an invitation for a webinar on May 15<sup>th</sup> where a lot of information about studying next year was shared and student were able to ask questions. This might have affected our results, but we can control for presence at this webinar.

The total group of 22,558 students is divided into five groups, who get different emails. We test the proposed interventions and their combined effect and we look at effects on application rates compared to both a group that did not receive any information and a group that received an email with basic information on the supplementary grant. Exact numbers are given in Table 1. The two proposed interventions contained either two extra sentences that aim to decrease perceived complexity or an intervention that aims to decrease perceived risks or fear. The English translation of these sentences, that were discussed in chapter 2, are shown in Table 1.

#### 4.2 Data

Application figures were measured by looking at whether scholars applied for the supplementary grant between the dates 5<sup>th</sup> of June and the 5<sup>th</sup> of July. We had tried to only send the emails to scholars who did not already apply for the supplementary grant, but 751 (3%) scholars of the total of 23,309 scholars in the emailed population did already apply for the supplementary grant. The fact that these people before being sent an email, made that we did not include these applications in our data, which explains the number in Table 1.

Furthermore, we measured whether scholars were actually assigned the supplementary grant, which in most cases (69%) was calculated within a day after application for the grant and what the value of this assignment is. We take the assigned value of the grant for September, the month that these scholars start to be eligible. As control variables, we use the level of secondary education to control for educational level. We also have data on whether a scholar applied for and was assigned the supplementary version of the WTOS

(sWTOS), which is similar to the supplementary grant as it is also supplementary for scholar with parents with a relatively low income. Lastly, we were able to measure whether a scholar attended the webinar organized by DUO at May 15<sup>th</sup>.

Table 1: Summary of experimental design

Intervention	Information in the email	N (total = 22,558)
No email	(original situation)	4,832
Email with basic information	<ul style="list-style-type: none"> <li>- Information about existence</li> <li>- Maximum amount is 403 euros a month</li> <li>- 1 in 3 is eligible</li> <li>- It is only a gift when graduated within ten years</li> <li>- Application is simple (to-do list)</li> </ul>	4,430
Basic information + fear Intervention	<ul style="list-style-type: none"> <li>- “Most students succeed in graduating within ten years.”</li> <li>- “When this doesn’t happen, you will only have to repay it when your income is high enough.”</li> </ul>	4,430
Basic information + complexity Intervention	<ul style="list-style-type: none"> <li>- “If you have difficulties to assess eligibility, we recommend you to apply.”</li> <li>- “After applying, DUO will examine by itself whether you are eligible.”</li> </ul>	4,441
Basic information + Both interventions	(Fear and complexity intervention)	4,425

Aside from data on a personal level, we also used data available from the Dutch Central Statistics Bureau (CBS) with information on both the median household income and migrant numbers in Dutch ZIP-code areas. These areas, in which on average 390 people live, is the most accurate data available for both income and migration background. The most recent data on median household incomes dates from 2017, while the most recent data of migrant figures dates from 2019. Data on household income is used to test whether an effect of the percentage of migrants in a ZIP-code area on application levels results from underlying socioeconomic backgrounds.

ZIP-code income data did not appear to be a good proxy for household income, which is used to calculate eligibility of the supplementary grant. This data can be used, however, to control whether effects of migrant data were not explained by underlying income differences between ZIP-code areas. When controlling for income data, the effects of migration background on application levels were not significantly different than without this control. This finding results in the fact that we only use the most recent data on migrant numbers in ZIP-code areas.

#### 4.3 Timing

As stated in chapter 3, relevant timing is an important factor that might lead to effective proactive reminders. As a result of the COVID-19 crisis, Dutch students did not have to do a final exam but got a notice at June 5<sup>th</sup> whether they graduated or not. This means there is a good chance that they knew from this date on whether they would be able to go to college next year. This is why our email was sent on June 5<sup>th</sup> at the end of the afternoon. When one looks at application numbers for the supplementary grant in other years, June and July are the months in which most application for the supplementary grant are normally done.

To properly assess the results of our intervention, we measure after a month, on July 5<sup>th</sup> whether one has applied for the supplementary grant or not. We also measure the effects after two months to assess whether we did not only trigger scholars to apply while they otherwise would have done anyway.

#### 4.4 Randomization

To avoid selection effects, the groups that receive the treatments are randomized using simple randomization. This is standard practice in the Ministry of Education, in order to minimize the request of privacy sensitive data. In Table 2, I have depicted the results of this randomization on the distribution of 5 different variables over the 5 different interventions. It appears that mean age, gender and education, when 5 different educational levels are each assigned a number between 1 and 5, are roughly equally distributed over the interventions. This also seems to be the case for the share of scholars receiving an sWTOS allowance. This is an allowance that is similar to the supplementary grant in the sense that eligibility depends on the income of one's parents.

The only problem with randomization lies in randomization of webinar attendance. At. As Table 2 shows, attendance at the webinar is not similar for all groups. Furthermore, it appears to cause problems in further analysis as this attendance is highly influential in whether scholars apply for the supplementary grant. To ensure that randomization does not cause problems for further analysis, this analysis will also control for the variables in Table 2.

This small randomization issues could have been avoided if we used stratified randomization instead of simple randomization. This has also been done in a similar experiment (Bhargava & Manoli, 2015). A way to do this randomization is by ensuring that variables that are potentially influential, like webinar attendance, are equally distributed among all groups. What these authors had also done, randomizing at income levels and comparing for data like income is also something we were not able to do. We not able to gather recent or personal data on for example income, or migration status.

Table 2: Randomization of the experiment

	<b>N</b>	<b>% male</b>	<b>mean age</b>	<b>mean educational level</b>	<b>% webinar attendance</b>	<b>% sWTOS</b>
<b>No email</b>	4832	53.7	18.913	1.535	3.3	36.7
<b>Mail with basic info</b>	4430	54.3	18.905	1.546	2.7	35.2
<b>fear intervention</b>	4441	54.7	18.899	1.571	3.2	37.5
<b>complexity intervention</b>	4425	55.0	18.902	1.527	3.8	37.4
<b>both intervention</b>	4430	53.1	18.929	1.545	4.1	37.1

#### 4.5 Questionnaire

To confirm whether the email interventions were actually read, what important reasons are to apply or not whether perceptions on general information regarding the supplementary grant, complexity and risks had changed, we have also sent out a questionnaire. 25% of the receivers of an email were sent such a questionnaire, which comes down to around 1100 per intervention. With a response rate of 11%, we got extra information on perceptions of around 120 people per intervention. Indices will be made to cover perceptions on knowledge, complexity, risks and psychological costs and furthermore, there will be tests for financial stigma, financial literacy and risk aversion. The influence of all these indices on each other and application rates is then calculated.

The index that measures knowledge consists of self-reported knowledge about existence of the supplementary grant and a test whether people know how high the maximum supplementary grant is and for which percentage this grant is available. The index that measures perceived complexity is constructed by using answers on how difficult on a scale of

1 to 5 people think it is to apply, how many much it costs and the answer to a question whether people think they have to fill in the income of their parents. The perceived risk index is calculated by asking after the chance of not graduating within 10 years, whether people are less inclined to apply because they see risks and the degree in which they see the supplementary grant as a grant and a loan. A psychological cost index is made by combining the answers to a question about shame, pride, injustice, trust and this perceived risk index. For all indices, the Cronbach's alpha is calculated, which indicates whether there is a certain cohesion between answers to questions in one index. This gives an indication whether we actually measure what we aim for.

In the questionnaire, there are also tests for financial literacy, financial stigma and risk aversion. The test for financial literacy is a test a one-item subjective financial literacy measure. We chose for this measure as it is a combination of self-esteem and financial knowledge and both tend to influence financial behavior (Tang & Baker, 2016). For risk-aversion, we use a widely used one-item subjective measure that asks how risk averse someone is on a scale of 1 to 11 developed by Dohmen et al. (2011) and it tested to best predict risky behavior in general (Szrek et al., 2012). For financial stigma I have used a combination of answers to two questions based on previous work by Pinel (1999).

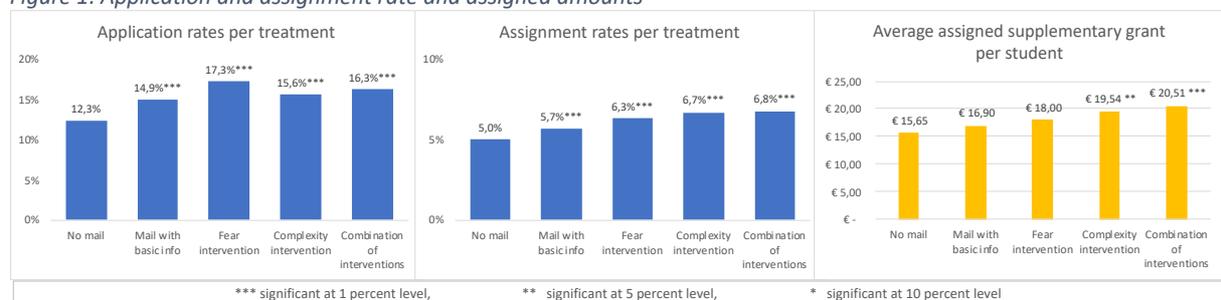
## 5. Results

Table 3 shows an overview of the results of the intervention. It seems that the interventions resulted in higher application rates, assignment rates and average amounts of the supplementary grant compared to a situation in which no mail is sent. If a combination of interventions would be standard, this would result in €4,86 more supplementary grant per student per month. The total effect of the 4 interventions already come close to €55,000 per month or €655,000 a year as a result of enhanced take-up, just for the not even 18.000 students that received an email. Furthermore, application rates rose from 12.3% for the group with no mail to 14.9% for a basic mail and 17.3% in the most effective mail which is a combination of both interventions. While the effects of the fear interventions seem the biggest, we will see in the next section that this is the result of randomization issues.

