The effects of financial literacy on Dutch students financial behaviours

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Management summary

From the year 2015-2016 the student allowance that the Dutch government gives students will be changed into a loan. At this moment most of the Dutch students get an allowance from the government to support studying. The change will result on average in € 15.000 extra study debt for the students that start to study from 2015 (Coevert, 2014). This has started a lot of discussing. How does this influence the behaviour of students? Will less people start to study because of the extra expected depth? Will studying be only for the elite?

To help understand the discussion we will research the financial behaviour of the current Dutch students. The opinion about the student loan change will be looked at as an additional result, first we need to understand the current situation. By measuring financial literacy, we will investigate how many Dutch students know. Financial literacy is the ability to understand how money works in the world: how does someone manages to earn or make it, how does that person manage it, how he/she invests it (to turn it into more) and how that person donates it to help others. More in detail, financial literacy refers to the set of skills and knowledge that allows an individual to make informed and effective decision for their financial choices. This includes any decision made that includes any financial resource. We will use actual, perceived and combined financial literacy to explain the financial behaviour of Dutch students, the research questions is as following:

´How does financial literacy influence Dutch students financial behaviour?'

Measuring what students know about their personal finance is important, because the students will get more and more personal financial responsibilities over a lifetime. At this point, students invest money in their study, social life, living arrangements and more. The investment at this moment will be compensated with a higher expected income in the future.

We use a survey containing questions about: actual financial literacy, perceived financial literacy, demographic variables and variables for credit card, investment, insurance, loan, spending and CSSC behaviour. This quantitative Dutch survey was online distributed.

We found a significant positive correlation between actual financial literacy and perceived financial literacy of 0,217. Within this relation, having a higher income results in a higher correlation between actual and perceived financial literacy. We also found that being a male, following an economical university study with higher income are more likely to have a higher combined financial literacy score. Finally the only behaviour that is explained by financial literacy is loan behaviour. We find that both perceived and combined financial literacy explain it, but combined financial literacy explains it better. Thus combined financial literacy, the sum of actual financial literacy and perceived financial literacy is a better measure than only using either actual financial literacy or perceived financial literacy.

The importance of this paper is to understand whether combined financial literacy is a better measure than actual or perceived financial literacy to explain the financial behaviour of Dutch students. Despite the fact that we can't conclude how all financial behaviour is established, except loan behaviour, we do know more about financial literacy within this sample and the financial behaviour they show. We found that the biggest part of the students thinks about the student loan change as a negative thing, despite that they are not affected by it anymore.

One of the limitations of this survey was mainly people from Rotterdam and from the close friends of the author filled in the survey. The question that arises is: does this sample represent the population? We expect that a broad survey in the different cities of Netherlands will yield better/different results. Also the actual financial literacy measure should be broadened. Students in general know a lot about financial literacy, this results in the high score for a lot of the students. The problem that this brings is that we have a hard time defining what kind of relation there is.

Students are the future and how will their future look like? The aging of the population of the Netherlands doesn't help the prospectus of a future pension. Combine this with an extra € 15.000 study debt and studying might have become too expensive. Combining what we have learned so far from this paper, should be used to go more in depth on the study loan change.

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1 Introduction

Students' financial literacy is important because of the many choices they will make in now and in the future. Students invest money in their study, living arrangements, social life and more to increase their future income. The Dutch government has decided to change the current student allowance system. At this moment almost each Dutch student gets an allowance from the government to support studying. As from the college year 2015-2016 this allowance will be changed into a loan. This will result on average in € 15.000 extra study debt for the students that start to study from 2015 (Coevert, 2014). There are multiple ways to finance your study costs, but which one do they choose? The result of bad financial decisions may cause big debts when they graduate.

Financial literacy is the knowledge about personal finance. As already has been proven in Allgood and Walstad (2013) financial literacy influences financial behaviour. We will investigate the effect of financial literacy on a few different financial behaviours using two ways of measuring financial literacy. The first measure will be objective financial literacy and is based on correct and incorrect answers to test questions. The second measure will be subjective measure and focuses on what people think they know about personal finance based on a self-rating of their financial literacy. The combination of objective and subjective financial literacy can provide a better explanation for financial behaviours. This might give insights on the relation between actual and perceived financial literacy and how they work together. Also, the interaction between the objective and subjective financial literacy will be looked into. The combined measure of financial literacy will investigate what kind of influence it has on financial behaviours within and across six topics: Credit card, Investment, Loaning, Insurance, Spending and Consumer spending self-control. Within each topic we include 2 - 4 behaviours to provide depth to the analysis of each topic. Because the recent change in the Dutch student loan system we will also provide 2 questions around this topic. The results of Allgood & Walstadt, 2013 suggest that the combination of both objective and subjective financial literacy is more valuable and insightful and positive effect on financial behaviours regardless of the level of objective financial literacy. They also find that subjective financial literacy appears to make a significant contribution in order to explain financial behaviour (Allgood & Walstad, 2013). However, this study uses an US Households sample. We will re-validate their findings on Dutch students. Moreover, we will empirically investigate how Dutch students think handle the planned change in student allowance system.

1.1 Problem statement

Since the chance has been announced a lot of discussing has been going on. How does this influence the behaviour of students? Will less people start to study because of the expected depth? Will studying be only for the elite? To help understand the discussion we are going to research the basic behaviour of students at this moment. The change will be used as an additional result, but we first need to understand the current situation. As already explained in the introduction we will use actual and perceived financial literacy to look at the financial behaviour of Dutch students, the research questions is:

´How does financial literacy influence Dutch students financial behaviour?'

To be able the answer the research we will need sub questions. First we want to understand the financial literacy of Dutch students. We will look at actual financial literacy, perceived financial literacy and in the following chapters the combined effect of them. To be able to use the best measure for financial literacy we will investigate the relationship between actual and perceived resulting in the following sub question:

- *How is the perceived financial literacy related to the actual financial literacy?*

After we have found the relationship we will look for factors that create this relation. The demographic characteristics asked for in the survey will be the variables which will we investigate if they account for the relation between perceived and actual financial literacy. In the next chapter we will explain which demographic variables will be used. The sub question for this part will be:

- *Which factors account for the relation between perceived and actual financial literacy?*

We now know what kind of relation there is between perceived and actual financial literacy, and we know what factors account for this. The next step is to combine the acquired knowledge and with the outcomes for the Dutch students financial behaviour. In the next chapter we will go in depth about the variables used for financial behaviour. The formulation of the question of this part is:

- *How does this relation impact the Financial Behaviour?*

Combining all the sub questions, we will have gathered enough insights to be able to formulation an answer for the main research question.

1.2 Scientific relevance

In this study we will partly test the findings of (Allgood & Walstad, 2013) on a different sample. Instead of US households it will be Dutch students. Dutch student sample is interesting because of the recent change in Dutch student loan system. A study requires a big investment of time and money, even more after this change. The sample change from US households to Dutch students means that a few things will be different. First of all, Dutch student will only have their personal finance, while US household have a whole household finance. In the survey we have left out a few things that aren't relevant: Marital status, children, Income-drop and financial advice behaviours. Since we look at individuals that still study, marital status isn't relevant and so are children. Students don't have a regular job, so they won't have to deal with income-drop. Financial advice will also be left out, because students are in some cases still attached to their parent's choices. After the age of 21 you are financial independent. We have added spending behaviour and consumer spending self-control as extra variables for financial behaviour. A few minor questions have also been removed and added, but these will be explained in the next chapters.

Besides (Allgood & Walstad, 2013) there have been other researches on and around this topic. Research on the objective and subjective knowledge relationship of the consumer; the findings were that there is a positive relation (Carlson, Vincent, Hardesty, & Bearden, 2009). Financial literacy is also important for the future. If people know how personal finance works, they are less likely to get into depths or problems. The way to educate financial literacy is researched, but no concrete outcomes (Huston, 2010). Research on financial literacy among the young gives us insight in the current status. It show that the financial literacy is at a low level; less than one-third of young adults possess basic knowledge of interest rates, inflation and risk diversification. Financial literacy was strongly related to family financial sophistication (Lusardi, Mitchell, & Curo, 2010). In 2012 there was looked back at the previous ways of measuring financial literacy and how well the previous literature addresses whether financial education improves financial literacy or personal financial outcomes. They conclude that the current literature at that moment is inadequate to draw good conclusions from. So we can't conclude if and under what conditions financial education either works or is cost-effective (Hastings, Madrian, & Skimmyhorn, 2012). This study will focus on the status of financial literacy of Dutch students. While a few of these studies looked at the possibility to improve financial literacy and financial behaviour, we will focus on the current status of these. To improve something, we first need to understand it.

In the following table a short view of what each study has contributed.

