



# Getting the picture: A visual metaphor increases the effectiveness of retirement communication



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## ABSTRACT

Citizens who accrue pension via defined benefit systems, do not always have a correct idea of how the concept of retirement accrual works. Basic understanding of the pension system is desirable as incorrect conceptions affect the attitude towards retirement and planning for retirement. Visuals, specifically visual metaphors, help to understand abstract concepts. In this study, we tested whether information on pension accrual, with a visual expressing a navigation metaphor, better communicates the basics of pension accrual, compared to information with a simple visual or a plain text version. Sixteen pension funds and 5449 respondents participated in the study. Results show that the navigation metaphor conveyed the best the concept that the future income gradually grows, and that the expected amount has not yet been granted. Conveying the gradual growth on its turn positively impacted efficacy beliefs with regard to checking the adequacy of the accrual and the attitude towards retirement. Findings suggest that the navigation metaphor functions as an organising principle that increases the effectiveness of retirement communication.

## 1. Introduction

Citizens who accrue pension via defined benefit systems, do not always have a correct idea of how the accrual of retirement works. Basic understanding of the pension system is desirable as incorrect conceptions affect the attitude towards retirement and retirement behaviour (Griffin, Loe, & Hesketh, 2012; Visser, Oosterveld, & Kloosterboer, 2012). It is important to check the adequacy of the accrual every now and then because pension providers cannot guarantee a balance between future expenditures and income. When citizens have an incorrect view of the pension system, this can be defined as a mental model problem. Mental models are based on a small set of fundamental assumptions that guide our thoughts and actions (Byrne & Johnson-Laird, 2009). A mental model is typically believed to be true, although the assumptions behind the model can be false (Byrne, 2007).

A metaphor can be useful to reframe the mental model that is applied to retirement (cf. Doyle & Ford, 1998). Especially visual metaphors are a powerful instrument to explain abstract concepts (Cornelissen, Holt, & Zundel, 2011; Forceville, 2008; Jaspaert, Van de Velde, Brône, Feyaerts, & Geeraerts, 2011) and change mental models. Metaphors can reframe the perception of an object, by adding new meaning, features or views, which help to understand complex, abstract topics and to make sense of the information (Lakoff & Johnson, 1980; Schön, 1993). Previous research has shown, for example, that metaphors helped to change the way people think about electricity (Gentner & Gentner, 1983). Specifically, a metaphor of flowing water through pipes increased understanding of batteries, whilst a metaphor of moving crowds resulted in better understanding of the concept of resistance. The researchers concluded that the associations with the source domain (water, crowds) truly were reflected in the target domain (electricity).

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In this research we investigated whether a visual navigation metaphor can help to increase public understanding of, and reasoning about, the accrual of pension. The experiment reported in this paper tested which form communicated best the basics of retirement accrual: information about the accrual of retirement income with a visual metaphor, versus information without a metaphor. We also investigated whether (better) communicating the basics impacts the attitude towards retirement in general and perceived efficacy towards checking the adequacy of the accrual.

### 1.1. The potential of metaphors

Metaphors map knowledge or feelings about one domain (the source) to another domain (the target) (Lakoff & Johnson, 1980), e.g., *life* (target) is a *journey* (source) (Gentner & Gentner, 1983; Lakoff, 1993). Visual metaphors are a specific form of metaphors. Both target and/or source can be depicted (Ojha, 2013). A metaphor gives certain elements greater perceived relevance than they would in the abstract visualisation (Nisbet, 2009; Scheufele, 1999) and can improve the transfer of knowledge (Eppler, 2003). When individuals see a visual metaphor, they knowingly or unknowingly understand that the visual is not a straightforward representation of the information, and they start thinking about the possible meaning (McQuarrie & Mick, 1999; Phillips, 1997). Metaphors thus help to frame issues, i.e. to highlight specific features, and they have a significant influence on how we decide to act (Inayatullah, Izgarjan, Kuusi, & Minkkinen, 2016). Metaphors are ‘a constitutive factor of all mental constructions and reconstructions of reality’ (Paprotté & Dirven, 1985: viii).

The way a visual metaphor is elaborated (the ‘thinking’) is not clear (Phillips, 1997; Proctor, Proctor, & Pappasolomou, 2005). Understanding a metaphor depends on the level of familiarity with the metaphor and the quality of the metaphor (Gerring & Healy, 1983; Lakoff, 1993).

The target we want to clarify is the pension system in the Netherlands. In the Netherlands, 79% of Dutch citizens believe they pay for other individuals who are retired (Pensioenfederatie, 2016). This mental model is incorrect: only the state pension is accrued this way<sup>1</sup>. The correct conceptualization is that Dutch employees accrue their own retirement income gradually via their employer. Each month, the employer pays the pension fund a premium for the personal accrual of pension rights of the employers. Employees often pay a personal contribution that is deducted from their gross salary. Once employees retire, they receive the pension they accrued themselves. Fig. 1 shows the current mental model and the actual situation in the Netherlands.

An analysis of Dutch communication material showed that pension providers already use verbal metaphors to explain retirement. Most of them are related to ‘growing’ and ‘building’, and thus take a long-term perspective. The Dutch language has no equivalent of the neutral ‘accrual’. Citizens, however, speak of other financial matters in terms of here and now. Researchers conclude that retirement messages are difficult to understand as the two repertoires do not match (Sanders, van Krieken, Prast, & Boggio, 2016). The ‘growing’ metaphor (“your pension will grow a bit every year”) implies that the accrual of pension happens automatically, without any involvement required. The ‘building’ metaphor (“you build your pension via a defined benefit system”) may strengthen the idea that you can control and precisely predict the outcome. An effective metaphor can move individuals from the ‘used’ future to an alternative future (Milojević & Inayatullah, 2015). A future that is not guaranteed, but indicated, and a future that needs attention in the present now and then.

We propose that the current mental model of the majority of Dutch citizens can be changed by using the concept of a navigation system. In car navigation systems, the route from now to the future destination is projected. The system gives information about one’s personal journey, with a personal estimated outcome, the expected time and length of the journey. It is commonly known that the arrival time shown by the navigation system is an estimation that changes with ‘events’ like traffic jams or accidents. The navigation system concept (source) may help citizens understand basic knowledge on the accrual of pension (target). Specifically, it may convey the idea that people gradually accrue personal pension rights, rather than ‘save money for other people currently retiring’. The navigation metaphor is closely related to the journey metaphor, which was the subject of several studies. The journey metaphor is well recognized by people and can be transferred to targets in another domain (Landau, Oyserman, Keefer, & Smith, 2014). It is associated with a sense of purpose and control (Semino et al., 2017). We propose that a navigation metaphor can solve the current mental model problem as it connects the ‘now’ with the ‘future,’ and visualizes a personal goal. Fig. 2 shows how the navigation metaphor is applied to information on the retirement accrual.