Table 3: Overview of results

	N	Application rate	Assignment rate	Assignment rate if applied	Average amount	Average amount when assigned
No mail	4832	12,3%	5,0%	40,60%	€ 15,65	€ 309,76
Mail with basic info	4430	14,9%***	5,7%***	38,00%	€ 16,90	€ 297,05
Fear intervention	4441	17,3%***	6,3%***	36,52%	€ 18,00	€ 283,88
Complexity intervention	4425	15,6%***	6,7%***	42,87%	€ 19,54	€ 294,36
Combination of interventions	4430	16,3%***	6,8%***	41,66%	€ 20,51	€ 304,14

Figure 1: Application and assignment rate and assigned amounts



### 5.1 Treatment effects on application

In order to test whether the effects of as seen in Table 3 are not the result of coincidence or randomization errors, I will use a binomial logistic regression. This regression is used because the dependent variable is either a one or a zero and application and assignment rates are

lower than 20%. I will use a variety of control variables and I will estimate both the effect of the different interventions compared to a situation where no email is sent and to the application rates when only a basic email is sent. These same estimations will also be done for assignment of the supplementary grant. As only eligible students are actually assigned the supplementary grant, these figures tell us whether these newly generated applications are also done by eligible students. The model we use to do the analysis is the following:

$$\begin{aligned} \Pr(\text{Application}_i = 1) &= \alpha + \sum \beta^j \text{Intervention}_i^j (+ \gamma \text{WTOS}_i^k + \delta \text{Webinar}_i + \theta \text{Male}_i + \mu \text{Age}_i \\ &+ \sum \rho^k \text{Education}_i^l + \pi \text{WesternMigrant}_i + \sigma \text{nonWesternMigrant}_i) + \varepsilon_i \end{aligned}$$

In this model, the type of intervention is denoted by indicator variable  $j(\text{Intervention}_i^j)$  and  $\beta^j$  is the causal parameter of interest that shows the average effect of the treatments  $j$  on individual  $i$ . Furthermore, there are several control variables.  $\text{Webinar}_i$  and  $\text{Male}_i$  are dummies and give information on gender and attendance to the webinar on May 15<sup>th</sup>.  $\text{WTOS}_i^k$  is a categorical variable and gives information on whether one did an application for the sWTOS and whether this application was approved.  $\text{Age}_i$  is given in years.  $\text{WesternMigrant}_i$  and  $\text{nonWesternMigrant}_i$  give information on the percentage of western or non-western migrants in the ZIP-code area.  $\text{Education}_i^l$  is a categorical variable for educational level  $l$ . Finally,  $\alpha$  is the intercept and  $\varepsilon_i$  is the error term. The brackets in the model show that there is both a simple model and a model in which there is controlled for several variables. Results are depicted in Table 4.

The main coefficients indicate the odds ratios, where ratios above 1 mean that the odds for these specific variables increase in reference to the base odds. As we use as a nonlinear regression, marginal effects are different along the distribution of control variables. To still say something about marginal effects, we use the depicted odds ratios to calculate probabilities of application by using a base rate for the control variables in which the control variables have the average value and not a value of zero. This value is given in the square brackets below baseline odds. It is a bit counterintuitive to take the mean value of categorical variables but doing so gives a nice overview of the average marginal effects. Otherwise, we have to estimate treatment effects for all different possible combinations of the categorical variables. We will test whether this is a problem in section 5.4 where we test for heterogeneity.

Column 1 estimates the treatment effects in a simple regression the estimates shown compare to application rates of the group who did not receive a mail. To check quality of randomization over the interventions, one can compare the estimated odds ratios with column 2 which shows the same regression was done including several control variables. If randomization was done appropriately, the control variables would affect all treatment groups the same. This would result in similar odds ratios with and without control variables. When comparing columns 1 and 2, it appears that odds ratios change. This might be the result of the strong effect of webinar attendance, which is not evenly distributed among the treatment groups as we saw in Table 2. A similar issue is found when comparing columns 4 and 5. We have controlled for small randomization issue by adding the control variables to the regression and we only discuss controlled effects.

In column 2, treatment effects on application are compared to application behavior of scholars who did not receive an email. It appears that the interventions have fairly large significant positive effects. The basic info mail has the smallest effect and increases application

with 2.7%-points or 25%. Furthermore, it seems that the fear intervention has a slightly higher effect, the complexity intervention the second highest effect and the combination of interventions the biggest effect.

Table 4: Binomial logistic regressions estimating application rates among intervention groups

	no email			Basic info email		
	simple (1)	controlled (2)	After 2 m (3)	simple (4)	controlled (5)	After 2 m (6)
Email with basic info	1.251*** (0.076) [21%] 3.1pp	1.294*** (0.081) [25%] 2.7pp	1.191*** (0.064) [15%] 2.7pp			
Fear intervention	1.315*** (0.079) [27%] 3.3pp	1.334*** (0.083) [29%] 3.1pp	1.206*** (0.064) [16%] 2.9pp	1.051 (0.062) [4%] 0.6pp	1.032 (0.063) [3%] 0.4pp	1.012 (0.054) [1%] 0.2pp
Complexity intervention	1.384*** (0.082) [32%] 3.9pp	1.373*** (0.085) [32%] 3.4pp	1.249*** (0.066) [20%] 3.4pp	1.106* (0.065) [9%] 1.3pp	1.061 (0.064) [5%] 0.7pp	1.047 (0.056) [4%] 0.8pp
Combination of interventions	1.487*** (0.088) [40%] 4.9pp	1.479*** (0.091) [41%] 4.4pp	1.341*** (0.071) [26%] 4.7pp	1.188*** (0.069) [16%] 2.3pp	1.143** (0.069) [12%] 1.6pp	1.125** (0.059) [10%] 2.0pp
sWTOS application rejected		1.932*** (0.094)	1.987*** (0.082)		1.942*** (0.103)	2.032*** (0.094)
sWTOS application assigned		4.214*** (0.207)	4.551*** (0.200)		4.093*** (0.223)	4.415*** (0.218)
Webinar attendance		3.343*** (0.206)	2.693*** (0.211)		3.389*** (0.304)	2.747*** (0.240)
Male		0.823*** (0.032)	0.893*** (0.030)		0.830*** (0.035)	0.885*** (0.033)
Age		0.996 (0.029)	1.015 (0.026)		0.979 (0.032)	1.010 (0.029)
HAVO		1.040 (0.042)	1.103*** (0.039)		1.015 (0.078)	1.087** (0.043)
VMBO		0.820** (0.076)	1.055 (0.085)		0.746*** (0.078)	1.061 (0.095)
Other education		0.285*** (0.043)	0.0173*** (0.020)		0.3270*** (0.046)	0.154*** (0.021)
% non western migrants		1.008*** (0.002)	1.100*** (0.001)		1.007*** (0.002)	1.009*** (0.002)
% western migrants		0.970*** (0.004)	0.973*** (0.038)		0.971*** (0.005)	0.974*** (0.004)
Questionnaire			0.966 (0.038)			0.956 (0.042)
Baseline odds	0.140*** (0.006) [0.123]	0.124*** (0.042) [0.108]	0.142*** (0.038) [0.178]	0.176*** (0.007) [0.149]	0.229*** (0.141) [0.136]	0.189*** (0.042) [0.205]
N	22558	22506	22498	17726	17688	17683
Pseudo R2	0.003	0.072	0.082	0.001	0.067	0.081

Notes: This table summarizes the odds ratios of application of the supplementary grant. Columns 1, 2 and 3 compare the odd ratios of the interventions against a situation in which no mail is sent, columns 4, 5 and 6 against the mail with basic information. Furthermore columns 1 and 4 show the results of simple binomial logistic regressions, while in 2, 3, 5 and 6 there is controlled for a number of variables. The estimated relative change in probability of application compared to a the relevant control group is mentioned in square brackets. The change in percentage points (pp) are stated below this figure. These figures are calculated using the figure in square brackets found under the baseline odds.

\*\*\* significant at 1 percent level  
 \*\* significant at 5 percent level  
 \* significant at 10 percent level

Column 5 shows the results of a regression where treatment effects are compared to the application rates of the group that received the basic info mail. It shows that the fear intervention does not have significantly different effects than the basic info mail. The

complexity intervention is only significant in the simple regression, where take-up rates are 9% higher, but when controlling for various variables, only an insignificant 5% increase remains. Only the combination of interventions turns out to have a significant positive effect on application rates compared to the basic info mail. This intervention increases take-up from 14.1% to 15.7%.

Columns 3 and 5 show the effects on application after two months instead of one. It appears that odds ratios and the relative increase in take-up are a bit lower, which is somewhat logical as the base rate increases. Marginal effects, however, remain intact for our two most effective interventions and even rise a little.

Table 5: Regressions estimating treatment effects on assignment of the supplementary grant

	no email			Basic info email		
	Odds (1)	After 2m (2)	Amounts (3)	Odds (4)	After 2m (5)	Amounts (6)
Email with basic info	1.176* (0.114) [16%] 0.6pp	1.079 (0.083) [7%] 0.5pp	0.909 (1.866) [3%]			
fear intervention	1.307*** (0.123) [29%] 1.0pp	1.167** (0.081) [6%] 0.4pp	-0.546 (1.867) [-2%]	1.109 (0.104) [10%] 0.4pp	0.986 (0.076) [-1%] -0.1pp	-1.462 (1.920) [-5%]
complexity intervention	1.336*** (0.125) [32%] 1.1pp	1.167** (0.088) [16%] 1.0pp	2.484 (1.867) [9%]	1.134 (0.105) [13%] 0.5pp	1.080 (0.082) [7%] 0.5pp	1.560 (1.922) [6%]
combination of intervention	1.372*** (0.128) [36%] 1.2pp	1.214*** (0.091) [20%] 1.2pp	5.552*** (1.867) [20%]	1.165* (0.108) [16%] 0.6pp	1.123 (0.108) [11%] 0.8pp	4.635** (1.922) [17%]
sWTOS application rejected	2.611*** (0.217)	2.658*** (0.173)	13.526*** (1.537)	2.777*** (0.249)	2.708*** (0.194)	14.296*** (1.748)
sWTOS application assigner	10.570*** (0.768)	10.684*** (0.629)	98.446*** (1.747)	10.166*** (0.105)	10.153*** (0.667)	98.052*** (1.985)
webinar attendance	2.833*** (0.331)	2.334*** (0.245)	25.248*** (3.301)	2.777*** (0.357)	2.353*** (0.273)	25.592*** (3.735)
male	0.806*** (0.047)	0.845*** (0.041)	-4.018*** (1.203)	0.783*** (0.051)	0.791*** (0.042)	-5.768*** (1.368)
age	0.956 (0.047)	0.995 (0.035)	-0.209 (0.958)	0.991 (0.045)	0.991 (0.039)	-0.634 (1.089)
HAVO	1.168** (0.072)	1.284*** (0.066)	6.124*** (1.301)	1.177** (0.080)	1.276*** (0.073)	5.682*** (1.480)
VMBO	0.685*** (0.089)	1.043*** (0.066)	-0.231 (3.262)	0.669*** (0.096)	1.070 (0.118)	0.338 (3.675)
Other education	0.332*** (0.071)	0.242*** (0.037)	-31.709*** (2.747)	0.306*** (0.074)	0.218*** (0.038)	-33.671*** (3.095)
% non western migrants	1.009*** (0.002)	1.012*** (0.002)	0.525*** (0.053)	1.008*** (0.002)	1.011*** (0.002)	0.500*** (0.059)
% western migrants	0.975*** (0.006)	0.973*** (0.005)	-0.560*** (0.122)	0.980*** (0.007)	0.979*** (0.006)	-0.453*** (0.137)
Questionnaire		0.996 (0.056)	0.180 (1.391)		1.000 (0.062)	0.095 (1.580)
Baseline odds / constant	0.056*** (0.045) [0.033]	0.049*** (0.032) [0.062]	12.721 (18.113) [27.557]	0.071*** (0.064) [0.039]	0.057*** (0.042) [0.068]	20.569 (18.113) [27.774]
N	22506	22498	22498	17688	17683	17683
Pseudo R2	0.102	0.157	0.153	0.133	0.152	0.151