Study	Subject	Method	Contribution
Carlson, Vincent, Hardesty & Bearden, 2009	Objective and subjective knowledge relationship: A quantitative analysis of consumer research findings	Meta-analysis	Objective knowledge and subjective knowledge are positively related
Huston, 2010	Measuring Financial Literacy	Meta-analysis	These mixed results may indicate that not all financial education programs are equally effective, that factors other than financial literacy contribute to financial distress or both. It is increasingly apparent that financial mistakes can impact individual welfare as well as create negative externalities that affect all economic participants.
Lusardi, Mitchell & Curto, 2010	Financial literacy among the young	Survey	A college-educated male whose parents had stocks and retirement savings was about 45 percentage points more likely to know about risk diversification than a female with less than a high school education whose parents were not wealthy.
Hastings, Madrian & Skimmyhorn, 2012	Financial Literacy, financial education and economic outcomes	Meta-analysis	Given the current inconclusive evidence on the casual effects of financial education on either financial literacy of financial outcomes, there remains disagreement over whether financial education is the most appropriate policy tool for improving consumer financial outcomes.
Allgood & Walstad, 2013	The effects of perceived and actual financial literacy on financial behaviours	Survey	Perceived financial literacy makes an important contribution to financial literacy.
Krüger (This thesis), 2014	The effects of financial literacy on Dutch students financial behaviours	Survey	The effect of perceived & actual financial literacy on financial behaviour.

Table 1 - Contribution table

1.3 Managerial relevance

Getting more understanding about the relation between actual and perceived financial literacy, and the connection with financial behaviour can be of a use to a few sides of the society. The current change of the Dutch student loans will have impact on the way students are going to finance their study in the future. Thanks to this research, banks get to know how they can anticipate to the coming change. Insurers get more information about students' insurance behaviour. The whole community will get more insights into the Dutch student financial behaviour. The Dutch government will see how the current students act and how expect to have anticipated to the change of the student loan. And last we see what Dutch students would have done if they started studying after the student loan change.

1.4 Delimitations

The research will have some borders. The information gathered about the recent changes in the Dutch student loan system, will not be covered within the hypothesizes. The results will be used as some additional results. As stated before, the sample will be Dutch students. To be able to judge how good the sample represents the population, we will ask the students for their study as well. Due to time restrictions the survey will be available for a limited time.

2 Theoretical framework

The main theory behind this research is mental accounting, established by economist Richard Thaler. Mental accounting is the set of cognitive operations used by individuals to organize, evaluate, and keep track of financial activities. Mental accounting does not, unlike other accounting ways, consist of numerous rules and conventions that have been codified over the years. We can learn about mental accounting only by observing behaviour and inferring the rules. The focus of the theory will be on a few parts of mental accounting.

The first part captures how outcomes are perceived and experienced, and how decisions are made and subsequently evaluated. With mental accounting both ex ante and ex post cost-benefit analyses can be made. The second part involves around assigning certain activities to specific accounts. Both income and expenditures of funds are labelled in mental accounting and in real life. The expenditures are organised into categories and can be constrained by a budget, either implicit or explicit. The income of funds is also labelled, both as flows and as stocks. The last part of mental accounting we elaborate on is the frequency with which accounts are evaluated and what Read, Loewenstein and Rabin (1998) have labelled 'choice bracketing'. Accountings within mental accounting can be balanced daily, weekly, yearly and so on. Defining the accounts either narrowly or broadly is important as well.

Understanding mental accounting processes helps us understand choices made, because mental accounting rules are not neutral. The decision made, whether to combine an outcome with others in that category, how often to balance the 'books' can affect the perceived attractiveness of choices.
This is because mental accounting violates the economic notion of fungibility. According to this notion a property of a good or a commodity whose individual units are capable of mutual substitution. In the case of mental accounting, money is not a perfect substitute for money in another account. Combining this with our research goal, we can see if students use mental accounting as well. Do they also have an account for each part of their financial situation? How will they look at the change in the student loans? Using mental accounting we predict certain outcomes and help us understand the choices made (Thaler, 1999).

2.1 What is financial literacy and why it is important

The ability to understand how money works in the world, is better known as financial literacy: how does someone manages to make money, manage money, invests money (to turn it into more) and how that person donates it to help others. More in detail, financial literacy refers to the knowledge and skills to make the best devision for the financial choices. This includes any decision made that includes any financial resource. Next to the ability to make choices, it also involves intimate knowledge of financial concepts. For example: compound interest, financial planning, mechanics of credit card, consumer rights, time value of money and so on.

Previous literature gives an impression of the importance of financial literacy. The main finding is that financial literacy can have important implications for financial behaviour. A few examples that indicate the importance of financial literacy in general, in the next paragraph we will go deeper into previous literature. A person with a low financial literacy is more likely to have problems with debt (Lusardi & Tufano, 2009), less likely to participate in the stock market (van Rooij, Lusardi, & Alessie, 2011b), less likely to choose mutual funds with lower fees (Hilgert, Hogarth, & Beverly, 2003; Stango & Zinman, 2007) and less likely to plan for retirement (Lusardi & Mitchell, 2007). These researches showed that financial that financial literacy has an important role in financial decision making.

2.2 Previous literature on how to measure financial literacy

The most challenging part of conducting research on financial literacy is the difficulty of determining how best to measure financial literacy. This is because there is no standard definition of it in the research literature (Hung, Parker, & Yoong, 2009; Huston, 2010; Remund, 2010). Previous research on financial literacy has a focus on the cognitive dimensions of the construct and mainly relies on a test measure of what people know or understand about financial concepts. To measure this objective approach, there is most often made use of a set of multiple-choice test questions or true-false test questions that are embedded in a questionnaire that also include questions about demographic characteristics and ask about financial behaviours and activities (Hilgert, Hogarth, & Beverly, 2003; Hastings, Madrian, & Skimmyhorn, 2012). Using these test measures of financial literacy has explained many different financial behaviours. For example: banking (Grimes, Rogers, & Smith, 2010), inflation (Bruine de Bruin, van der Klaauw, Downs, Fischhoff, Topa, & Armantier, 2010) , retirement planning (Lusardi & Mitchell, 2007; Lusardi & Mitchell, 2008; van Rooij, Lusardi, & Alessie, 2011a; Lusardi & Mitchell, 2011), stock investing (Abreu & Mendes, 2010; van Rooij, Lusardi, & Alessie, 2011b) and wealth accumulation (Behrman, Mitchell, Soo, & Bravo, 2012; Gustman, Steinmeier, & Tabatabai, 2012).

As states before, there is no standard definition of financial literacy. There is also no standardization in the measures that are used in research studies. Measurements cover a wide range even there is as few as three questions. The studies use different focuses within measuring financial literacy, they each focus on economics, personal finance and numeracy or a combination of these. Despite the fact that there are a lot of differences within and across these measures, the operational definition of financial literacy is to measure what people actually know about financial concepts. For the purpose of this research we label this as 'actual' financial literacy. As used in research literature (Hung, Parker, & Yoong, 2009).

Next to the objective measure, there is also the subjective measure such as a self-assessment of financial literacy. In general, economist prefer to use objective measures in their research, but there is growing interest in the use of subjective measure for studying different types of economic or financial behaviours such as perceptions of life satisfaction, happiness and well-being (Kahneman & Krueger, 2006; Stanca, 2012; Corazzini, Esposito, & Majorano, 2012), risk (Hallahan, Faff, & McKenzie, 2004; Botzen & van den Bergh, 2012; Kelly, Letson, Nelson, Nolan, & Solis, 2012) and credit scores (Courchance, Gailey, & Zorn, 2008). Also political scientist have relied on subjective measurements methods, like public opion polls, of political or voting behavior (Jacoby, 2010; McDonald & Tolbert, 2012). The medical field has been using self-assessments in order for getting feedback from patients on subjective concepts such as pain (Turk & Melzack, 2011).
Also, studies of subjective and objective knowledge also have long been the focus of consumer or marketing research (Alba & Hutchinson, 2000; Carlson, Vincent, Hardesty, & Bearden, 2009; Moorman, Diehl, Brinberg, & Kidwell, 2004; Park, Mothersbaugh, & Feick, 1994). These studies research the two types of knowledge. What people think they know about a particular and what they actually know about a particular consumer product.

2.3 Hypotheses development

For this study we will label the subjective assessment of financial literacy as 'perceived'. The following literature on financial literacy has done alike before this study (Hung, Parker, & Yoong, 2009). Previous research on financial literacy implicates that perceived financial literacy is not simply a proxy for actual financial literacy, but a different measure. To find an answer for the research question *´How does financial literacy influence Dutch students financial behaviour?'*, there will be three hypotheses to answer each sub question.

One study found that for knowledge of investments the correlation between perceived and actual financial knowledge are significantly depending on the individual, but the sign of the correlation is in all cases positive (Agnew & Szykman, 2005). Another study reported only a modest correlation (0.366) between actual financial knowledge and perceived knowledge of economics (Parker, Bruine de Bruin, Yoong, & Willis, 2011). A third study found that on average there is a positive association between subjective and objective measures of financial literacy, but the cross-tabulations of scores shows sizable percentages of individuals in each possible combination (van Rooij, Lusardi, & Alessie, 2011b). The relationship between the two types of scores also may be less positive if the objective test covers is specific, this was proved by the findings from (Gallery, Gallery, Brown, Furneaux, & Palm, 2011), 41% of the respondents with a good or very good self-rating of financial literacy did also score in the highest two quintiles on the specific investment questions. To investige the subquestion: '*How is the perceived financial literacy related to the actual financial literacy?'* the following hypothesis has been set up:

H_1: Perceived financial literacy is positively correlated with actual financial literacy.