### 1.2. Effects of understanding

A mental model consists of a set of beliefs (characteristics, qualities) on a certain subject. The attitude theory proposes that attitudes are a function of belief strength and evaluations (Fishbein & Ajzen, 1975; Fishbein, 1963). Beliefs about pension accrual can mediate the effects of accrual information on the attitude towards retirement. 22% of Dutch citizens currently take into account that no money will be left for them after retirement. Understanding that part of the pension is already accrued, and that the pension will continue to grow, might be perceived as positive and could lead to a more positive attitude towards retirement. The sender of the message might also benefit from better understanding. Gaining insight is a positive experience and leads to a favourable judgment of the communicators’ credibility (Bowers & Osborn, 1966; Osborn & Ehninger, 1962). Thirdly, a positive experience is related to higher perceived efficacy to perform the expected behaviour (Bandura, 1977). Understanding *how* pension is accrued may thus lead to

<sup>1</sup> The state pension, the so-called AOW (Algemene Ouderdomswet, General Retirement Law) is a monthly sum that everybody in the Netherlands above the state pension age receives. Individual pensions are accrued in addition to this state pension.

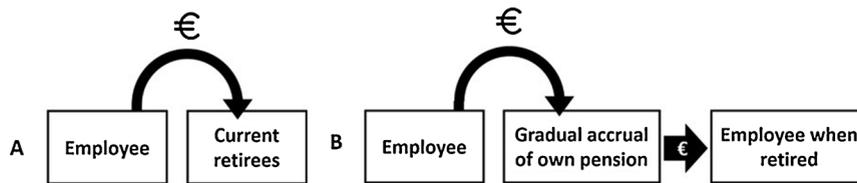


Fig. 1. Current mental model (A) and reality (B) of Dutch retirement system.



Fig. 2. Navigation metaphor applied to projection of future retirement income.

higher perceived efficacy with regard to checking whether *enough* pension is accrued.

These three aspects: attitude towards retirement, perceived honesty of the sender, and perceived efficacy positively influence retirement related behaviours (Ajzen, 1985; Bandura, 1977; Taylor & Shore, 1995; Taylor-Carter, Cook, & Weinberg, 1997). Given the fact that only 9% are willing to invest time in their retirement situation (Visser et al., 2012), 60% of Dutch citizens have no idea whether they can make ends meet after retirement (Van der Schors & Warnaar, 2015), and more than 20% of Dutch citizens face a pension that is too low to pay their basic expenses (de Bresser & Knoef, 2015), a higher level of activity is desirable.

### 1.3. Textual effects

We compare the effects of metaphorical and abstract images to plain text characteristics, which may also impact the evaluation of visuals. Previous studies on the textual characteristics of communication about uncertainties suggest that the level of text detail can impact the understanding of the content. Two studies showed that a higher level of information detail increased the understanding of the information (Inglis & Farnill, 1993; Mazur & Hickam, 1990). However, in other studies a higher level of detail was not related to better understanding (Quaid, Faden, Vining, & Freeman, 1990) or only slightly influenced comprehension (Zwijnenberg et al., 2012). In the Netherlands, it is required by law that pension statements show three aspects relevant for the future situation: the income in an optimistic scenario, a neutral scenario and a pessimistic scenario. Mentioning three amounts is a simplification of the actual estimation: only the bounds of the confidence interval and the point estimate are described. A more detailed text could describe that the income can be lower than the lower bound (in the pessimistic scenario) and higher than the upper bound (in the optimistic scenario).

The level of detail with regard to the *probability* that the optimistic or the pessimistic scenario comes true, can also vary. A more detailed text would provide information on the chance a scenario comes true. A less detailed text just describes the possibility that a scenario can come true, without any reference to a probability. A probability can be expressed in a percentage, but people have difficulties in understanding percentages (e.g., Tversky & Kahneman, 1982) and transform percentages immediately into verbal labels, e.g., 'low chance' or 'high chance' (Bottorff, Ratner, Johnson, Lovato, & Joab, 1998; Palmer & Sainfort, 1993). A reason for this might be that concepts of probability were developed approximately three centuries ago, whilst verbal expressions for uncertainty levels exist in most languages for a much longer period. People feel more familiar with words than with figures (Zimmer, 1983). A downside of probability phrases, is the great variability in interpretation on the part of the receiver. E.g., 'doubtful' could be interpreted as very unlikely, but also as a significant probability. Nevertheless, the interpretation of some phrases is consistent when used in the same context (e.g., Wallsten, Zwick, Forsyth, Budescu, & Rappaport, 1988). 'A small chance' and 'poor chance' are examples of such phrases. The present study uses different levels of detail to further explore the importance of textual elements.

Information on the accrual of pension is a mandatory part of communication for pension providers in the Netherlands. Currently Dutch pension providers communicate one amount, but the Dutch Government adopted a law that has to enable employees to obtain a more realistic insight into their retirement situation. The 'Pension Communication Law' (Rijksoverheid, 2015) prescribes that pension providers have to communicate the expected income via an optimistic, a neutral and a pessimistic scenario. The idea behind the legislation is that the outcome is mostly not a certain, fixed amount (Rijksoverheid, 2014). Even though most citizens in the Netherlands accrue retirement income via a defined benefit plan<sup>2</sup>, also in this type of plan the accumulated pension can be lowered (and sometimes raised) during the accrual, due to unforeseen developments. The format of communicating the scenarios is not

<sup>2</sup> In 2016 91% of Dutch employees accrued pension via a defined benefit plan (DNB).

elaborated yet.

#### 1.4. Research questions and hypothesis

To the best of our knowledge, no studies have been carried out on the impact of using visual metaphors for processing financial information with an uncertainty component. The primary goal of this study was to test whether a navigation metaphor (the source) communicated in a better way the basic principles of retirement accrual (the target). We specifically tested whether the navigation metaphor communicated better that (a) a range of outcomes is possible, instead of only the amounts mentioned in the communication (*Range Outcomes*), (b) the amounts presented can be different next year (*Variability*), (c) the retirement income is accrued gradually (*Gradual Growth*) and the estimated outcome has not yet been granted (*No Right*). We hypothesized that the navigation metaphor communicates best the basic features of retirement accrual, more than a plotted confidence interval or information without a visual.

We furthermore assessed whether using the visuals impacted a) the attitude towards retirement accrual information; the perceived honesty, b) retirement in general and c) efficacy beliefs regarding checking the adequacy of the accrual and if so, whether these effects are mediated by the extent to which a visual conveys the basic features of pension accrual.

## 2. Method

### 2.1. Design

This study used a 3 (Visual; 'Navigation Metaphor', 'Slider' and 'No Visual'-control group) x 2 (Text Detail Outcome; yes vs. no) x 2 (Text Detail Probability; yes vs. no) between subjects factorial design.

Twelve labels were created, each with one level of visualization and a combination of the two text factors (four combinations). Participants were randomly assigned to one of the twelve labels and answered a set of questions with regard to the label and their personal situation.

