Interactivity in online pension planners enhances engagement with retirement planning – but not for everyone

Elisabeth Christine Brüggen
Department of Marketing & SCM, School of Business and Economics, Maastricht University, Maastricht, The Netherlands and Network for Studies on Pensions Aging and Retirement, Tilburg, The Netherlands
Thomas Post
Department of Finance, School of Business and Economics, Maastricht University, Maastricht, The Netherlands and Network for Studies on Pensions Aging and Retirement, Tilburg, The Netherlands, and
Katharina Schmitz
Department of Marketing & SCM, School of Business and Economics, Maastricht University, Maastricht, The Netherlands

Abstract

Purpose – People around the world are not sufficiently capable or willing to engage in retirement planning. New technological tools have been proposed as a promising solution to foster involvement and consequently encourage retirement planning. This paper aims to test whether an interactive online pension planner can improve participants' behaviour, behavioural intentions, attitude, knowledge and perceived ease of use, usefulness and enjoyment.

Design/methodology/approach – In collaboration with a company specialised in technologically advanced pension planners, three different versions of an online pension planner were created. The control condition only allowed participants to check their pension situation and the composition of future retirement income. In the medium interactivity level, participants could choose to modify certain variables affecting their pension income, on top of the features from the control. The highly interactive planner additionally included an interactive budget tool and showed whether the accumulated pension income was sufficient to cover the desired spending. Data were collected with the help of an online panel ($N = 285$).

Findings – This paper finds a positive effect of interactivity on behaviour within the planner, that is, the number of clicked options, as well as on participants' intention to check their personal pension situation in the upcoming three to six months. Moreover, this paper finds gender differences: male participants prefer a high level of interactivity, while women prefer a medium level.

Research limitations/implications – An interesting modification to the current research design would be to use personal, self-relevant data in the online pension planner. Moreover, conducting the study in a computer laboratory could increase concentration on the task, and hence involvement. Next to gender, there might be other factors that possibly influence the results. It would be interesting to investigate other measures of behaviour such as the time spent on the pension planner. Further research should also study the effects of other features that shape user's perception of interactivity, which include human-to-human interactivity.

Practical implications – The results show that technological services, such as advanced online pension planners, can positively affect engagement with retirement planning. Thus, pension providers are encouraged to use interactive online pension planners. The results with respect to gender suggest tailoring pension planners to match specific preferences of recipients. New service technologies provide novel opportunities to cater to individual differences by, for example, integrating less interactive features for women than for men in a pension planner. Moreover, cognitive involvement should be stimulated by integrating relevant, interesting and valuable information.

Social implications – Lack of engagement with retirement planning is an important challenge to Western societies. People who do not sufficiently search for information about their expected pension benefits may encounter significant pension gaps resulting in detrimental welfare effects at retirement. This problem is enhanced by the fact that increasingly, the risks and responsibility for retirement planning are being shifted towards pension plan participants themselves. Thus, finding ways to increase engagement with retirement planning by making use of advances in service technologies brings benefits to society.

The current issue and full text archive of this journal is available on Emerald Insight at: **www.emeraldinsight.com/0887-6045.htm**

Journal of Services Marketing
33/4 (2019) 488–501
Emerald Publishing Limited [ISSN 0887-6045]
[DOI 10.1108/JSM-02-2018-0082]

Received 28 February 2018
Revised 20 August 2018
12 December 2018
18 January 2019
Accepted 28 January 2019

Originality/value – First, this paper contributes to the customer engagement literature by studying how new technological interfaces improve user experiences, knowledge and engagement within the low involvement context of retirement planning. Second, this paper advances service research by zooming in on customer heterogeneity in using the technology-based online pension planner and studying the moderating effect of involvement and gender more closely. Third, this paper contributes to the financial services literature by studying how new service technologies can help to increase attitudes, knowledge and engagement with retirement planning.

Keywords Interactivity, Gender differences, Heterogeneity, Service technology, Web-based pension communication, Pension planners

Paper type Research paper

Introduction

According to a recent UN report (2015), the proportion of persons aged 60 and over is expected to double between 2007 and 2050. This fact, combined with continued low interest rates puts pension systems around the world under pressure. Increasingly, the risks and responsibility for retirement planning are being shifted towards pension plan participants themselves (EIOPA 2013). However, the majority of people around the world are currently not actively engaged in their retirement planning (Aegon Retirement Readiness Survey, 2018). A recent study by a large American financial services provider finds that people spend less time planning for their individual retirement account investment than for choosing a restaurant or buying a flat screen TV or tablet (TIAA-CREF, 2014). If people do not appropriately search for information about their expected pension benefits and take action if needed, some of them may encounter significant pension gaps resulting in detrimental welfare effects in retirement.

New technological communication tools have emerged that aim at increasing pension awareness and engagement. These include personal online environments that allow people to check their accumulated pension rights, either at their specific pension provider or across all pension providers (e.g. in The Netherlands: www.mijnpensioenoverzicht.nl/ or in Sweden www.pensionsmyndigheten.se). Such technologically facilitated communication offers a more convenient and faster way to share information and also enables the provision of up-to-date information to pension fund members. More and more pension funds are making use of a pension calculator on their website in the hope that this interactive tool improves user experiences and increases user engagement with their retirement planning.

Interactive online environments increase information processing and have been successfully used to improve attitudes, involvement and behavioural intentions in a high involvement context, such as online shopping (Cho and Leckenby, 1999; Sicilia *et al.*, 2005; Song and Zinkhan, 2008). However, research on user experiences with personal online planning platforms in the low involvement and long-term retirement planning context is limited. Due to the special nature of the pension setting, insights from other fields may not readily be applicable. First, in contrast to an online shopping experience, saving for retirement creates immediate costs but little or no immediate benefits, turning it into an aversive activity in the short run (Eberhardt *et al.*, 2016). Second, pensions are accumulated over a long period. Due to the long-term decision context, people often do not perceive a need to take immediate action. Correspondingly, pension communication must affect people at a deeper level. Third, information on pension accumulation and decumulation and how choices affect these is much more complex than information in most other settings. Thus, customers may experience more complexity and information overload through additional interactive features (Jones *et al.*, 2004) rather than a smooth orchestration of user experiences through the use of technology (Heinonen *et al.*, 2010).

The aim of our study is to investigate whether additional levels of interactivity in online pension planners improve or hamper user attitudes (attitudes, perceived usefulness, ease of use and enjoyment), knowledge and engagement with retirement planning (behavioural intentions and behaviour). We find a positive effect of interactivity on behaviour displayed in the planner, that is, the number of clicked options, as well as on participants' intention to check their personal pension situation in the upcoming three to six months. Moreover, we find gender differences: male participants prefer high levels of interactivity, while women prefer a medium level. This preference is manifested as increasing perceptions of usefulness and ease of use, which also partially mediates the effect on behavioural intentions.

We make three theoretical contributions to the literature. First, we contribute to the services and engagement literature by generating insights about how new service technologies can help to improve user attitudes, knowledge and engagement with retirement planning. Although the appropriate definition and operationalisation of engagement is still the focus of discussion (Hollebeek *et al.*, 2016), we follow the common approach to study individuals' focal engagement levels towards our focal object, the pension planner. More specifically, we operationalise engagement as behavioural intentions and real behaviours (i.e. the number of clicked options within the planner). That is, we study individuals' search for and engagement with information, behaviours that go beyond the transaction of acquiring a pension plan. Extant research on customer engagement has predominantly focussed on high involvement contexts such as brands or brand communities (Brodie *et al.*, 2013; Hollebeek *et al.*, 2014). Our study contributes to engagement literature by studying interactivity in a low involvement context such as retirement planning. Moreover, Hollebeek *et al.* (2016) note that little is known regarding engagement through interactive interfaces or platforms and specific cross-context comparative research, thus resulting in limited generalisability of key findings. We fill this lacuna by studying how new technological interfaces improve user experiences, knowledge and engagement within the low involvement context of retirement planning.

Second, in 1998 Danaher already made the criticism that services research often ignores customer heterogeneity (Danaher, 1998). As new service technologies provide novel

opportunities to cater to individual differences, and marketing is becoming more personalised, investigating customer heterogeneity in using a new service technology is becoming more important (Rust and Huang, 2014). We study the moderating effect of involvement and complement existing research on gender differences in financial services and retirement planning (Bajtelsmit *et al.*, 1999) by looking at the differential effect for men versus women.

