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Segmentation of pension plan participants

Identifying dimensions of heterogeneity

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DESIGN 47

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DESIGN PAPER 47

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Colophon
January 2016

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SEGMENTATION OF PENSION PLAN PARTICIPANTS

Abstract

Reforms of funded occupational pension systems result in more choice and greater responsibility and investment risk for individual plan participants. Yet, studies suggest that participants in occupational pension schemes know very little about their pension and do not read information provided by pension providers. Potential pension gaps remain undetected, even though they may have severe consequences for participants once they retire. Pension providers are confronted with very heterogeneous participant bases, and they do not know which demographic and psychographic dimensions of heterogeneity determine whether participants seek information about their expected pension benefits.

In this paper, we review the literature concerning potential dimensions of heterogeneity in marketing, health promotion, psychology, behavioral finance, and economics. We then develop the Retirement Belief Model and argue that beliefs determine the information search behavior of participants. So in order for individuals to search for information, they have to (1) believe that the consequences of not informing themselves are severe (*severity*), and (2) that they are at risk of experiencing an undesirable outcome such as a pension gap (*susceptibility*), (3) think that the benefits of gaining information weigh heavier than the costs (*benefits vs. barriers*), and finally (4) feel that they are able to change their situation (*self-efficacy*).

In collaboration with a Dutch pension provider, we conducted a survey involving 583 pension plan participants to identify the most relevant beliefs and emotions. We found that participants are more likely to acquire pension information when perceived barriers are low, while perceived benefits and severity are high. If participants perceive low self-efficacy to inform themselves, their intention to do so is actually high. We then identified three distinct segments: the overconfident, the emotional, and alpha males. These segments differ significantly as to the beliefs and emotions that are most important in determining participants' motivation to gain information.

While previous research focused on average participants, we instead considered differences between participants among multiple dimensions to achieve a better explanation of individual information search behavior. We show how behavioral intention of pension plan participants depends on different beliefs and emotions regarding retirement and pensions, and provide segmentation guidelines for pension communication.

1. Introduction

Inadequate pension benefits represent one of the biggest challenges of aging societies in the 21st century. Mandatory pension systems have been established to prevent individuals from poverty in old age, but such systems were based on populations with a large share of young workers and a small share of retirees. Given the demographic changes of the past few decades, these systems are no longer sustainable. Serious problems are therefore expected in the near future (Lindbeck & Persson, 2003).

Current reforms of funded occupational pension systems result in more choice and greater responsibility and investment risk for individual plan participants (Bodie et al., 1988; Knoef et al., 2014; Van Rooij et al., 2007). Yet, studies suggest that while some participants seek information about expected retirement benefits, most participants in occupational pension plans know very little about their pension and do not read the information provided by pension providers (Gustman & Steinmeier, 2004). Potential pension gaps remain undetected, with severe consequences for participants once they retire.

The very first step that pension participants need to take is to actively search for information about their pension situation and expected retirement income. Without information about their current and future situation, participants cannot make sound choices regarding retirement, whether it be about saving, delaying their retirement age, or changing their asset allocation. Still, the literature often focuses on retirement savings intentions (Hershfield et al., 2011), asset allocation (Sunden & Surette, 1998), or planned retirement age (Gustman et al., 2012). At this point, we do not know what drives some participants to gain information and how we can activate more participants. Pension providers are

confronted with very heterogeneous participant bases. Inherent to the system is that there is limited personal contact with and knowledge about participants (beyond financials and demographics). This makes it even more difficult to understand participants and to communicate effectively.

Knowledge on who reacts when and in what way requires a solid understanding of the multiple factors that motivate participants. Academic insights on relevant dimensions of heterogeneity in the pension context and how they attenuate or strengthen the motivation of participants to take action are scarce and mostly focus on demographic factors, such as age or gender (Donkers et al., 2001). Other dimensions of heterogeneity are differences in socio-economic characteristics (e.g. income), financial preferences (e.g. risk-taking), financial literacy, emotions (e.g. retirement anxiety), and beliefs (e.g. perceived barriers) of pension plan participants. Previous research mainly focused on the cognitive perspective on retirement saving decisions, in other words that, by processing certain information (e.g. planning aid with how-to steps), individuals would act upon that information. For example, Samwick (2006) argues that the most important dimensions of heterogeneity that keep individuals from saving for retirement are budget constraints, life-cycle motives, and their discount rate. The evidence is scattered, and we expect that heterogeneity matters, but we do not know which dimensions of heterogeneity are most important. Thus, more insights are needed on the psychological and behavioral dimensions of heterogeneity. Our research questions in this paper are therefore: *What are the relevant dimensions of heterogeneity that help identify which persons seek information and which do not? And how do these dimensions influence the motivation to seek information?*

To answer this question, we start by integrating the research on heterogeneity among people in the context of retirement decision-making. Next, we develop a unifying framework to identify which factors influence the motivation of individuals to seek information: the Retirement Belief Model (RBM). Our research is exploratory: by merging dimensions of heterogeneity from health promotion and financial research into a single framework, we aim to uncover underlying differences between participants that determine information search behavior, which can help in segmenting participants. According to the RBM, people only engage in a certain behavior if they (1) believe that the consequences of engaging (or not engaging) in that behavior are severe (*severity*) and (2) that they are at risk of experiencing an undesirable outcome (*susceptibility*), (3) think that the benefits of taking action weigh heavier than the costs (*benefits vs. barriers*), and, finally, (4) feel that they are able to effect a change in their situation (*self-efficacy*).

In collaboration with a Dutch pension provider, we conducted a survey among 583 pension plan participants to understand how participants differ in terms of the dimensions of heterogeneity. We found that for different participants, different beliefs play a deciding role for the behavioral intention to seek information. We see that perceived benefits and barriers have the most substantial influence on information behavior, followed by severity and self-efficacy. We then identify three segments in our sample: the overconfident, the emotional, and alpha males. We find that the impact of the distinct beliefs on motivation to act differs in sign and magnitude per segment.

This research on the dimensions of heterogeneity of pension plan participants provides researchers and practitioners with a new perspective and starting point for improved pension commu-

nication: a foundation for segmentation to tailor communication effectively. Since we know by segment which emotions, beliefs and financial preferences are most important in determining the motivation to seek information, communication can be adapted to these factors. In this way, we expect to increase the perceived relevance of communication and to be able to trigger participants to seek information.

We start with an overview of the literature on dimensions of heterogeneity among participants (Chapter 2). Then we review the role of beliefs in health promotion and retirement decision-making (Chapter 3). We explain the empirical RBM study among Dutch pension plan participants (Chapter 4) and finally discuss the findings (Chapter 5).

2. Literature review

The Netherlands currently has the second best pension system in the world – only Denmark scores better on adequacy, sustainability, and integrity (Mercer, 2015). The Dutch system consists of three pillars: first, the state old age pension as basic income based on a pay-as-you-go system; second, occupational pension accumulation via the employer; and third, additional voluntary savings such as a life insurance policy (Pensioenfederatie, 2010). During the past several decades, Dutch pension plan participants have not been required to take any personal action: by default, they would build up their pension in defined-benefit schemes, and replacement ratios of 70% ensured sufficient pension income. Yet, with an aging population, an economy still recovering from the financial crisis, severe cuts in the second pillar (Knoef et al., 2014) and recent changes towards defined-contribution schemes, participants will need to become more active in the coming years (SZW, 2012).