Notes: This table summarizes effects of the interventions on assignment of the supplementary grant. The odds ratios of assignment of the supplementary grant after 1 and 2 months are found in columns 1 and 2 if the control group is the group that did not receive a mail and in columns 4 and 5 if the control group is the group that received the basic information mail. These odds ratios are calculated using a binomial logistic regression. The marginal treatment effects on the height of the assigned supplementary grant is depicted in columns 3 and 6 and are calculated using an OLS regression. The estimated relative change in probability of assignment or assigned amounts compared to a situation in which no email is sent or a basic info mail is sent are reported in square brackets. The change in percentage points (pp) are stated below this figure. These figures are  
\*\*\* significant at 1 percent level  
\*\* significant at 5 percent level  
\* significant at 10 percent level

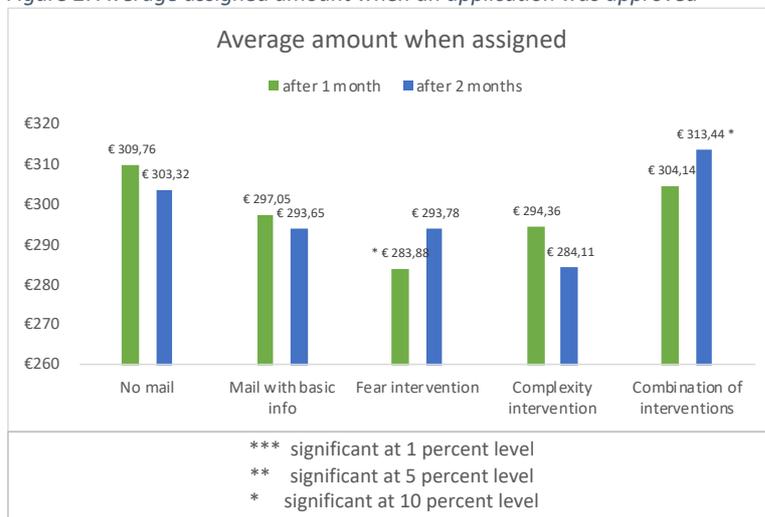
## 5.2 Treatment effects on assignment

Extra applications of the supplementary grant are only useful if applying students are actually eligible. This is why we also look at assignment rates. Table 5 shows that the effects of the interventions are smaller for assignment of the supplementary grant than for application. This is logically as not all applications are approved. The percentage of students that has an assigned supplementary grant rises from 3.3% for those who had not received an email, to 3.9% for those who received the basic info mail and to 4.5% for those who received the combination of interventions. Column 4 indicates that only the group that received the combination of interventions showed significantly higher take-up rates compared to the basic info mail. The complexity intervention also seems to increase assignment rates somewhat, but these figures are not significant.

Columns 2 and 5 shows the treatment effects on assignment of the supplementary grant after two months. Similar to the 2-month effects on application, the odds ratios are somewhat lower, but the marginal effects remain intact for the most effective interventions. Surprisingly, the fear intervention now has an insignificant negative impact on assignment rates. This could be a coincidence, however. Columns 3 and 6 show the average assigned amounts for the whole group after two months instead of the chance of having an approved application. It appears that this figure only rises for the combination of interventions.

In order to check if the newly generated applications by our interventions had a lower chance to be approved, we can look at figures on the chance of assignment and the average assigned amount when an application was approved. Table 3 and Figure 2 show that average assigned amount only significantly decreases a little in the case of the fear intervention. This effect is only found in the short run, however. When looking at the effects after two months, our most effective intervention even seems to increase the assigned amount of supplementary grant.

Figure 2: Average assigned amount when an application was approved



## 5.3 Control variables

Aside from the treatment effects, Table 5 also shows some notable findings concerning the control variables. It turns out that having applied for a supplementary allowance before significantly increases the chance that one applies for another one. This effect is much bigger for those who actually were assigned the supplementary version of the WTOS. This could have two reasons. Either these people know more about supplementary allowances because every

month they get reminded of it when checking their bank account, or there these people are surer they are eligible because of the income situation of their parents. That these students are actually more eligible than their counterparts who did not receive the sWTOS can be seen in Table 6. It appears that people that were assigned an sWTOS have higher chances to actually be assigned a supplementary grant after an application as well.

Furthermore, it appears that having attended the webinar on May 15<sup>th</sup> still had a large impact on supplementary grant applicants even after June 5<sup>th</sup>. This could either mean that scholars have actively or passively waited until they knew they graduated, or these students were already actively searching for information, which resulted in participating in the webinar. Either way, these students have more information about the existence and possible eligibility for the supplementary grant, just as their counterparts who previously applied for the sWTOS.

Aside from these fairly large effects on application, there are also some smaller effects of other control variables. It for example seems that being a man decreases chances of application and age and being a HAVO-scholar do not affect applying. HAVO-scholars do show higher assignment rates however, which could mean they are more likely to be eligible and thus have parents with lower incomes. VMBO and other education, which is mostly practical education, appears to have a fairly large negative effect on applying. This might result from the fact that people that are 18+ and are still at this level of education are not likely to study and thus to be eligible for the supplementary grant. The sample of these group are only small, however.

Lastly, it seems that having a relatively high percentage of western migrants in your neighborhood significantly decreases application rates, while the share of non-western migrants has a positive effect on application. This might result from network effects that are possibly stronger for non-western migrants.

Table 6: Assignment rate if applied

	sWTOS-receivers	non-sWTOS-receivers
No mail	63,4%	24,2%
Mail with basic info	63,9%	24,3%
Fear intervention	64,4%	24,6%
Complexity intervention	61,2%	28,8%
Combination of interventions	61,6%	27,9%

#### 5.4 Treatment effects on borrowing behavior

Aside from affecting application and assignment of the supplementary grant, our interventions also had a side-effect by affecting student loans. There are multiple channels how this borrowing behavior could be affected. First, it could be that as a result of our interventions, we more generated more traffic for DUO, which might lead to more student loans. However, it could also be the case that as more people apply for the supplementary grant, more people will expect to be eligible and borrow to compensate for this amount.

Table 7 shows that both the chance of taking on a loan and the loan amount were decreased by the combination of interventions, albeit with a relatively low significance. The results show that the chance of taking on a loan decreases by 6% from 21.6% to 20.3%. This marginal effect of 1.3 percentages points is roughly equal to the marginal effect to assignment of the supplementary grant. This finding supports the hypothesis that people might compensate for extra income from the supplementary grant and do not apply for a loan. Column 2 shows that the average height of student loans was €9.40 lower for the combination of interventions and €8.25 for the complexity intervention. The low significance of the effects should, however, lead us not to jump to conclusions too fast.

Column 3 shows whether these loan amounts that are applied for, are also actually assigned. The applied and assigned amounts could differ as not all people that apply actually enroll in education and there is a maximum amount of €897.56 that a student can receive as a sum of the loan and the supplementary grant. If a student receives a supplementary grant, the assigned loan is automatically decreased. Both of these effects do not result in highly different effects on loans as they are probably similar for all treatment groups.

Table 7: Treatment effect on probability of taking on a loan and loan amounts

Regressions estimating treatment effects on student loans

	Taking on a loan (1)	Height of loan application (2)	Height of assigned loan (3)
Email with basic info	-0.004 (0.009) [-2%]	-3.053 (5.707) [-3%]	0.551 (5.450) [0%]
Fear intervention	-0.008 (0.009) [-4%]	-4.569 (5.505) [-4%]	-2.504 (5.447) [-2%]
Complexity intervention	-0.003 (0.009) [-1%]	-8.248 <sup>^</sup> (5.596) [-7%]	-6.424 (5.440) [-6%]
Combination of interventions	-0.013 <sup>^</sup> (0.009) [-6%]	-9.403* (5.507) [-8%]	-10.296* (5.450) [-9%]
sWTOS application rejected	0.004 (0.007)	6.623 (4.685)	2.643 (4.474)
sWTOS application assigned	-0.016* (0.009)	0.013 (5.531)	-20.584*** (5.282)
Webinar attendance	0.073*** (0.015)	24.807** (9.796)	22.791** (9.355)
Male	-0.038*** (0.006)	-11.059*** (3.682)	-11.219*** (3.517)
Age	0.045*** (0.026)	34.341*** (3.134)	28.284*** (2.993)
HAVO	-0.095*** (0.006)	-59.987*** (3.801)	-57.115*** (3.630)
% non western migrants	-0.001*** (0.000)	-0.861*** (0.002)	-0.912*** (0.160)
% western migrants	0.004*** (0.001)	3.177*** (0.371)	3.042*** (0.354)
Questionnaire	-0.006 (0.007)	-7.403* (4.260)	-5.534 (4.089)
Constant	-0.595*** (0.091) [0.216]	0.056*** (0.045) [120.18]	-426.074*** (56.507) [111.91]
N	20442	20442	20442
Pseudo R2	0.025	0.025	0.025

Notes: This table summarizes the treatment effects on student loans after 2 months. Column 1 gives the marginal treatment effects for the chance of taking on a loan of borrowing compared against a situation in which no mail is sent. Column 2 gives the marginal effects on the height of the loan and column 3 gives the marginal effects on assignment of the loan. Relative changes are stated between square brackets. These figures are calculated using the figure in square brackets found at constant. This figure is the uncontrolled estimate for a situation in which no mail is sent.