Third, we also contribute to the financial services literature by studying how new service technologies can help to influence attitudes, knowledge and engagement with retirement planning. As engagement with retirement planning is so low and yet important, extant research aims to identify and analyse interventions that increase engagement. Most approaches can be classified as either structural approaches (Benartzi and Thaler (2013) for discussions about auto-enrolment, tax benefits or raising contribution limits), or financial education approaches (Wiener and Doescher, 2008). We contribute to this literature by studying a new approach that relies on new service technologies. More specifically, we study how service technologies such as online pension planners can help to influence attitudes, knowledge and engagement with retirement planning.

Theoretical background

Research on customer engagement has increased significantly over the past decade (Jaakkola and Alexander, 2014). A large body of research has emerged on antecedents and outcomes of customer engagement, such as value co-creation, involvement, experience, loyalty or profitability (Hollebeek *et al.*, 2014, Jaakkola and Alexander, 2014, Van Doorn *et al.*, 2010). Yet, most studies on customer engagement study high involvement contexts such as brands or brand communities (Brodie *et al.*, 2013; Hollebeek *et al.*, 2014). These settings are very different from retirement planning, which can be considered a low involvement setting (Rickwood and White, 2009). Although people see the relevance of retirement planning they still procrastinate and do not engage in it (Krijnen *et al.*, 2015).

A possible solution to this societally relevant problem is to make use of the rapidly changing technological environment of financial services. New technologies have the potential to enhance user attitudes and generate personalised and actionable real-time insights. This also holds for interactive, personal online retirement planning tools that allow people to check their accumulated pension rights. Such technologically facilitated communication offers a more convenient and faster way to share information and also supports the provision of up-to-date information to pension fund members. At the same time, information on pension accumulation and decumulation is much more complex than information in most other settings, so that additional information in such online tools may also result in more complexity and information overload (Jones *et al.*, 2004). Thus, technologically facilitated communication through online pension planners provides ample opportunities for communicating more (personalized) information, but is more information and interaction always better? Do increasing levels of interactivity in online pension planners enhance or hinder user attitudes, knowledge and engagement with retirement planning? To shed more light on the effect of interactivity in online pension planners, the next paragraph will review the interactivity literature.

The topic of interactivity has received substantial attention in literature, but a consistent definition and conceptualisation of the construct is still lacking (Yang and Shen, 2017). These inconsistencies arise mainly because studies have focussed on different aspects of interactivity (process, feature or perception). Because online pension planners are online tools that function through a mechanical process without direct communication between provider and customer, our research adopts the process definition of Steuer (1992, p. 84): "Interactivity is the extent to which users can participate in modifying the form and content of a mediated environment in real time".

In line with a more mechanical, user-message interaction perspective, the above stated definition of Steuer (1992) also acknowledges the increasingly active role of the user in modifying the received content.

Although the literature acknowledges a multifaceted nature of the interactivity construct, three broad categories emerge. First, nearly all authors present a dimension related to two-way communication (Liu and Shrum, 2002). Other authors term it "perceived personalisation" or "direction of communication" (McMillan and Hwang, 2002) to refer to the ability to provide reciprocal communication between companies and users, the system and users or users and users. A second dimension focussing on time stands out. This dimension is referred to as "synchronicity" (Liu and Shrum, 2002), "responsiveness" (Song and Zinkhan, 2008) or simply "time" (McMillan and Hwang, 2002). This dimension is concerned with the degree to which an input from a user occurs simultaneously to the response to the input. Finally, the amount of control is frequently perceived as an underlying dimension of interactivity and is referred to as "active control" (Liu and Shrum, 2002), "control" (Song and Zinkhan, 2008) or "user control" (McMillan and Hwang, 2002).

These dimensions can also be transferred to the stimulus of our study, the online pension planner. Because users are able to actively and voluntarily choose which option to click on in the pension planner, they are able to exert a certain degree of control. Furthermore, because a pension planner may respond to the user in the form of adapted graphs or schedules that highlight the future pension income, this online tool enables two-way communication, although not in the form of interpersonal communication. Finally, in contrast to e-mail or postal mail, the online pension planner is able to adapt quickly to user input, turning it into a responsive medium (more details on the different levels of interactivity in the online pension planners can be found in the description of the experimental procedure and Figure 2).

Interactivity is proven to be effective in shaping a diverse range of variables, such as attitude, purchase intentions and involvement (Cho and Leckenby, 1999; Sicilia *et al.*, 2005; Jiang *et al.*, 2010). However, despite the predominant evidence for positive interactivity effects, there have been several documentations of suboptimal interactivity outcomes. Jones *et al.* (2004) argue for information overload that prevents individuals from processing and using all encountered information. Due to a limited capacity for storing information, people might respond by generating simpler responses, or even

by terminating their participation (Jones *et al.*, 2004). Moreover, Bucy (2004) introduced the term "interactivity paradox" as another potential negative outcome of interactivity: "Subjects evidently enjoyed news site interactivity and the active involvement that it entailed more than reading electronic text but this form of online participation produced a certain amount of disorientation, exacting a cognitive and emotional cost." (p. 65). However, most research to date has focussed on settings that are very different from the long-term and complex pension context. As experiences such as shopping are inherently much more pleasant than retirement planning, it needs to be determined whether the same results can be obtained in the pension context.

Research on interactivity in the domain of pensions is scarce. Dellaert (2010) reviewed recent research on online interactive decision aids that can be helpful in overcoming complexity related to individual pension decisions. Although he focuses on finding suitable new pension products, the insights are relevant for our study. He reviews two types of technologies: preference formation tools and product-selection tools. The most suitable online decision aid for our study are information acceleration tools, part of preference formation tools, which are developed to help customers learn about new and unfamiliar consumption situations (Dellaert, 2010). The virtual environment is designed to simulate the information that is available to the consumer at the point in the future where he or she makes a decision. In the specific case of retirement, this could involve providing information about a future retirement situation (Dellaert, 2010). As such, information acceleration tools have been proposed to increase consumer understanding of new consumption situations, which might be promising for the case of assisting consumers in better understanding future pension preferences and needs (Dellaert, 2010). Harrison *et al.* (2006) do not focus on interactivity but assesses the extent to which consumers are being empowered by online pension information provision. They identify gaps between consumer needs for information and information provision and conclude that the sense of empowerment that is generally felt through the internet has not been fully realised in the context of pensions.

Hypotheses development

We first propose a hypothesis for engagement. We conceptualise engagement as behaviour (the number of clicked options within the planner) and behavioural intentions. These behaviours and behavioural intentions extend beyond transaction and examine several aspects of acquiring more information about retirement planning in general or a specific personal situation. Behaviours motivated by a search for information are at the starting point of the decision-making funnel, in line with the purpose of pension planners.

Extant literature in the domain of advertising demonstrates that high levels of interactivity lead to higher processing of product information, suggesting that customers are motivated to gather information that is important for their purchasing decisions (Schlosser, 2003). Consequently, these cognitive responses influence outcomes, such as behavioural intentions. In the context of health communication, interactive information motivates people to acquire health-related information (Weinstein *et al.*, 2004). Indeed, research indicates that deep involvement with information provoked by system interactivity more reliably affects behavioural intentions (Petty and Cacioppo, 1986).

Although pension planners provide more complex information and operate in a low involvement setting, we still expect that the interactive nature of the web environment is positively related to behavioural intentions and behaviour (i.e. number of clicked options). Hence, we expect:

H1. The greater the level of interactivity offered by an online pension planner, the more positive the behavioural intentions.

H2. The greater the level of interactivity offered by an online pension planner, the higher the behaviour (i.e. the number of clicked options within the planner).

One major goal of online pension planners is to attract people's attention to induce curiosity and thoughtfulness about the topic. Interactivity allows for active online engagement restraining users from inattentively browsing through the content. Consequently, users allocate more cognitive resources and feel greater involvement than users who do not interact with the pension planner (Noort *et al.*, 2012). Because people devote more cognitive resources when interacting with the pension planner they feel closer to the information than people who merely read the information. Consequently, message recall and understanding will be enhanced (Tam and Ho, 2006), leading to an increase in knowledge. Hence, we expect:

H3. The greater the level of interactivity offered by an online pension planner, the more the knowledge of the users will be enhanced.

Besides the total amount of information processing evoked by interactivity, interactivity can also influence the valence of such processing (Sicilia *et al.*, 2005) and hence the user attitude. In the field of advertising, perceived website interactivity was found to positively influence attitudes towards the website (Cho and Leckenby, 1999; Sicilia *et al.*, 2005). Having control over the information flow increases the pleasure of the experience itself, generating more favourable responses and evaluations from the customer. A so-called "attitude transfer mechanism" (MacKenzie *et al.*, 1986) allows for a transfer of the favourableness in processing to the information shown in the online pension planner. Accordingly, we expect:

H4. The greater the level of interactivity offered by an online pension planner, the more positive the attitude towards pensions.