Dutch pension providers are legally obliged to provide participants with annual information on their pension benefits. However, it is a challenge for providers to design these obligatory as well as additional contact moments in such a way that participants find the information understandable, attractive, and relevant. Evidence from the Netherlands shows that participants consider pension information as too difficult to understand. Only one third of participants read their yearly overview of pension benefits thoroughly, and participants report that their overview does not encourage them to think more about their pensions. Participants declare themselves as not being open for pension communication, with women and young persons being the least interested (Visser et al., 2012). Similar evidence applies to other

countries: US pension plan participants often do not know the details of their plan and are misinformed about their range of choices (Chan & Stevens, 2008). Irish participants are also reported to lack knowledge about and interest in their pension schemes (Barrett et al., 2013). Previous research identifies several factors that may explain why individuals do or do not seek understandable information. The sections below provide an overview of these factors.

2.1 Socio-demographic factors

We first review the literature on how socio-demographic characteristics influence the degree to which individuals seek information about retirement. Age, gender, life events, income, and education are the main socio-demographic characteristics that have been researched (Gough & Niza, 2011).

Older persons spend more time thinking about and planning or preparing for retirement (Adams & Rau, 2011). Younger persons may think about retirement from time to time, but they do not take active steps. This is either because they find it impossible because of financial constraints or because they do not see the need to act since retirement is still so far away (Van Schie et al., 2013; Kemp et al., 2005). Furthermore, research in neuroscience has indicated that the frontal lobe, the brain region responsible for planning and decision-making, is not fully developed before one's mid-20s (Blakemore & Choudhury, 2006; Giedd, 2008). However, Ellen et al. (2012) do not find a significant difference between the retirement preparedness of older versus younger persons.

Women are less engaged in retirement planning (Hershey et al., 2002) and generally save less for retirement than men (Adams & Rau, 2011). This may be because they join the workforce only on a

part-time basis or stop working at all in order to take care of their children.

Life events also influence retirement planning. Married individuals tend to prepare and save more for retirement compared to single or non-married ones, while household size relates negatively to retirement preparation (Adams & Rau, 2011): the more members, for example children, that a household has, the more money is needed for competing saving goals such as college education. "Teachable moments" such as a 40th or 50th birthday, the birth of a child, getting married or divorced, or a job change trigger individuals to think more about retirement (Kemp et al., 2005). When the environment of a person changes, it is easier for that person to change his or her habits or normal behavior (Wood et al., 2005). Yet, it can be difficult for people to estimate the likelihood and influence of important life events on their financial future (Bruine de Bruin et al., 2007; Fischhoff et al., 2000), so it is not quite clear how life events influence information search behavior.

College graduates are often better informed about retirement and other savings as they are more likely to have a higher income (Ricketts et al., 2013). A high income facilitates individuals to save for retirement, and households with higher income have shown to be more willing to save and are better prepared for their retirement (Hayhoe et al., 2012; Ricketts et al., 2013). Income is also positively related with financial interest (Donkers & Van Soest, 1999). However, the direction of the relationship can be in both ways: either individuals are generally interested in financial matters and therefore choose a study and take a job where they are able to earn more, or they come to have a job that produces a higher income, which requires them to learn about investing the money earned or managing their finances.

2.2 Financial literacy and intertemporal choice biases

Another body of research argues that insufficient financial literacy is an important barrier to action. Often people lack basic information on financial planning in general and pensions in particular (Van Rooij et al., 2012). They find the information provided too complex and difficult to understand and thus shy away from further action (Hershey & Jacobs-Lawson, 2012; Visser et al., 2012). Those with a good understanding of financial principles are said to plan more for retirement (Lusardi & Mitchell, 2011). However, Fernandes et al. (2014) show in a meta-analysis that interventions to improve financial literacy only explain 0.1% of variance in financial behavior.

Moreover, as time and energy are precious resources, participants typically go for options that require little (or no) effort and stick to defaults (e.g. Kahneman, 2003). In occupational pension schemes, as for example in the Netherlands, the default option is to not seek information and stay inactive (as, by default, the pension scheme is one of the non-negotiable terms of employment). When deciding on whether to take action, the barriers of seeking information seem to outweigh the benefits for most participants. Barriers could, for example, be the emotions related to a participant's negative view of the retirement phase or the pension system. Some participants experience retirement anxiety (Hayslip et al., 1997; Lusardi, 2000) and avoid thinking about retirement altogether (hence no subsequent planning and action).

Other explanations that have been put forward in the literature, but that are outside the scope of this paper, include lack of self-control, time-inconsistent preferences, and problems imagining the future or the future self (Brüggen et al., 2013; Lynch & Zauberman 2006; Hershfield et al., 2011; Ellen et al., 2012).

2.3 Summary

The current focus of the literature is on socio-demographic factors and their influence on retirement-related behavior. There seem to be several factors that potentially influence information search motivation and behavior, and individuals seem to differ along these factors. We do not know how these factors interact and the evidence is scattered. For that reason we develop a unifying framework that combines and connects dimensions of heterogeneity in the pension context. To this end, we incorporate insights from health promotion.

3. Health and retirement beliefs

Since our central question is how to engage and enable participants, we consider the field of health promotion, meaning "the process of enabling people to increase control over, and to improve, their health" (World Health Organization, 2015), as one of the main areas which pension communication researchers can learn from. Within health promotion, differences between the beliefs of individuals are used to explain and predict healthy behavior. Based on the similarities between decisions that can increase health and those that can increase retirement wealth, we expect that beliefs about saving for retirement can also help to explain and predict pension information search behavior for different segments of participants. First we introduce the field of health promotion, then we explain similarities and differences between decisions that influence personal health and wealth. Finally, we develop the Retirement Belief Model (RBM), which integrates new dimensions from health promotion with the current knowledge of dimensions on heterogeneity within the pension context.

3.1 Health promotion

Health promotion campaigns are often confronted with two major challenges that are similar to those faced in pension communication: first, the perception of people that they are invulnerable, that they will not be diagnosed with a certain health problem (or a pension gap in our context); second, the difficulty of changing habits and rituals (Burns, 1992; Jayanti & Burns, 1998). People often estimate the chances of developing a negative health condition as very low, which leads them to ignore warnings by peers or those in public campaigns. Even when they know that

smoking or not wearing a seatbelt kills, they still engage in this dangerous behavior and ignore the potential consequences. As soon as desirable behavior has been achieved once, it needs to be translated into long-term behavioral change.

These two challenges are especially apparent with preventive health behavior, meaning activities that individuals undertake to check their state of health (Rosenstock, 1974) as opposed to sickness role behavior, which are activities that individuals undertake when feeling sick in order to get better (Becker et al., 1974). If no clear symptoms of health problems are present or noticed, people assume that they are invulnerable, and as a result they do not take preventive steps and tend to act careless. Since there are no symptoms of insufficient savings for retirement that are felt today, this attitude is also strongly present within the pension context. Likewise, changing old habits, such as an unhealthy diet or one's consumption and spending pattern, is more difficult if there are no tangible problems today.

However, there are people who manage to take preventive, health-promoting steps. Within the field of health promotion, the search for socioeconomic, demographic and psychographic factors that influence personal behavior has a long tradition. In 1964, Atkinson laid the foundation with his theory of motivation. This was followed by a discussion of how patients differ in their acceptance of and compliance with health advice (Becker & Maiman, 1975). Rosenstock (1966) developed the Health Belief Model (HBM), a model for preventive behavior, such as screenings or check-ups. The HBM offers a framework that concentrates on personal beliefs and perceptions to predict health-related behavior, making it one of the most widely used models in health promotion. The aim of HBM was to understand and explain health behavior as a function of personal characteristics (Rosenstock,

1966). According to the model, beliefs (which have both a cognitive and an emotional dimension) influence current personal behavior as well as behavioral change. Demographics such as gender, age, race, and marital status, as well as socioeconomic factors such as income and education determine these beliefs. Personal experiences, e.g. a close relative getting diagnosed with a disease, can also alter beliefs. The same applies to internal cues (e.g. recognized change of skin condition) or external ones (e.g. media campaign) to action (Becker & Maiman, 1975).