As stated above, Agnew & Szykman found that correlations between perceived and actual financial knowledge of investments varied considerable depending on the characteristics of the individual; job title, salary and education. Interesting is that a person that has the following characteristics has the best view of his own financial knowledge; the person is a professor earning greater than $60.000 and has some graduate work (Agnew & Szykman, 2005). Another study reported that on average there is a positive association between subjective and objective measures of financial literacy, but the cross-tabulations of scores shows sizable percentages of individuals in each possible combination (van Rooij, Lusardi, & Alessie, 2011a; Lusardi & Mitchell, 2007). To give further insight in the possible relation found in H_1 and to answer the second sub question '*Which factors account for the relation between perceived and actual financial literacy?',* we will split up the sub question in order to look at the effect of each of the demographic characters. The following demographic characters are

incorporated to look into the effect: gender, livening arrangement, age, level of education, study area, employment and total income. Each demographic character will be described, next we will look into previous literature about the relation of this variable and financial literacy. And then we can formulate a hypothesis for the variable.

The first demographic variable is gender, Male = 1 and Female = 0. Whether a person is female or male might have influence on financial literacy. Agnew & Szykman (2005) found that a female has a lower actual financial literacy score than male. Van Rooij, Lusardi & Alessie (2007) and Chen & Vole (2002) found the same negative outcome. For gender we will formulate the following hypothesis:
H_2A: Females have higher correlation between perceived and actual financial literacy than men.

Students are in general still dependant on their parents. Moving out can be a big decision, both financially and mentally. They can either live by themselves, with other students, maybe even with their partner or something else. We expect that the biggest differences will be between students that still live at their parents' house and those who don't live there anymore. The difference will properly be that students who still live with their parents are less independent, and therefore know less about personal finance and get a lower financial literacy score. This hasn't been used in previous studies on this topic before, but we will use this hypothesis:
H_2B: Students who do not live with their parents have higher correlation between perceived and actual financial literacy than students who live with their parents.

As the people get older they tend to get wiser, therefore we also look into age. Despite the fact that the sample is only Dutch students, which indicates the age will properly will be between 16 and 30, we will look at the effect. Because of the close range of expected age, we might not get a significant result. Previous literature found that the '40-49 years old' has better results than '30-39 years old' and 'under 30 years old' has even worse results (Agnew & Szykman, 2005). Not completely in the line with this study; we find that the group 'older than 65' has the worst results. Followed by '36-50', '35 and younger' and the group '51-65' has the best results (van Rooij, Lusardi, & Alessie, 2011a). We expect that this demopgrahic will have, if it is significant, a positive relation. And so we can formulate the following hypothesis:
H_2C: Older students have higher correlation between perceived and actual financial literacy than younger the student.

Financial literacy can be seen as the knowledge about personal finance. Therefore we include the variable education which is, either Higher Education = 0 or University = 1. We expect that the higher the education, the better the knowledge will be. Previous results indicate that the correlation between actual and perceived financial literacy are higher when the education is higher (Agnew & Szykman, 2005). In line with these results are the results from both theses researches that people with a college degree or more score the highest in all cases (Lusardi & Mitchell, 2007; van Rooij, Lusardi, & Alessie, 2011a). We will use the following hypothesis:

H_2D: If the education is university level, higher correlation between perceived and actual financial literacy than lower education level.

Continuing on the education, we will make a distinction between economic studies or not. Since a few of the questions are topics that are covered within these studies, we expect better results from those students. This hasn't been used in previous studies on this topic before, but we will use this hypothesis:

H_2E: Students with an economic study haves higher correlation between perceived and actual financial literacy than students with non-economic study.

The next part will be about whether the students have a job next to his study. It can be argued that people who work understand the value of money better. Previous literature was mainly about an other sample, which makes this part different. There has been found evidence that 'non-employed' scored the best in the financial literacy test, while 'workers' scored the lowest. 'Self-employed' and 'retired' scored in between those (van Rooij, Lusardi, & Alessie, 2011a). In this case we see employment as a yes or no question to whether they have a job. If the answer is yes, we will include the amount of hours. Despite the previous findings we suggest a positive effect for having a job and amount of hours work, as stated in this hypothesis:

H_2F: Students that work have a higher correlation between perceived and actual financial literacy than students who do not work.

The last demographic variable is the total income, per month. This includes everything the student gets in one month. Either from their parents, work or any other source of income. Previous literature takes incomes from households, which are way higher in respect to the income of students. Nevertheless, they find that 'greater than $60.000' has the highest correlation between actual and perceived financial literacy, the others groups are lower (Agnew & Szykman, 2005). Despite the previous findings we suggest a negative effect for higher income, as stated in this hypothesis:

H_2G: The higher the income that students have, the higher the correlation between perceived and actual literacy than students with lower income.

Since prior research in financial literacy and other areas indicates that both perceived and actual financial literacy are different constructs, then by extension a study of the combination between the two would be valuable for capturing a wider range of individual differences than is possible if only one type is used. Some individuals may show a high level of actual financial literacy but a low level of perceived financial literacy, whereas other individuals may exhibit just the opposite, and still others may have high or low concentrations of both attributes. Individuals make decisions based on what they think they know, not their actual knowledge, so it may be the case that financial behaviour is more influenced by what people think they know about financial matters compared with what they actually know. Analysing how perceived and actual financial literacy separately contribute to financial behaviour and how the two together reinforce or offset each other should provide a better understanding of the full effects of financial literacy on financial behaviour. Allgood & Walstad, 2013 has already done this on a USA household sample. Because the sample will be Dutch students, the definition of financial behaviour will be different. Allgood & Walstadt, 2013, used the following determinants: Credit card behaviour, Investment behaviour, Loan behaviour, Insurance behaviour and financial advice behaviour. To adjust for the sample loan behaviour will be changed: IB-groep[1] and parents will be added. Also Dutch student have other insurances then USA household, so these will be changed as well. Financial advice behaviour is left out since this isn't relevant for the sample. Last, we add the way the student spending behaviour and a consumer spending self-control. This result in the following variables for financial behaviour: Credit card behaviour, Investment behaviour, Loan behaviour, Insurance behaviour, spending behaviour and consumer spending self-control behaviour. In the methodology chapter, the variables will be explained further. To answer the last sub question '*How does this relation impact the Financial Behaviour?'*, we will introduce the variable ´Combined Financial Literacy´. This is the combination of both actual and perceived financial literacy. We will take the average from both financial literacy scores, correcting them for their scales. Actual has a scale from 0 to 5 and perceived from 1 to 7. We will go further into this later on. In the hypotheses we go into each financial behaviour and look whether this behaviour is better explained by Combined, Perceived or Actual financial literacy. We will also look at the direction of relation, but this is not included in the hypothesis. In general we expect that combined financial literacy explains the behaviours better than actual or perceived, because it contains more information.

[1] http://ib-groep.nl/particulieren/default.asp. Dutch government; ministry of Education, Culture and Science.

First we will go into credit card behaviour. Allgood & Walstadt, 2013 has found that there respondents with higher perceived and actual financial literacy, are more likely to have a credit card. The following hypothesis can be formulated:

H_3A: Combined financial literacy explains credit card behaviour better than either perceived or actual financial literacy alone.

The next part is about investment behaviour. We expect that higher financial literacy will increase the likelihood of participation in investment products (Abreu & Mendes, 2010; van Rooij, Lusardi, & Alessie, 2011b). The following hypothesis can be formulated:

H_3B: Combined financial literacy explains investment behaviour better than either perceived or actual financial literacy alone.

Loan behaviour is one of the most interesting behaviours, because most students tend to spend/invest more at this moment with the idea that they will earn it back later. 4 kind of debts are asked for, this gives a total number of the debt. The total debt, 0 in case of no debt, will be used. We expect that students with higher financial literacy will have a lower debt. We formulate the hypothesis as following:

H_3C: Combined financial literacy explains loan behaviour better than either perceived or actual financial literacy alone.

In the Netherlands you are obligated to have a health insurance, so this insurance is left out. Other insurances that students might have are: Fire & theft insurance[2] and a mobile phone insurance. Whether a students has extra insurances will determine his insurance behaviour. Allgood & Walstadt, 2013 found that people with high PFL and low AFL are more likely to have a life insurance than people with low PFL and low AFL. We will test the following hypothesis:

H_3D: Combined financial literacy explains insurance behaviour better than either perceived or actual financial literacy alone.