One of the principal barriers in the usage of online pension planners is the perceived complexity of pension-related information. As a result, two important variables are the perceived relevance, as well as the comprehensibleness of the received information. According to Davis (1989), perceived usefulness refers to the degree to which a person perceives information as being relevant for his or her personal situation. Perceived ease of use, in contrast, is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). Within the technology acceptance model (TAM), perceived usefulness and perceived

ease of use have been shown to influence the decision whether or not to use a technology. Liao *et al.* (2008) extended the TAM model to incorporate perceived enjoyment as an additional antecedent of behavioural intentions. Enjoyment is intrinsically motivating, meaning that an activity is performed for the process of performance itself. Interactivity was shown to increase perceived ease of use, perceived usefulness and perceived enjoyment (Cyr *et al.*, 2009).

Because interactivity captures the attention of users and increases their involvement, the information is delivered more effectively to the user. As such, we expect that interactivity reduces the mental effort needed to process the information and thus increases perceived ease of use. Furthermore, interactivity allows users to customise their visit. In the case of a pension planner, as users are invited to enter their personal information they can control the content they see and receive customised information. This design characteristic offers users the possibility to obtain information relevant for their personal pension situation and hence is expected to increase perceived usefulness. Moreover, we expect an interactive pension planner to give users better access to content and help users find information that is important to financial decisions more easily, as similar results were found in the online travel industry (Cyr *et al.*, 2009). Finally, interactivity is supposed to enhance perceived user enjoyment because it allows users to exert control over their actions and thus to act unrestrictedly and to fully engage (Loonam and O'loughlin, 2008). As such, customers attain self-efficacy and simultaneously experience a sense of playfulness. Therefore, we expect:

H5. The greater the level of interactivity offered by an online pension planner, the more positive are: (a) the perceived usefulness, (b) the perceived ease of use and (c) the perceived enjoyment.

Our last hypothesis concerns the underlying process through which interactivity evokes the expected outcomes. Interactivity engages users in the communication process by requiring them to be cognitively active and make choices (Liu and Shrum, 2002). Thus, a highly interactive online environment demands closer attention as well as more elaboration than a non-interactive environment. We adopt the definition of Liu and Shrum (2002) to refer to involvement as "the extent of cognitive elaboration that occurs in a communication process" (p. 60). In contrast with product involvement (related to permanent involvement with a product), situation specific involvement used for the purpose of our research is a condition that is temporally bounded by the communication process itself (Liu and Shrum, 2002). As such, it denotes the elaboration process that starts and ends with the interaction with the pension planner.

We expect interacting with a pension planner to increase participants' involvement, as it raises the degree of information processing. Through this increased devotion of cognitive resources, users will feel more involved, leading to an increase in behavioural intentions, number of clicked options, knowledge and attitude. Involvement is not expected to mediate the relationship between interactivity and perceived usefulness, perceived ease of use and perceived enjoyment, as these variables focus primarily on the technical aspects of communication. We therefore expect:

H6. Involvement mediates the relationship between interactivity and (a) behavioural intentions, (b) number of clicked options, (c) knowledge and (d) attitude.

Figure 1 shows the conceptual framework that we develop based on the hypotheses and the expected direction of effects.

Research methodology

Sample and experimental procedure

The data for this study were collected using a non-probability online panel in The Netherlands. Participants were randomly and equally allocated to one of the three treatment conditions (moderate level of interactivity vs high level of interactivity vs. control). In total, 293 respondents participated in the study. Eight respondents were deleted from the original data set due to conspicuous answers on reversed items or unrealistic response times below 2 min, implying participation in the study was not taken seriously. The final data set thus encompassed $N = 285$ respondents (control: $N = 99$; moderate level of interactivity: $N = 89$; high level of interactivity: $N = 97$), of which 56.8 per cent were male. The mean age of the respondents is 52 years (SD_{Age}=12.06). Survey respondents' demographic characteristics are given in Table I.

The online questionnaire was sent out via e-mail to the panel members. Participation in the study was voluntary and participants earned points that can be redeemed for a gift of choice. The data were collected over a period of two weeks. The questionnaire was initially developed in English, translated into Dutch by a native speaker (Appendix A) and subsequently validated through back-translation.

The opening text of the questionnaire provided participants with a short introduction to the purpose of the study. The text stated that this study constitutes a pre-test for a pension planner that will later be employed on a pension fund website with the aim of learning about users' impressions and behaviours. After completing the questionnaire, participants were asked to click on a link at the bottom of the page that redirected them to the pension planner.

The versions of the stimulus material (Figure 2), that is, the pension planners that differed in their level of interactivity, were developed together with a company specialised in pension planners. In all versions of the pension planner participants were first shown a simulation of an unbranded pension planner on which they could find, depending on the version, different buttons to click on. The first version of the pension planner (control condition) only allowed participants to choose the option "What is the level of my pension income?" to check their fictional pension situation and the composition of future retirement income (split by state and occupational pension income). The information was depicted in both a table and graph. In the second version of the pension planner (medium level of interactivity condition), participants could choose to modify certain variables affecting their pension income, on top of the option from version 1. Specifically, they could click the button "Which choices can I make?" to see additional, interactive options. Participants were able to alter their retirement age, choose whether they would like to work part-time for a specific time period or whether they would like to reallocate the amount of their partner's pension scheme.

Figure 1 Conceptual Mmodel

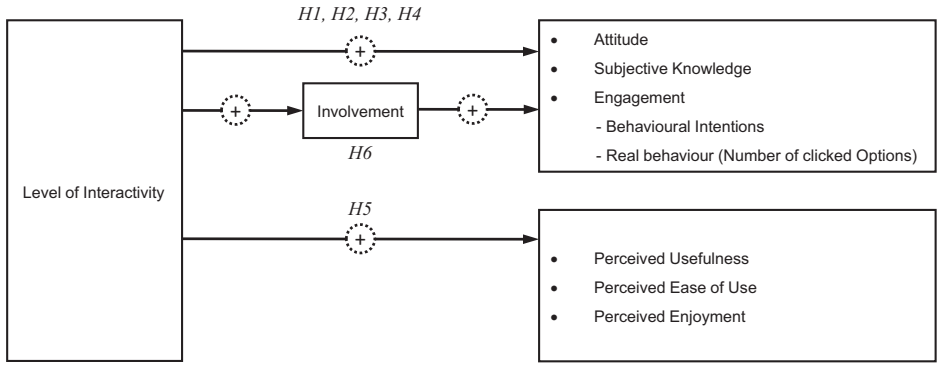


Table I Respondents' demographic profile

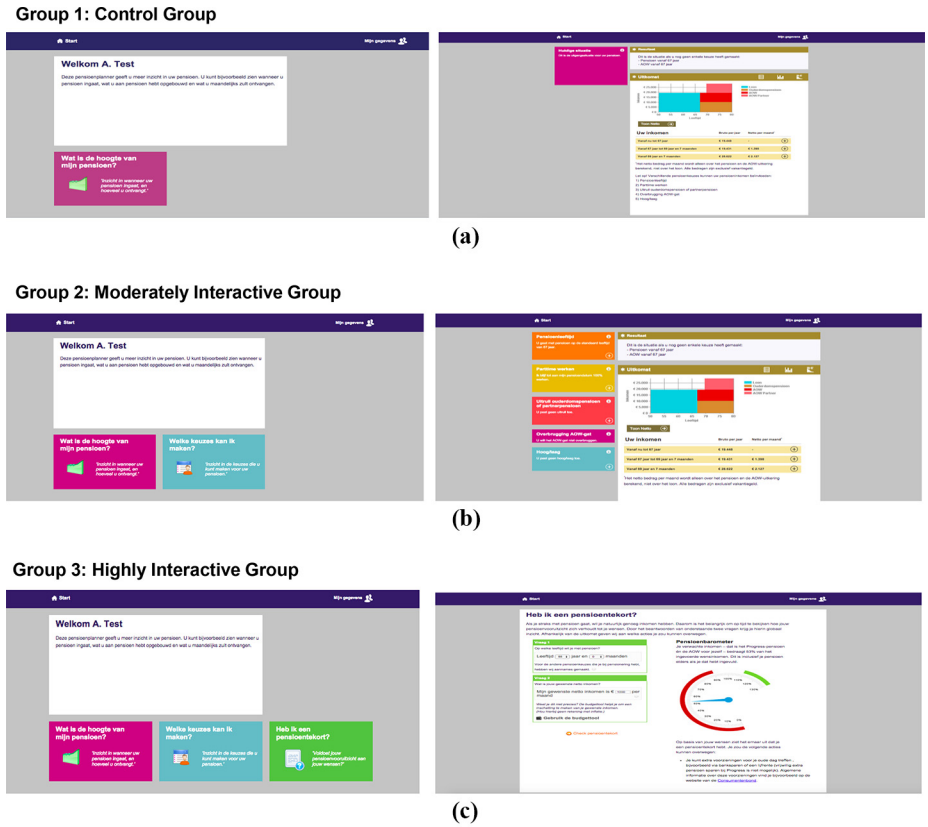
Respondent characteristic	Frequency	(%)
Gender		
Male	162	56.8
Female	123	43.2
Age		
<35	15	5.3
36-45	73	25.6
46-55	88	30.9
56-65	70	24.6
>65	39	13.7
Education		
No education	1	0.4
Primary school	5	1.8
Secondary school	142	49.8
Higher vocational education	86	30.2
Bachelor's degree	3	1.1
Master's degree	22	7.7
University specialised degree	14	4.9
Other	12	4.2
Income		
Less than 30,000€	118	41.4
Between 30,000€ and 39,999€	68	23.9
Between 40,000€ and 49,999€	36	12.6
Between 50,000€ and 59,999€	31	10.9
Between 60,000€ and 69,999€	11	3.9
More than 70,000€	21	7.4