3.2 Relation between decisions influencing health and retirement finances

We incorporate theory from health promotion in our Retirement Belief Model for several reasons. First, because of their intertemporal nature, decisions that influence personal health and those that influence long-term financial well-being share similarities. Both decisions involve immediate costs such as time, effort and money, but positive outcomes (e.g. healthy condition or sufficient retirement income) which are subject to some level of risk (e.g. getting cancer or losing money during a financial crisis). Second, the perceived barriers for both types of behavior are similar: healthy behavior can be "too expensive, painful, challenging" (Carpenter, 2010) for individuals to commit to it; and for a person to acquire information about retirement, the time, effort and money that this involves, as well as the feeling of not knowing where to start (Lusardi et al., 2009), may play a detaining role. Third, emotions are important in both contexts: a person may not want to get a health screening or inform himself about his retirement income situation because of the assumption that the outcome will be negative. Feelings of fear and insecurity concerning one's health (Witte & Allen, 2000) may be similar

to the feeling of retirement anxiety, i.e. "concerns about one's income and health, emotional and mental well-being" (Hayslip et al., 1997). Emotions of powerlessness, boredom, confusion, and distrust have been shown to arise when thinking of retirement (Visser et al., 2012) and can keep people from taking beneficial action. Similar biases such as default or framing effects emerge in health and wealth-related fields (Cox & Cox, 2001; Kooreman & Prast, 2010). Gubler and Pierce (2014) argue that the same psychological mechanisms underlie intertemporal choice behavior, and they declare time discounting to be a general personal trait that predicts behavior across intertemporal choice domains.

However distinct, domain-specific drivers potentially trigger different kinds of intertemporal behavior (Ariely & Wertenbroch, 2002; Chapman, 1996). Although health and financial choices share similarities, they differ in important dimensions. First, the level of involvement is expected to be lower with pensions than with health-related decision-making. While most persons dislike the thought of taking action concerning their pension (Visser et al., 2012), they can be very involved with their health since, in that context, positive feelings such as joy, relief or satisfaction are more likely to occur (Dellande et al., 2004). Second, health benefits are clear whereas benefits from gaining pension-related information are more vague. Healthy behavior can result in medium-term benefits, such as improved outer appearance, weight loss, and satisfaction when personal milestones are reached (Dellande et al., 2004). In contrast, potential benefits from information gathering on pension benefits accumulation, such as a sense of security about one's future situation, can be overshadowed by negative beliefs (Ellen et al., 2012), such as lack of trust towards financial institutions and expectation of collapse of the pension system in general. Third, task

complexity and access to support differ between health-related and retirement-related decisions. Retirement-related actions, e.g. asset allocation, calculating how much one would need to save, or understanding different types of pensions, are complex (Lusardi et al., 2009), while health-related actions (e.g. exercise, taking medicines, visiting a doctor) are not necessarily difficult (Carpenter, 2010).

Therefore, we incorporate ideas from health promotion, but we adapt these to the pension context and enrich our model with factors mentioned in Sections 2.1 and 2.2. We then test the entire model to generate required insights.

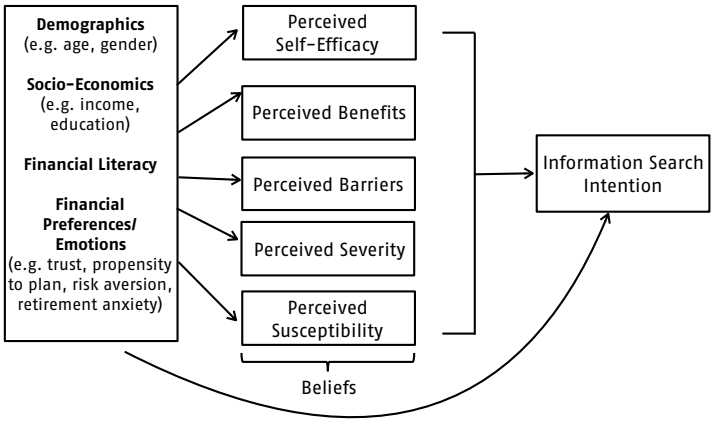
3.3 The retirement belief model

We develop a model to study the relevant dimensions of heterogeneity that determine the intention of participants to learn about their pension, the Retirement Belief Model (RBM). We study information search intention, as intentions are normally used as key predictors for behavior in psychological research (Sheeran, 2002; Webb & Sheeran, 2006). The RBM includes beliefs, emotions, financial literacy and preferences, and socio-demographic dimensions. This is displayed in a simplified way in Figure 1.

3.3.1 Beliefs

Beliefs determine attitude and ultimately the behavior of individual persons. Beliefs can be defined as the "subjective probability that the object has a certain attribute" (Ajzen & Fishbein, 2000). People may, for example, believe that having the right information helps in preventing a savings gap. They can form different beliefs about a given behavior, but only the strongest accessible beliefs determine attitude. Attitude is defined as

Figure 1: Retirement belief model



evaluation of behavior (Ajzen & Fishbein, 2000), so whether individuals judge gaining information as (un)desirable behavior. We investigate beliefs here instead of final attitudes in order to determine the set of underlying factors that explain different information behavior among different participants. This approach enables us to understand the interaction between the strength of different beliefs and their influence on the behavioral intention to seek information.

According to the RBM, people only engage in a certain behavior if they (1) believe that the consequences of engaging in that behavior (or of not engaging in it) are severe (*severity*) and (2) that they are at risk of experiencing an undesirable outcome (*susceptibility*), (3) think that the benefits of taking action weigh heavier than the costs (*benefits vs. barriers*), and finally (4) feel that they are able to change something about their situation (*self-efficacy*) (Glanz et al., 2008; Janz & Becker, 1984).

Perceived severity describes an individual's personal perception of the seriousness of a condition; in the retirement context this would be defined as the severity of not saving enough for retirement. Many people have false confidence in their retirement preparations, assuming that they do not need much money later, and never calculate how much they would need to save (Ellen et al., 2012). If they do not save enough for retirement, the financial and social consequences can be severe. However, only if they anticipate the full range of resulting difficulties, will they also act upon them. There is also evidence of an optimism bias among Dutch participants, since more than 80% expect that they will receive 70% of their previous earnings as retirement income (GfK, 2014). While most participants in Dutch pension schemes believe that they are saving enough, approximately 49% of households will probably not reach a gross replacement rate of 70% when taking into account the first and second pillar savings (Knoef et al., 2015).

Perceived susceptibility is the degree to which people see themselves at risk of having a pension gap, i.e. as not accumulating enough money for retirement. Since the pension benefits of current retirees in most countries are comparably generous (e.g. in the US, Gustman & Steinmeier, 1999), participants often only consider the relatively rich retirees of today and have trouble imagining themselves as poor retirees. However, due to media coverage of recent pension system reforms and ageing society, some individuals can get a sense of urgency to act. In order for participants to seek information, they need to consider themselves as vulnerable to a pension gap. Some participants fall prey to an optimism bias, causing them to be reluctant to admit any vulnerability to a pension gap, because the threat of harm would worry them too much (Kirscht et al., 1966).

Perceived benefits are the advantages that participants perceive if they seek information. Participants would benefit from relevant and insightful information on their current situation and potential future actions. These benefits may include the peace of mind that comes from a sense of security about one's pension situation and the determination to take action to have a comfortable retirement. However, these benefits may be drowned out by negative feelings or ideas concerning the pension system, such as expectations that the system will collapse in the future anyway, or that financial institutions cannot be trusted.