In this part we look on a Likert-scale to spending behaviour. Combining how often the students spends more than they receive and how often do they take the time to look at their financial status. The combination will give use an insight in how likely they have spending problems. We will use the following hypothesis the test which kind of financial literacy explains the behaviour the best:

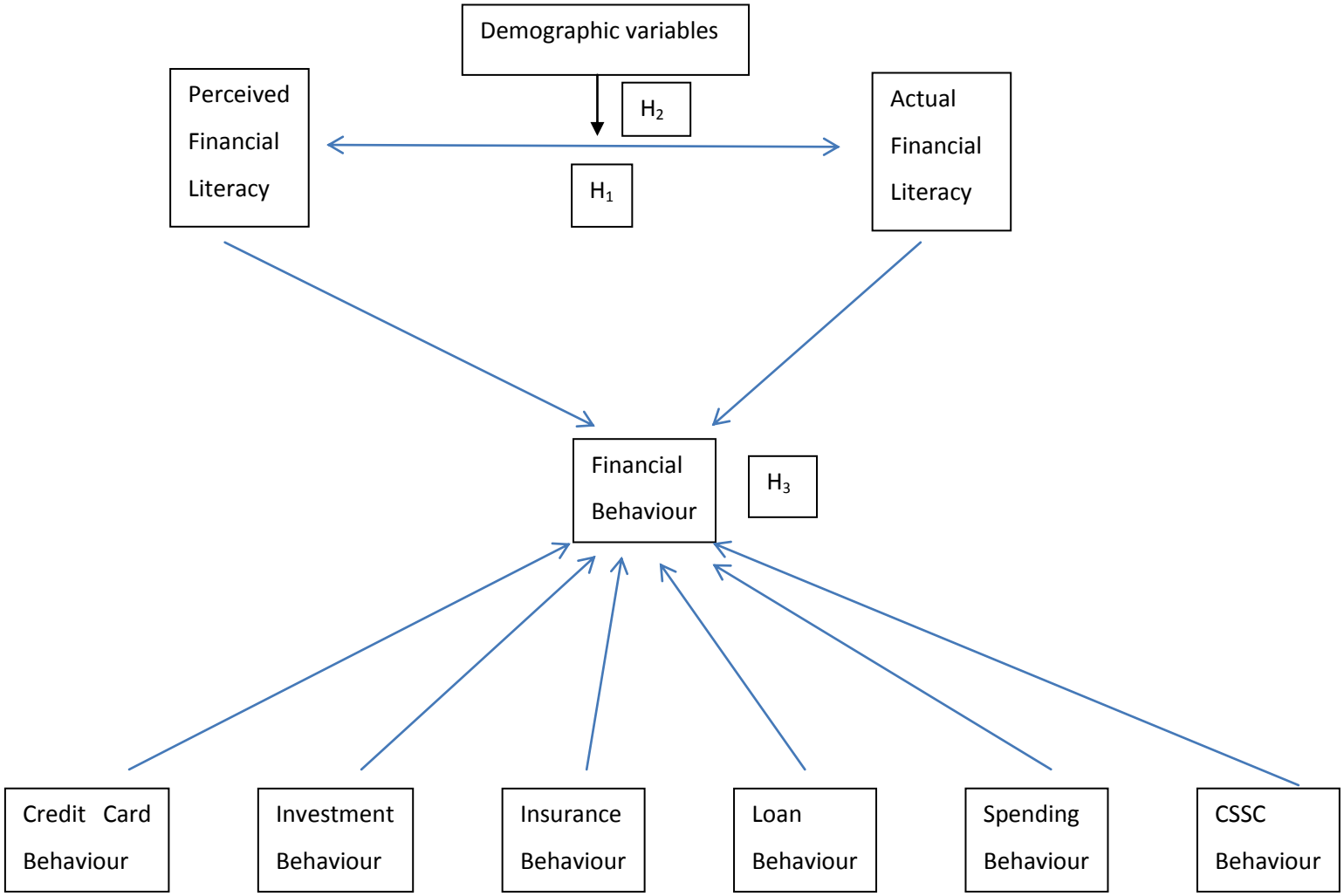
[2] The English word for the Dutch 'inboedel verzekering'.

H_3E: Combined financial literacy explains spending behaviour better than either perceived or actual financial literacy alone.

Finally we have consumer spending self-control. On the basis of 10 questions we take a look on how good they control their spending. Combining this into an average we can look in to the relation with the following hypothesis:

H_3F: Combined financial literacy explains consumer spending self-control better than either perceived or actual financial literacy alone.

2.4 Conceptual model



3 Methodology

3.1 Research type & method

This research will be quantitative, meaning that the data is collected with a survey which gives comparable answers. In this explanatory research the cause & effect of financial behaviour and financial literacy is looked at. The used survey is free, anonymous and available to everyone. Because international students in the Netherlands don't have comparable financial situations, the sample will be only Dutch students. Therefore the survey is in Dutch, but the variables will be explained in English. We expect the data to be representative for all the Dutch students.

3.2 Questionnaire

Financial Literacy variables:	***Source***	***Question***	***Answers***	***Scale type***
Q1	*Allgood & Walstad, 2013*	Suppose you had €100 in a savings account and the interest rate was 2% per year. After 5 years how much do you think you would have in the account if you left the money to grow?	more than €102* / exactly €102 / less than €102	-
Q2	*Allgood & Walstad, 2013*	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you able to buy with the money in the account?	more than today / exactly the same / less than today*	-
Q3	*Allgood & Walstad, 2013*	If interest rates rise, what will typically happen to bond prices?	they will rise / they will fall* / they will remain the same / there is no relationship between bond prices and the interest rate	-
Q4	*Allgood & Walstad, 2013*	A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.	true* / false	-
Q5	*Allgood & Walstad, 2013*	Buying a single company's stock usually provides a safer return than a stock mutual fund.	true / false*	-
Actual Financial Literacy	*Allgood & Walstad, 2013*	***Amount of corrects answers* to the questions (every correct answer is 1 point)***		Ratio
Perceived Financial Literacy	*Allgood & Walstad, 2013*	On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?	self-rating 1 to 7	Ordinal

Financial Behaviour variables:				
Credit Card Behaviour				
Ownership Credit Card	*Rossiter, 1995*	Do you own a credit card?	Yes / No	Nominal
Not paid full	*Allgood & Walstad, 2013*	Do you always pay your credit cards in full?	Yes / No	Nominal
Usage last month	-	How much did you pay for with your credit card last month?	Amount	Ratio
Investment Behaviour				
Ownership Stocks	*Allgood & Walstad, 2013*	Do you own any investments in stocks, bonds, mutual funds or other securities?	Yes / No	Nominal
Rebalance	*Allgood & Walstad, 2013*	How often do you change or rebalance your investments in stocks?	Never / Once a year / Multiple times a year / I don't make the investment choices	Nominal
Loan Behaviour				
IB-Groep	-	Do you, if so how much, have a permanent loan? (In case of none, 0)	Amount	Ratio
Parents	-	Do you, if so how much, have a loan at your parents? (In case of none, 0)	Amount	Ratio
Bank debt	-	Do you, if so how much, have a debt at your bank? (In case of none, 0)	Amount	Ratio
Other debts (including CC)	-	Do you, if so how much, have other debts including credit card? (In case of none, 0)	Amount	Ratio

Insurance Behaviour				
Fire & theft insurance	-	Do you have a fire & theft insurance? (Inboedel verzekering)	Yes / No	Nominal
Mobile phone insurance	-	Do you have a smartphone insurance?	Yes / No, it is not insured / No, don't own a smart phone	Nominal
Review insurances	*Allgood & Walstad, 2013*	How often do you review your insurance coverage?	Never / At least once a year / Once every few years / I don't do it myself	Nominal
Spending Behaviour				
Spending > Income	-	How often are your spending bigger than your incomes?	1 (almost never) to 7 (very often)	Ordinal
Financial status	-	How often do you review your financial status?	1 (almost never) to 7 (very often)	Ordinal

Consumer spending self-control				
Q1	*Haws & Bearden, 2010*	1. I closely monitor my spending behaviour.	1 (strongly disagree) to 7 (strongly agree)	Likert
Q2		2. I am able to work effectively toward long term financial goals.		
Q3		3. I carefully consider my needs before making purchases.		
Q4		4. I often delay taking action until I have carefully considered the consequences of my purchase decisions.		
Q5		5. When I go out with friends, I keep track of what I am spending.		
Q6		6. I am able to resist temptation in order to achieve my budget goals.		
Q7		7. I know when to say when regarding how much I spend.		
Q8		8. In social situations, I am generally aware of what I am spending.		
Q9		9. Having objectives related to spending is important to me.		
Q10		10. I am responsible when it comes to how much I spend		
Consumer spending self-control rating	*Haws & Bearden, 2010*	***Average of the 10 questions***		Likert

Student loan changes variables				
Student loan change '14	-	The 'studiefinanciering' is going to be a loan starting in '15/ '16. What do you think about this decision?	Negative, because I wouldn't study at all or fewer number of young people will study. Neutral, the economy is not good, so it is necessary. Positive, because students who study will be more motivated and will finish their study in time.	Nominal
Student loan change '14	-	Would you have done anything different, financially, if you would start studying in '15/'16?	Yes / No If Yes, please specify	Nominal
Demographic variables:				
Gender	-	Male or Female?	Male / Female	-
Living arrangements	-	How do you live?	Alone / Parents / Partner / Student room / Other	-
Age	-	How old are you?		-
Education	-	HBO or WO?	HBO / WO	-
Study	-	What do you study?		-
Employment	-	Do you work?	No / Yes, amount of hours?	-
Total Income	-	How much money do you get each month in total?	Amount	-

Table 2 - Survey questions

3.3 Sampling method & size

The definition of sampling is the use a of subset of a population in order to represent the whole population. We are gathering our own data, therefore we will use nonprobability sampling as sampling method. In this research there might be a bit of convenience sampling.