Additionally, participants could choose if they would like to redistribute their pension income so that instead of receiving a constant level of income during the whole retirement period they receive more income during the first years and less income later on, or vice versa. Finally, because the state pension will not be disbursed before the age of 67, people might encounter a gap between retiring and receiving state pension in case they wish to retire before that age. For this reason, participants could opt for a bridging of that pension gap. The third version of the pension planner (high level of interactivity condition) included the two options from version 1 and 2, and in addition an option "Do I have a pension deficit?". Here, participants could use an interactive budget tool. The tool allowed participants to enter their monthly spending either directly as a total amount, or split into different categories, such as rent, cost of living or leisure activities. The pension planner then created a graphical representation that showed whether the accumulated pension income was sufficient to cover the desired spending. The graph was set up as a barometer visualising the percentage of desired income that was covered by the anticipated pension income. Percentages below 90 per cent appeared in red and percentages above 110 per cent were highlighted in green. After participants interacted with the pension planner, they completed a questionnaire.

Measurement and assessment

Engagement consists of behavioural intentions and real behaviour that extend beyond a transaction and focus on the search for and engagement with additional information, in line with the goals of pension planners. To measure *behavioural intentions* in the context of pension planning, a six-item, seven-point Likert Scale (1 = Strongly disagree to 7 = Strongly agree) was specifically developed for this study, based on the scale of Ajzen and Fishbein (1969). The scale captures participants' intentions to check their personal pension situation as well as intentions to collect pension-related information via the employer, friends and family members, financial advisors and via own research. Real behaviour was operationalised as the *number of clicked options* and was gathered using Log Files, indicating the specific options that were chosen within the pension planner. Knowledge was operationalised as *subjective knowledge*, as subjective knowledge has been shown to be more associated with experience with the product category. It was measured on the basis of a five-item, seven-point Likert Scale (1 = Strongly disagree to 7 = Strongly agree), developed by Flynn and Goldsmith (1999) and adapted for the purpose of this study to measure participants' perceived knowledge of pension-related information. We used seven-point validated semantic differential measurement scales, consisting of four adjective pairs, to measure *attitude* towards pensions (Stevenson *et al.*, 2000). Finally, the TAM (Davis, 1989) provides the scales to measure *perceived usefulness* and *perceived ease of use*. Two items from each scale were extracted based on their factor loadings and plausibility in the pension context. These items were complemented with two items from the *perceived enjoyment* scale used in the extended technology

Figure 2 Group 1 control group



Notes: (a) Group 1: Control Group; (b) group 2: Moderately Interactive Group; (c) group 3: Highly Interactive Group

acceptance model proposed by Liao *et al.* (2008). Again, the items with the highest loading were selected. This newly developed scale, comprising six items, was measured on a seven-point Likert Scale (1 = Strongly disagree to 7 = Strongly agree).

We adapt the revised Personal Involvement Inventory (PII) scale (Zaichkowsky, 1994) to measure *involvement* with the pension planner. The scale consists of ten adjective pairs, measured with seven-point semantic differential measurement scales. Even though the construct has its origins in advertising literature, it has been applied and validated in previous research to measure website involvement (McMillan and Hwang, 2002).

The effectiveness of the manipulation was determined with the following general closed manipulation check adopted from Sundar *et al.* (2003): *How interactive would you rate this pension planner?* The manipulation check was measured on a scale from 1 to 10, and was integrated in the questionnaire directly after participants were exposed to the pension planner.

Finally, *socio-demographics* (age, gender, income and education) and *risk aversion* (Dohmen *et al.*, 2011) were included in the questionnaire. We controlled for the variables in the analyses as they potentially influence the relationship between the level of interactivity and the dependent variables. For example, older respondents might display higher behavioural intentions because they are closer to retirement age than younger people. Similarly, participants who score higher on risk aversion might indicate higher behavioural intentions, subjective knowledge and involvement because they are more disposed to have an intrinsic motivation.

We used exploratory factor analysis and reliability analysis to assess scale validity and internal consistency reliability. The factor analysis was conducted using principal axis factoring with Promax rotation (Appendix B). The Kaiser–Meyer–Olkin measure of sampling adequacy indicated that the data is suitable for factor analysis (0.901). Unidimensionality of the measures was given as the items loaded higher than the guideline set by Hair *et al.* (2013) of 0.4 on only a single factor. The factor analysis revealed that the items of the behavioural intentions, subjective knowledge and attitude scales all loaded on one unique factor. Because of that, common method bias is unlikely to be an issue in the data (in addition to the fact that we also study real behaviour and not just self-reported behavioural intentions). Yet, the items of the perceived usefulness, perceived ease of use and perceived enjoyment scale loaded on the same underlying factor, explaining 35.7 per cent of the total variance. Accordingly, we performed additional analyses combining the three components into one variable *user experience*. Furthermore, the items comprising the involvement scale loaded on two distinct factors. Jiang *et al.* (2010) obtained similar results and consequently split the involvement scale into *affective involvement* and *cognitive involvement*. Cognitive

involvement is defined as being induced by utilitarian motives and affective involvement is associated with emotional and hedonistic aspects of communication (Jiang *et al.*, 2010).

Cronbach's alpha ranged from 0.81 to 0.93, exceeding the cut off value of 0.7, and thus provides evidence for a high degree of internal consistency reliability. Table II reports the descriptive statistics as well as the Cronbach's alpha values for all constructs.

Normality checks of the dependent variables with the help of both the Kolmogorow–Smirnov and the Shapiro–Wilk test revealed a violation of the normality assumption. Yet, according to Hair *et al* (2013), these results are common for larger samples. Due to the robustness of the applied statistical tests and the large sample size of above N = 30 per group, we do not expect a violation of the normality assumption to influence the test results.

Manipulation check

Results indicated a significant difference in *perceived interactivity* scores for the three versions of the pension planner ($F(2,282) = 62.107$, $p = 0.000$). Post hoc comparisons using the Games Howell test revealed that the mean scores of all three groups significantly differed from each other, with the pension planner in the control condition being perceived as the least interactive ($M = 1.95$, $SD = 0.862$), followed by the moderately interactive condition ($M = 5.35$, $SD = 1.383$) and the highly interactive condition ($M = 7.63$, $SD = 1.13$). Consequently, the manipulation of the level of interactivity was successful.

Results

Results revealed no significant main effect of the level of interactivity on *behavioural intentions* ($F(2,282) = 2.087$, $p = 0.126$). Even though the highly interactive condition displayed the highest behavioural intentions ($M = 3.33$, $SD = 1.22$), followed by the moderately interactive condition ($M = 3.18$, $SD = 1.19$) and lastly the control group ($M = 2.97$, $SD = 1.28$), these differences are not statistically significant. Hence, *H1* is not supported. As the six items of the behavioural intentions scale partially point in different directions (i.e. the first two items are concerned with checking the private pension situation whereas the last four mainly focus on consultation from third parties, see details of scale in Appendix A), a separate analysis for each item was conducted. The level of interactivity in the pension planner significantly influences respondents' intentions to check their personal pension situation in the upcoming three to six months ($F(2,282) = 3.064$, $p = 0.048$). The highly interactive condition ($M = 3.96$, $SD = 1.68$) showed a significant difference in comparison to the control group ($M = 3.37$, $SD = 1.74$), whereas the moderately interactive condition ($M = 3.83$, $SD = 1.8$) did not significantly differ from either of the other two groups.