Perceived barriers are the obstacles that may prevent participants from seeking information. Unlike the benefits of information behavior, the barriers are specific: the time, effort, and money it costs to seek information. Additionally, people focus mainly on the present and on what happens today when making choices that require effort, than when making choices that cost money (Augenblick et al., 2013). With information search behavior, time and effort probably form the main barriers in the information acquisition process. Individuals may conduct a cost-benefit analysis when deciding whether to engage in a certain behavior, in this case whether to learn more about pensions or not. If the barriers are higher than the perceived benefits, then they will not bother to learn more about the subject. We therefore expect a negative outcome of this cost-benefit analysis for most participants, since the benefits of more information are vague, whereas the barriers are very clear.

Perceived self-efficacy is the certainty that one can accomplish a behavior that will lead to a desired outcome (Bandura, 1994), specifically the degree to which people feel that they are capable

of learning, for example where to look for information, and whether one would be able to understand the acquired information. Especially the latter is important, since previous research noted that when facing retirement-related information, participants feel powerless (Visser et al., 2012) and do not know how to act upon the information (Lusardi et al., 2009). When people feel confident about their skills to acquire financial information, they show more positive retirement-related behavior such as saving for an emergency fund, or figuring out how much money they will need for retirement (Fernandes et al., 2014). Furthermore, the efficacy and achievability of goals have been shown to positively influence the savings behavior of participants (Cheema & Bagchi, 2011).

3.3.2 Emotion, financial preferences and literacy

Aside from beliefs, there are other factors that either directly or indirectly influence the information search intention.

Retirement anxiety is defined as "preretirement expectations of the consequences of retirement" (Van Solinge & Henkens, 2008). Some participants may not associate the retirement phase with good times but rather with poor health and disability problems. Additionally, the farther individuals are away from retiring, the less information they have on aging or retirement, and the more anxious they are (Hayslip et al., 1997). We expect a high level of retirement anxiety to be positively related to the willingness to seek information, such that participants who fear retirement feel a stronger urge to look for information. Yet, fear can also have the opposite effect: individuals get scared and shy away from taking any action at all (Ellen et al., 2012). Whether retirement anxiety has a positive or negative effect on the information

search intention is therefore difficult to predict. Besides that, we expect participants with a high level of retirement anxiety to also perceive a high level of severity and to see themselves as more vulnerable to a pension gap.

Propensity to plan reflects the differences between participants in their frequency of forming planning goals and a personal preference to plan (Lynch et al., 2010). Individuals differ in their preference for planning horizons. If participants have a preference to plan, they will experience comfort after an information process (Lynch et al., 2010). Planners understand the benefits of acquiring information, and, in anticipation of this, they will be more likely to seek information.

Risk-taking is the willingness of individuals to take risks (Dohmen et al., 2011). We assess the participant's level of financial risk-taking and expect that risk-taking is a preference that is positively correlated with self-efficacy. Risk-averse persons experience more fear and want to minimize the risk of the unknown (Loewenstein et al., 2001), whereas risk-taking persons have more confidence in themselves. If people are confident enough to take financial risks, they may have already acquired information about their personal retirement situation, which assures them of their ability to do so again.

Financial literacy is the degree to which a person understands financial concepts and possesses the ability and confidence to manage his personal finances, both on the short and the long term (Remund, 2010). If participants are financially literate, they will understand that it is wise to acquire information concerning retirement and will also be more willing to do so than less finan-

cially literate individuals (Lusardi & Mitchell, 2011). We measure financial literacy by using the three basic financial knowledge questions of Lusardi and Mitchell (2010), and we expect that financially literate participants will have higher self-efficacy while perceiving lower barriers.

Trust towards one's service provider (Hansen, 2012) – in this case the participant's pension provider – is another component of the RBM. If participants expect that the service provider can be relied on to deliver on its promises (Hansen, 2012), then their trust in the pension provider will be high. They will consider their provider as a first contact point for retirement information and will therefore be more willing to search for information. Besides that, trusting participants will also perceive higher benefits, since they have a better relationship with their service provider than non-trusting participants.

3.3.3 Socio-demographic dimensions

We include in our model factors such as age, gender, marital status, number of children, current living situation (living with partner or alone), housing situation (living in rented or own space), education, monthly net household income, and the participant's contribution in percentage terms of this household income.

Related to our literature review, we for example expect older, wealthier, higher educated and male participants to be relatively more positive in their beliefs about retirement than their counterparts, since they often have more positive prospects concerning their retirement.

4. Measuring heterogeneity dimensions in a field study

Data collection

We designed an online survey to test our framework with Dutch pension plan participants of a large international insurance company and occupational pension provider. Together with a newsletter, the survey was sent out via email to 7,122 participants in September 2014, the complete active DC participant base of the provider. Focusing on DC plan participants makes the results of the study more generalizable to other countries where this is the predominant form of pension plan. Furthermore, the share of DC pension plans as compared to DB plans is increasing steadily, making it even more relevant to generate insights in this area. Also, DC participants face higher risks, and they may have more choices and responsibility for their retirement income than DB participants (Van Rooij et al., 2007). In this research context, participants can choose between life cycle and free investing. Therefore, it is particularly important to raise awareness and stimulate action in this group.

All participants in this DC base are building up their second pillar pension in this scheme via their employer. Persons who participated in the DC scheme before, but who are no longer actively building up retirement benefits ("sleepers") are not included in the sample. Over 90% of the participants stayed in the default investment portfolio with low risk exposure. To encourage participation in the survey, respondents could win a 50 euro gift voucher. Participants had twenty days to respond, with a reminder being sent after one week. 885 participants opened the survey link, and 638 participants filled out the complete questionnaire. We match the survey data with the anonymized administrative data of the pension provider. Our final

Table 1: Retirement belief model questionnaire

Overview Constructs			
Construct	# Items Scale	Reference	Indicators
Behavioral Intention	7	Self-developed	(1) How big is the chance that you will look at your pension situation in the upcoming months? (2) I am planning to look up information about my pension in the upcoming months.
Perceived Barriers	7	Grispen et al.(2011)	(1) The financial costs of seeking information about my pension are a barrier to me. (2) The time it costs to seek information about my pension are a barrier to me. (3) The efforts it costs to seek information about my pension are a barrier to me. (4) Seeking information would make me too concerned with my financial situation during retirement. (5) Being overly concerned about my financial situation during retirement scares me. (6) Just thinking about seeking information about my pension scares me. (7) Just thinking about seeking information about my pension scares me.
Perceived Benefits	7		(1) In my opinion, seeking information about your pension is important. (2) Seeking information about your pension means taking responsibility for your own financial situation. (3) Seeking information about your pension gives a feeling of certainty about your own financial situation. (4) By seeking information about my pension, I can reassure myself. (5) By seeking information about my pension, I can take care of my own financial situation. (6) It feels good to take responsibility for my own financial situation.
Perceived Self-Efficacy	7		(1) Seeking information over my pension is difficult. (2) When seeking information about my pension I would miss professional assistance. (3) If I would like to do something with the received information about my pension I would miss professional assistance. Note: SE recoded into Self_Efficacy_1_Rec (positive wording)
Perceived Severity	7		(1) In your opinion, how severe is it to not save enough for your retirement?
Perceived Susceptibility	7		(1) In your opinion, what are the chances that you discover that you are not saving enough for retirement? (2) In your opinion what are the chances that you discover that you are not saving enough for retirement, compared to others of your age and gender?