Unlike probability or random sampling, with nonprobability sampling you can't calculate the probability of getting any particular sample. Therefore it cannot be used to infer from the sample to the general population. Therefore we can say less on the basis of a nonprobability sample than on the basis of a probability sample. On the other hand, the cost of nonprobability sampling are way lower compared to probability sampling. Many analysts draw generalizations from analyses of nonprobability sampled data. Therefore we should ask ourselves if the grounds and these samples are justifiable to draw generalizations from. In this case we are interested in one specific case and that is Dutch students, so we don't have oppurtunity to access a list of Dutch students to draw a probability sample and therefore we use nonprobability sampling in this thesis (Lucas, 2014a).

Convenience sampling is the case that the members of the population are chosen based on their relative ease of access. The Dutch student sample are mainly friends of author and the reach of his Facebook. These samples might be biased because of it might approach some kinds of respondents and avoid others (Lucas, 2014a).

The population is defined as Dutch students currently studying in the Netherlands. Because of time restrictions and demanding sample size, we will use at least 100 students. The absolute minimum is 50 respondents (van Voorhis & Morgan, 2007). Harris's (1985) formula suggests that the number of participants should exceed the number of predictors by at least 50. In this case that would be a minimum of 50 + 10 = 60 participants. Another formula of Green (1991) suggests a minimum of 10 observations per independent variable. To be sure we will take 100 as a minimum.

The Dutch survey can be found by the following link: http://www.thesistools.com/web/?id=422350[3]. It can also be found in appendix A.

[3] Online until 18 September 2014.

3.4 Testing hypotheses

First we will test the quality of the data with descriptive statistics (amount of observations, minimum, maximum, mean and standard deviation). After that we can continue testing the quality of measurements. A part of the survey was created by ourselves which means it has not been used before.

H_1: Perceived financial literacy is positively correlated with actual financial literacy.

To test this hypothesis we will look into the correlation between the amount of the correct answers on the first 5 questions about financial literacy and the self-rating the respondents gave themselves. Both the actual and perceived financial literacy can be considered an ordinal scale, therefore we can use the Spearman correlation coefficient to calculate the correlation.

Spearman correlation		Perceived Financial Literacy	Hypothesis
H1	Actual Financial Literacy		

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3 - Hypothesis 1 framework

H_2A-G: <Demographic variable> has a negative/positive effect on the correlation between perceived and actual financial literacy.

We will calculate the correlation between actual financial literacy and perceived financial literacy, with a dummy for the categorical variable. This way we get a correlation for both the male and the female group. The next step is to use a Fisher's test to look whether the correlations significantly differ from each other. This way we can look at the relation and conclude what its influence is. On the side we will calculate the correlation with combined financial literacy (CFL), but this will not be used in the hypotheses.

		Correlation (TFL)	Correlation (AFL, PFL)	Partial correlation	Correlation test	Significance	Hypothesis
H2A	Male				Fisher's test		
	Female						
H2C	Age				Partial correlation		
H2D	HBO				Fisher's test		
	University						
H2E	Non-economical				Fisher's test		
	Economical						
H2F	No job				Fisher's test		
	Job						
H2G	Income				Partial correlation		

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4 - Hypothesis 2 framework

H_3A-F: Combined financial literacy, explains <financial behaviour> better than either perceived or actual financial literacy alone.

We will make 3 regressions for each variable. In each hypothesis the financial behaviour is the independent variable and as dependent variable: perceived financial literacy or actual financial literacy or perceived & actual financial literacy. Depending on whether the financial behaviour is binary categorical, multinary categorical or continuous. In the case of a binary categorical variable, we use a binary logistic regression. In the case of a multi categorical variable we will use a multinomial logistic regression and with a continuous variable a linear regression. The following regression will be made for each financial behaviour:

$$Combined\ Financial\ Literacy = \frac{Actual\ Financial\ Literacy + 1}{6} * 7 + Perceived\ Financial\ Literacy$$

$$< Financial\ Behavior > = \beta_0 + \beta_1 * Actual\ Financial\ Literacy + \varepsilon$$

$$< Financial\ Behavior > = \beta_0 + \beta_1 * Perceived\ Financial\ Literacy + \varepsilon$$

$$< Financial\ Behavior > = \beta_0 + \beta_1 * Combined\ Financial\ Literacy + \varepsilon$$

4 Results

In order to be able to work with the data we need to add and adjust a few of the variables of the data. We had a total of 106 respondents on the survey, after a close look in the results we found that 4 weren't complete and are therefore removed. Respondent 6, 27, 55, 99 had missing answers. We therefore do the analysis with N = 102. The sample consists of: 70,6% male; mean age is 21,97; 100% of the respondents don't with their parents; 84,3% follow an university level education; 64,7% follow an economical study; 51% have an job and work an average of 12,87 hours per week; and the average monthly income is € 1075,07. The descriptive statistics of the demographic variables can be found in appendix B.

The variable LivingArrangement has been changed into the question whether students live with their parents or not. This binary variable has the value of 1, because all the respondents don't live with their parents. This can be found in the frequency table in appendix B.

The next step was the adjustment of variables. We added the following variables to the data received from the survey:

The 5 questions that measure the actual financial literacy (thereafter AFL) were turned into correct / incorrect answers. Then we could add this up and create the variable AFL, this is the total correct answers for that respondent. The descriptive statistics of financial literacy can be found in appendix B. The sample had an average of 4,08 out of 5 (SD = 0,70) correct answers for actual financial literacy and rated themselves on average 4,5 out of 7 (SD = 1,38) on perceived financial literacy. This combines into an average of 4,87 out of 7 (SD = 0,85) for combined financial literacy.

As show in appendix B, we have 53,9% of the respondents using a credit card and 94,5% of the people with a credit card always paid it fully. The average usage of their credit card last month was € 249,65. We create a new variable CC_Behaviour that combines CC_Ownership with CC_Payfull. This variable has 3 values: Owns a credit card, fully paid, owns a credit card, not fully paid every time and does not own a credit card.

The sample contains 54 respondents that have a loan at IB-groep. Only 5 at their parents, 4 at the bank and 7 have any other loans (including credit card). Because of the low numbers we will combine this into 1 variable Loan_Ownership. This measures if the respondent has any loan. To follow up this step, we also combine the amount of all the loans. This creates the variable

Loan_Amount. Because Loan_Amount didn't follow a normal distribution (Skewness > 1), we took the log function of this variable to create a normal distributed variable called: Loan_Amount_Log.

52% of the respondents have an Fire & Thief insurance while only 26,5% have a smartphone insurance. We combine these into one variable for insurance behaviour that is measured as a binary variable indicating whether the students has any extra insurances (Fire & Thief or/and Smartphone) or none.

Spending_behaviour will be measured as mean of two items "spendings bigger than income" and "review financial status". We first need to reverse the review financial status variable, in order to get 1 to be negative and 7 to be positive. The variable can take a value between 1-7 (1 indicating no problem with spendings i.e. no debts, 7 indicates problem with spendings i.e. debts) because likert scale is used. On average the respondents score is 3,57.

For the consumer spending self-control variable there were 10 questions with a Likert scale from 1 to 7. To address the correct measure we took the average of the 10 questions and made the variable CSSC_Average. On average the respondents score is 4,48.