There was a statistically significant difference in real behaviour, i.e. the *number of clicked options* for the three treatment conditions ($F(2,282) = 81.416$, $p = 0.000$). Specifically, participants in the moderately interactive condition ($M = 1.78$, $SD = 0.45$) and the highly interactive condition ($M = 1.95$, $SD = 0.86$) clicked on significantly more options than the control group ($M = 0.98$, $SD = 0.14$). The mean scores for the highly and moderately interactive conditions did not significantly differ from each other. Accordingly, *H2* receives partial support. Interestingly only 19 out of 97 participants in the highly interactive condition made use of the additional third option to check whether they will face a pension deficit during their retirement period. Furthermore, only 7 out of these 19 participants used the budget-tool to calculate their monthly spending. In light of these results the question arises whether the manipulation with the highly interactive pension planner, albeit successful according to the manipulation check, was able to achieve the desired effects if participants did not engage with the tool to its full extent.

H3 predicts that interactivity in a pension planner enhances *subjective knowledge*. Yet, the analysis did not yield any significant main effect of the varying interactivity levels ($F(2,282) = 1.908$, $p = 0.150$). Participants in the highly interactive condition ($M = 3.68$, $SD = 1.22$) or moderately interactive condition ($M = 3.90$, $SD = 1.14$) did not display significantly higher levels of subjective knowledge than the control group ($M = 4.00$, $SD = 1.14$). Consequently, *H3* is not supported.

With respect to *attitude towards pensions*, similar results were found. There is no significant main effect of increasing interactivity levels in a pension planner on attitude towards pensions ($F(2,282)=1.311$, $p = 0.271$). The control group ($M = 4.48$, $SD = 1.33$) did not significantly differ from either the moderately interactive ($M = 4.18$, $SD = 1.22$) or the highly interactive condition ($M = 4.27$, $SD = 1.35$), providing no support for *H4*.

Regarding the main effect proposed in *H5a*, the greater the level of interactivity in a pension planner the greater the perceived usefulness, the results were significant at the $p < 0.10$ significance level ($F(2,282)=2.326$, $p = 0.0995$). A significant difference at the $p < 0.10$ significance level exists between the control group ($M = 4.22$, $SD = 1.56$) and the moderately interactive condition ($M = 4.71$, $SD = 1.49$), with the latter condition displaying a higher perceived usefulness than the former condition. The highly interactive condition ($M = 4.49$, $SD = 1.64$) did not significantly differ from any of the other conditions. These results provide partial support for *H5a*. Regarding *H5b*, the greater the level of interactivity in a pension planner the greater the perceived ease of use, the analysis revealed no significant main effect ($F(2,282)=0.783$, $p = 0.458$). Even though the highly interactive condition displayed the highest ease of use perceptions ($M = 4.92$, $SD = 1.45$), followed by the moderately interactive condition ($M = 4.74$, $SD = 1.33$) and lastly the control group ($M = 4.67$, $SD = 1.56$), these differences were not statistically significant. Therefore, *H5b* is not supported. Similarly, *H5c* is also not supported. Perceived enjoyment was not found to significantly

Table II Scale reliability

Scale label	M	SD	No. of items	Cronbach's alpha
Behavioural intentions	3.16	1.23	6	0.87
Subjective knowledge	3.86	1.17	5	0.84
Attitude	4.32	1.30	4	0.92
User experience	4.47	1.34	6	0.93
Cognitive involvement	4.50	1.09	5	0.93
Affective involvement	4.47	0.79	5	0.90

differ between the three conditions ($F(2,282)=0.610$, $p=0.544$): With a mean of $M=4.23$ ($SD=1.41$), the highly interactive pension planner was not perceived to be significantly more enjoyable than the moderately interactive condition ($M=4.24$, $SD=1.40$) or the control group ($M=4.04$, $SD=1.48$). Because the results from the exploratory factor analysis indicated that the items from the TAM – scale load together on only one factor, a one-way ANOVA was conducted with *user experience*, combining perceived usefulness, perceived ease of use and perceived enjoyment into one factor, as dependent variable. As expected, no significant differences between the three conditions were found ($F(2,282)=1.078$, $p=0.342$). Participants in the highly interactive condition ($M=4.55$, $SD=1.35$) did not significantly differ in their user experience from participants in the moderately interactive condition ($M=4.56$, $SD=1.26$) or the control group ($M=4.31$, $SD=1.40$). Table III summarises the descriptive statistics and *p*-values for the dependent variables related to *H1-H5*, and indicates whether the hypotheses were supported.

Mediation

A Sobel test on the basis of a macro developed by Preacher and Hayes (2004) was used to analyse the mediating role of involvement. As the factor analysis indicated that involvement is composed of two factors, both cognitive involvement and affective involvement were used as mediators in the Sobel test. The mediation effect of cognitive involvement was neither significant for behavioural intentions ($z=0.36$, $p=0.71$), nor for subjective knowledge ($z=0.34$, $p=0.73$), attitude ($z=0.37$, $p=0.71$) and number of clicked options ($z=0.35$, $p=0.73$). Similarly, affective involvement was not found to mediate the relationship between the level of interactivity and behavioural intentions ($z=1.31$, $p=0.19$), subjective knowledge ($z=1.18$, $p=0.24$), attitude ($z=1.31$, $p=0.19$) and number of clicked options ($z=0.99$, $p=0.32$). Furthermore, neither cognitive nor affective involvement proved to mediate the relationship between the level of interactivity and any of the single items of the constructs. Hence, *H6a-H6d* are not supported. Two additional one-way ANOVAs revealed that the treatment conditions did not significantly affect cognitive involvement ($F(2,282)=0.205$, $p=0.814$) and affective involvement ($F(2,282)=0.961$, $p=0.384$). To analyse the effect of cognitive and affective involvement on the different dependent variables, several standard multiple regressions were conducted using both types of involvement as independent variables. Preliminary analyses displayed no violation of the assumptions of multicollinearity, normality, linearity, homoscedasticity, independence of residuals and no outliers were found. The results revealed that when taking behavioural intentions as the dependent variable, affective and cognitive involvement explain 17.3 per cent of the variance in behavioural intentions ($F(2,282)=29.597$, $p=0.000$). Cognitive involvement ($beta=0.331$, $p=0.000$) makes a stronger unique contribution than affective involvement ($beta=0.118$, $p=0.093$), which is still statistically significant at the $p<0.10$ significance level. For number of clicked options, neither type of involvement was statistically significant ($F(2,282)=3.076$, $p=0.048$). Furthermore, both forms of involvement explain 10.9 per cent of the variance in attitude towards pensions ($F(2, 282)=17.270$, $p=0.000$). Affective involvement ($beta=0.258$, $p=0.000$) makes a stronger unique contribution than cognitive involvement ($beta=0.100$, $p=0.170$), which does not reach statistical significance. Similarly, for subjective knowledge only affective involvement is a statistically significant predictor at the $p<0.10$ significance level ($beta=0.134$, $p=0.080$) and cognitive involvement does not have a statistically significant influence ($beta=0.044$, $p=0.563$). The standardised coefficients (β) as well as the R^2 values can be found in Table IV.

These findings are notable since they verify that affective and cognitive involvement have a different impact on the dependent variables. Whereas cognitive involvement influences behavioural intentions, affective involvement significantly predicts attitude towards pensions as well as subjective knowledge and behavioural intentions at the $p<0.10$ significance level. Moreover, the insignificant mediation effect of both types of involvement might follow from the insignificant effect of the level of interactivity in the pension planner on involvement.

