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How Tailoring the Mode of Information Presentation Influences Younger and Older Adults' Satisfaction with Health Websites

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Although older adults are increasingly using online health information, many websites are not senior-friendly, which might lead to user-problems and dissatisfaction among older people. It has been suggested that websites targeted at older adults should take into account age-related abilities and limitations, for example by providing the opportunity to adjust the modality (i.e., "mode") of information presentation based on visual and auditory capabilities. This study investigates the effects of a mode-tailored website, allowing users to self-tailor the mode of information presentation, on younger and older adults' satisfaction with health websites. The results from a 5 (*condition*: tailored vs. text, text with visuals, text with audiovisual, combination) × 2 (*age*: younger [25–45] vs. older [≥ 65] adults) experimental study ($N = 563$) show that mode tailoring positively influenced satisfaction with the attractiveness and comprehensibility of the website, as compared to non-tailored conditions. These effects on website satisfaction were not different for younger and older adults. The current study provides relevant insights for researchers and practitioners in the field of digital health communication.

Recent statistics show that around half of the elderly population, both in Europe and the United States, go online every day (Eurostat, 2014; Pew Research Center, 2014; Statistics Netherlands, 2011, 2013). Next to activities such as emailing and online banking, older adults mostly use the Internet for health information (Statistics Netherlands, 2013). Online health information – in the form of patient portals or the more widespread health websites – can be a valuable addition to communication with healthcare providers (Rider, Malik, & Chevassut, 2014), and serves functions such as information provision, information exchange, and promoting self-management (Bol et al., 2013; Bolle et al., 2015). However, many of the available health websites do not consider age-related factors in their design (Becker, 2004; Bolle et al., 2016), which could partly explain why many older adults who go online to obtain health information are not satisfied with the information they find (Rideout, Neuman, Kitchman, & Brodie, 2005).

Because of the plentiful possibilities of the Internet, online health information is in itself much richer than traditional formats of health information (e.g., print, television), and thus there are many message features that can be tailored to individual characteristics (e.g., content, delivery mode, and the level of interactivity). An advantage of online health information is that it provides the opportunity to deliver information through different modalities (i.e., modes), such as textual, visual, and/or audiovisual information, to suit individual preferences and abilities (Lustria et al., 2013; Ritterband, Thorndike, Cox, Kovatchev, & Gonder-Frederick, 2009; Smit, Linn, & Van Weert, 2015). Until now, tailoring studies have mainly focused on adjusting the message *content* to match the preferences or characteristics of recipients. However, as individuals also differ in their preferences for information modality and processing styles (Heo & Cho, 2009; Felder & Silverman, 1988), it is important to consider the *mode* of information presentation in the design of online health information as well (Smit et al., 2015).

Particularly, older adults often cope with age-related sensory (e.g., impaired vision and/or hearing) and cognitive declines (e.g., reduced processing speed), which are likely to alter their mode preferences regarding online information (Kiessling et al., 2003; Loos & Romano Bergstrom, 2014; Ogozalek, 1994; Soroka et al., 2006; Wright et al., 2008). When individual preferences and age-related factors are not considered, this might negatively influence older adults' experience and satisfaction with websites (Chen & Chan, 2011; Hawthorn, 2000; Wagner, Hassanein, & Head, 2014). One way to take age-related factors into account when developing online health information is to tailor the mode of information presentation to individual

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preferences and abilities. While scholars have recently suggested that *mode tailoring* can be used as a strategy to improve the design of online health information (Smit et al., 2015) – in particular for older adults (Bol et al., 2013; Nguyen et al., 2017) – it is still unclear how mode-tailored information is evaluated by users.

This study aims to test the effects of mode tailoring – when users can adjust the mode of information presentation via textual, visual, and/or audiovisual information – on evaluative outcomes that are considered important for health websites, namely satisfaction with a) the attractiveness of the website, b) the comprehension of the website's information, and c) the emotional support from the website among older adults (≥65 years) and younger adults (25–45 years).

Theoretical Background

Satisfaction with Health Websites

Satisfaction with online health information is suggested to be an important indicator of appropriate use of online interventions (Spittaels, De Bourdeaudhuij, Brug, & Vandelanotte, 2007), and consequently of more positive health-related outcomes (e.g., McKay, King, Eakin, Seeley, & Glasgow, 2001; Vandelanotte, Spathonis, Eakin, & Owen, 2007; Wang, Wang, & Maercker, 2016). Furthermore, satisfaction with online health materials has been shown to be related to patient health-related outcomes such as recall of medical information (Bol et al., 2014), which is in turn important for coping with and managing diseases (Linn, Van Dijk, Smit, Jansen, & Van Weert, 2013; Van der Molen, 1999). Users of online health information can be satisfied with health websites in different ways. First of all, one can be satisfied with the attractiveness of a website, which relates to the liking of the overall design of the website, and whether the website is judged to be well developed (Bol et al., 2014; Van Weert et al., 2011). Next to the aesthetics of the website, users can base their evaluation on its comprehensibility. For example, whether the health information on a website is clear and understandable (Bol et al., 2014). Finally, users can be satisfied with the emotional support of a health website, for example when the website increases self-confidence, or puts someone at ease (Bol et al., 2014). Previous studies have shown that health websites might play an important role in helping people to cope with illness, and deal with negative emotions and distress (Lee, Hwang, Hawkins, & Pingree, 2008; Ziebland et al., 2004). Therefore, the current study focuses on these three dimensions of website satisfaction.