### 2.2. Materials

Each label with retirement accrual information showed the same minimum, expected and maximum amounts (840, 1300, 1400 euro), based on realistic scenarios for an average worker accruing a retirement income in the Netherlands<sup>3</sup>. The three amounts were chosen based on data from the Statistics Netherlands and forecasts of the Dutch Central Bank (AFM, 2012).

#### 2.2.1. Visual

The factor 'Visual' was operationalized by three levels: 'Navigation Metaphor', 'Slider' and 'No Visual'. Both visuals showed an outlook; the future prospects based on the knowledge at the present point in time. Fig. 3 shows an example of 'Navigation Metaphor' and 'Slider'.

The 'Navigation Metaphor' showed the development from the current accrual to the expected outcome in the future. The visual was based on the screen in car navigation systems. The arrows illustrate a direction of movement (from the amount accrued now to the amount to expect) and indicated the (temporal) distance (between now and the moment you retire) (Kurata, 2007; van der Waarde & Westendorp, 2000). The text indicating the expected income was held constant with slight adjustments, in order to fit the navigation metaphor. For instance, we added text about the current accrual and changed the term 'expected income' to 'expected outcome'.

The 'Slider' showed the confidence interval with three amounts: the expected income (the likelihood of receiving less or more is 50% in both cases) and the amounts related to the lower and upper boundary of the confidence interval. The position of the expected income is not in the middle of the range, but relatively close to the upper boundary, as the distribution of possible outcome is not symmetrical.

#### 2.2.2. Level of detail in text

Four versions of texts were used, with variations on two aspects. The first aspect concerned the level of detail with regard to the outcome. The detailed text described that the income can be lower than the lowest amount (in the pessimistic scenario) and higher than the highest amount (in the optimistic scenario), whilst the text without detail just mentioned three amounts. The factor *Level of Detail Outcome* was operationalized by the phrases "...you receive 840/you receive 1400 euro" ('No Detail Outcome') and "...you receive less than 840 euro/you receive more than 1400 euro" ('Detail Outcome').

The second aspect, *Level of Detail Probability*, was operationalized with the phrases "als het tegenzit, ..." (in Dutch), which can be translated as 'in case of a setback' and the positive equivalent "als het meezit" (in Dutch), which can be translated as "if all goes well" ('No Detail Probability'). The more detailed text, with information about the probability, was: "there is a small chance that ..." ('Detail Probability'). The reason for using a verbal probability is that people translate numerical probabilities (e.g., 5% chance) immediately into verbal probabilities (Bottorff et al., 1998; Palmer & Sainfort, 1993) and people prefer to use them (Zwick & Wallsten, 1989). The combination of the two textual factors *Level of Detail Outcome* and *Level of Detail Probability* resulted in four groups of phrases, see

<sup>3</sup> Possible effects of inflation and purchasing power were not taken into account when assessing the fictitious amounts.

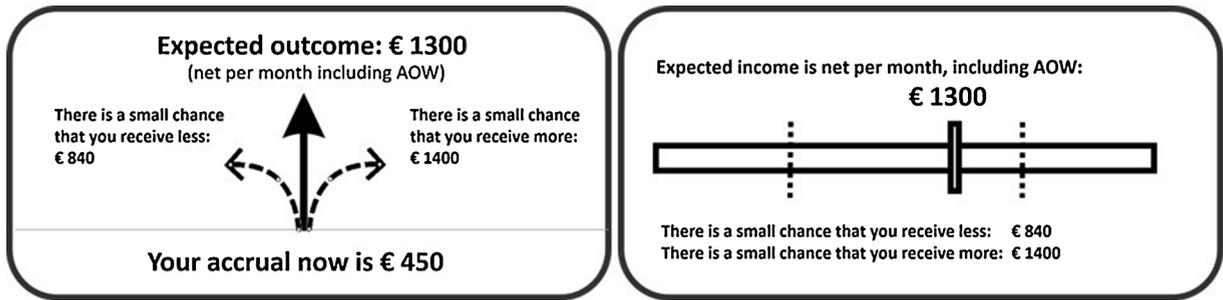


Fig. 3. 'Navigation Metaphor' and 'Slider', with one of the text versions (AOW is the state pension in the Netherlands).

## Appendix A.

### 2.3. Participants

Individuals participating in the employer sponsored plan of 16 Dutch pension funds were invited to complete an online survey. The research sample consisted of a group of respondents from fourteen pension funds who participated in a panel study in 2014 and 2015, supplemented by the participants of two additional funds. In total 31,733 participants were invited. 5449 respondents completed the survey, resulting in a response rate of 17.2%. To yield robust and consistent results, we only included respondents that answered all questions on the measures of interest (described in paragraph 2.5): 4052 cases. We also excluded 43 multivariate outliers, resulting in a dataset with 4009 respondents<sup>4</sup>. The outliers were assessed with a Mahalanobis distance analysis, based on a chi-square distribution,  $p < .001$ , (Aggarwal, 2015).

In order to control for demographic variables: age, level of education, level of income and gender were measured. We also measured the self-estimated financial literacy with one question and the actual financial literacy with a set of four questions. The questions regarding financial literacy were developed by OECD (2014) and tested basic knowledge of inflation, compound interest and risk of investment. Furthermore, we assessed the level of trust (1 item) in the pension fund (0–100 scale), expectations with regard to economic developments in the near future (1 item, 3 possible answers: it is getting better, getting worse or remains the same), expectations with regard to their own financial situation (idem) and self-reported financial planning behaviour in the last 12 months: (a) checking the accrual (yes/no) and (b) checking the adequacy of the accrual (yes/no). A one-way ANOVA shows that participants were equally divided across the twelve labels with regard to all control variables, see Table 1. Post-hoc tests also show no significant differences between the funds. The number of respondents per question differs, as answering the questions was not mandatory.

Age varied from 21 to 65 ( $M = 52.6$ ,  $SD = 10.1$ ); 78% was male. The large amount of male respondents was due to the fact that a large number of the pension funds participating in this study implement a pension scheme for employees (> 25,000 of the invited) in a male-dominated sector.

### 2.4. Procedure

All respondents were invited via email to take part in an online survey. Respondents were provided with preliminary instructions in order to establish the appropriate mind-set: they were explicitly asked to react to a test label. It was explained that the amounts on the label did not reflect their personal accrual, nor their expected pension. The survey tool selected randomly one of the twelve labels per respondent. All questions regarding the label concerned one randomly assigned label. All labels were assigned an equal amount of times. In order to decrease the chance of a selection bias towards participants interested in the topic, we offered an incentive (chance to win a week in a holiday home) to respondents who finished the complete survey.

### 2.5. Measures

Participants were asked to indicate their agreement or disagreement on each statement on a 100-point bipolar scale (0 = *fully disagree*, 100 = *fully agree*).