In order to be as complete as possible, a list of all the used variables with their description:

Variable	Description	Value
AFL	Actual Financial Literacy, # correct awnsers	Range: 0 - 5
PFL	Perceived Financial Literacy, self rating	Range: 1 - 7
CFL	Combined Financial Literacy, AFL & PFL	Range: 1 - 7
CC_Behaviour	Credit Card behaviour	1 = Owns a CC, fully paid; 2 = Owns a CC, not fully paid; 3 = Does not own a CC
Investment_Behaviour	Active investing	0 = Does not invest, 1 = Does invest
Loan_Ownership	Any loans	0 = No, 1 = Yes
Loan_Amount_Log	Log function of total amount of loans	-
Insurance_Behaviour	Fire & Thief or/and Smartphone insurances	0 = No extra insurances, 1 = Extra insurances
Spending_Behaviour	Combination of Spendings & Financial review	1 = No spending problems, 7 = Spending problems
CSSC_Average	Consumer Spending Self-Control, average	1 = Little self-contol, 7 = Big self-control
Studentloan_Opion	Studentloan change, opion about it	1 = Negative, 2 = Neutral, 3 = Positive
Studentloan_Action	Studentloan change, done something different?	0 = No, 1 = Yes
Gender	Gender	0 = Female, 1 = Male
Living_Arrangements	At parents, or not	0 = At parents, 1 = Not at parents
Age	Actual age	-
Education_Level	HBO or University	0 = HBO, 1 = University
Education_Area	Economical area study or not	0 = Non-economical, 1 = Economical
Job	A job next to study	0 = No, 1 = Yes
Income	Income per month	-

Table 5 - Variables

4.1 Correlation analyses

In the correlation matrix in appendix C, we first take all the demographic variables, combined financial literacy, perceived financial literacy and actual financial literacy. We can make the following remark: as indication for the first hypothesis, AFL and PFL are significant positively correlated ($\rho = 0{,}267$; $p < 0{,}01$).

AFL is significantly correlated with Education_Area ($\rho = 0{,}201$; $p < 0{,}05$) and Income ($\rho = 0{,}241$; $p < 0{,}05$). This indicates that economical students and students with higher income are more likely to have higher AFL scores.

PFL is significantly correlated with Gender ($\rho = 0{,}330$; $p < 0{,}01$), Education_Level ($\rho = 0{,}236$; $p < 0{,}05$), Education_Area ($\rho = 0{,}464$; $p < 0{,}01$) and Income ($\rho = 0{,}256$; $p < 0{,}01$). This indicates that male students that study an economical university study and students with higher income are more likely to give themselves a higher PFL.

CFL is significantly correlated with Gender ($\rho = 0{,}335$; $p < 0{,}01$), Education_Level ($\rho = 0{,}243$; $p < 0{,}05$), Education_Area ($\rho = 0{,}458$; $p < 0{,}01$) and Income ($\rho = 0{,}306$; $p < 0{,}01$). This indicates that male students that study an economical university study and students with higher income are more likely to have a higher CFL score.

Gender is significantly correlated with Education_Level ($\rho = 0{,}195$; $p < 0{,}05$), Education_Area ($\rho = 0{,}244$; $p < 0{,}05$) and Income ($\rho = 0{,}240$; $p < 0{,}05$). Also Education_Level and Education_Area ($\rho = 0{,}358$; $p < 0{,}01$) are positively correlated.

Next we will look into the correlation matrix of AFL, PFL, CFL and the financial behaviours in appendix C. Interesting to see is that there is only one behaviour correlated with AFL, PFL or CFL. PFL is positively correlated with Loan_Ownership ($\rho = 0{,}231$; $p < 0{,}05$) and Loan_Amount_Log ($\rho = 0{,}230$; $p < 0{,}05$), so people that rate themselves high on their knowledge about financial literacy are more likely to have a loan and a higher total debt. This indicates that the chance of getting significant results for hypothesis 3 is something to be concerned about.

CC_Behaviour is correlated with Insurance_Behaviour ($\rho = -0{,}204$; $p < 0{,}05$). Loan_Ownership is highly correlated with Loan_Amount_Log as to be expected ($\rho = 0{,}963$; $p < 0{,}01$), Spending_Behaviour ($\rho = 0{,}205$; $p < 0{,}05$) and CSSC_Average ($\rho = -0{,}211$; $p < 0{,}05$).

Loan_Amount_Log is just like Loan_Ownership correlated with Spending_Behaviour (ρ = 0,234; p < 0,05) and CSSC_Average (ρ = -0,225; p < 0,05). Spending_Behaviour is correlated with Insurance_Behaviour (ρ = 0,195; p < 0,05).

4.2 Hypothesis 1

The relation between perceived financial literacy and actual financial literacy can be measured by correlation. The hypothesis suggests that a higher perceived financial literacy score indicates a higher actual financial literacy score.

H_1: Perceived financial literacy is positively correlated with actual financial literacy.

We find a significant correlation (p = 0,029) of 0.216, see appendix D. We don't reject H_1, perceived financial literacy and actual financial literacy are positively correlated.

4.3 Hypothesis 2

Using the spearman's rho we calculate the influence of each demographic variable on the correlation between perceived and actual financial literacy. We make two groups, based on the demographic variable and compare the correlation and test whether there is a significant difference. Also we calculate the partial correlation to see the correlation between actual and perceived financial literacy controlling for the demographic variable.

H_2A: Females have higher correlation between perceived and actual financial literacy than men.

Male sample:	ρ = 0,219	p = 0,065
Female sample:	ρ = 0,026	p = 0,891
Partial correlation:	ρ = 0,229	p = 0,022
Fisher's test:		p = 0,192

The correlation within each of the samples is not significant. We see a lower correlation, when controlling for Gender in comparison to the regular correlation between AFL & PFL of ρ = 0,267; p = 0,007. This indicates that Gender has an positive influence on the correlation. But because the correlations in the samples are not significant (p > 0,05) and neither is the Fisher's test (p > 0,05), we will reject H_2A. Gender does not have an effect on the relation between perceived and actual financial literacy.

H_2B: Students who do not live with their parents have higher correlation between perceived and actual financial literacy than students who live with their parents.

Because our sample has only respondents that don't live with their parents, we can't research H_2B.

H_2C: Older students have higher correlation between perceived and actual financial literacy than younger the student.

Age has an insignificant correlation with AFL of ρ = 0,020; p = 0,844. Age also has an insignificant correlation with PFL of ρ = 0,088; p = 0,381. We get a partial correlation of ρ = 0,267; p = 0,007. When we compare this to the correlation between AFL & PFL without controlling for Age ρ = 0,267; p = 0,007, we see there is no change. This indicates that Age has an positive influence on the correlation. Also because the correlations are not significant (p > 0,05), we will reject $H_{2A}C$. Age does not have an effect on the relation between perceived and actual financial literacy.

H_2D: If the education is university level, higher correlation between perceived and actual financial literacy than lower education level.

HBO sample:	ρ = 0,349	p = 0,186
University sample:	ρ = 0,195	p = 0,073
Partial correlation:	ρ = 0,246	p = 0,013
Fisher's test:		p = 0,287

The correlation within each of the samples is not significant. We see a lower correlation, when controlling for education level in comparison to the regular correlation between AFL & PFL of ρ = 0,267; p = 0,007. This indicates that education level has an negative influence on the correlation. But because the correlations in the samples are not significant (p > 0,05) and neither is the Fisher's test (p > 0,05), we will reject H_2D. Education level does not have an effect on the relation between perceived and actual financial literacy.

H_2E: Students with an economic study haves higher correlation between perceived and actual financial literacy than students with non-economic study.

Non-economical sample:	ρ = 0,383	p = 0,021
Economical sample:	ρ = 0,032	p = 0,801
Partial correlation:	ρ = 0,201	p = 0,044
Fisher's test:		p = 0,042

The correlation in the non-economical sample is significant (p < 0,05) and the correlation in the economical sample is not significant (p > 0,05). We see a lower correlation, when controlling for education level in comparison to the regular correlation between AFL & PFL of ρ = 0,267; p = 0,007. This indicates that education area has an negative influence on the correlation. But because the

correlation in the economical sample is not significant (p > 0,05), we will reject H_2E. Education area does not have an effect on the relation between perceived and actual financial literacy.

H_2F: Students that work have a higher correlation between perceived and actual financial literacy than students who do not work.

No job sample:	ρ = 0,225	p = 0,117
Job sample:	ρ = 0,230	p = 0,101
Partial correlation:	ρ = 0,272	p = 0,006
Fisher's test:		p = 0,488

The correlation within each of the samples is not significant. We see a higher correlation, when controlling for education level in comparison to the regular correlation between AFL & PFL of ρ = 0,267; p = 0,007. This indicates that Job has an negative influence on the correlation. But because the correlations in the samples are not significant (p > 0,05) and neither is the Fisher's test (p > 0,05), we will reject H_2F. Job does not have an effect on the relation between perceived and actual financial literacy.

H_2G: The higher the income that students have, the higher the correlation between perceived and actual literacy than students with lower income.

Income has an significant correlation with AFL of ρ = 0,241; p = 0,015. Income also has an significant correlation with PFL of ρ = 0,256; p = 0,009. We get a partial correlation of ρ = 0,219; p = 0,028. When we compare this to the correlation between AFL & PFL without controlling for Age ρ = 0,267; p = 0,007, we see there is negative change. This indicates that Income has an positive influence on the correlation. The correlations are significant (p < 0,05) and the correlation went down when controlling for Income (ρ_{Income} = 0,219 < ρ = 0,267), we confirm H_2G. The higher the income that students have, the higher the correlation between perceived and actual literacy then students with lower income.

For the complete overview of hypothesis 2, we collected the data into a table with can be found here. All the SPSS output can be found in appendix E.