- \*\*\* significant at 1 percent level
- \*\* significant at 5 percent level
- \* significant at 10 percent level
- <sup>^</sup> significant at 15 percent level

## 5.5 Heterogeneous effects

There is a possibility that different groups respond differently to different interventions, which could blur our average treatment effects. Table 8 shows separate sets of pooled regressions. In this table, the results of multiple heterogeneity tests are shown. There is a test for different genders and education (only HAVO and VWO). Furthermore, there is a test for informed and uninformed people. Informed means in the sense that a person has applied for a supplementary WTOS before or visited the webinar on May 15<sup>th</sup>. Another test compares

treatment effects of people with or without an assigned supplementary WTOS. Two last groups that are compared are people that did or did not apply for some kind of student finance before our mailing on June 5<sup>th</sup>. The p-value is calculated by using a pooled regression including the relevant interaction term and the variable of interest as a control variable. For gender, this meant that a dummy was added for gender and the interaction term condition\*gender. This p-value indicates whether the effects are significantly different for the different groups.

Table 8 shows that there are no heterogeneous effects for gender. An effect that is significantly different among groups is that VWO-scholars were more likely to apply as a result of the complexity intervention than HAVO-scholars. This effect contrasts the notion that these scholars are following higher education and are thus expected to have a higher financial literacy and thus make more informed decisions. This effect of financial literacy on perceived complexity was also not found in our questionnaire. One reason for the bigger effect of the complexity intervention for VWO-scholars might be that HAVO-scholars are more likely to apply anyway, which is seen in Table 7 and also was seen in self-reported reasons for non-take-up of the supplementary grant. Another hypothesis for this effect could be that VWO scholars are more sensitive to perceived complexity as other reasons like perceived risks are lower for these students (Van den Broek et al., 2018).

Another finding is that the fear intervention affected application behavior more positively for uninformed scholars than for informed scholars. An explanation for this result might be that high perceived risks might lead people to not inform themselves actively. This hypothesis is in line with literature that states that financially illiterate people experience higher stress when applying for social benefits (Bertrand et al., 2006). Furthermore, the basic info mail had a larger impact for non-sWTOS-receivers. This might result from the fact that sWTOS-receivers already have a high chance of applying for the supplementary grant (28.3% vs 8.7%) and the remaining non-applyers thus need more to convince them than a basic mail. That effects on the separate group of sWTOS-receivers are not significant might be the result of low numbers that result in less power. The odds ratios should thus not be just viewed as not different than one.

The clearest finding arises when comparing the groups that did or did not apply for a supplementary grant. All interventions were more successful for those that did already apply for student finance, but not yet the supplementary grant. This is mainly the result of a low application rate of this group. This also makes sense, because these scholars see less reason to apply for the supplementary grant in a second application. The fact that as extra information leads to more applications for this group might indicate that the reason to not apply for the supplementary grant for this group is that this group was not fully informed when applying.

Table 8: Heterogeneous effects measured with LMP

	Binomial logistic regression to analyze heterogeneous effects on application														
	gender			educational level			Informed			sWTOS assigned			SF application before email		
	male (1)	female (2)	p	HAVO (3)	VWO (4)	p	yes (5)	no (6)	p	yes (7)	no (8)	p	yes (9)	no (10)	p
Application rates when no mail	0.097	0.124		0.127	0.096		0.201	0.069		0.283	0.087		0.043	0.120	
Email with basic info	1.295***	1.302***	0.99	1.265**	1.419***	0.38	1.219**	1.396***	0.28	0.984	1.436***	0.08	2.546***	1.204***	0.00
fear intervention	1.343***	1.304***	0.77	1.316***	1.399***	0.68	1.180**	1.527***	0.04	1.100	1.457***	0.67	2.623***	1.260***	0.01
complexity intervention	1.411***	1.346***	0.68	1.208*	1.617***	0.02	1.326***	1.488***	0.37	1.157	1.478***	0.68	2.369***	1.300***	0.01
combination of interventions	1.560***	1.410***	0.42	1.400***	1.613***	0.27	1.407***	1.607***	0.27	1.258**	1.580***	0.96	2.411***	1.387***	0.00
N	12191	10315		8195	12664		9243	13780		3682	18824		3543	18963	

Notes: The table summarizes the average treatment effects denoted in odds ratios caused by the different interventions. These estimates show whether these effects are different for different subgroups. These subgroups are the different genders, educational levels, whether a scholar is actively informed in the sense that it applied for a sWTOS before or attended the webinar, whether a scholar was actually assigned the sWTOS and whether a scholar already applied for student financing before the experiment. P-values are calculated using a pooled logistic regression with control variables including the relevant interaction term. Application rates when no mail was sent is calculated by using the mean value of all control variables. In columns 3 and 4 only observations for HAVO and VWO are compared, as these are the only educational levels with enough observations to make usefull conclusions.

- \*\*\* significant at 1 percent level
- \*\* significant at 5 percent level
- \* significant at 10 percent level

## 5.6 Questionnaire

### General findings

Table 9: General information on questionnaire response

	Invitations sent	Absolute response	Response in percentages	Read the intervention	Application rate	Knowledge about existence
no email	1243	153	12,3%	-	28%	77%
basic email	1143	129	11,3%	73%	37%	85%**
fear intervention	1140	107	9,4%	69%	38%**	82%*
complexity intervention	1139	104	9,1%	63%	35%	90%***
combination of interventions	1141	125	11,0%	68%	38%	85%**

\*\*\*significant at 1 percent level, \*\*significant at 5 percent level, \*significant at 10 percent level

In the questionnaire, we asked 25% of the scholars that participated in the original experiment after their perceptions of the supplementary grant, we tested their financial knowledge, financial stigma and risk aversion and lastly asked them some general background questions. A short overview of the response can be found in Table 9. This table shows the number of sent questionnaires and the response rates. Response rates lie around eleven percent, which is normal for questionnaires sent by DUO. Furthermore, we see that around two thirds of the responding scholars said they read the email sent on June 5th, which is quite high. Lastly, response rates are somewhat higher than appeared in our experiment, but there is still a difference between whether scholars got an email or not. The actual overall application rates are 22.6% for the group that did not receive an email and 27.3% for the group that received the combination of interventions. These rates are lower than the self-reported application levels and the differences between interventions are also bigger. This could imply that the respondents show selection effects in the sense that people that applied were more likely to respond to our questionnaire. Differences between groups remain, however, which still makes it possible to make comparisons between the groups.

Appendix E shows an overview of the answers of the participating scholars per intervention. It appears that knowledge about height or the proportion of eligible students has not increased as a result of our interventions. The main effect on knowledge of our intervention, is that more scholars know about the existence of the supplementary grant. This figure increased significantly from 77% in the group without mail to 90% in the group that were mailed the complexity intervention. The other groups with interventions also had a significant impact on knowledge about existence.

Another interesting finding is that around 80% of the participants think that they have to fill in the income of their parents when applying for the supplementary grant, while this is not the case and it is even explicitly mentioned in the complexity intervention and combination of interventions. This figure is somewhat lower for our interventions but remains remarkably high. Furthermore, the results show that scholars estimate their chance of not graduating within ten years, which is a prerequisite to transform the grant in a gift instead of a loan, at around 30%, while it actually lies around 10%. The intervention that explicitly states that by far the most students actually graduate within ten years does not influence this perceived risk.

When looking at the reasons that scholars give why they responded to the mail by applying for the supplementary grant, it appears that students that were triggered by the basic info mail called the fact that they saw the mail as a reminder more than with the other interventions. The intervention that contained the sentence that was added to reduce perceived complexity triggered the scholars to view the grant more as a gift than a loan. While this was our aim for the fear intervention, this intervention did not affect this opinion.

Furthermore, the group that did not receive a mail, reported that they did not need the grant a lot more than the groups that did receive mails. This might implicate that this is not really the case as this reason comes forward less when there were emails sent. Also interesting is that a fairly large group indicates that they just not applied yet, while this was not a standard answer option.

When looking at the main sources of information, it appears that self-gathered information was most important, after which sent information, their parents and their friends have influence at a diminishing level. Considering psychological costs, shame or pride appear to play a marginal role (0.18 on a scale of 0 to 1) when applying for the supplementary grant, while injustice about receiving a grant that one does not need plays a larger role (0.4 on a scale of 0 to 1). Trust about handling data well by DUO is very high (0.8).

## Regressions

We have combined the answers for several categories into five indices that give a value for knowledge, perceived complexity, risks and psychological costs and financial stigma. In Table 10 the composition of these indices and the Cronbach's Alpha, that denotes how well variables fit together in an index, are given. This figure is rather low for the knowledge and complexity index, which might result from the fact that only the answers to three questions are compared. This means that conclusions from these analyses are not exact science, but it still gives an indication of perceptions. Furthermore, we asked students how risk averse they were and how high their financial knowledge in general was.

Table 10: Background of indices

	Knowledge index	Complexity index	Risk index	Psychologic cost index	Financial stigma
Composition	Knowledge about existence Right height Right number of eligibles	Fill in income How complicated Number of minutes	Perceived as grant (-) Perceived as loan Less inclined as a result of loan Chance of not graduating within 10	Risk index Shame Pride Injustice Trust (-)	Negative thoughts Negative treatment
Cronbach's Alpha	0.29	0.36	0.59	0.58	0.73

Table 11 shows the results of regressions that were run to estimate the effect of the indices on application levels and the influence of other variables on the indices. It appears that our interventions have low effects on perceptions of the supplementary grant. Only a combination of interventions has a small effect on the knowledge index, albeit only at a 10% significance level. Perceived complexity does decrease after our complexity and cocktail interventions, perceived risk decreases somewhat for the cocktail intervention and the complexity intervention decreases psychological costs. All effects are, however, fairly small.