The extent to which the label conveyed key aspects of the pension accrual was assessed with four individual items that pertain to different aspects of understanding. The items concerned the variability of the expected outcome (*Variability*,  $M = 65.88$ ,  $SD = 33.19$ ), the range of outcomes; the fact that other outcomes than the three amounts are possible (*Range*,  $M = 75.80$ ,  $SD = 28.43$ ), the fact that the expected outcome has not yet been granted (*No Right*,  $M = 51.13$ ,  $SD = 38.54$ ) and the fact that the pension has not been accrued yet, but gradually grows (*Gradual Growth*,  $M = 34.53$ ,  $SD = 33.72$ ).

The degree to which the label was perceived as genuine: *Perceived Honesty* ( $M = 56.62$ ,  $SD = 30.91$ ) and the degree to which the

<sup>4</sup> We ran all analyses also on the complete sample before removal of the respondents that did not answer all questions on the measures of interest and the outliers. We found no significant differences in results.

**Table 1**  
Results one-way Anova: between group differences on control variables.

Control variable	F statistics
Age	$F(11,3940) = .79, p = .47$
Income	$F(11,3686) = .97, p = .47$
Level of education	$F(11,3957) = .71, p = .74$
Percentage male	$F(11,3946) = 1.14, p = .32$
Financial literacy	$F(11,3949) = .92, p = .52$
Estimated financial literacy	$F(11,3957) = .49, p = .91$
Expectations economic developments	$F(11,3709) = .41, p = .95$
Expectations own financial situation	$F(11,3869) = .43, p = .95$
Trust in pension fund	$F(11,3879) = .75, p = .67$
Behaviour: Checking accrual	$F(11,4008) = 1.05, p = .40$
Behaviour: Checking adequacy accrual	$F(11,4008) = .46, p = .93$

label made the respondents feel good about retirement (*Positive Attitude*,  $M = 35.79$ ,  $SD = 28.11$ ) were each assessed with one item. Next, we measured perceived efficacy with four items (Bandura, 2006). We assessed to which degree each label was perceived to be helpful, in order to gain insight into the personal financial situation after retirement. A sample item was 'This label will help determine whether you receive enough pension'. Factor analysis with varimax rotation yielded that all four self-efficacy sub items loaded consistently on one factor (*Efficacy*, Eigenvalue = 2.6;  $\alpha = 0.82$ ,  $M = 48.26$ ,  $SD = 24.98$ ).

## 2.6. Manipulation check

To test that we successfully manipulated Level of Detail Outcome, we performed a manipulation check and measured the level of agreement with the statements that a) there is a possibility that income can be lower than the lower bound and b) higher than the higher bound (both 0–100 scale). The level of agreement with each statement should be higher with 'Detail Outcome' than with 'No Detail Outcome'.

For a complete overview of the survey questions, we refer to Appendix B.

## 3. Results

### 3.1. Manipulation check

The data confirmed that the labels with 'Detail Outcome' better conveyed the information that the expected retirement income can be lower than the lower bound ( $M = 48.22$ ,  $SD = 33.73$ ) than with 'No Detail Outcome' ( $M = 35.90$ ,  $SD = 34.18$ ),  $F(1, 3956) = 130.06$ ,  $p < .001$ ,  $\eta^2 = .03$ ). The labels with 'Detail Outcome' also conveyed better that the income can be higher than the upper bound ( $M = 40.55$ ,  $SD = 30.99$ ) than with 'No Detail Outcome' ( $M = 29.22$ ,  $SD = 29.88$ ),  $F(1, 3933) = 136.30$ ,  $p < .001$ ,  $\eta^2 = .03$ ).

### 3.2. Main results

ANOVAs were conducted to compare the main effects of the use of a visual, level of detail in text and interaction effects between the three conditions on the dependent variables. The presented analyses below first describe the extent to which the labels conveyed key aspects of retirement accrual. We only describe effects with  $\eta^2 \geq 0.01$ . For detailed results, we refer to Tables 2–4. We then describe the main mediation analyses of the labels on the derived variables that pertain to attitude and efficacy. A complete overview of the results of the mediation analysis is presented in Table 5.

**Table 2**  
Results for Visual.

Statements 0 = fully disagree, 100 = fully agree	No Visual (1)	Slider (2)	Navigation Metaphor (3)	F statistics	$\eta^2$	Tukey's HSD
Gradual Growth	$M = 20.91$ $SD = 26.09$	$M = 22.55$ $SD = 26.49$	$M = 58.53$ $SD = 33.02$	$F(2, 4008) = 742.45$ $p < .001$	.27	1,2 < 3
No Right	$M = 47.77$ $SD = 39.09$	$M = 41.61$ $SD = 37.70$	$M = 63.24$ $SD = 35.56$	$F(2, 4008) = 120.68$ $p < .001$	.06	2 < 1 < 3
Variability	$M = 66.39$ $SD = 33.28$	$M = 63.90$ $SD = 33.51$	$M = 67.29$ $SD = 32.72$	$F(2, 4008) = 3.75$ $p = .02$	–	2 < 3
Range Outcomes	$M = 75.18$ $SD = 29.16$	$M = 75.82$ $SD = 28.05$	$M = 76.38$ $SD = 28.11$	$F(2, 4008) = .60$ $p = .55$	–	

**Table 3**  
Results for Level of Detail Outcome (verbal).

Statements 0 = fully disagree, 100 = fully agree	No Detail Outcome	Detail Outcome	F statistics	$\eta^2$
Gradual Growth	$M = 34.40$ $SD = 34.10$	$M = 34.66$ $SD = 33.34$	$F(1, 4008) = .06 p = .81$	–
No Right	$M = 52.04$ $SD = 38.83$	$M = 50.19$ $SD = 38.22$	$F(1, 4008) = 2.32 p = .13$	–
Variability	$M = 65.88$ $SD = 33.30$	$M = 65.89$ $SD = 33.08$	$F(1, 4008) = .00 p = .99$	–
Range Outcomes	$M = 71.44$ $SD = 31.60$	$M = 80.33$ $SD = 23.89$	$F(1, 4008) = 100.39 p < .001$	.02

**Table 4**  
Results for Level of Detail Probability (verbal).

Statements 0 = fully disagree, 100 = fully agree	No Detail Probability	Detail Probability	F statistics	$\eta^2$
Gradual Growth	$M = 34.75$ $SD = 33.51$	$M = 34.31$ $SD = 33.94$	$F = (1, 4008) = .17 p = .68$	–
No Right	$M = 50.98$ $SD = 38.25$	$M = 51.28$ $SD = 38.83$	$F = (1, 4008) = .06 p = .80$	–
Variability	$M = 68.27$ $SD = 32.35$	$M = 63.46$ $SD = 33.85$	$F = (1, 4008) = 21.21 p < .001$	–
Range Outcomes	$M = 75.77$ $SD = 29.02$	$M = 75.83$ $SD = 27.83$	$F = (1, 4008) = .004 p = .95$	–

### 3.2.1. Conveyance of basic facts

A unifactor ANOVA with visual (metaphor, slider, no visual) as fixed factor was used to determine whether labels with the navigation metaphor (with different levels of text detail) produced a higher level of agreement with a set of statements on basic facts about the accrual of retirement income. The analyses revealed that the visuals yielded significant variation  $F(2, 4008) = 742.45 p < .001$ ,  $\eta^2 = 0.27$  with regard to communicating that the income is accrued gradually ('*Gradual Growth*'). We found a similar result for verbally communicating that the expected income has not yet been accrued ('*No Right*'):  $F(2, 4008) = 120.68 p < .001$ ,  $\eta^2 = 0.06$ . Post hoc Tukey tests showed that Navigation Metaphor communicated more clearly that the income is accrued gradually ('*Gradual Growth*') and has not been accrued yet, compared to the slider and the information without a visual (both  $p$ 's  $< .001$ ).