Additional analyses

When we include covariates in the analysis, further important results are revealed. First, several moderation effects were found. A two-way between-groups ANOVA was conducted to explore the effect of *interactivity levels* and *gender* on *behavioural intentions*. The interaction effect between treatment condition and gender was statistically significant ($F(2,279)=6.959$, $p=0.001$). In the highly interactive conditions, men ($M=3.75$, $SD=1.16$) displayed higher behavioural intentions than women ($M=2.90$, $SD=1.14$). In contrast, the mean scores for behavioural intentions were higher for women in the moderately interactive condition and in the control group. The difference in behavioural intentions mean scores between males and females is statistically significant in the highly interactive condition ($t(95)=-3.64$, $p=0.000$) and in the moderately

Table III Mean and *p*-values of the dependent variables, and indication of support for hypotheses

Variables	Control group	Moderately interactive	Highly interactive	*p*-value	Hypothesis	Hypothesis support
Behavioural intentions	2.97	3.18	3.33	0.126	1	partial (1 construct item)
Number of clicked options	0.98	1.78	1.95	0.000	2	partial (control vs moderate)
Subjective knowledge	4.00	3.90	3.68	0.150	3	no
Attitude	4.48	4.18	4.27	0.271	4	no
Perceived usefulness	4.22	4.71	4.49	0.0995	5a	partial (control vs moderate)
Perceived ease of use	4.67	4.74	4.92	0.458	5b	no
Perceived enjoyment	4.04	4.24	4.23	0.544	5c	no
User experience	4.31	4.56	4.55	0.342	5a, b, c	no

Table IV R Squared and standardised coefficients by type of involvement

Independent variables	Behavioural intentions		Subjective knowledge		Attitude		No. of clicked options	
	R^2	ß	R^2	ß	R^2	ß	R^2	ß
	0.173		0.027		0.109		0.021	
Cognitive involvement		0.331*		0.044		0.100		0.081
Affective involvement		0.118**		0.134**		0.258*		0.080

Notes: *Significant at the $p < 0.05$ significance level; **significant at the $p < 0.10$ significance level

interactive condition at the $p < 0.10$ significance level ($t(87) = 1.723$, $p = 0.088$).

After splitting the data set into male and female participants, a one-way ANOVA was conducted to further investigate the significant interaction effect. Results revealed that for the male subgroup the main effect of the level of interactivity on behavioural intentions is significant ($F(2,159)=6.983$, $p = 0.001$), whereas for the female group the main effect is insignificant ($F(2,120)=2.257$, $p = 0.109$). Even though the mean difference between the moderately and highly interactive conditions did not reach statistical significance for females, the tendency suggests that women prefer a medium level of interactivity over low and high levels of interactivity. Male participants in the highly interactive condition ($M = 3.75$, $SD = 1.16$), on the other hand, indicated significantly higher behavioural intentions than men in the moderately interactive condition ($M = 3.01$, $SD = 1.14$) and in the control group ($M = 2.96$, $SD = 1.31$). The moderately interactive condition in contrast did not significantly differ from the control group. Overall, these results illustrate that the insignificant total effect of the level of interactivity on behavioural intentions found for *H1* is attributable to the insignificant difference in mean scores within the female subset, which absorbs the significantly positive results for males.

Similar results were found for *user experience*. A two-way ANOVA indicated that there was a statistically significant crossover interaction effect between the treatment condition and gender ($F(2,279)=3.597$, $p = 0.029$). Looking at the different components of user experience in more detail revealed a significant interaction effect for perceived usefulness ($F(5,279)=4.722$, $p = 0.010$), as well as for perceived ease of use ($F(5,279)=2.431$, $p = 0.090$) at the $p < 0.10$ significance level, but not for perceived enjoyment ($F(5,279)=1.947$, $p = 0.145$). Investigating the interaction effect even further using a one-way ANOVA again revealed that the difference between the treatment conditions regarding user experience is significant for males ($F(2,159)=3.614$, $p = 0.029$). The Tukey honestly significant difference test indicated that the mean score of the highly interactive condition is significantly higher than the mean score of the control group (Table V). The moderately interactive group did not significantly differ from either of the other two groups. Investigating the difference in user experience mean scores for males and females within each treatment condition revealed that only the difference in the control group is statistically significant ($t(97)=2.044$, $p = 0.044$). Furthermore, there was a significant main effect for *perceived usefulness* ($F(2,159)=5.233$, $p = 0.006$) and *perceived ease of use* ($F(2,159)=2.373$, $p = 0.096$) at the $p < 0.10$ significance level. For perceived usefulness, the control group significantly differed from the moderately and highly interactive group, whereas the latter two did not significantly differ from each other. Regarding perceived ease of use, only the control group significantly differed from the highly interactive group at the $p < 0.10$ significance level. The mean values are given in Table V.

Discussion

We investigated whether increasing levels of interactivity in online pension planners, that is, in a low involvement context, improves or hampers user attitudes, knowledge and engagement with retirement planning. We find that a high level of interactivity, compared to no interactivity, positively influences participants' intentions to check their personal pension situation in the upcoming three to six months. The pension planner encourages this type of behaviour as it acts as a reminder for participants to check their own pension situation. Yet, more abstract behavioural intentions that require a bit more effort, such as consulting outside parties, were not activated.

We also find a significant effect of interactivity on real behaviour, that is, the number of options that are clicked. Interestingly, the moderately and highly interactive group did not significantly differ from each other regarding the number of clicked options. However, the manipulation check revealed a significant difference between all three groups regarding perceived interactivity of participants. Hence, participants in the highly interactive condition recognised the interactivity but did not fully engage with the tool. This finding indicates a general inattentiveness that might prevent the effectiveness of the manipulation. There are several potential reasons for this inattentiveness. Participants' might perceive the variety of options in the most interactive version of the pension planner to be overly extensive, requiring too much time to make use of them. Alternatively, because the information provided in the pension planner reflects the data of a fictional account, it is possible that the manipulation did not provoke the desired self-motivation to fully explore the pension planner. According to the elaboration likelihood model (ELM), a lack of motivation to think about information, which can be induced when faced with self-irrelevant information, might indeed inhibit deliberate information processing (Petty and Cacioppo, 1986).

Another explanation relates to the setup of our study. Whereas we conducted our research by sending out e-mails that were answered privately by participants, prior studies conducted the experiment in a computer laboratory (Jiang *et al.*, 2010; Sicilia *et al.*, 2005) where participants face less distractions and are consequently more likely to concentrate on the experiment with more serious intent. In addition to motivation, the ELM states that distractions can decrease an individual's ability to process a message by limiting the availability of cognitive resources (Petty and Cacioppo, 1986).

Table V Mean scores for perceived usefulness, perceived ease of use, perceived enjoyment and user experience in total by gender

Condition	Perceived usefulness*		Perceived ease of use**		Perceived enjoyment		Total user experience*	
	Males[a]	Females	Males[b]	Females	Males	Females	Males[a]	Females
Highly interactive	4.78	4.21	5.06	4.78	4.48	3.98	4.77	4.32
Moderately interactive	4.70	4.73	4.75	4.71	4.30	4.16	4.58	4.53
Control	3.90	4.70	4.42	5.04	4.23	3.92	4.08	4.65

Notes: *Significant interaction effect at the $p < 0.05$ significance level; **significant interaction effect at the $p < 0.10$ significance level; [a]significant main effect at the $p < 0.05$ significance level; [b]significant main effect at the $p < 0.10$ significance level

A potential explanation for the insignificant effect of interactivity on attitude might be that the general attitude regarding pensions was already relatively high among participants (M = 4.32) and consequently interactivity did not have the scope to induce a sufficient impact.

A final and an important reason for insignificant main effects for which we have direct evidence is heterogeneous treatment effects. Men and women reacted differently to the level of interactivity of the pension planner, some main effects cancelled out on average. Male participants in the highly interactive condition displayed statistically significantly higher behavioural intentions than in the other conditions. Moreover, comparing this result to the female subgroup for which the main effect was insignificant highlights that within the moderately and highly interactive conditions men indicated significantly higher behavioural intentions than women did. Similarly, the user experience, encompassing perceived usefulness, perceived ease of use and perceived enjoyment, increased with increasing levels of interactivity for males, with the highly interactive condition having a significantly higher mean than the control group. Women, on the contrary, seem to prefer low levels of interactivity as reflected in a decrease of user experience with increasing interactivity levels. In addition, user experience, specifically perceived usefulness and perceived ease of use, partially mediates the relationship between the level of interactivity and behavioural intentions, but only for men. Thus, at least a part of the increase in behavioural intentions is due to the increase in perceived ease of use and usefulness triggered by the interactivity in the pension planner. A possible explanation for the discrepancies between the gender groups is that males and females encounter different levels of disorientation problems. Specifically, women experience more disorientation than men, accompanied by less understanding of how to use navigation tools, and a greater likelihood of feeling out of control (Ford *et al.*, 2001). An alternative explanation is that males and females differ regarding the purpose of their Internet usage. Whereas men tend to use the internet for information gathering and entertainment activities, correlating with human-to-computer interactivity, women show a tendency to use the Internet mainly for interpersonal communication and educational purposes, which corresponds more to human-to-human interaction (McMahan *et al.*, 2009). As the online environment of a pension planner constitutes human-to-computer interactivity, it might be the case that men, who are more skilled in matters of this specific type of interactivity, experience less confusion and consequently indicate a higher level of user experience. These differences between men and women are in line with recent calls for communication that incorporates heterogeneity among recipients (Rust and Huang, 2014). It is no longer sufficient to consider average effects, assuming that all individuals respond in a similar fashion to communication initiatives, but rather it is necessary to discover the properties that constitute this customer heterogeneity and to give way to more personal attention.