When looking at the influence of the indices on application levels it appears that all indices have the expected effects: more knowledge tends to lead to more applications and less perceived risks, complexity and psychological costs tend to have a negative impact on application. These effects should be viewed with caution as it might also be the case that applying has an impact on knowledge, risks and complexity instead of the other way around. Furthermore, it seems from the regression that financial stigma leads to more applications. This might reflect that children from poorer families, who normally experience more financial stigma, also have higher chances to apply as their eligibility is clearer.

Furthermore, psychological costs tend to cohere with a general financial stigma and knowledge about the supplementary grant tend to cohere with general financial knowledge. Perceived risks are positively correlated with psychological costs like pride and injustice and negatively with trust. Knowledge has a negative connection to perceived complexity, risks and

psychological costs, while perceived complexity has a positive connection to perceived risks and other psychological costs.

Lastly, it appears that MBO students know less about the supplementary grant and experience more psychological costs. The lowest levels of MBO (1 and 2), for who the prerequisite of graduating within ten years does not count, show this by having lower perceived risks.

Table 11: OLS regressions estimating influence on application levels and indices

OLS regressions estimating influence on application levels and indices					
	Application	Knowledge index	Complexity index	Risk index	Psychological cost index
Email with basic info	0.081 (0.050)	0.028 (0.032)	-0.018 (0.021)	-0.027 (0.018)	0.020 (0.018)
Fear intervention	0.120** (0.052)	-0.013 (0.033)	0.006 (0.022)	0.002 (0.019)	-0.015 (0.019)
Complexity intervention	0.063 (0.054)	0.056 (0.034)	-0.039* (0.022)	-0.017 (0.019)	0.045** (0.019)
Combination of interventions	0.015 (0.052)	0.059* (0.033)	-0.059*** (0.021)	-0.031* (0.018)	-0.005 (0.018)
Male	-0.025 (0.035)	-0.028 (0.022)	0.019 (0.015)	-0.006 (0.013)	-0.003 (0.013)
Age	0.007* (0.004)	0.000 (0.003)	-0.004** (0.002)	0.001 (0.001)	0.003* (0.001)
HBO	0.085** (0.036)	-0.026 (0.023)	-0.043*** (0.015)	0.035*** (0.013)	0.018 (0.013)
MBO3-4	0.069 (0.082)	-0.150*** (0.052)	-0.035 (0.034)	0.031 (0.029)	0.089*** (0.029)
MBO1-2	0.127 (0.096)	-0.155** (0.061)	-0.065 (0.040)	-0.056 (0.035)	0.116*** (0.034)
Financial knowledge	-0.155* (0.085)	0.167*** (0.053)	-0.025 (0.036)	-0.034 (0.030)	-0.040 (0.030)
Risk aversion	0.006 (0.009)		-0.004 (0.004)	-0.004 (0.003)	-0.001 (0.003)
Financial stigma	0.431*** (0.088)	0.070 (0.056)	-0.057 (0.037)	-0.024 (0.034)	0.297*** (0.029)
Knowledge index	0.233*** (0.064)		-0.067** (0.027)	-0.077*** (0.023)	-0.088*** (0.022)
Complexity index	-0.844*** (0.098)	-0.154** (0.062)		0.103*** (0.035)	0.164*** (0.034)
Risk index	-0.487*** (0.128)	-0.205** (0.081)	0.097* (0.053)		
Psychological cost index	-0.350*** (0.132)	-0.176** (0.084)	0.176*** (0.055)		
Shame				0.049 (0.045)	
Pride				0.081** (0.039)	
Trust				-0.070** (0.030)	
Injustice				0.096*** (0.021)	
Constant	0.606*** (0.130)	0.629*** (0.075)	0.519*** (0.050)	0.406*** (0.054)	0.189*** (0.044)
N	617	617	617	617	617
R2	0.273	0.123	0.104	0.187	0.264

Notes: This table summarizes the estimates an OLS regression for application of the supplementary grant (first column) and several indices.

\*\*\* significant at 1 percent level

\*\* significant at 5 percent level

\* significant at 10 percent level

## 6. Summary & conclusion

Literature has pointed out that there are three main reasons for non-take-up, which are a lack of knowledge about existence or eligibility, the (perceived) complexity of application of benefits and psychological costs that come with applying for benefits. These psychological

costs might rise as a result of stigma, but also because people might have fears to repay benefits. In the specific case of the supplementary grant, it seems that not complexity of the application, but mainly perceived complexity plays an important role.

This thesis has tested four major hypotheses on a group of scholars that was already known with DUO and were likely to go studying next year. The first one was whether a well formatted active reminder can increase take-up compared to a situation in which no such mail is sent. The results show that sending a short, to-the-point email that contains basic information on the supplementary grant and is sent at a timing that student orientate for further education, significantly increases take-up of the supplementary grant by 24% or 2.7 percentage point.

The second hypothesis was that take-up can be even further increased by adding a sentence that aims to decrease perceived risk. The sentence to reduce perceived risks or fear was that “Most students succeed in graduating within ten years and when this doesn’t happen, you will only have to repay it when your income is high enough.” The mail with basic information that also included this sentence showed a significant increase compared to a situation in which no mail is sent. We also found a greater effect than the mail with basic information, but this effect was not found to be significant.

The third hypothesis was that take-up could be increased by adding a sentence to decrease perceived complexity. This was tested by adding the following sentence to the basic info letter: “If you have difficulties to assess eligibility, we recommend you to apply. After applying, DUO will examine by itself whether you are eligible.” For this sentence, similar conclusions are reached as for the second hypothesis: significantly higher take-up than in a situation without mail and a higher, albeit insignificant take-up than the basic mail. This intervention also seems to have a bigger effect than the fear intervention, but these effects are also not significant.

The fourth hypothesis, that a combination of interventions would have an effect that was the biggest is supported. This was the only intervention that had a significantly bigger effect on take-up levels compared to the basic info mail of 10-12 percentage point. The fact that a combination of interventions has a stronger effect than the separate interventions can be caused by an interaction effect or by the addition of two effects. An interaction effect would mean that there might be a threshold of information or arguments that needs to be passed in order to active scholars and that this threshold is only passed in the cocktail intervention. Addition of effects can arise if some scholars respond to the fear intervention and others respond to the complexity intervention, leading to bigger effects when both of the interventions are shown. We cannot conclude this latter because the fear and complexity interventions do not show significantly different application or assignment rates than a basic mailing. These effects could thus be a mere coincidence.

When we look at whether the newly generated applications are not done by people that are not eligible, we have also tested whether these applications were actually approved. It appeared that the combination of interventions led to a rise in assigned supplementary grants, both in numbers as in amounts. The complexity intervention also seemed to have a positive effect on this assignment rate, but this is insignificant. The fear intervention does not show significant changes in application rates and the average assigned amounts are also significantly lower when looking at data after one month. This could mean that non-eligible people are mostly responsive to this intervention, while the actual goal is to improve application rates for eligible students.

When comparing treatment effects after one month to those after two months, it appears that relative treatment effects on application are somewhat lower as a result of higher application rates in the control group. The marginal effects, however, tend to persist. This means that the newly generated applications are, when looking at this data, not likely to be the result of bringing forwards applications that would have otherwise been done later anyway.

The combination of interventions does not only affect application and assignment rates of the supplementary grant, it also affected student loans. Students that received this intervention, were less likely to borrow and their borrowing amounts were lower. This could be the result of a taking in the mind a possible assignment of the supplementary grant that was applied for more as a result of the intervention. These people might thus think they need less loan if they get more supplementary grant.

When looking at heterogeneous effects, it appeared that these did not arise much. Heterogeneity that did appear were a higher effect of the complexity intervention for VWO- than for HAVO-scholars, a relatively big effect of the fear intervention for uniformed scholars and a relatively low effect of the basic info intervention on scholars with an assigned supplementary WTOS. Furthermore, people that already arranged their student finance before the experiment were more responsive to all our interventions.

Results from the questionnaire tell us that the aside from higher knowledge about existence of the supplementary grant, most perceptions about the grant did not change. It also appeared that perceived risks are remarkably high and that a lot of people (around 80%!) think that one has to fill in an income when applying, which is not the case. Regressions that were run also indicate that financial knowledge in general or more specifically on the supplementary grant is associated with higher application rates. The opposite effect was found for perceived complexity, risks and other psychological costs. This means that perceptions do play a role, but they are not changed by the interventions. As perceptions are not changed, the effects on application are thus either achieved by increasing knowledge about existence of the supplementary grant or by a direct conviction by the mail that resulted in short term effects on perceptions.

When looking at the financial consequences of our interventions, it seems that we have generated both extra applications and assignments of the supplementary grant. The current experiment already increased per student expenses of nearly €27,77 without our intervention by 17% or €4.64 to €32.41 for the most effective intervention. When taking this most effective effect, there is a possibility that average costs per student on supplementary grant could rise a lot. When extrapolating the results of the combination of interventions to the whole group of participants that of 22500 students, total expenditures to the supplementary grant can increase by €104,400.- a month or 1,250,000.- a year.

## **7. Discussion & recommendations**

This experiment was done in the irregular times of covid-19, which through multiple channels, makes it somewhat harder to generalize the effects that were found to other situations. First of all, covid-19 resulted not only in a healthcare disaster, but also in how the IMF described it as “The great lockdown”, or “the greatest economic recession since the Great Depression” (Gopinath, 2020). This might have resulted in more attention for the financial situation of people. It has also resulted in the fact that schools were closed, and the final exams were not held this year, which resulted in other periods that scholars knew if they graduated. Aside from these problems with generalization the crisis also resulted in a more limited sample than

we aimed for, both regarding to numbers and selection. The limited number result in less power than we aimed for and might be the cause of the non-significant effect of the fear and complexity intervention compared against the basic mail.