A small, but significant difference ( $F(2, 4008) = 3.75, p = .02, \eta^2 < 0.01$ ) was found for verbally communicating that the expected income can vary over time ('*Variability*') between Navigation Metaphor ( $M = 67.29$ ) and Slider ( $M = 63.90$ ). Navigation Metaphor and No Visual did not differ significantly with respect to Variability. The extent to which the label shows that a wide range of outcomes is possible instead of the three amounts mentioned in the label ('*Range Outcomes*') did not differ for the three levels of the visual.<sup>5</sup>

It was hypothesized that Navigation Metaphor would best communicate the key features of retirement accrual: gradual accrual, the fact that the amounts in the information can be different next year, the fact that the estimated outcome has not yet been accrued and the possibility of a range of outcomes, compared to Slider and No Visual. As Navigation Metaphor only resulted in a significantly higher level of agreement on the statement that the labels shows a) the gradual accrual and b) the fact that the expected outcome has not yet been accrued, data support the hypothesis partially.

Regarding text effects on understanding and perceived comprehensibility, 'Detail Outcome' communicated better that a wide range of outcomes is possible (*Range Outcomes*) ( $M = 80.33, SD = 23.89$ ) than 'No Detail Outcome' text ( $M = 71.44, SD = 31.60$ ),  $F(1, 4008) p < .001$ ,  $\eta^2 = 0.02$ . No other effects of text were found. We found no interaction effects.

### 3.2.2. Predicting attitudes and perceived efficacy

The SPSS macro model 4, provided by Preacher and Hayes (2008), was used to test whether the visuals directly affect a) the attitude towards retirement accrual information; the perceived honesty, b) retirement in general and c) efficacy beliefs regarding checking the adequacy of the accrual, or indirectly, via key features of retirement accrual. Fig. 4 is a graphical representation of the tested mediation effect. Panel A illustrates the total effect of X on Y (path c), without mediators M in the model. Panel B represents the mediation design with multiple mediators. The direct effect is the effect of X on Y that does not pass through the mediators M and is depicted as path c'.

We tested indirect effects on the relationship between the factor 'Navigation Metaphor' and the attitude towards retirement in

<sup>5</sup> Even though we checked whether the respondents were evenly distributed among the conditions, we checked whether conveyance of the key features was influenced by level of education and financial literacy. The means of the labels with the navigation metaphor were consistently higher than the means of the other two types of labels at all levels of education and financial literacy.

**Table 5**  
Mediation analysis with multiple mediators.

Path X→M	Effect	BootLLCI	BootULCI	SE	T	P-value
a <sub>1</sub> (X→M1 Gradual Growth)	36.79	34.92	38.67	0.96	38.50	< .001
a <sub>2</sub> (X→M2 No right)	18.56	16.13	21.00	1.24	14.92	< .001
Y Perceived Honesty						
Path M→Y	Effect	BootLLCI	BootULCI	SE	T	P-value
Total effect (c)	6.19	4.19	8.19	1.02	6.07	< .001
Direct effect (c')	-0.64	-2.94	1.66	1.17	-0.55	0.58
b <sub>1</sub> (M1 Gradual Growth →Y)	0.14	0.11	0.17	0.02	8.14	< .001
b <sub>2</sub> (M2 No right →Y)	0.09	0.06	0.12	0.01	6.76	< .001
Indirect effects						
Total indirect effect	6.83	5.54	8.22	0.68		
a <sub>1</sub> b <sub>1</sub>	5.17	3.80	6.55	0.70		
a <sub>2</sub> b <sub>2</sub>	1.67	1.08	2.26	0.30		
Y Attitude towards retirement						
Path M→Y	Effect	BootLLCI	BootULCI	SE	T	P-value
Total effect (c)	6.49	4.67	8.31	0.93	7.00	< .001
Direct effect (c')	-4.25	-6.29	-2.22	1.04	-4.10	< .001
b <sub>1</sub> (M1 Gradual Growth →Y)	0.28	0.25	0.31	0.02	18.10	< .001
b <sub>2</sub> (M2 No right →Y)	0.03	0.01	0.05	0.01	2.70	.007
Indirect effects						
Total indirect effect	10.74	9.49	12.10	0.67		
a <sub>1</sub> b <sub>1</sub>	10.16	8.88	11.51	0.68		
a <sub>2</sub> b <sub>2</sub>	0.59	0.13	1.06	0.24		
Y Perceived Efficacy						
Path	Effect	BootLLCI	BootULCI	SE	T	P-value
Total effect (c)	5.05	3.43	6.67	0.82	6.12	< .001
Direct effect (c')	-1.09	-2.95	0.77	0.95	-1.15	.25
b <sub>1</sub> (M1 Gradual Growth→Y)	.16	0.13	0.19	0.01	11.54	< .001
b <sub>2</sub> (M2 No Right→Y)	.01	-0.01	0.03	0.01	1.09	.28
Indirect effects						
Total indirect effect	6.14	5.07	7.20	0.55		
a <sub>1</sub> b <sub>1</sub>	5.93	4.84	7.08	0.56		
a <sub>2</sub> b <sub>2</sub>	0.22	-0.22	0.67	0.22		

general, perceived honesty and perceived efficacy via communicating the gradual accrual (M1: *Gradual growth*), the fact that the expected income has not yet been granted (M2: *No right*) and that the expected income can be different next year (M3: *Variability*). The extent to which the retirement information demonstrably communicated these three aspects was significantly influenced by the navigation metaphor. We used 'indicator' or dummy coding (Hayes & Montoya, 2017), with 'No Visual' and 'Slider' as a combined reference group. Indicator coding is a modelling approach to estimate the direct and indirect effects when the independent variable X is multicategorical. We primarily chose to combine the categories 'No Visual' and 'Slider' in the reference group, as we were interested in the added value of using a metaphor over and above a realistic plot and a presentation without a visual.