Managerial contributions

Our study offers two core implications for increasing the effectiveness of pension planners. First, our study revealed heterogeneity among users of pension planners, that is, men and women respond differently to the level of interactivity in a pension planner. Whereas men in the highly interactive condition perceive the information presented in the pension planner to be more useful and easy to use than in the other two conditions, the tendency for women points towards a preference for low and medium levels of interactivity. Similarly, male participants in the highly interactive condition displayed significantly higher behavioural intentions than female participants in the same condition, but within the moderately interactive condition female participants indicated higher behavioural intentions, albeit only significant at the $p < 0.10$ significance level. These results suggest tailoring pension planners to match specific preferences of recipients by, for example, integrating less interactive features for women than for men in a pension planner.

Second, cognitive and affective involvement affect the dependent variables differently. Depending on the goal of pension planners, a different focus might be chosen. To influence behavioural intentions, more attention should be placed on increasing cognitive involvement. If the goal is to increase attitude towards pensions and perceptions of knowledge, a stronger focus should be placed on increasing affective knowledge. Yet, as behavioural intentions are probably the most important goal to increase awareness, and because neither affective nor cognitive involvement had a negative effect on any of the dependent variables, pension planners should ideally aim at increasing both forms of involvement. Cognitive involvement can be induced by integrating relevant, interesting and valuable information, which should be accomplished with a pension planner that contains the personal pension information. Hedonic features such as animation, sound and colours might be integrated in an online pension planner to elicit affective involvement.

Theoretical contributions

Most extant engagement literature research on customer engagement predominantly focuses on high involvement, offline contexts, such as brands or brand communities. As

Hollebeek *et al.* (2016) note, little is known regarding engagement through interactive interfaces or platforms and specific cross-context comparative research. By focussing on a technological interface for retirement planning, a low involvement context, we are broadening the scope of engagement literature and we add revealing insights on engagement-based interface platforms and interactivity. Our study is the first to test the effectiveness of interactivity in influencing the actual behaviour (i.e. the number of clicked options) in a technologically advanced tool. Interactivity was found to significantly increase the number of clicked options in comparison to no interactivity; however, there was no statistically significant difference in the number of clicks between the moderately and highly interactive conditions. In short, if the purpose is to attract users' attention, interactivity might constitute a promising solution.

Second, we advance service research by zooming in on customer heterogeneity (Danaher, 1998) in using the technology-based online pension planner and studying the moderating effect of involvement more closely. In addition, we complement existing research on gender differences in financial services and retirement planning (Bajtelsmit *et al.*, 1999) by looking at the differential effect for men versus woman. We show that the growing calls to incorporate heterogeneity concerns into communication initiatives (Rust and Huang, 2014) also hold for the pension context. The effect of interactivity on user experience and behavioural intentions was found to differ between male and female participants, which highlights that the effectiveness of the design of the pension planner cannot be generalised, but depends on socioeconomic circumstances.

Third, we contribute to the financial services literature by applying a new approach, other than structural and education approaches, which relies on new service technologies. More specifically, we study how service technologies such as online pension planners can help to influence attitudes, knowledge and engagement with retirement planning. Based on our results, we conclude that the beneficial effects of interactivity as established in previous studies cannot unreservedly be transferred to the pension domain. As retirement planning represents a unique context that it can be categorised as a low involvement (aversive task with delayed rewards), the effects of interactivity seem to differ from other investigated domains that demand a less complex decision-making process.

Limitations and future research

Our study focuses on interactivity within the scope of a pension planner, further research efforts are required to obtain additional insights into this topic. First, the basic information contained in the pension planner, i.e. income, occupational pension and state pension, was fictional and consequently might have not been able to elicit the desired motivation and involvement of the participants. An interesting extension of our study would, therefore, be using personal, self-relevant data to see whether the effects will be strengthened than when using fictional data.

Second, as the effect of interactivity on both forms of involvement has proven to be statistically insignificant, it might be insightful to identify the mechanism that actually underlies the relationship between interactivity and several outcome variables in a pension context. Sicilia *et al.* (2005) made use of thought elicitation to measure the amount of information processing that took place during exposure to a website. Participants were instructed to recall as many thoughts as possible from the time they were exposed to the website. This final amount of information processing could potentially play a mediating role.

Third, besides gender, there might be other factors that possibly influence the results. For example, previous literature has included, need for cognition as a moderator, defined as the extent to which individuals enjoy effortful thinking, extensive deliberation and thinking abstractly (Sicilia *et al.*, 2005). Interestingly, the ELM also predicts that to process information more effectively via the central route, individual factors such as the need for cognition are responsible for arousing the motivation required to process this information (Petty and Cacioppo, 1986). Liu and Shrum (2002) integrated desire for control as a personal motivational factor, which refers to the extent to which people are motivated to see themselves in control of their life events. Likewise, individuals' ability to understand the information in the planner (e.g. financial literacy) might interact with the involvement dimension. For example, more literate individuals might be more influenced by cognitive involvement, while less literate individuals might be more influenced by affective involvement.

Fourth, interactivity is a broad concept that is composed of several features and appears in different forms. Our research specifically investigated the effects of personalised interactive features in a pension planner that focussed exclusively on human-to-computer interaction. Further research needs to study the effects of other features that shape a user's perception of interactivity such as e-mail links, games or chat rooms, which simultaneously include aspects of human-to-human interactivity. Moreover, it might be interesting to study not only the effects of interactivity in a pension planner, but in a pension website in general. It could, for example, be tested whether including live chats with employees, where personal interaction takes place, has a beneficial effect in the pension environment, which is not only a low involvement context, but also constitutes a sensitive and private topic.

Fifth, our study used the number of clicked options to measure the attention with which participants interacted with the pension planner. Yet, it is possible that participants only clicked on several options as a matter of form, but did not really engage with the tool. They might have, for example, directly left the option after clicking on it. Therefore, it would be interesting to investigate other measures of attention, such as the time spent on the pension planner itself, to get an impression of how attentive participants were during exposure to the stimulus. Future research should also study additional behaviours and examine whether more downstream behaviours, such as saving, are also affected by increasing levels of interactivity.

References

Aegon Retirement Readiness Survey (2018), "A new social contract", available at www.aegon.com/research/reports/yearly/aegon-retirement-readiness-survey-2018-a-new-social-contract/ (accessed 26 November, 2018).

Ajzen, I. and Fishbein, M. (1969), "The prediction of behavioral intentions in a choice situation", *Journal of Experimental Social Psychology*, Vol. 5 No. 4, pp. 400-416.

Bajtelsmit, V.L., Bernasek, A. and Jianakoplos, N.A. (1999), "Gender differences in defined contribution pension decisions", *Financial Services Review*, Vol. 8 No. 1, pp. 1-10.

Benartzi, S. and Thaler, R.H. (2013), "Behavioral economics and the retirement savings crisis", *Science (New York, N.Y.)*, Vol. 339 No. 6124, pp. 1152-1153.

Brodie, R.J., Ilic, A., Juric, B. and Hollebeek, L. (2013), "Consumer engagement in a virtual Brand community: an exploratory analysis", *Journal of Business Research*, Vol. 66 No. 1, pp. 105-114.

Bucy, E.P. (2004), "The interactivity paradox: closer to the news but confused", in Bucy, E.P. and Newhagen, J.E. (Eds), *Media Access: Social and Psychological Dimensions of New Technology Use*, Routledge, New York, NY, pp. 47-72.

Cho, C.H. and Leckenby, J.D. (1999), "Interactivity as a measure of advertising effectiveness", in *Proceedings of the American Academy of Advertising*, University of FL, Gainesville, FL, pp. 162-179.

Cyr, D., Head, M. and Ivanov, A. (2009), "Perceived interactivity leading to e-loyalty: development of a model for cognitive–affective user responses", *International Journal of Human-Computer Studies*, Vol. 67 No. 10, pp. 850-869.

Danaher, P.J. (1998), "Customer heterogeneity in service management", *Journal of Service Research*, Vol. 1 No. 2, pp. 129-139.

Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13 No. 3, pp. 319-340.