Furthermore, covid-19 resulted in irregular customer demand at DUO, which has led to our targeted population of WTOS-receivers. This group was only targeted, because this group was already sent some emails with information on student finance before and were less likely to generate extra customer contact. This has an impact in various ways. First, this group has already had multiple emails and even a webinar. This might have reduced the potential of our experiment as these previously sent emails may have triggered scholars to apply, while they otherwise might have not. Our experiment thus misses the so-called low hanging fruit. Second, WTOS-receivers had already found their way to the WTOS. Other research states that having applied to benefits before increases the chance of applying to other benefits (Bargain et al., 2012; Domingo & Pucci, 2014). This means the impact of our interventions would probably be bigger for a group that also contains people that do not already know their way in DUO's systems. Third, the recipients of our mail are relatively old (18+) and even though our analysis shows that age does not significantly impact take-up this might be another case for a broader group. Aside from the covid-19, results are also hard to generalize to non-take-up of other benefits or non-take-up in other countries as this non-take-up depends on a lot of variables of which a lot I have already described.

Another issue with our results is that there could have been Information-spillovers or peer effects which means that students who received a mail can have shared this information with their peers that possibly received another version or no version of our mail. This might also have distorted our results. Another shortcoming of our analysis is the fact that we only look at results after one and two months. It might be the case that effects go further than the analysis of this thesis, but as a result of deadlines, we cannot capture all results. Nudges like this tend to have mainly short-term effects on non-take-up (Manoli & Turner, 2017). The ministry will, however, assess long term effects when data is available.

When looking at our results, there are some things that stand out. The difference in take-up levels between men and women is different to other literature that investigates non-take-up. While other research did find that women tend to be less financial literate or more risk averse (Eckel et al., 2007), research on differing non-take-up between groups (see Appendix A) normally finds that gender is not a groups with differing non-take-up.

Another remarkable result is the fact that our complexity and fear interventions did not show a different impact on take-up the basic info intervention, even though there is a wide array of literature, which we discussed in chapter 3, that shows these interventions might have an impact. Interesting in this regard is the fact that a combination of both interventions does generate a significant impact on take-up. This might be an indication that there might be an effect of the separate interventions, but that this effect, for the current population, is too small to generate significance, while a combined intervention is successful in such a degree that it does create significance. There is also a possibility that there is some kind of interaction between the two interventions which ensures a certain information threshold needs to be passed to convince people to apply. There is little evidence for this hypothesis, however. A similar experiment even showed that more information could lead to lower take-up as it makes the notice more complicated (Bhargava & Manoli, 2015). I would thus recommend to either repeat the experiment with a bigger population or to repeat the experiment several years. In the first case, significance is easier found and in the second case,

a similar image every time could decrease the option that the effects are coincidentally higher than the basic info mail.

Scientifically seen, further research on the subject on non-take-up is necessary, but experiments like this and like other did before (Bhargava & Manoli, 2015) gives important insights in how knowledge and (perceived) complexity and psychological costs play a role for non-take-up. While there are some issues with generalizability, this experiment shows, like other experiments before, that information can help reduce non-take-up if it is presented in an active, personal and to-the-point way. These effects are not solely applicable to the supplementary grant. Furthermore, we have pointed at the fact that not only absolute values for risk or complexity matter, but that perceived values might be just as important. This finding should also be kept in mind when investigating non-take-up for other benefits or in other countries. Another notion is that our interventions do not change perceptions. Other research might focus more on the effects of communication these underlying thoughts about benefits more in detail. If possible, I would recommend other researchers to use larger, better randomized populations and to test multiple changes in communication.

Seen from a policy perspective, this research gives insights in reasons for non-take-up and how to lower it. It is clear that an active reminder that is sent at a relevant timing helps lowering this non-take-up and it also appears that more information helps to reduce non-take-up. If the ministry will replicate this experiment in any way, I would take this combination of interventions as new basic information mail. I would then recommend adding more information in order to see additional effects. An example of this could be to decrease uncertainty about eligibility by adding information about specific groups with a relatively high non-take-up. Other research has shown that this might help in decreasing non-take-up (De Lombaerde, 2018). Groups that would be interesting to mention as they experience relatively high non-take-up are children of divorced parents, self-employed parents, parents that studied in higher education and students in academic education (Konijn, 2020). Our research indicates that it might help to add extra information, but other research has found that extra information can decrease non-take-up as it could make communication more complicated (Bhargava & Manoli, 2015). It would thus be interesting to see what an optimal level of information would be.

Aside from adding more information, there are also possibilities in differing how information is presented. There are indications that there are different effects between sending letters instead of emails (Van der Werf et al., 2019) and between sending letters to parents instead of children (Ideas42, 2016). Furthermore, there is evidence that two reminders within two weeks do not have different effects than one reminder (Guyton et al., 2016). One could test the effects of differing time periods between reminders. Another recent finding is that 40% of all students is eligible (Konijn, 2020). Now we always advertise with the fact that 1 in 3 students are assigned the supplementary grant, but you could also state that 4 in 10 is eligible, which is a higher amount.

Aside from these communicational interventions, non-take-up might also be lowered by changing the application environment (Bhargava & Manoli, 2015). An example how this could be done is by automatically testing students for eligibility and showing this on DUO's application website. When this is not possible, this eligibility could also be communicated by sending a proactive mail. The best possible option to increase take-up, however, would be to automatically enroll people and giving the grant as an unconditional gift. While this might not be possible policy wise, it is still the most effective way to reduce non-take-up

A more general policy recommendation would be to send more active reminders, as they tend to be effective in increasing knowledge about existence of the grant and increase application and assignment of the supplementary grant if targeted and timed correctly. This might also have side-effects on borrowing behavior. Furthermore, I would recommend urging possible eligible students to apply when there are suspicions that non-take-up is the result of incorrect perceived complexity or fears. Notable observations of the questionnaire are that a lot of people think that they are not eligible while not testing this and most importantly, they think they have to fill in incomes, which is not the case and might strongly influence non-take-up. I would recommend DUO to be clearer that this is not the case and maybe state this explicitly in tools on their website where people can test eligibility.

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## Appendix A: Take-up among different groups

Table 12: Summary of findings in literature on non-take-up among different groups

<b>High non-take-up</b>	<b>Low non-take-up</b>
High incomes (Dubois & Ludwinek, 2014; Tempelman & Houkes-Hommes, 2016)	Low incomes (Dubois & Ludwinek, 2014; Tempelman & Houkes-Hommes, 2016)
Higher educated (Bargain et al., 2012; Blank & Ruggles, 1996)	Lower educated (Bargain et al., 2012; Blank & Ruggles, 1996)
(Fulltime) employed (Chareyron et al., 2018; Tempelman et al., 2011)	(long lasting) unemployed (Chareyron et al., 2018)
Singles (Dubois & Ludwinek, 2014)	Families with children (Blank & Ruggles, 1996)
Homeowners (Bargain et al., 2012; Bruckmeier & Wiemers, 2012)	Disabled (Blank & Ruggles, 1996; Chareyron & Domingues, 2018; Domingo & Pucci, 2014)
Newly eligible (Tempelman & Houkes-Hommes, 2016)	Retired (Blank & Ruggles, 1996)
Changing life events (Tempelman et al., 2011)	Homeless (Chareyron & Domingues, 2018)
Migrants (Ametépé & Hartmann-Hirsch, 2010; Berkhout et al., 2019)	Migrants (Aizer & Currie, 2004; Borjas & Hilton, 1996)
Lowest incomes (Chareyron & Domingues, 2018; Tempelman & Houkes-Hommes, 2016)	Applicants to other benefits (Bargain et al., 2012; Domingo & Pucci, 2014)
People in social isolation (Currie, 2006)	People living in social housing (Bargain et al., 2012)
Self-employed (Bargain et al., 2012; Tempelman et al., 2011)	

## **Appendix B: Customer journey of the application for the supplementary grant**

To assess potential for different interventions, I have looked into the communication of DUO and the Ministry of Education. This so-called customer journey is done by looking at send letters and emails and by looking at webpages to which is referred in this communication.

### **Existing letters**

Four letters with information about the supplementary student grant that are sent yearly. These letters are sent to (1) graduating student from secondary school or MBO4, (2) MBO-students who turned 18, that did apply for traveling product, but not yet for other kinds student finance, (3) everyone who almost turns 18 and (4) upcoming MBO-students.

The first letter is sent by the Ministry of Education every year in October to last-year HAVO- and VWO-scholars and contains all information the ministry thinks an upcoming student should know. It for example covers information on help with study choice, special facilities for the disabled, possible selection criteria and student finance. The information on student finances covers the website students should go to for application, the kinds of income transfers and loans and how the loans are paid back. More specifically on the supplementary grants, the letter states that a student could apply for it if parents cannot contribute to a students' financial situation, that a quarter of a students are eligible and that it is a gift when a student graduates within ten years. Furthermore, students are referred to a tool which helps budgeting for students and a webpage with more information about the supplementary grant.

The letter thus contains extensive information on a lot of topics. It has appeared from earlier experiments that a lot of information at one time might decrease application rates (Bhargava & Manoli, 2015) and that timely messages with not all information the same time, but spread over a period of time could increase application rates (Ideas42, 2016). While the letter might be too extensive to maximize impact, it appeared from an earlier experiment with this letter that the inclusion of the line "1 in 4 students is eligible" did manage to change behavior, especially from students in the third lowest income decile (De Lombaerde, 2018). This means the included information, albeit extensive, does have effects.

A second letter is sent to students who potentially enter MBO next year. This letter is similar to the first letter as it also contains information about deadlines, study choice, special facilities and financial matters. Aside from the fact the letter is sent to a different group of students, the letter is shorter and more to the point. Regarding student finance, the letter mentions that possible eligibility starts when turning 18 and that one is already eligible for the traveling product when not yet 18. The letter also refers to a webpage with a tool where one can calculate costs and income during student times.

The third letter is sent to MBO-students turning 18, who did apply for the travel product, but not for other student finance, is a proactive mail with sole goal to point students at other ways of student finance and especially the basic and supplementary grant. These letters are the same for all MBO levels, except for a line for MBO1-2-students where there is explicitly mentioned both grants are a gift and a line for MBO3-4-students that it is only a gift if graduated within 10 years. This difference arises from the fact that MBO1-2 students face different conditions. The letter contains information on differences between amounts depending on the living situation and that eligibility to the supplementary grant depends on your parents' income. Furthermore, students are referred to a webpage with information about the supplementary grant and a tool to calculate eligibility.