Overview Constructs			
Construct	# Items Scale	Reference	Indicators
Financial Risk-Taking	10	Dohmen et al. (2011)	(1) Are you in financial matters a person who is fully prepared to take risks or do you try to avoid taking risks?
Trust Financial Service Provider	7	Hansen, (2012)	(1) I believe that my [name pension provider] is trustworthy
Propensity to Plan	7	Lynch et al. (2010)	(1) I set financial goals for the next 1–2 months for what I want to achieve with my money. (2) I decide beforehand how my money will be used in the next 1–2 months. (3) I actively consider the steps I need to take to stick to my budget in the next 1–2 months. (4) I consult my budget to see how much money I have left for the next 1–2 months. (5) I like to look to my budget for the next 1–2 months in order to get a better view of my spending in the future. (6) It makes me feel better to have to have my finances planned out in the next 1–2 months.
Retirement Anxiety	7	Hayslip et al. (1997)	(1) I am concerned about my health after retirement. (2) I am concerned about my income after retirement. (3) I am concerned about where I will live after retirement. (4) I am concerned about feeling alone after retirement. (5) I am concerned about being able to care for myself after retirement.
Financial Literacy		Lusardi & Mitchell (2011)	(1) 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? (1 = More than $102, 2 = Exactly $102, 3 = Less than $102, 4 = Do not know, 5 = Refuse to answer) (2) 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 be able to buy with the money in this account? (1 = More than today, 2 = Exactly the same, 3 = Less than today, 4 = Do not know, 5 = Refuse to answer) (3) Please tell me whether this statement is true or false. 'Buying a single company's stock usually provides a safer return than a stock mutual fund'. (1 = True, 2 = False, 3 = Do not know, 4 = Refuse to answer) Note: FL recoded into Financial_Literacy_1_Rec etc. (0=wrong answer, 1=right answer) and Financial_Literacy_Total (0–3 questions correctly answered)
Already Informed	7	Self-developed	(1) I already know how much pension I have built up so far.

sample included only the participants for which this matching was possible: 583 participants, a final response rate of 8%. The descriptive statistics of the sample are presented in Appendix A.

As to gender, our sample is fairly representative for the total participant base: 34% of the total DC base is female, compared to 32% in our sample. The total base and sample differ as to age, income, and marital status. The mean age is 42 for the total base, whereas the sample, with a mean age of 45, is slightly older. The majority of respondents is married (60%), while half of all DC participants are married. Annual pensionable salary is somewhat higher for respondents as compared to the total base (see Appendix A, panel D). As to professional occupation, the sample is spread across different sectors. The largest sector (21%) is corporate services, followed by information and communications technology (17%), industrial and manufacturing sector (13%), and wholesale (12%).

Survey development

The questionnaire starts by asking about the behavioral intention of participants to seek information about their pension, and it then asks whether participants are already informed about their pension. After that, it continues with the belief dimensions of perceived self-efficacy, benefits, barriers, severity, susceptibility (adapted from Grispen et al., 2011) and response efficacy (adapted from Witte et al., 1996). For retirement anxiety (Hayslip et al., 1997), propensity to plan (Lynch et al., 2010), risk-taking (Dohmen et al., 2011), financial literacy (Lusardi & Mitchell, 2011), and trust towards the financial service industry and the pension provider (Hansen, 2012), we use scales established by the authors mentioned. Except for risk-taking (10-point scale) and financial literacy, all scales are 7-point Likert agreement scales. At the end

of the questionnaire, respondents are asked to indicate their gender, age, whether they live with a partner, marital status, children, monthly net household income, the percentage of the household income that they contribute, education, the sector they work in, and whether they own or rent a house (the latter with or without governmental support). The questionnaire of the latent constructs is presented in Table 1, the questions of the socio-demographics in Appendix B.

The survey was translated into Dutch and pre-tested with administrative university staff and professors (N=21) to ensure that the wording and structure of the questionnaire would be straightforward. Any inconsistencies or unclear elements were resolved.

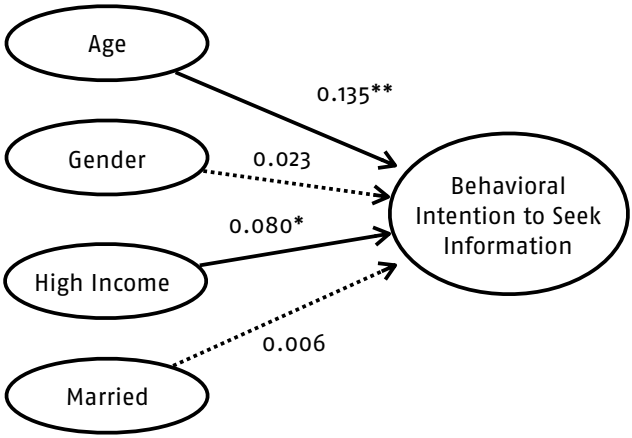
Data analysis

We estimate the RBM by building a structural equation model. In this way, we do not have to perform separate analyses (e.g. OLS regressions) for each dependent variable. Instead, we can test the network of relationships between different latent variables within the Retirement Belief Model simultaneously.

We apply the partial least squares (PLS) approach to the structural equation model, which includes an iterative algorithm to first evaluate the measurement model and second to estimate the path coefficients in the structural model. Contrary to ordinary least squares regression procedures, the estimation procedure in PLS is named partial because it alternates a series of single and multiple regressions step by step (Esposito et al., 2010).

All analyses are carried out using SmartPLS 3 (Ringle et al., 2015). The details of the analysis can be found in Eberhardt et al. (2015). We use PLS structural equation modeling instead of covariance-based structural equation modeling because the purpose

Figure 2: Influence of socio-demographics on intention

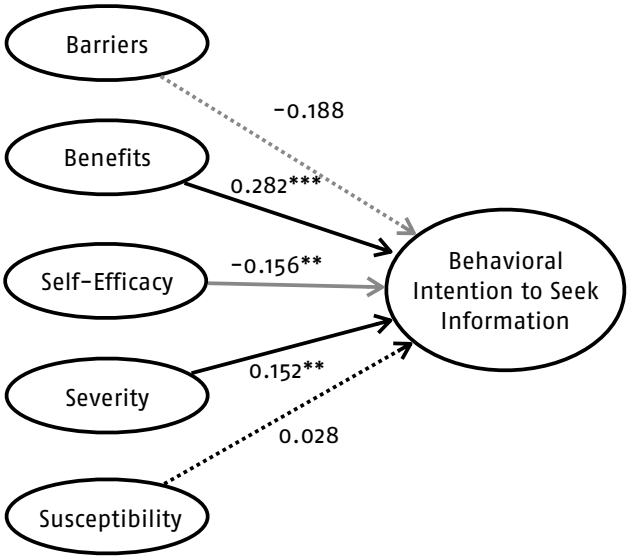


Note: This figure displays the path coefficients for demographics on behavioral intention to seek information. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level (estimated with PLS). Dotted lines show insignificant relationships, solid lines significant relationships.

of our research is exploratory, our data are partly non-normally distributed, and some constructs consist of less than three items (Hair et al., 2011).

We start by analyzing the influence of socio-demographics on behavioral intention, and we then use the observable characteristics of participants to predict the information search intention. The result is shown in Figure 2. The gender, high income, and married status variables are all coded to 0 or 1: 1 if gender is female, if monthly net household income exceeds 2,800 euros (based on median split), and if the participant is married. We only see an significant effect for age and high income, so the older and wealthier participants are, the higher their intention to seek information. However, this model does not explain intention very

Figure 3: Influence beliefs on behavioral intention



Note: This figure displays the path coefficients for the core RBM on behavioral intention to seek information. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level (estimated with PLS). Dotted lines show insignificant relationships, solid lines significant relationships.

well (adjusted R^2 of 0.019); this implies that we should not only rely on demographics to predict the information search intention.