Dellaert, B.G. (2010), "Interactive online decision aids for complex consumer decisions: opportunities and challenges for pension decision support", Netspar Panel Paper 19.

Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J. and Wagner, G.G. (2011), "Individual risk attitudes: measurement, determinants, and behavioral consequences", *Journal of the European Economic Association*, Vol. 9 No. 3, pp. 522-550.

Eberhardt, W., Brüggen, E., Post, T. and Hoet, C. (2016), "Segmentation of pension plan participants: identifying dimensions of heterogeneity", Netspar Design Paper 47.

EIOPA (European Insurance and Occupational Pensions Authority). (2013), "Good practices on information provision for DC schema, enabling occupational DC scheme members to plan for retirement", available at: https://eiopa.europa.eu/Publications/Reports/Report_Good_Practices_Info_for_DC_schemes.pdf (accessed 26 November, 2018).

Flynn, L.R. and Goldsmith, R.E. (1999), "A short, reliable measure of subjective knowledge", *Journal of Business Research*, Vol. 46 No. 1, pp. 57-66.

Ford, N., Miller, D. and Moss, N. (2001), "The role of individual differences in internet searching: an empirical study", *Journal of the American Society for Information Science and Technology*, Vol. 52 No. 12, pp. 1049-1066.

Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2013), *Multivariate Data Analysis*, Pearson, London.

Harrison, T., Waite, K. and Hunter, G.L. (2006), "The internet, information and empowerment", *European Journal of Marketing*, Vol. 40 Nos 9/10, pp. 972-993.

Heinonen, K., Strandvik, T., Mickelsson, K.-J., Edvardsson, B., Sundström, E. and Andersson, P. (2010), "A customer dominant logic of service", *Journal of Service Management*, Vol. 21 No. 4, pp. 531-548.

Hollebeek, L.D., Conduit, J. and Brodie, R.J. (2016), "Strategic drivers, anticipated and unanticipated outcomes of customer engagement", *Journal of Marketing Management*, Vol. 32 Nos 5/6, pp. 393-398.

Hollebeek, L.D., Glynn, M.S. and Brodie, R.J. (2014), "Consumer brand engagement in social media: conceptualization, scale development and validation", *Journal of Interactive Marketing*, Vol. 28 No. 2, pp. 149-165.

Jaakkola, E. and Alexander, M. (2014), "The role of customer engagement behavior in value co-creation: a service system perspective", *Journal of Service Research*, Vol. 17 No. 3, pp. 247-261.

Jiang, Z., Chan, J., Tan, B.C. and Chua, W.S. (2010), "Effects of interactivity on website involvement and purchase intention", *Journal of the Association for Information Systems*, Vol. 11 No. 1, pp. 34-59.

Jones, Q., Ravid, G. and Rafaeli, S. (2004), "Information overload and the message dynamics of online interaction spaces: a theoretical model and empirical exploration", *Information Systems Research*, Vol. 15 No. 2, pp. 194-210.

Krijnen, J.M., Zeelenberg, M. and Breugelmans, S.M. (2015), "Decision importance as a cue for deferral", *Judgment and Decision Making*, Vol. 10 No. 5, pp. 407-415.

Liao, C.H., Tsou, C.W. and Shu, Y.C. (2008), "The roles of perceived enjoyment and price perception in determining acceptance of multimedia-on-demand", *The International Journal of Business and Information*, Vol. 3 No. 1, pp. 27-52.

Liu, Y. and Shrum, L.J. (2002), "What is interactivity and is it always such a good thing? implications of definition, person, and situation for the influence of interactivity on advertising effectiveness", *Journal of Advertising*, Vol. 31 No. 4, pp. 53-64.

Loonam, M. and O'loughlin, D. (2008), "An observation analysis of e-service quality in online banking", *Journal of Financial Services Marketing*, Vol. 13 No. 2, pp. 164-178.

McMahan, C., Hovland, R. and McMillan, S. (2009), "Online marketing communications: exploring online consumer behavior by examining gender differences and interactivity within internet advertising", *Journal of Interactive Advertising*, Vol. 10 No. 1, pp. 61-76.

McMillan, S.J. and Hwang, J.S. (2002), "Measures of perceived interactivity: an exploration of the role of direction of communication, user control, and time in shaping perceptions of interactivity", *Journal of Advertising*, Vol. 31 No. 3, pp. 29-42.

MacKenzie, S.B., Lutz, R.J. and Belch, G.E. (1986), "The role of attitude toward the ad as a mediator of advertising effectiveness: a test of competing explanations", *Journal of Marketing Research*, Vol. 23 No. 2, pp. 130-143.

Noort, G., Van Voorveld, H.A. and Van Reijmersdal, E.A. (2012), "Interactivity in brand web sites: cognitive, affective, and behavioral responses explained by consumers' online flow experience", *Journal of Interactive Marketing*, Vol. 26 No. 4, pp. 223-234.

Petty, R. and Cacioppo, J.T. (1986), *Communication and Persuasion: Central and Peripheral Routes to Attitude Change*, Springer Science & Business Media, New York, NY.

Preacher, K.J. and Hayes, A.F. (2004), "SPSS and SAS procedures for estimating indirect effects in simple mediation models", *Behavior Research Methods, Instruments, & Computers*, Vol. 36 No. 4, pp. 717-731.

Rickwood, C. and White, L. (2009), "Pre-purchase decision-making for a complex service: retirement planning", *Journal of Services Marketing*, Vol. 23 No. 3, pp. 145-153.

Rust, R.T. and Huang, M.H. (2014), "The service revolution and the transformation of marketing science", *Marketing Science*, Vol. 33 No. 2, pp. 206-221.

Schlosser, A.E. (2003), "Experiencing products in the virtual world: the role of goal and imagery in influencing attitudes versus purchase intentions", *Journal of Consumer Research*, Vol. 30 No. 2, pp. 184-198.

Sicilia, M., Ruiz, S. and Munuera, J.L. (2005), "Effects of interactivity in a web site: the moderating effect of need for cognition", *Journal of Advertising*, Vol. 34 No. 3, pp. 31-44.

Song, J.H. and Zinkhan, G.M. (2008), "Determinants of perceived web site interactivity", *Journal of Marketing*, Vol. 72 No. 2, pp. 99-113.

Steuer, J. (1992), "Defining virtual reality: dimensions determining telepresence", *Journal of Communication*, Vol. 42 No. 4, pp. 73-93.

Stevenson, J.S., Bruner, G.C. and Kumar, A. (2000), "Webpage background and viewer attitudes", *Journal of Advertising Research*, Vol. 40 Nos 1/2, pp. 29-34.

Sundar, S.S., Kalyanaraman, S. and Brown, J. (2003), "Explicating website interactivity: impression-formation effects in political campaign sites", *Communication Research*, Vol. 30 No. 1, pp. 30-59.

Tam, K.Y. and Ho, S.Y. (2006), "Understanding the impact of web personalization on user information processing and decision outcomes", *MIS Quarterly*, Vol. 30 No. 4, pp. 865-890.

TIAA-CREF (2014), "TIAA-CREF survey finds Americans spend less time planning their IRA investment than choosing a restaurant", available at: www.tiaa.org/public/about-tiaa/news-press/press-releases/pressrelease495.html (accessed 26 November, 2018).

UN report (2015), "World population ageing", available at: www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2015_Report.pdf (accessed 26 November, 2018).

Van Doorn, J., Lemon, K.N., Mittal, V., Nass, S., Pick, D., Pirner, P. and Verhoef, P.C. (2010), "Customer engagement behavior: theoretical foundations and research directions", *Journal of Service Research*, Vol. 13 No. 3, pp. 253-266.

Weinstein, N.D., Atwood, K., Puleo, E., Fletcher, R., Colditz, G. and Emmons, K.M. (2004), "Colon cancer: risk perceptions and risk communication", *Journal of Health Communication*, Vol. 9 No. 1, pp. 53-65.

Wiener, J. and Doescher, T. (2008), "A framework for promoting retirement savings", *Journal of Consumer Affairs*, Vol. 42 No. 2, pp. 137-164.

Yang, F. and Shen, F. (2017), "Effects of web interactivity: a meta-analysis", *Communication Research*, Vol. 45 No. 5, pp. 1-24.

Zaichkowsky, J.L. (1994), "The personal involvement inventory: reduction, revision, and application to advertising", *Journal of Advertising*, Vol. 23 No. 4, pp. 59-70.

Corresponding author

Elisabeth Christine Brüggen can be contacted at: e.bruggen@maastrichtuniversity.nl