The letter is short and to the point and is sent at a point in time where students might not know they are eligible. MBO-students turn eligible for other types of student finance than

the traveling product when they turn 18 and this letter thus helps good for time-management, which is one of the factors that makes information interventions effective (Oreopoulos, 2019). It does not directly cover information on amounts and the simple application but refers to a webpage instead. Earlier research found out that this might increase usage of the tool, but it has less effects on actual application behavior than providing the relevant information already in the letter itself (Van der Werf et al., 2019).

The fourth letter is a collaboration between the tax services and DUO and provides all youngsters information at changing financial circumstances when turning 18. It is one page and gives short information on tax returns, health benefits and student finance. It mentions that only fulltime students are eligible for student finance and it refers to a webpage with more information on turning 18. Webpages will be analyzed next section. The letter is short and sent at a relevant time but contains little information.

Table 13: Summary of customer journey

Recipient and description	Information in letter	Information in provided links
<p><b>Possible next year HO-students</b></p> <p>Much and extensive information for upcoming HO-students.</p>	<ul style="list-style-type: none"> <li>- You are also eligible when not yet 18.</li> <li>- It is a gift when graduated within 10 years.</li> <li>- Eligible when parents cannot contribute.</li> <li>- 1 in 4 is eligible.</li> </ul>	<ul style="list-style-type: none"> <li>- Calculation tool for student budgeting and extensive tool to check eligibility for supplementary grant</li> <li>- All Information concerning supplementary grant</li> </ul>
<p><b>Possible next year MBO-students</b></p> <p>Much, but to-the-point information for upcoming MBO-students.</p>	<ul style="list-style-type: none"> <li>- When you are 18 you are eligible for student finance.</li> <li>- If you are not yet 18, you can make use of the travel product.</li> </ul>	<ul style="list-style-type: none"> <li>- Calculation tool for student budgeting and for calculating eligibility for supplementary grant</li> <li>- All information concerning student finance, with a link to all information concerning supplementary grant</li> </ul>
<p><b>MBO-students turning 18</b></p> <p>Short email with a reminder for student finance eligibility when turning 18.</p>	<ul style="list-style-type: none"> <li>- You are possibly eligible for basic and supplementary grant.</li> <li>- Eligibility depends on income of parents.</li> <li>- Amount depends on living situation.</li> <li>- Application is fast.</li> </ul>	<ul style="list-style-type: none"> <li>- Extensive calculation tool to check eligibility for supplementary grant.</li> </ul>
<p><b>Everyone turning 18</b></p> <p>Short letter with Information on changing finances when turning 18.</p>	<ul style="list-style-type: none"> <li>- You might be eligible for student finance when following a fulltime study.</li> </ul>	<ul style="list-style-type: none"> <li>- Information on all steps to take when applying for student finances</li> </ul>

## Webpages

The described letters contain five different links to webpages. The first link (Duo.nl/rekenhulp) is found in the first two letters. This webpage contains links to two calculation tools. One of these tools helps students to choose an appropriate student loan, both on the basis of income and expenses as possible eligibility to the supplementary grant. To calculate eligibility, a

student is asked to fill in income of parents. The second tool is a more comprehensive version of this first tool and also asks about other children of the parents and whether they are still together and more accurately calculates eligibility. Aside from being more accurate, it is also more work to complete. This second tool is also referred to in letter 3 ([Duo.nl/apps/rekenhulp-aanvullende-beurs/index.html](https://duo.nl/apps/rekenhulp-aanvullende-beurs/index.html)).

A second link in the first letter provides all necessary information about the supplementary grant, from different amounts when there are multiple children to when parents are divorced ([duo.nl/particulier/aanvullende-beurs-of-toelage](https://duo.nl/particulier/aanvullende-beurs-of-toelage)). On this webpage, one can also find a link to a tool with a troubleshooter that assumes one has applied for a supplementary grant and has a question regarding allocation.

Another link is referred to in the second letter ([duo.nl/particulier/studiefinanciering](https://duo.nl/particulier/studiefinanciering)) and gives information concerning student finance. All different kinds are explained and requirements are stated. Finally, the letter to all upcoming 18-year-olds contains information on all kinds of student finance, how to apply and what steps one has to fulfill to be able to apply.

## Appendix C: Interventions

Beste [VOORNAAM],

Dit is de laatste mail in een reeks om je voor te bereiden op komend jaar. Hierin hebben we je eerder gewezen op een mogelijk recht op studiefinanciering als je gaat studeren in het mbo, hbo of aan de universiteit. Onderdeel hiervan is de aanvullende beurs.

### Wat is de aanvullende beurs?

- De aanvullende beurs is een toelage voor studenten met ouders met een inkomen dat niet boven een bepaalde grens uitkomt.
- De aanvullende beurs kan wel tot € 403 per maand bedragen.

### Moet ik de aanvullende beurs terugbetalen of niet?

De aanvullende beurs is net als het studentenreisproduct een prestatiebeurs. Dat betekent dat het een gift is als je binnen 10 jaar afstudeert. (Veruit de meeste studenten lukt dit ook. Als dit niet lukt, dan betaal je het alleen terug als je inkomen hoog genoeg is [[Fear intervention](#)]).

### Heb ik recht op de aanvullende beurs?

Dat ligt aan het inkomen van je ouders. 1 op de 3 studenten krijgt de aanvullende beurs maandelijks gestort. Er hebben echter nog meer studenten recht op zonder dat ze het aanvragen. Ook jij hebt er misschien recht op zonder dat je het weet. (Als je moeite hebt om in te schatten of je recht hebt, vraag de aanvullende beurs dan vooral aan. DUO berekent na een aanvraag zelf of je recht hebt. [[Complexity intervention](#)])

### Hoe vraag ik de aanvullende beurs aan?

De aanvullende beurs vraag je eenvoudig aan in Mijn DUO. Volg onderstaand stappenplan voor jouw situatie. DUO bericht vervolgens of en hoeveel aanvullende beurs je ontvangt.

Ik heb nog geen studiefinanciering	Ik heb al studiefinanciering aangevraagd
<ol style="list-style-type: none"><li>1. Log in op <a href="#">Mijn DUO</a></li><li>2. Klik op 'Aanvragen' in het blokje 'Studiefinanciering' van het overzichtsscherm</li><li>3. Volg daarna de instructies op de schermen</li><li>4. Kies bij de onderdelen van je studiefinanciering ook de aanvullende beurs aan</li></ol>	<ol style="list-style-type: none"><li>1. Log in op <a href="#">Mijn DUO</a></li><li>2. Klik in de blauwe balk bovenaan op 'Mijn Producten/studiefinanciering'</li><li>3. Klik op 'Aanvragen aanvullende beurs'</li></ol>

### Weet je nog niet of je gaat studeren?

Ook dan is ons advies om wel alvast je financiering te regelen. Op [duo.nl/eindexamen](http://duo.nl/eindexamen) weet je binnen een minuut wat je moet doen.

Alles al geregeld? Of ga je niet studeren in het mbo, hbo of aan de universiteit? Dan kun je deze e-mail als niet verzonden beschouwen.

Met vriendelijke groet,

Willem Schutte,  
Directeur Onderwijsvolgers  
Dienst Uitvoering Onderwijs

## Appendix D: Questionnaire

### Sectie 1

Fijn dat je deze vragenlijst wilt invullen! We beginnen met een paar algemene vragen.

1. Ga je in schooljaar 2020-2021 een studie volgen in het MBO, HBO of aan de Universiteit?

Ja                      Misschien/waarschijnlijk                      Nee

### Sectie 2 Alleen voor degenen die gaan studeren

2. Vergeleken met andere volwassenen in Nederland, hoe is jouw algemene kennisniveau over financiële zaken?

1 = zeer laag    5 = zeer hoog

3. Zie je jezelf als een persoon die zeer bereid is om risico's te nemen of probeer je risico's te vermijden?

1 = je bent helemaal niet bereid om risico's te nemen.      10 = je bent zeer bereid om risico's te nemen.

De volgende vragen gaan over hoe jij denkt over de aanvullende beurs.

4. Ben je op de hoogte van het bestaan van de aanvullende beurs?

Ja      Nee

De aanvullende beurs is er voor studenten die ouders hebben met een relatief laag inkomen.

5. Wat denk jij dat de maximale hoogte van de aanvullende beurs is, per maand, in euro's?

6. Hoe zeker ben je over dit antwoord?

1 = zeer onzeker                      5 = zeer zeker

7. Welk percentage van alle studenten denk jij dat recht heeft op de aanvullende beurs?

0% tot 100%

8. Hoe zeker ben je over dit antwoord?

1 = zeer onzeker      5 = zeer zeker

- 
9. In hoeverre ben je het eens met de volgende twee stellingen?

	Helemaal mee oneens	Mee oneens	Neutraal	Mee eens	Helemaal mee eens
--	---------------------	------------	----------	----------	-------------------

Ik zie de aanvullende beurs als een lening.

Ik zie de aanvullende beurs als een gift.

10. Hoe groot schat jij de kans in dat je niet binnen 10 jaar afstudeert?

0% tot 100%

11. Hoe zeker ben je over dit antwoord?

1 = zeer onzeker                      5 = zeer zeker

12. Hoe ingewikkeld denk je dat het is om de aanvullende beurs aan te vragen?

1 = helemaal niet ingewikkeld                      5 = zeer ingewikkeld

13. Hoeveel tijd, in minuten, denk je kwijt te zijn met een aanvraag voor de aanvullende beurs? q13

14. Hoe zeker ben je over dit antwoord?

1 = zeer onzeker                      5 = zeer zeker

15. Moet je het inkomen van je ouders invullen bij een aanvraag voor de aanvullende beurs? q15

Ja      Nee

16. Hoe zeker ben je over dit antwoord?

1 = zeer onzeker   5 = zeer zeker

17. In hoeverre ben je het eens met de volgende stellingen?

	Helemaal mee oneens	Mee oneens	Neutraal	Mee eens	Helemaal mee eens
Anderen denken op een negatieve manier over mensen in mijn financiële situatie.					
Door mijn financiële situatie behandelen anderen mij op een manier die ik niet prettig vind.					
Schaamte zorgt ervoor dat ik minder geneigd ben de aanvullende beurs aan te vragen.					
Trots zorgt ervoor dat ik minder geneigd ben de aanvullende beurs aan te vragen.					
Ik vind het onrechtvaardig om een aanvullende beurs aan te vragen als ik ook rond kan komen zonder aanvullende beurs.					
Een mogelijk risico dat ik de aanvullende beurs moet terugbetalen zorgt ervoor dat ik minder geneigd ben de aanvullende beurs aan te vragen.					
Ik vertrouw erop dat DUO op een juiste manier met mijn gegevens omgaat.					