Tailoring the Mode of Information Presentation

A starting point for examining how mode tailoring influences evaluative outcomes, such as website satisfaction, is to consider how tailored information is processed. The elaboration likelihood model (ELM) is a widely applied theoretical framework in the tailoring literature (Petty, Barden, & Wheeler, 2002), which posits that attitudes (i.e., evaluative outcomes) can be influenced through persuasive messages in different ways. Depending on both the *ability* and *motivation* of individuals to process information, people either form more robust attitudes (i.e., when

information is processed centrally) or more instable attitudes (i.e., when information is processed peripherally). Tailoring, or adjusting information to individual abilities and motivations, can be used as a strategy to facilitate central processing and is thus expected to maximize the effect of online health information. Mode tailoring specifically, can facilitate both the ability (e.g., by adapting to individual processing styles) and motivation (e.g., by adjusting to individual mode preferences) to process information better – which is likely to result in more stable and favorable attitudes toward the health information.

Although scholars have previously suggested that individuals should be able to choose the preferred mode of health information delivery as it is expected to improve the evaluative outcomes of health materials (e.g., Foley, Maddison, Jones, Brown, & Davys, 2011; Vandelanotte, Duncan, Plotnikoff, Mummery, 2012), empirical studies examining the effect of mode tailoring on satisfaction are scarce. Yet, research has indicated that individual preferences for modality in online information exist, such as text-oriented and audiovisual-oriented people (Heo & Cho, 2009). Additionally, individual processing styles could also define one's preferences for the mode of information presentation, such as verbal learners who might prefer textual information as opposed to visual learners who might prefer illustrations or moving images (Felder & Silverman, 1988). Moreover, an early study by Bakker (1999) found that adolescents with a low need for cognition were more likely to develop positive attitudes toward health messages in a visual cartoon form than written messages, while written messages were more effective for adolescents with a high need for cognition. These findings are consistent with the theory-based assumption that information will be evaluated more positively (i.e., more favorable attitudes) when the information delivery mode is tailored to individual processing abilities.

Similar to how website satisfaction consists of different cognitive (i.e., comprehensibility) and affective dimensions (i.e., attractiveness and emotional support), attitudes are also widely assumed to consist of both cognitive and affective components (Crites Jr, Fabrigar, & Petty, 1994; Eagly & Chaiken, 1998). Although it is unclear how mode tailoring influences these cognitive or affective dimensions of attitude, we expect, based on the theoretical assumptions and empirical evidence described above, that tailoring the mode of information leads to higher satisfaction with health websites, for both cognitive and affective dimensions. Specifically, we hypothesize that:

H1: Exposure to a mode-tailored website results in *higher* satisfaction with the (a) attractiveness of the website, (b) comprehensibility of the website, and (c) emotional support from the health website, as compared to exposure to a non-tailored website with either text-only, text with visuals, text with audiovisual, or a combination of all modes.

The Importance of Mode Tailoring for Older Adults

There is a widespread notion that variability in different domains increases with age. Namely, older adults differ more in fundamental domains such as biological, cognitive, personality and social characteristics than younger adults (e.g., Dannefer & Sell, 1988; Nelson & Dannefer, 1992; Stone, Lin, Dannefer, &

Kelley-Moore, 2016). This increased variability might lead to different preferences and abilities regarding the use of information and communication technologies and media among older users (Nimrod, 2013; Van Der Goot, Beentjes, & Van Selm, 2015). For example, older adults' preferences for modality are also dependent on decreases in age-related abilities such as vision, hearing, and cognition (Loos & Romano Bergstrom, 2014; Soroka et al., 2006; Wright et al., 2008). Hence, this "aged heterogeneity" should be taken into account when developing health websites targeted at older adults (Morrell, 2002; Watkins & Xie, 2014). Mode tailoring, by taking into consideration individual preferences and abilities regarding information presentation modes, is likely to be an effective solution to enhance satisfaction with health websites, particularly among older users.