The next step in our analysis is to estimate the RBM. We first examine the effects of beliefs on behavioral intention to seek information about one's pension. The results are displayed in Figure 3.

Perceived benefits and severity positively influence behavioral intention, while barriers and susceptibility do not have a significant effect. For self-efficacy, the path on behavioral intention is significant, but with an unexpected negative sign, contrary to what Fernandes et al. (2014) found. Following their explana-

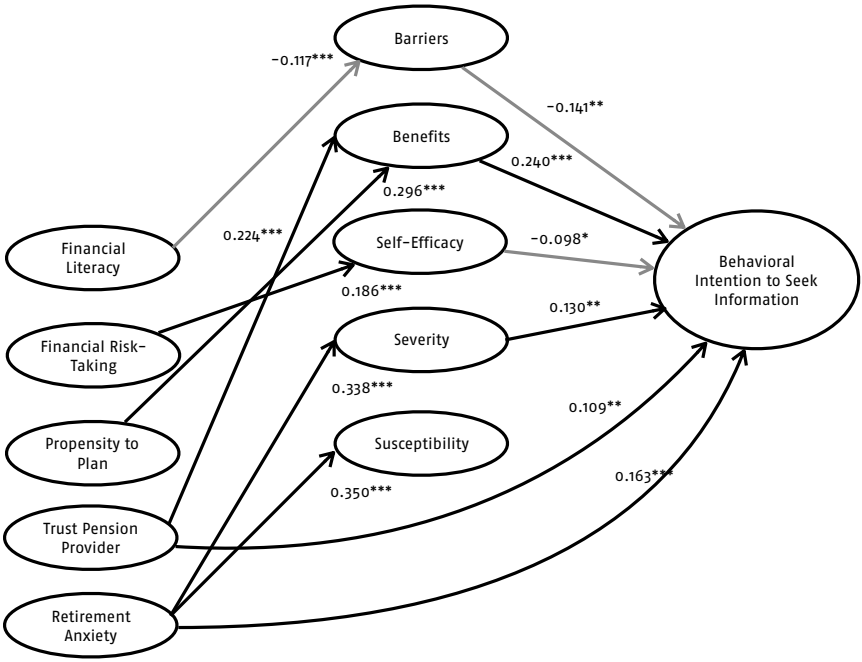
tion we would expect participants who are confident about their ability to be more likely to seek information. We investigated the influence of beliefs on the construct of already being informed in a separate analysis, and saw that self-efficacy has a significant positive influence. Individuals who have high self-efficacy are more likely to be already informed, and therefore have no intention to do so again in the near future.

After having estimated the role of beliefs in the RBM, we were interested to see what dimensions of heterogeneity influence beliefs (and behavioral intention) and how socio-demographic factors influence the additional dimensions of heterogeneity as well as beliefs. We therefore estimated a broader RBM to explore these relationships. We found that the higher that participants are educated, the higher is their financial literacy (or knowledge), financial risk-taking and the lower their retirement anxiety. Age increases self-efficacy, since older participants are more experienced with the pension information process. Women are significantly less financially literate and risk-taking, but they show higher trust in their pension provider. As to beliefs, women feel that having a pension gap is more severe, they see more barriers to gain information, and they are less self-confident about their ability to search for pension information and what to do with that information. Interestingly, participants with a higher income do not perceive significantly lower barriers but, instead, a lower susceptibility to a pension gap (Eberhardt et al., 2015).

In Figure 4, we do not display the above mentioned socio-demographic factors for simplicity reasons. Instead, we show only the significant relationships between additional dimensions of heterogeneity, beliefs and behavioral intention.

As to beliefs, interesting barriers now significantly influence behavioral intention in a negative sense. Since we added a

Figure 4: Selection of extended RBM



Note: This figure displays the path coefficients for the extended RBM on behavioral intention to seek information *, **, and *** denote statistical significance at the 10%, 5%, and 1% level (estimated with PLS). Only significant relationships are displayed.

path between financial literacy and barriers, this could indicate mediation. We tested for this by conducting a separate analysis in which we added a path from financial literacy on behavioral intention. This led us to see that financial literacy has a positive, significant influence on barriers, but not on intention. Therefore, barriers fully mediate the impact of financial literacy on the intention to seek information. This means that financially illiterate participants experience higher barriers to seeking infor-

mation and, via that channel, display a lower intention to seek information.

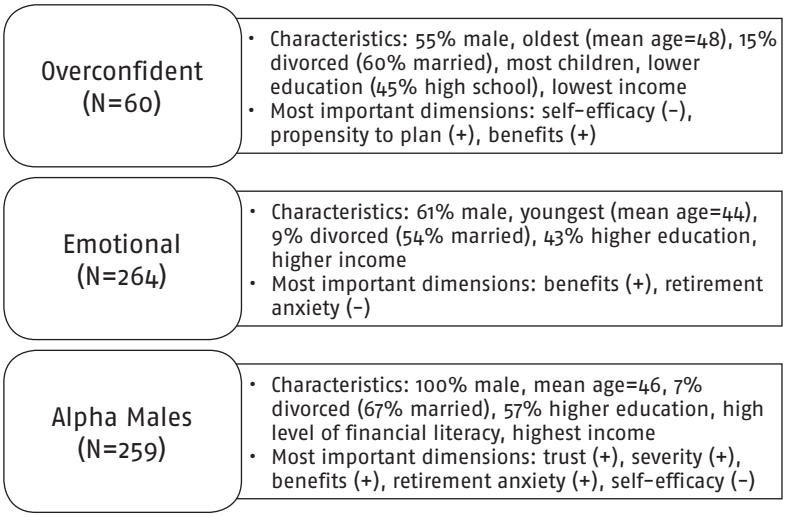
Aside from positive beliefs, retirement anxiety and trust in one's own pension provider increase the intention of participants to seek information.

The extended model has an adjusted R2 of 0.19 for the explanation of information search behavior. Compared to the low adjusted R2 of 0.019 when using only demographic factors, this model explains information search behavior much better. Yet, it could be that participants differ on so many dimensions that the model does not perfectly fit every participant. Hence, we try to improve the process for explaining the behavior of different participants and estimate a model that allows for differences in impact of the various factors on behavioral intention (e.g. the segment of self-efficacy may have a less strongly positive or negative influence than another segment). The fourth and last analysis step therefore includes estimating a finite mixture (FIMIX) segmentation model, because we expect the impact of the different beliefs and psychographic and socio-demographic dimensions to vary for different segments of participants.

Segmentation

Using the FIMIX-PLS procedure, we estimated the different relationships within the RBM and at the same time investigated heterogeneity in our sample (Ringle et al., 2010). To obtain the optimal number of segments, we used established procedures and the evaluation criteria log-likelihood (lnL), Akaike information criterion (AIC), Bayesian information criterion (BIC), consistent Akaike information criterion (CAIC) (Hahn et al., 2002), as well as the entropy statistic (EN) (Ringle et al., 2010). Evaluation of these criteria suggested that three classes is the optimal choice for the

Figure 5: Segment characteristics



Note: This figure displays peculiar socio-demographic characteristics of the three distinct segments, as well as beliefs and psychological dimensions that have the largest significant influence on behavioral intention to seek information about one's pension. + and – in brackets indicate whether this influence is positive or negative.

dataset at hand. Further details of the FIMIX-PLS procedure can be found in Eberhardt et al. (2015).