18. In hoeverre ben je het eens met de volgende stellingen?

Bij de keuze om wel of geen aanvullende beurs aan te vragen speelt ...

	Helemaal mee oneens	Mee oneens	Neutraal	Mee eens	Helemaal mee eens
... advies van mijn ouders/ verzorgers een belangrijke rol.					
... advies van mijn vrienden een belangrijke rol.					

---

... informatie die ik  
toegestuurd heb gekregen  
een belangrijke rol.

---

... informatie die ik zelf heb  
verzameld een belangrijke  
rol.

---

Op 6 juni heb je een e-mail gekregen van DUO waarin we je specifiek wezen op een mogelijk recht op de aanvullende beurs. Deze mail had de titel "Heb jij recht op max 403 euro per maand? Denk aan de aanvullende beurs!" en zag er als volgt uit. [ONLY FOR STUDENTS WHO RECEIVED A MAIL]

19. Heb je deze mail gelezen?

Ja, aandachtig Ja, vluchtig Wel ontvangen, maar nog niet gelezen Niet ontvangen

20. Heb je door de mail actie ondernomen?

Ja Nee

21. Waardoor kwam dit? [IF JA] Er zijn meerdere antwoorden mogelijk.

Ik wilde de beurs al aanvragen en de mail hielp als reminder.

De aanvraag bleek makkelijker dan ik dacht.

Het maximale bedrag bleek hoger dan ik dacht.

Het blijkt voor de meeste studenten een gift te zijn.

Anders, namelijk \_\_\_\_\_

22. Waardoor kwam dit? [IF NEE] Er zijn meerdere antwoorden mogelijk.

Ik heb waarschijnlijk geen recht op de aanvullende beurs.

De aanvraag is te veel gedoe.

Ik weet te weinig over de aanvullende beurs.

Ik wil geen lening.

Anders, namelijk \_\_\_\_\_

De volgende vragen gaan over de producten die DUO aanbiedt en of je deze hebt aangevraagd.

23. Heb je een aanvullende beurs aangevraagd?

Ja Nee

24. Op het moment van aanvragen, hoe zeker was je ervan dat je de aanvullende beurs toegekend zou krijgen? [IF 23=JA]

1 = heel onzeker 5 = heel zeker

25. Heb je inmiddels bericht ontvangen van DUO over het resultaat van je aanvraag voor een aanvullende beurs? [IF 23=JA]

Ja, de aanvraag is toegekend Ja, de aanvraag is afgewezen

Nee, nog geen bericht gezien Weet ik niet

26. Waarom heb je geen aanvullende beurs aangevraagd? [IF 23=NEE] Er zijn meerdere antwoorden mogelijk.

Ik denk geen recht te hebben op de aanvullende beurs.

Ik ben bang dat ik de aanvullende beurs later terug moet betalen.

Ik heb geen aanvullende beurs nodig om rond te komen.

Het lijkt me te ingewikkeld om een aanvraag in te dienen.

Anders, namelijk \_\_\_\_\_

27. Heb je een lening aangevraagd?

Ja Nee

28. Wat is de hoogte van je aangevraagde lening, per maand, in euro's? [IF 27=JA]

29. In hoeverre heb je bij je aanvraag voor een lening rekening gehouden met de  
mogelijk te ontvangen aanvullende beurs? [IF 27=JA]

1 = helemaal niet 5 = in zeer sterke mate

Dit element tonen

30. Heb je inmiddels bericht ontvangen van DUO over het resultaat van je aanvraag?

Ja Nee

31. Heb je je lening aangepast na ontvangst van het bericht over de aanvullende beurs?  
[IF 30=JA]

Ja Nee

32. In welke richting en in welke mate? [IF 31 =ja]

Naar beneden, met hetzelfde bedrag als de aanvullende beurs die ik krijg.

Naar beneden, met een kleiner bedrag dan de aanvullende beurs die ik krijg.

Naar beneden, met een groter bedrag dan de aanvullende beurs die ik krijg.

Naar boven.

33. Waarom niet? [IF 31=NEE] Er zijn meerdere antwoorden mogelijk.

Ik wist niet dat dit maandelijks kon.

Ik heb er nog geen tijd voor gehad.

Het lijkt me te ingewikkeld.

Ik schat in dat mijn eerder gekozen leenbedrag nog steeds het juiste bedrag is.

Ik zie de aanvullende beurs als een extraatje en niet als vervanging voor de lening.

Anders, namelijk \_\_\_\_\_

34. Heb je collegegeldkrediet aangevraagd?

Ja Nee

35. Wat is de hoogte van je collegegeldkrediet, in euro's?[IF 34 = ja]

36. Heb je een studentenreisproduct aangevraagd?

Ja Nee

### Sectie 3 Achtergrondgegevens

Tot slot vragen we een paar achtergrondgegevens. Hiermee kunnen we nog steeds niet achterhalen wie je bent, de enquête blijft dus anoniem.

37. Welk onderwijsniveau ga je komend studiejaar volgen?

MBO1 MBO2 MBO3 MBO4 HBO WO

38. Welk geslacht heb je?

Man Vrouw Wil ik liever niet zeggen

39. Wat is je geboortejaar?

### Sectie 4 Eind

Je hebt het einde van de vragenlijst bereikt. Als je op 'Antwoorden versturen' klikt, kun je niet meer terugbladeren.

Hartelijk dank voor het meedoen aan de enquête! Je antwoorden zijn succesvol opgeslagen.

## Appendix E: Questionnaire results per intervention

Table 14: Questionnaire results per intervention

<b>Knowledge</b>	Knowledge about existence	Estimated height	Estimated eligibles	knowledge index			
no email		77,1%	400	41,3%	0.501		
basic email		85,3%	429	41,9%	0.525		
combination of interventions		84,8%	390	39,1%	0.557		
fear intervention		82,2%	372	44,5%	0.470		
complexity intervention		90,1%	433	42,6%	0.551		
<b>Certainty about</b>	height	number of eligibles	time required	requirement of having to fill in income			
no email		2,48	2,36	3,05	4,02		
basic email		2,69	2,52	3,17	4,04		
combination of interventions		2,76	2,47	3,14	4,12		
fear intervention		2,6	2,5	3,03	3,98		
complexity intervention		2,7	2,39	2,93	3,86		
<b>Perceived complexity</b>	Estimated time required for application	Estimated difficulty of application	Requirement of having to fill in income	complexity index			
no email		32	0.377	86,3%	0.441		
basic email		36	0.349	83,7%	0.426		
combination of interventions		28	0.324	74,4%	0.380		
fear intervention		34	0.404	85,0%	0.447		
complexity intervention		27	0.361	80,8%	0.410		
<b>Perceived risk</b>	Estimated chance of not graduating within 10 years	Loan	Grant	Less inclined to apply as a result of risks	Risk index		
no email		30,5%	0.400	0.590	0.518	0.408	
basic email		31,4%	0.359	0.620	0.479	0.383	
combination of interventions		31,7%	0.320	0.684	0.508	0.365	
fear intervention		30,8%	0.395	0.568	0.521	0.414	
complexity intervention		28,8%	0.413	0.623	0.469	0.387	
<b>Psychological costs</b>	Shame	Pride	Justice	Trust	Psychological cost index	Financial stigma index	
no email		0.131	0.170	0.423	0.807	0.329	0.257
basic email		0.168	0.196	0.452	0.795	0.346	0.258
combination of interventions		0.140	0.149	0.404	0.776	0.317	0.261
fear intervention		0.133	0.186	0.398	0.805	0.323	0.260
complexity intervention		0.174	0.213	0.417	0.762	0.354	0.246
<b>Sources</b>	Parents	Friends	Sent info	Looked up information			
no email		3,83	2,52	3,68	4,1		
basic email		3,63	2,69	3,81	3,98		
combination of interventions		3,66	2,62	3,65	3,88		
fear intervention		3,67	2,63	3,74	3,97		
complexity intervention		3,55	2,51	3,81	4,02		
<b>Reason for response to mail</b>	Reminder	Ease	Height	Grant	Curious for eligibility		
no email		-	-	-	-	-	
basic email		70,5%	20,5%	13,6%	18,2%	0,0%	
combination of interventions		59,5%	9,5%	7,1%	35,7%	7,3%	
fear intervention		64,7%	20,6%	8,8%	11,8%	8,8%	
complexity intervention		66,7%	16,7%	0,0%	33,3%	8,3%	
<b>Reason for no response to mail</b>	Not eligible	Complexity	Loan	Lack of knowledge	Not yet	Already done	
no email		-	-	-	-	-	
basic email		40,7%	1,2%	4,9%	7,3%	1,2%	3,6%
combination of interventions		38,8%	3,8%	2,5%	11,3%	2,5%	3,7%
fear intervention		40,3%	4,3%	8,7%	5,8%	2,8%	4,2%
complexity intervention		43,2%	4,1%	6,9%	8,5%	2,8%	2,7%
<b>Reason for not applying</b>	Not eligible	Complexity	Loan	Not necessary	Not yet	Home situation	
no email		13,2%	11,4%	13,2%	30,7%	10,5%	2,6%
basic email		12,3%	11,1%	12,3%	17,3%	9,9%	0,0%
combination of interventions		10,1%	10,1%	10,1%	13,9%	16,5%	0,0%
fear intervention		14,5%	8,7%	14,5%	14,5%	5,8%	0,0%
complexity intervention		8,5%	8,5%	8,5%	11,3%	11,3%	0,0%