The visual metaphor affected *Gradual Growth* and *No right* significantly. The bootstrapped 95% confidence interval for the effect of visual metaphor on *Variability* included zero [-0.06, 4.26], meaning that *Variability* did not function as mediator. The two remaining measures positively affected perceived honesty of the retirement information and the attitude towards retirement in general. The effect of the navigation metaphor on perceived efficacy was mediated by *Gradual Growth*, but not by *No Right*. A complete overview of the mediation analyses is presented in Table 5.

We additionally assessed whether the effect of the navigation metaphor was mediated differently by *Gradual Growth* and *No Right*, when 'Slider' and 'No Visual' were assessed separately as reference groups. We found no significant differences.

## 4. Discussion and conclusion

### 4.1. Discussion

Can a navigation metaphor help people to understand the basic principles of retirement accrual? An experimental study assessed the effects of using a navigation metaphor in retirement communication on conveying the basic facts and via conveying these facts on the attitude toward retirement, the perceived honesty of the retirement information and perceived efficacy with regard to checking

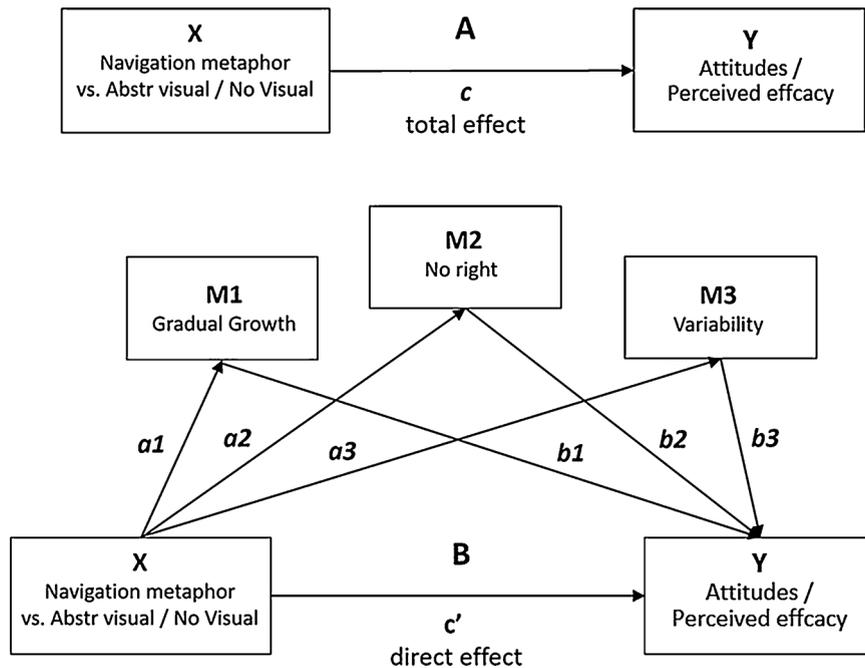


Fig. 4. Graphical representation of tested mediation effects.

the personal retirement situation.

As expected, the navigation metaphor communicated best the key features of retirement accrual. Respondents who received the accrual information with the navigation metaphor, indicated a substantially higher level of agreement that retirement income is accrued gradually, that the expected income can vary over time and is not guaranteed, than respondents who saw the information with a realistic confidence interval or no visual at all. Findings suggest that this visual metaphor, representing being 'on the go', may have emphasized the changing nature of the outcome. The visual with the realistic confidence interval communicated the least clearly that the expected income is not accrued yet, even less clearly than information without a visual.

Further analysis revealed that the navigation metaphor also impacted the attitude towards retirement and the perceived honesty of the message, as well as perceived efficacy. Specifically we found that using a navigation metaphor contributed to these three aspects, in particular by communicating better that the pension is gradually accrued, and -to a lesser extent- by communicating that the expected income has not yet been granted. Communicating that the retirement income is accrued gradually can dismantle the current misunderstanding that employees pay for the retirees (Pensioenfederatie, 2016). Understanding that the accrued pension is not static, but grows in the future may cast a different and more positive light on pension in general. The message that the expected pension has not yet been granted, could be perceived as negative, but results show the opposite. The implicit messages ("you are part-way" and "your pension will keep on growing") may be perceived as positive. Another possible explanation is that – next to the evaluation of the concept itself – understanding a concept more easily results in a more positive evaluation of the concept (Burgers, Konijn, Steen, & Iepsma, 2015).

Similar effects were found for the association between the navigation metaphor and perceived honesty of the message. The navigation metaphor conveyed better the basics of retirement accrual, which in turn positively affected perceived honesty of the message. Gaining new insights may again be a positive experience that leads to a favourable judgment of the communicators' credibility. This conclusion is consistent with the results of previous studies of Bowers and Osborn (1966) and Osborn and Ehninger (1962).

Finally, the navigation metaphor contributed to perceived efficacy with regard to financial planning behaviour, via conveying the information that the pension is accrued gradually. The other two visuals communicated this fact less strongly. The effect of the navigation metaphor and the presentation without a visual on perceived efficacy was fully mediated by conveying that the pension is accrued gradually.

Conveyance of the fact that the expected pension has not yet been granted did not contribute to higher efficacy. We assume that understanding this fact may have contributed to higher perceived efficacy ("I see that I accrue, now I know that I can check my accrual"). When citizens think they do not accrue a pension (and pay for the retirees), the concept of checking their own accrual may seem a bit odd. Visualizing the personal accrual makes related behaviours, like checking the accrual, more relevant and possible.

Overall, the effects of using a visual and specifically the navigation metaphor, largely exceeded the effects of using different texts. The visual with the navigation metaphor communicated most clearly that the pension is accrued gradually and that the expected outcome has not yet been granted. The 'dual coding principle' (Clark & Paivio, 1991; Paivio, 1991), stating that people understand complex messages better when a text is combined with a visual and both are conceptually organized, seems to apply to the navigation

metaphor. In addition, communicating clearly that the pension right gradually grows and the expected income has not yet been granted, contributes to a positive attitude towards retirement and is perceived as most honest. Communicating these principles clearly also contributes to higher perceived efficacy. This finding aligns with earlier findings that visual metaphors not only help to explain, but also contribute to positive evaluations of the issue that has to be explained (Burgers et al., 2015).

#### 4.2. Conclusion

This research examined the effects of the use of a navigation metaphor on communicating key features of retirement accrual and identified a number of mediation effects of the message that was conveyed on evaluative judgements of retirement and retirement information, and perceived efficacy with regard to getting insight into the financial situation after retirement.

The study was conducted in the Netherlands, where citizens think the state pension system also applies to the pension they accrue via their employer. A large majority (79%) of citizens think they pay for the retirees via their employer. In reality they pay for the accrual of their own retirement income. Citizens should understand that the pension income they can expect is accrued gradually and has not yet been granted. Communication about the expected retirement income should help to understand these basic features. The communication should ideally also contribute to a positive attitude towards retirement and the message itself, as a positive attitude may help citizens become more involved, and stimulate them to follow their personal retirement situation (Taylor & Shore, 1995).