Based on the path coefficients (which are comparable to OLS regression coefficients) in the RBM, each observation was then fitted with a finite mixture probability into one of the segments (based on their demographic and psychographic characteristics). In this way, respondents were assigned to one of the three segments. We then conducted a multi-group analysis to see whether the paths for the various segments differ significantly. As such, we estimated the RBM for every segment to see how the influence of beliefs, emotions, and financial preferences on the information search intention differs among segments. Complete

results are reported in Eberhardt et al. (2015). Characteristics of the three segments are shown in Figure 5, together with the dimensions of heterogeneity that influence behavioral intention.

The first segment (N=60, 55% male), the overconfident, is the oldest group, with the least education, income and financial literacy and the highest divorce rate. Self-efficacy and propensity to plan are the most influential variables on information search intention. We call this segment the overconfident since the related participants have relatively high self-efficacy but low financial literacy; thus they think they can gain information, but they may actually not be capable of it. Self-efficacy has a negative influence on information intention for this segment, while most of the participants involved are not informed yet about their pensions.

The second segment (N=264, 61% male), the emotional, is the youngest group, has the highest rate of persons without children (37%), is similar to segment 1 as to financial literacy, but generally has a higher education and a higher household income. For this group, emotions play a large role: their level of retirement anxiety is high, they fear retirement. Security is important to them, and these emotions stimulate them to take action: retirement anxiety and perceived benefits (which are mainly emotional, such as getting a feeling of certainty) significantly influence the intention to seek information in a positive way.

Segment 3, the alpha males (N=259), is exclusively male and perfectly financially literate and has the highest income, education, and rate of home ownership (90%). Especially trust in their own pension provider is important in triggering this group to seek information. These participants are financially literate and want partners for their retirement planning who take them seriously. Furthermore for this group, self-efficacy has a negative

influence, but this effect is significantly weaker than the negative effect for the overconfident. Yet, this segment is also the most informed segment, meaning that they not only think they can do it, but they are actually capable of it. Interestingly, while segment 3 perceives lower barriers than the other two groups, there are no significant differences between the segments in terms of how susceptible to a pension gap they perceive themselves to be.

In addition, the adjusted R2 values for each segment are now higher (0.24, 0.20 and 0.33 respectively) than the adjusted R2 value for the entire sample (0.19). This shows that there are large differences between the segments, which should be taken into account when developing pension communication. The path coefficients for the various segments differ significantly in their magnitude (and sign in some cases) (Eberhardt et al., 2015). Descriptive statistics for the three segments are presented in Appendix C.

5. Conclusion

Ensuring sufficient retirement income is one of the most important social challenges of this day, especially for societies with growing numbers who approach retirement. The shift towards DC schemes put participants in the role of decision-makers, a role that many are not ready for. Pension communication should trigger participants to become informed about their pension income situation. Using our Retirement Belief Model, we show how the information search intention depends on beliefs, emotions, financial literacy, and financial preferences, and we provide pension communication providers with segmentation guidelines.

We aim to contribute to the literature by developing the Retirement Belief Model, a new conceptual model to research heterogeneity between pension plan participants by examining the factors that influence their motivation to seek information about retirement. Second, we recognize the impact of emotions on retirement decision-making. Previous research (e.g. Ellen et al., 2012; Lusardi et al., 2009) focused on the cognitive perspective on retirement saving decisions; this implied that by processing certain information (e.g. planning aid with how-to steps), individuals would act upon that information. We argue that, by focusing on the cognitive aspect, key aspects of the decision-making process are missed, including beliefs and emotions such as retirement anxiety. Third, while previous research focused on the average individual (e.g. Hershfield et al., 2011), we consider differences between people in order to identify differential effects, beliefs and dimensions of heterogeneity on the information search intention.

In this paper we show which dimensions of heterogeneity influence whether a participant will seek information. Our find-

ings display that the "usual suspects", namely the older, higher educated, wealthier and male participants, are more likely to be informed. We show, however, that using only socio-demographic information is not well suited for explaining information search intentions. Beliefs and psychographic dimensions play an important role and are essential in the way segments of pension plan participants are formed. Each segment has different beliefs that determine the intention to become active. For the overconfident, self-efficacy has a significant negative impact; they feel that they can obtain the necessary information, whereas in practice they do not actually do so. The emotional segment experiences high levels of retirement anxiety, which together with their perceived benefits of gaining information stimulates them to take action. The third segment, the alpha males, depends on trust in their pension provider for them to seek information. For this segment, the belief that the consequences of not being informed are very severe is also a key trigger to act.

Our findings support our expectation that heterogeneity of participants matters, and they underline the need to approach different groups differently, with communication adapted to each. We expect, for example, that for individuals who are overconfident it would be important to create a sense of urgency, since they are the most vulnerable to a pension gap but fail to act even though they feel they could do so. For the emotional segment, communication may focus on feelings, emphasizing the peace of mind that participants can gain by becoming informed. In communication with alpha males, trust and severity should be stressed.

Based on our findings, we expect that personalized messages would increase their relevance, lead to awareness, and stimulate action. Personalizing the information provided to partici-

pants could help in getting participants more involved with their personal retirement planning. However, developing personalized messages is only possible when the relevant dimensions of heterogeneity are known. Yet we lack knowledge about how different target groups react to different types of framing information. Based on the insights from our research, we can make a step forward in tailoring communication to the different segments of the participants involved.

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Appendix

A – Descriptives

Descriptive Statistics (N=583)			
Panel A. Education			
Highest Educational Degree	%	**Financial Literacy** (# questions correctly answered)	%
High school	23.0	0	3.9
Intermediate vocational (Dutch: MBO)	22.1	1	7.0
College (bachelor degree)	35.4	2	31.4
University (master degree)	14.9	3	57.6
PhD	2.9		
Other	1.7		
Panel B. Income			
Net Monthly Household Income	%	**Contribution to Household Income**	%
Less than 1200 €	0.3	0–20	3.9
1200–1800 €	7.2	20–40	7.2
1800–2800 €	24.2	40–60	21.4
2800–3800 €	26.6	60–80	21.6
3800–5000 €	15.4	80–100	30.5
More than 5000 €	9.4	No answer	15.3
No answer	16.8		
Panel C. Marital Status & Children			
Marital Status	%	**Children**	%
Married	60.2	None	31.2
Separated	0.2	1 child	14.8
Divorced	8.7	2 children	38.8
Widowed	1.4	3 or more	15.3
Never married	29.5		
Panel D. Non-response analysis	**All DC participants**	**Respondents**	**t-statistic on mean difference**
N	7.122	583	
Proportion of males (%)	66%	68%	(-)0.74
Mean Age (SD)	42 (10.55)	45 (10.85)	9.18***
Age Range	20 – 66	21 – 64	
Mean Yearly Pensionable Salary in € (SD)	48,189 (26,024.37)	50,758 (24,944.67)	2.40**
Married (%)	49%	60%	5.20***

Note: This table presents the distribution of education, financial literacy, net monthly household income, respondent's contribution to household income, marital status, and number of children. Panel D shows a comparison between the sample of participants that received the survey link via e-mail and the respondents, and the results of an independent samples t-test. Standard deviations (SD) are given in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level.