		Correlation (TFL)	Correlation (AFL, PFL)	Partial correlation	Correlation test	Significance	Hypothesis
H2A	**Male**	ρ = 0,350**	ρ = 0,219	ρ = 0,229*	Fisher's test	p = 0,1922	Reject H2A
	Female		ρ = 0,026				
H2C	**Age**	ρ = 0,079	ρ = 0,020	ρ = 0,267**	Partial correlation		Reject H2C
			ρ = 0,088				
H2D	**HBO**	ρ = 0,232*	ρ = 0,349	ρ = 0,246**	Fisher's test	p = 0,2877	Reject H2D
	University		ρ = 0,195				
H2E	**Non-economical**	ρ = 0,444**	ρ = 0,383*	ρ = 0,201**	Fisher's test	p = 0,0418*	Reject H2E
	Economical		ρ = 0,032				
H2F	**No job**	ρ = 0,007	ρ = 0,225	ρ = 0,272**	Fisher's test	p = 0,488	Reject H2F
	Job		ρ = 0,230				
H2G	**Income**	ρ = 0,306**	ρ = 0,241*	ρ = 0,219**	Partial correlation		Confirmed H2G
			ρ = 0,256**				

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6 - Hypothesis 2 outcomes overview

4.4 Hypothesis 3

Each hypothesis will be with a binary logistic regression, multinormaly logistic regression or a linear regression. This is based on the way the variable is measured. We will make a regression with AFL, PFL and CFL. Comparing the adjusted R^2, we can conclude which financial literacy measure explains the financial behaviour the best. The complete SPSS outputs for hypotheses 3 can be found in appendix F.

H_3A: Combined financial literacy explains credit card behaviour better than either perceived or actual financial literacy alone.

First we will use a multinomial logistic regression to regress CC_Behaviour on AFL, PFL and CFL.

CC_Behaviour	Significance	R squared		
		Cox & Snell	Nagelkerke	McFadden
AFL	0,335	0,065	0,081	0,042
PFL	0,488	0,107	0,133	0,07
CFL	0,926	0,095	0,119	0,062

Table 7 - CC_Behaviour regressions

None of the regressions give use a significant beta for a variable. We can conclude that there is no explanatory power from AFL, PFL or CFL. We therefore reject H_3A.

H_3B: Combined financial literacy explains investment behaviour better than either perceived or actual financial literacy alone.

We will use a binary logistic regression to regress Investment_Behaviour on AFL, PFL and CFL.

Investment_Behaviour	Significance	R squared	
		Cox & Snell	Nagelkerke
AFL	0,587	0,003	0,004
PFL	0,07	0,034	0,049
CFL	0,091	0,03	0,043

Table 8 - Investment_Behaviour regressions

None of the regressions give use a significant beta for a variable. We can conclude that there is no explanatory power from AFL, PFL or CFL. We therefore reject H_3B.

H_3C: Combined financial literacy explains loan behaviour better than either perceived or actual financial literacy alone.

We will use a linear regression to regress Loan_Behaviour on AFL, PFL and CFL.

Loan_Behaviour	Significance	Adjusted R squared
AFL	0,082	0,02
PFL	0,02	0,043
CFL	0,009	0,057

Table 9 - Loan_Behaviour regressions

Both PFL and CFL get a significant beta. This results in the following regression:

$$Loan\_Behaviour = 0{,}673 + 0{,}322 * Perceived\ Financial\ Literacy + \varepsilon$$

The standard deviation of β_{PFL} is 0,136 and this regression has an adjusted R^2 of 4,3%.

$$Loan\_Behaviour = -0{,}713 + 0{,}582 * Combined\ Financial\ Literacy + \varepsilon$$

The standard deviation of β_{CFL} is 0,219 and this regression has an adjusted R^2 of 5,7%.

We can see that the CFL regression has a higher R^2 and therefore explains the financial behaviour better. We do not reject H_3C, CFL explains Loan_Behaviour better than either PCL or AFL.

H_3D: Combined financial literacy explains insurance behaviour better than either perceived or actual financial literacy alone.

We will use a binary logistic regression to regress Insurance_Behaviour on AFL, PFL and CFL.

Insurance_Behaviour	Significance	R squared	
		Cox & Snell	Nagelkerke
AFL	0,258	0,013	0,017
PFL	1	0	0
CFL	0,641	0,002	0,003

Table 10 - Insurance_Behaviour regressions

None of the regressions give use a significant beta for a variable. We can conclude that there is no explanatory power from AFL, PFL or CFL. We therefore reject H_3D.

H_3E: Combined financial literacy explains spending behaviour better than either perceived or actual financial literacy alone.

We will use a linear regression to regress Loan_Behaviour on AFL, PFL and CFL.

Spending_Behaviour	Significance	Adjusted R squared
AFL	0,722	-0,009
PFL	0,859	-0,01
CFL	0,722	-0,009

Table 11 - Spending_Behaviour regressions

None of the regressions give use a significant beta for a variable. We can conclude that there is no explanatory power from AFL, PFL or CFL. We therefore reject H_3E.

H_3F: Combined financial literacy explains consumer spending self-control better than either perceived or actual financial literacy alone.

We will use a linear regression to regress CSSC_Average on AFL, PFL and CFL.

CSSC_Average	Significance	Adjusted R squared
AFL	0,671	-0,008
PFL	0,544	-0,006
CFL	0,752	-0,009

Table 12 - CSSC_Average regressions

None of the regressions give use a significant beta for a variable. We can conclude that there is no explanatory power from AFL, PFL or CFL. We therefore reject H_3F.

To give a quick overview we summarise the outcomes of the hypothesis.

H1	Perceived financial literacy is positively correlated with actual financial literacy	Do not reject H1, AFL and PFL are positive correlated.
H2A	Females have higher correlation between perceived and actual financial literacy than men.	We reject H2A, Gender has no significant effect on the relation.
H2B	Students who do not live with their parents have higher correlation between perceived and actual financial literacy than students who live with their parents.	-
H2C	Older students have higher correlation between perceived and actual financial literacy than younger the student.	We reject H2C, Age has no significant effect on the relation.
H2D	If the education is university level, higher correlation between perceived and actual financial literacy than lower education level.	We reject H2D, Education level has no significant effect on the relation.
H2E	Students with an economic study haves higher correlation between perceived and actual financial literacy than students with non-economic study.	We reject H2E, Education area has no significant effect on the relation.
H2F	Students that work have a higher correlation between perceived and actual financial literacy than students who do not work.	We reject H2F, Job has no significant effect on the relation.
H2G	The higher the income that students have, the higher the correlation between perceived and actual literacy than students with lower income.	Do not reject H2G, Total income has a positive effect on the relation.
H3A	Combined financial literacy explains credit card behaviour better than either perceived or actual financial literacy alone.	We reject H3A, there is no significant relation.
H3B	Combined financial literacy explains investment behaviour better than either perceived or actual financial literacy alone.	We reject H3B, there is no significant relation.
H3C	Combined financial literacy explains loan behaviour better than either perceived or actual financial literacy alone.	We confirm H3C, CFK explains loan behaviour better than AFL or PFL.
H3D	Combined financial literacy explains insurance behaviour better than either perceived or actual financial literacy alone.	We reject H3D, there is no significant relation.
H3E	Combined financial literacy explains spending behaviour better than either perceived or actual financial literacy alone.	We reject H3E, there is no significant relation.
H3F	Combined financial literacy explains consumer spending self-control better than either perceived or actual financial literacy alone.	We reject H3F, there is no significant relation.

Table 13 - Hypotheses results overview

4.5 Other results

One of the reasons for this research is the recent change of the student loan, provided by the Dutch government. In order to go in to this bit as well, we asked two questions about it in the survey. The first question was about whether they saw the change as negative, neutral or positive. The second question was about if they would have done anything different, if the new law would have been applicable to them.

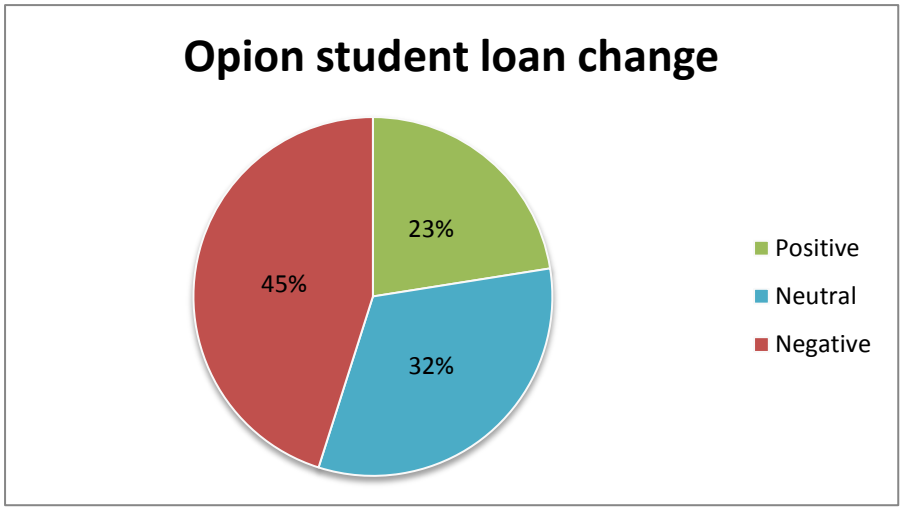


Figure 1 - Opinion, student loan change

As we can see 45,1% of the students see the change as a bad thing, 32,4% of the students is neutral to the change and the remaining 22,5% sees it as a positive change.