Results suggest that the navigation metaphor is a good organising principle that helps to reframe the idea about retirement via better understanding. Presenting the information via a navigation metaphor may give the information more meaning and makes the ingredients congruent ('a journey is uncertain' > accrual of your retirement income is a journey > 'the outcome is uncertain') (Gamson & Modigliani, 1989). Congruent messages that are better understood are deemed trustworthy and more persuasive (Selin, 2006). The finding that the visual with the realistic confidence interval communicated the least that the expected outcome can vary over time and is not yet accrued even less clearly so than the labels without a visual and inconsistent mediation effects of communication these principles on the attitude towards retirement and perceived efficacy, endorses this idea. Showing an expected income as static information may be not congruent with the fact that the actual outcome is not guaranteed.

In this context it is also noteworthy that the visual with the slider led to a number of spontaneous reactions. Respondents were offered the possibility to leave a comment at the end of the survey. A number of respondents who saw the slider with the realistic confidence interval, pointed out that we made a mistake when drawing this visual, because we did not position the expected income in the middle. This group was apparently offset by the skewed division. A too precise visualisation of the confidence interval may be undesirable, as this emphasizes aspects of the retirement accrual that are very difficult to explain. The navigation metaphor with the same (skewed) amounts did not lead to the spontaneous corrections. Were the skewed division a core message though, a precise visualisation might be used for better understanding.

Other spontaneous comments regarded the wording. Around 60 respondents requested a translation of 'a small chance' or 'in case of a setback' into concrete percentages. Although previous research showed that people translate numerical information into verbal labels (Bottorff et al., 1998; Palmer & Sainfort, 1993), this group of respondents indicated they felt uncertain because of the 'vague' wording. Some respondents also asked whether the chance of the pessimistic and the optimistic scenario were equal. We are not sure whether presenting a concrete percentage helps the respondents to get a grip on the information. The questions may also point to a need for certainty and it is doubtful whether a pension fund would meet this need by providing percentages. The navigation metaphor did not raise these questions.

Communicating a clear and coherent concept, and not only informing individuals about amounts, is desirable and even necessary. Ideally, individuals would have a realistic idea about their personal situation and feel able to act in case they face the risk of a too low income or lower than expected. Individuals who are involved in their personal financial situation after retirement and feel able to follow their situation, are empowered. Currently, many Dutch citizens do not know what to expect (Van der Schors & Warnaar, 2015), their expectations are unrealistically high (AFM, 2010; Alessie, Van Rooij, & Lusardi, 2011) and only 9% is willing to invest time in getting insight into their own situation (Visser et al., 2012). Every fifth Dutch citizen is expected to have serious problems after retirement: this group will not be able to afford their minimal expenditure, even if they would reduce their housing costs (de Bresser & Knoef, 2015). This attitude and behaviour could be labelled as 'not empowered'. The importance of empowering citizens with regard to retirement is evident, not only in the Netherlands, but in every country where a balance between retirement income and expenditure cannot be taken for granted.

Effective retirement communication should thus not only inform well, but also contribute to perceptions and beliefs that are related to being empowered: the situation in which individuals set meaningful goals, take action towards these goals and reflect on the impact of these actions (Cattaneo & Chapman, 2010). Findings in this study provide starting points. If pension providers want to change the way individuals think and feel about their future retirement income: namely as a personal income that is accrued by themselves gradually (instead of a pay-as-you-go system) and that they can keep track of it, they should invest in developing a good conceptual idea that can be used for visual messages, combined with text. A consistent and positive frame that illustrates the gradual accrual, is useful. The navigation metaphor we developed and derived from the journey metaphor (Landau et al., 2014; Semino et al., 2017) seems appropriate to change the current mental model and to empower citizens to manage their retirement situation. It is recommended not only to focus on the future, but also on the present situation. A metaphor illustrating the (uncertain) route from the present to the future seems to be 'the way to go'.

4.3. Future directions

We found that information about the accrued pension with a visual navigation metaphor conveys the best the basic features of pension accrual, compared to an abstract visual and a label without a visual. We did not test whether metaphorical language-use impacts the effects of communication. Dutch pension providers already use verbal metaphors to explain retirement, mostly related to 'growing' and 'building'. For the experiment, described in this paper, we used the Dutch equivalent of 'accrued': *opgebouwd* (built), as there is no neutral equivalent of 'accrual'. Text that are based on the building metaphor could imply that the accrual of pension happens automatically, without any involvement required. The building metaphor may strengthen the idea that you can control and precisely predict the outcome. It would be interesting to investigate whether the verbal use of the navigation metaphor also helps to understand the basics of pension accrual and could be used to reframe retirement. Alternatives for the current vocabulary, based on the navigation metaphor, could be developed and compared with the current use of language.

Furthermore worldwide, a large number of employees accrue pension via a so-call defined contribution (DC) plan, whilst Dutch employees in this study accrue pension via a defined benefit (DB) plan or a hybrid plan (combination of DB and DC plan). In full DC plans, projections of the expected income are already presented; mostly via amounts and sometimes via abstract graphics, with time on the horizontal axis. It is interesting to investigate the effects of using visuals metaphors, and the navigation metaphor in particular, on employees with a full DC plan. These employees are used to the idea that the expected income can vary and is not guaranteed. Nevertheless, empowering citizens is also desirable with regard to participants of DC plans.

Further research could also focus on elaborating and testing other visual metaphors and texts. Although we tested two visuals and four texts, we did not test different text variations, different amounts and/or different visual metaphors per condition.

Concept, design and personalisation are elements to be further investigated. It would be interesting to investigate the effect of mentioning the accumulated pension (the current location in the navigation metaphor) in mere text. Also the medium, moment and frequency could impact understanding and perception of the communication.

5. Concluding remark

The finding that a visual metaphor effectively conveys key features of retirement accrual and that effective conveyance in its turn leads to positive evaluations of the accrual of retirement income and higher perceived efficacy, asks for a change in the communication strategies used by pension providers. As such, it calls for a closer examination of the observed effects and further elaboration of the concept tested.

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Appendix A. Labels

Table A1

Table A1

The combination of the two textual factors *Level of Detail Outcome* and *Level of DetailProbability* and three levels of *Visual* resulted in twelve labels.