B – Questionnaire socio-demographics

Overview Demographics		
Variable	**Value**	**Variable Definition**
Gender	0	Male
	1	Female
Age	21–64	n.a.
Living Together with Partner	0	No
	1	Yes
Marital Status	1	Married
	2	Separated
	3	Divorced
	4	Widow(er)
	5	Never married
Children	1	None
	2	1 child
	3	2 children
	4	3 children
	5	More than 3 children
Monthly net household income	1	Less than € 1200
	2	€ 1200 – € 1800
	3	€ 1800 – € 2800
	4	€ 2800 – 3800
	5	€ 3800 – € 5000
	6	More than € 5000
	7	Rather not answer
Percent contribution to household income	1	0 – 20%
	2	20 – 40 %
	3	40 – 60 %
	4	60 – 80 %
	5	80 – 100 %
	6	Rather not answer
Housing Tenure	1	Rent with government support
	2	Rent without government support
	3	Own house
Education	1	None
	2	Primary education [basisonderwijs, lagere school]
	3	Lower vocational education [lager beroepsonderwijs]
	4	High school [MAVO, VMBO–Theorie , IVO, MULO, en ten hoogste 3 jaar HAVO, HBS, VWO of VHMO]
	5	High school [HAVO, VWO, Atheneum, Gymnasium, HBS, MMS]
	6	Middle vocational education[middelbaar beroepsonderwijs]

Overview Demographics		
Variable	**Value**	**Variable Definition**
	7	Higher vocational education [hoger beroepsonderwijs: HBO-bachelor, HBO oude stijl]
	8	University bachelor [universitaire opleiding: WO-bachelor, Kandidaatsexamen]
	9	Higher vocational education [hoger beroepsonderwijs: HBO-master]
	10	University master [Universitaire opleiding: WO-master, WO oude stijl, Officiersopleiding aan het KIM, de KMA of de Defensie Academie]
	11	University PhD / PostDoc [universitaire opleiding: gepromoveerd, post-doctorale beroepsopleiding]
Sector	1	IT /ICT [automatisering/ICT]
	2	Automobile [auto, reparatie, garagebedrijf]
	3	Financial sector [bank- en verzekeringswezen, financiële instellingen]
	4	Construction [bouw]
	5	Cultural sector [culturele sector]
	6	Retail food [detailhandel food]
	7	Retail non-food [detailhandel non-food]
	8	Health [gezondheidszorg en welzijnszorg]
	9	Wholesale [groothandel]
	10	Hotel, restaurant, catering [horeca]
	11	Industrial, manufacturing [industrie, delfstofwinning, energie-\ waterleidingbedrijven]
	12	Agriculture [landbouw, bosbouw, visserij]
	13	Education [onderwijs]
	14	Public sector [overheid, openbaar bestuur, sociale verzekeringen]
	15	Other public sector, non-profit [overige (semi-)overheidsinstellingen en non-profit instellingen werkzaam in het algemeen belang]
	16	Recreation [recreatie, toerisme en sport]
	17	Logistics [transport, opslag, communicatie]
	18	Trade unions, employers organisations, charity [werkgevers-, werknemers- en beroepsorganisaties, levensbeschouwelijke en politieke organisaties, overige ideële organisaties en charitatieve instellingen]
	19	Corporate services [zakelijke dienstverlening en verhuur]

Note: This table presents the demographic part of the questionnaire. For education and sector, some terms are specific to the Netherlands which is why all Dutch original terms are given in parentheses.

C – Descriptives per segment

Descriptive Statistics Segments (N=583)				
		Segment		
	All	1 (N=60)	2 (N=264)	3 (N=259)
Panel A. Education				
Highest Educational Degree		%		
High school	23.0	45.0	28.0	13.1
Intermediate vocational (Dutch: MBO)	22.1	15.0	23.1	22.8
College (bachelor degree)	35.4	31.7	30.4	41.3
University (master degree)	14.9	5.0	12.9	15.4
PhD	2.9	1.7	2.7	3.5
Other	1.7	1.7	3.1	0.4
Panel B. Income				
Net Monthly Household Income		%		
Less than 1200 €	0.3	3.3	0.0	0.0
1200–1800 €	7.2	13.3	10.2	2.7
1800–2800 €	24.2	28.3	27.3	20.1
2800–3800 €	26.6	21.7	23.5	30.9
3800–5000 €	15.4	13.3	10.6	20.8
More than 5000 €	9.4	1.7	8.0	12.7
Not answer	16.8	18.3	20.5	12.7
Panel C. Marital Status & Children				
Marital Status		%		
Married	60.2	60.0	53.8	66.8
Separated	0.2	0.0	0.4	0.0
Divorced	8.7	15.0	9.1	6.9
Widowed	1.4	3.3	1.1	1.2
Never married	29.5	21.7	35.6	25.1

		Segment		
	All	1 (N=60)	2 (N=264)	3 (N=259)
Financial Literacy (# questions correctly answered)		%		
0	3.9	11.7	6.1	0.0
1	7.0	13.3	12.5	0.0
2	31.4	53.3	57.2	0.0
3	57.6	21.7	24.2	100.0
Contribution to Household Income		%		
0–20	3.9	5.0	5.3	2.3
20–40	7.2	13.3	10.6	2.3
40–60	21.4	26.7	24.2	17.4
60–80	21.6	10.0	11.7	34.4
80–100	30.5	26.7	27.3	34.7
Not answer	15.3	18.3	20.8	8.9
Children		%		
None	31.2	26.7	37.1	26.3
1 child	14.8	16.7	16.3	12.7
2 children	38.8	36.7	34.5	43.6
3 or more	15.3	20.0	12.1	13.1

D – Summary statistics

Differences in RBM constructs divided by segment					
			Segment		
	Overall (N=583)	1 (N=60)	2 (N=264)	3 (N=259)	ANOVA
Variable	**Mean (SD)**		**Mean (SD)**		**F df (2, 580)**
Behavioral intention to seek information (1–7)	3.83 (1.58)	3.45 (1.97)	3.85 (1.36)	3.88 (1.67)	1.94
Already Informed	4.51 (1.66)	4.23 (2.15)	4.27 (1.52)	4.82 (1.62)	8.40***
Perceived self-efficacy	3.50 (1.42)	3.78 (2.12)	3.13 (1.06)	3.81 (1.42)	17.67***
Perceived barriers	3.31 (1.23)	3.36 (1.80)	3.65 (0.95)	2.96 (1.17)	23.50***
Perceived benefits	5.24 (1.00)	4.80 (1.69)	5.26 (0.76)	5.33 (1.00)	7.24***
Perceived susceptibility	3.64 (1.42)	3.44 (2.00)	3.74 (1.11)	3.58 (1.44)	1.65
Perceived severity	4.58 (1.47)	4.40 (2.25)	4.69 (1.21)	4.52 (1.44)	1.45
Retirement anxiety	3.42 (1.32)	3.49 (1.88)	3.58 (1.21)	3.22 (1.25)	5.13**
Propensity to plan	4.76 (1.48)	4.53 (1.94)	4.91 (1.31)	4.65 (1.51)	2.83*
Trust own pension provider	4.51 (1.42)	4.13 (1.89)	4.77 (1.10)	4.33 (1.53)	8.92***
Trust financial institutions	3.62 (1.54)	3.28 (1.80)	3.87 (1.34)	3.45 (1.63)	6.70***
Financial risk-taking (1–10)	4.03 (2.26)	3.27 (2.63)	3.59 (1.98)	4.65 (2.28)	19.35***

Note: Standard errors are given in parentheses. The column ANOVA shows the results of a mean comparison between the segments. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level.

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Segmentation of pension plan participants

Inadequate pension benefits represent one of the biggest challenges of aging societies in the 21st century. Current reforms of funded occupational pension systems result in more choice and greater responsibility and investment risk for individual plan participants. What are the relevant dimensions of heterogeneity that help identify which persons seek information and which do not? And how do these dimensions influence the motivation to seek information? In this paper, Wiebke Eberhardt (UM), Elisabeth Brüggen (UM), Thomas Post (UM) and Chantal Hoet (AEGON) review the available literature. They develop the Retirement Belief Model and conducted a survey in collaboration with a Dutch pension provider.

This is a publication of:
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January 2016