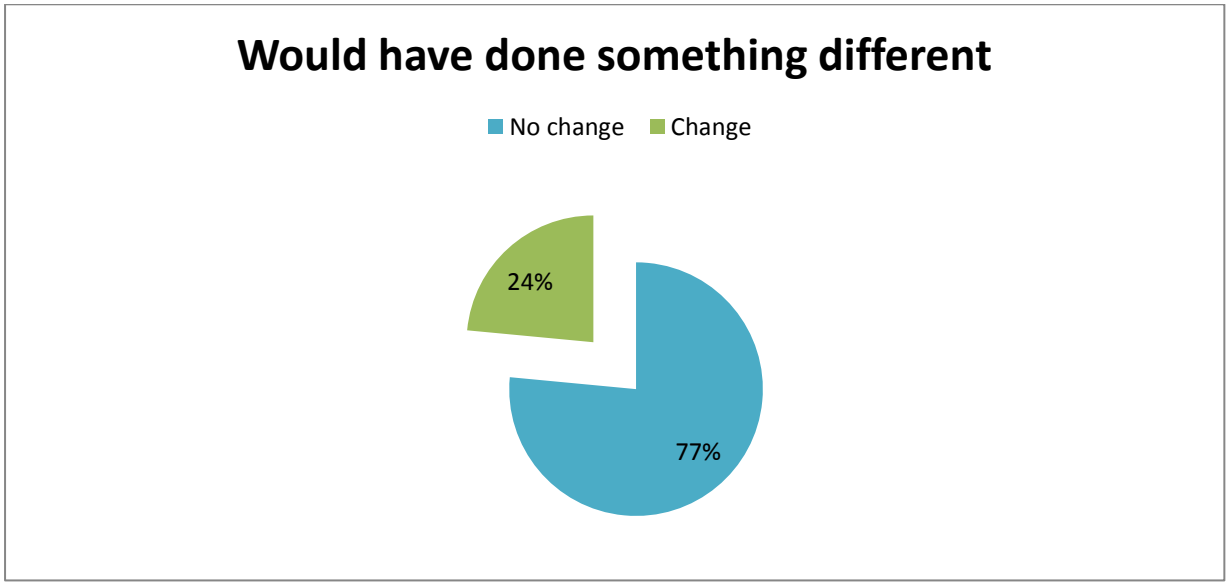


Figure 2 - % change, student loan change

More interestingly is the fact that 76,5% of the students would have not done something different. This means that the € 15.000 extra debt wouldn't have mattered. 23,5% would have done something different. Hereby things that would have been done:

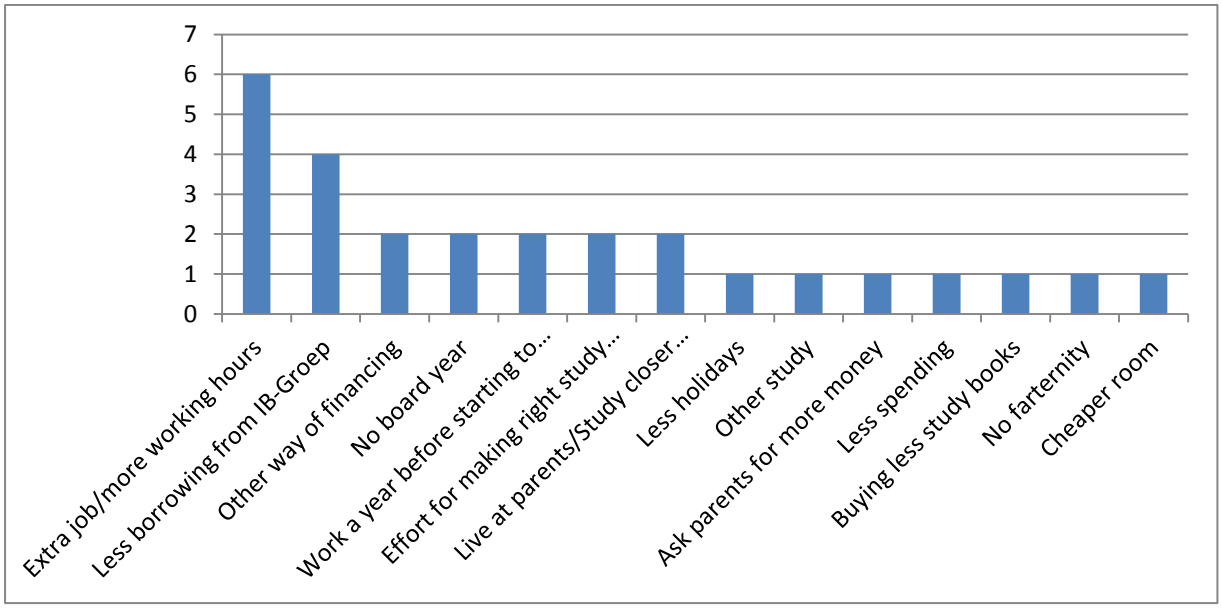


Figure 3 - Examples, student loan change

The students had the possibility to specify what they would have done different. We can see in figure 3 that most people would have worked in order to get some more money. Other people would borrow less from IB-groep in order to keep the student debt at a lower level. The other examples are ways to either save costs or increase income.

5 Conclusion

Combining the previous literature and the results we got, we can build a conclusion. The main research question of this paper is: *´How does financial literacy influence Dutch students financial behaviour?'*. This question accompanied by 3 sub questions:

- *How is the perceived financial literacy related to the actual financial literacy?*
- *Which factors account for the relation between perceived and actual financial literacy?*
- *How does this relation impact the Financial Behaviour?*

In hypothesis one we found that actual financial literacy and perceived financial literacy are positively correlated, to be exact: 0,217. Comparing this to other studies, for example (Parker, Bruine de Bruin, Yoong, & Willis, 2011) that found a positive correlation of 0.366, the correlation is even lower. The lower correlation indicates that the difference between what Dutch students think they know and what they actually know about financial literacy is bigger. As previously found in a study, the relation is positive which is in this research the case and might be more dependent on the characteristics of the individual (Agnew & Szykman, 2005).

The factor that account for the relation between perceived and actual financial literacy is: Income. Income is the only demographic variable that has a significant positive influence on the relations. We also measured the correlation with the combined financial literacy. In this measure Gender, Education_Level, Education_Area and Income had a significant influence on the financial literacy.

The next step was to take this information about the relation and use it to explain financial behavior. Unfortanetly we in general came to the conclusion that we barely got any significant results. This implies that AFL & PFL aren't a (main) driver behind the financial behaviors. Unlike the findings of Allgood & Walstadt we find that only Loan_Amount_Log, part of loan behaviour, is significantly explained by PFL & CFL. In this case loan behaviour is better explained by CFL.

We will formulate an answer to the research question to conclude the whole paper. The combined financial literacy, postively driven by gender, education level, education area and income, impacts loan behaviour of Dutch students in a positive way. Meaning that male, economical university students with higher income will have less debt.

5.1 Scientific relevance

This study did not confirm the findings of Allgood & Walstadt, 2013. The research confirmed the positive significant correlation between AFL and PFL; the effect of gender, education level, education area and income on CFL. Combined measure of actual and perceived financial literacy explained only one financial behaviour better. The other financial behaviours remain unexplained, from a financial literacy point of view.

5.2 Managerial relevance

Although actual and perceived financial literacy are correlated, they do not explain financial behaviour of Dutch students according to our results. Loan behaviour is the only exception. Financial literacy of females, HBO students and lower income levels could be improved better with new public policy programs. New policy programs should be developed to target those segments and improve their financial literacy. In terms of reaction to loan change in the Netherlands, the majority of students are negative, but they seem not to really worry about it. This might be due to the fact that students that are currently studying are not affected by the change, or in a smaller way. This might cause a bias in the results on the student loan change.

5.3 Limitations and future research

As states before, this paper has a few limitations. First of all the data collection. Due to the fact that the author did all the data collection mainly in Rotterdam and his close friends, the sample cannot be representative. We also think that the student sample might cause the financial behaviours to seem unrelated with financial literacy. The actual financial literacy measure should be extended. The rather concentrated earth of both AFL and PFL might have disturbed the relation that there might actually be. Students in general know a lot about financial literacy, this results in the high score for a lot of students. Or there is simply no relationship with the financial behaviors we have measured.

As a future research, the results of loan change and reactions worth to study. Another interesting consecutive research could be which factors influence financial behaviour of Dutch students given that financial literacy did not influence it in our study.