Version	Label 1-12	Translation into English
<p><i>Detail Probability:</i> low <i>Detail Outcome:</i> low</p>		<p>Expected outcome: € 1300. (net per month including state pension) In case of a setback, you receive less: € 840. When all goes well, you receive more: € 1400. Your accrual now is € 450.</p>
<p><i>Detail Probability:</i> low <i>Detail Outcome:</i> high</p>		<p>Expected outcome: € 1300. (net per month including state pension) In case of a setback, you receive less than € 840. When all goes well, you receive more than € 1400. Your accrual now is € 450.</p>
<p><i>Detail Probability:</i> high <i>Detail Outcome:</i> low</p>		<p>Expected outcome: € 1300. (net per month including state pension) There is a small chance that you receive less: € 840. There is a small chance that you receive more: € 1400. Your accrual now is € 450.</p>
<p><i>Detail Probability:</i> high <i>Detail Outcome:</i> high</p>		<p>Expected outcome: € 1300. (net per month including state pension) There is a small chance that you receive less than € 840.</p>

(continued on next page)

Table A1 (continued)

Version	Label 1-12	Translation into English
	<p><b>Verwacht eindresultaat: € 1300</b> (netto per maand inclusief AOW)</p> <p>Er is een kleine kans dat u minder ontvangt dan € 840</p> <p>Er is een kleine kans dat u meer ontvangt dan € 1400</p> <p><b>U heeft nu € 450 opgebouwd</b></p>	<p>There is a small chance that you receive more than € 1400. Your accrual now is € 450.</p>
Detail Probability: low Detail Outcome: low	<p>U ontvangt naar verwachting netto per maand, inclusief AOW: € 1300</p> <p>Als het tegenzit, ontvangt u minder: € 840 Als het mee zit, ontvangt u meer: € 1400</p>	<p>You are expected to receive net per month, including state pension: € 1300. In case of a setback, you receive less: € 840. When all goes well, you receive more: € 1400.</p>
Detail Probability: low Detail Outcome: high	<p>U ontvangt naar verwachting netto per maand, inclusief AOW: € 1300</p> <p>Als het tegenzit, ontvangt u minder dan € 840 Als het mee zit, ontvangt u meer dan € 1400</p>	<p>You are expected to receive net per month, including state pension: € 1300. In case of a setback, you receive less than € 840. When all goes well, you receive more than € 1400.</p>
Detail Probability: high Detail Outcome: low	<p>U ontvangt naar verwachting netto per maand, inclusief AOW: € 1300</p> <p>Er is een kleine kans dat u minder ontvangt: € 840 Er is een kleine kans dat u meer ontvangt: € 1400</p>	<p>You are expected to receive net per month, including state pension: € 1300. There is a small chance that you receive less: € 840. There is a small chance that you receive more: € 1400.</p>
Detail Probability: high Detail Outcome: high	<p>U ontvangt naar verwachting netto per maand, inclusief AOW: € 1300</p> <p>Er is een kleine kans dat u minder ontvangt dan € 840 Er is een kleine kans dat u meer ontvangt dan € 1400</p>	<p>You are expected to receive net per month, including state pension: € 1300. There is a small chance that you receive less than € 840. There is a small chance that you receive more than € 1400.</p>
Detail Probability: low Detail Outcome: low	<p>U ontvangt naar verwachting: € 1300 (netto per maand, inclusief AOW)</p> <p>Als het tegenzit, ontvangt u minder: € 840 Als het mee zit, ontvangt u meer: € 1400</p>	<p>You are expected to receive net per month, including state pension: € 1300. In case of a setback, you receive less: € 840. When all goes well, you receive more: € 1400.</p>
Detail Probability: low Detail Outcome: high	<p>U ontvangt naar verwachting: € 1300 (netto per maand, inclusief AOW)</p> <p>Als het tegenzit, ontvangt u minder dan € 840 Als het mee zit, ontvangt u meer dan € 1400</p>	<p>You are expected to receive net per month, including state pension: € 1300. In case of a setback, you receive less than € 840. When all goes well, you receive more than € 1400.</p>
Detail Probability: high Detail Outcome: low	<p>U ontvangt naar verwachting: € 1300 (netto per maand, inclusief AOW)</p> <p>Er is een kleine kans dat u minder ontvangt: € 840 Er is een kleine kans dat u meer ontvangt: € 1400</p>	<p>You are expected to receive net per month, including state pension: € 1300. There is a small chance that you receive less: € 840. There is a small chance that you receive more: € 1400.</p>
Detail Probability: high Detail Outcome: high	<p>U ontvangt naar verwachting: € 1300 (netto per maand, inclusief AOW)</p> <p>Er is een kleine kans dat u minder ontvangt dan € 840 Er is een kleine kans dat u meer ontvangt dan € 1400</p>	<p>You are expected to receive € 1300 (net per month, including state pension) There is a small chance that you receive less than € 840. There is a small chance that you receive more than € 1400.</p>

## Appendix B. Survey Questions

We test a new figure that shows your retirement income. The final result will show personalised amounts. Hereafter, you see an example with example amounts for someone else. All questions concern the same example. We would like to know your opinion on the figure.

Indicate to what extent you agree or disagree. (0 = *fully disagree*, 100 = *fully agree*).

- 1 This figure shows that the income to expect (in this case 1300 euro) can be different next year.
- 2 This figure shows that other outcomes than 840, 1300 and 1400 euro are also possible.
- 3 The person this figure applies to, needs to take into account the serious possibility that he receives less than 840 euro.
- 4 The person this figure applies to, needs to take account the serious possibility that he receives more than 1400 euro.
- 5 This figure shows that your retirement income is accrued gradually.
- 6 This figure shows that you are not entitled yet to your expected retirement income.
- 7 This figure is honest
- 8 This figure makes me feel good about retirement
- 9 This figure helps to get an idea of your future retirement income
- 10 This figure makes you feel that engaging in pension is terribly complicated
- 11 This figure gives you a better understanding of your retirement situation
- 12 This figure helps you to assess whether you receive enough pension after retirement
- 13 Did you check in the last 12 months the amount of pension you accrued?
  - [1] No
  - [2] Yes
  - [3] I do not know / No answer
- 14 Did you use your pension statement to assess whether the pension you have accrued (or expect to accrue) is enough for you?
  - [1] No
  - [2] Yes
  - [3] I do not know / No answer
- 15 Could you indicate your personal trust in your pension fund? (0 = no trust at all, 100 = full trust)
- 16 Do you expect the economic situation in the Netherlands to improve, to deteriorate or be similar the next 12 months?
  - [1] Improve
  - [2] Deteriorate
  - [3] Similar
  - [4] I do not know / no answer.
- 17 What do you expect regarding the financial situation of your household? Will it improve, worsen or be similar?
  - [1] Improve
  - [2] Deteriorate
  - [3] Similar
  - [4] I do not know / no answer.
- 18 How much do you know about financial issues? (e.g., investing, interest, inflation) (0 = I know nothing about financial issues, 7 = I know a lot about financial issues)
- 19 Suppose you receive 200 euro in one year from now. The inflation rate is 1% per year. How much can you buy with the 200 euro?
  - [1] More than now
  - [2] *Less than now*
  - [3] As much as now
  - [4] *That depends on what I buy*
  - [5] I do not know
- 20 Suppose you put 100 euro on a savings account, with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of five years?
  - [1] Less than 110 euro
  - [2] 110 euro

[3] More than 110 euro

[4] It is impossible to tell from the information given.

21 An investment with a high return is likely to be high risk.

[1] True

[2] False

22 High inflation means that the cost of living is increasing rapidly.

[1] True

[2] False

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