Furthermore, the technology acceptance model (Venkatesh, 2000), posits that computer self-efficacy is an important factor influencing user evaluations. In general, older adults feel less self-efficacious about using computers and find it more difficult to adequately use online health information than younger adults (Laguna & Babcock, 1997; Tennant et al., 2015). The lack of skills and self-efficacy might lead to more negative evaluations of health information that is being delivered through the Internet or a computer (Chen & Chan, 2011). However, at the same time, health technologies that address older adults' needs and abilities might actually empower them and lead to more positive evaluations online information (McMellon & Schiffman, 2002; Samoocha, Bruinvels, Elbers, Anema, & Van Der Beek, 2010). Specifically related to mode tailoring, earlier research has hinted that offering older adults a website, where they can self-tailor the mode of information presentation to match their preferences and abilities, can enhance perceptions of self-efficacy regarding the use and evaluation of online health information (Nguyen et al., 2018). As mode tailoring is expected to be particularly relevant and beneficial for older adults, we hypothesize that:

H2: The effect of mode tailoring on satisfaction with the (a) attractiveness of the website, (b) comprehensibility of the website, and (c) emotional support from the health website is relatively stronger for older adults than for younger adults.

Method

A 5 (condition: mode-tailored vs. non-tailored text-only, text with visuals, text with audiovisual, combination) × 2 (age group: younger [25–45] vs. older adults [≥65]) factorial between-subjects experiment was conducted to test the hypotheses. This study is part of a larger research project. A different paper has already been published which focused on the effects of mode tailoring on cognitive information processing in younger and older adults (see also Authors, 2017a). The current study, however, focuses on the effects of mode tailoring on evaluative outcomes for health websites, which are satisfaction with the attractiveness of the website, satisfaction with the comprehensibility of the website, and satisfaction with the emotional support from the website. Ethical approval was provided

by the Amsterdam School of Communication Research (ASCoR).

Stimulus Materials: Health Websites

Five versions of a health website (mode-tailored, text-only, text with visuals, text with video, and combination of all modes) were developed for this study. All five website versions contained the same content and used the same layout, except for the different modalities used in each condition and the tailoring function on the mode-tailored website. The content and lay-out were based on an existing webpage of the Gastro Intestinal Oncological Center Amsterdam (GIOCA), which is a medical clinic specialized in fast diagnostics in complex cases of colorectal cancer, based in The Netherlands (from now on referred to as the clinic). As this clinic is relatively unknown, the website information was suitable for this study.

All website versions contained a general introductory description of the clinic in text. Beneath this general information, information was given about important topics that would be discussed with a physician in case of colorectal cancer (e.g., physical symptoms and genetics) in different modes, depending on the condition. The text-only version contained only textual information. The text with visuals version included text supported by cognitive illustrations about topics that were mentioned in the text. Cognitive illustrations are explanatory visuals that support the text and aim to facilitate information processing (Bol et al., 2014). The text with video version contained the same introductory description of the clinic as in the text-only and text with visuals condition, but the information about important topics that would be discussed with a physician was communicated in a video. The verbal narration in the video was identical to the written text in the text-only and text with visuals condition. The combined version contained all modalities (text, visuals, and/or video) that were used in this study. This condition was included in order to rule out the possibility that the amount of information on the mode-tailored website could serve as an alternative explanation for possible effects of on our outcome variables. Lastly, the mode-tailored version also contained all modalities, but the modalities were adjustable to participants' own preferences. An example of the mode-tailored website and one of the non-tailored websites is shown in Figure 1.

Manipulation of Mode Tailoring

On the mode-tailored website, participants could self-tailor the information by selecting their preferred mode(s). A horizontal navigation bar was built-in at the top of the webpage, where participants could select and change their selection of the different modes (i.e., textual, visual, and/or audiovisual information) while viewing the website. On the right side of the webpage, an arrow was displayed pointed at the mode-tailoring tool, with the following instruction: "Select what you would prefer to see". All modes were turned off when participants opened the mode-tailored website. Participants could only see the introductory description about the clinic. This was done to ensure that

Fig. 1. Top: Mode-tailored website with male character (text, illustration, and video mode selected). Bottom: Non-tailored website with text and illustrations with female character.

participants had to select at least one mode before they saw any additional information.

Procedure

The data for this study was collected by the ISO certified online research company Panelclix. A stratified sample of Internet users was created in which younger and older adults, men and women, and high and low education levels were equally represented. To clearly distinguish younger from older adults, the younger group consisted of participants aged between 25 and 45 years (stratified to 25–34 and 35–45 years), while the older group consisted of participants aged 65 years and older (stratified to 65–74 and ≥75 years). Middle-aged participants (46–64 years) were screened out to create two clearly distinguished age groups with similar age ranges. Low education level ranged from no education followed to having a degree for the lowest level of secondary education in The Netherlands. High education level was determined by having a higher vocational education or university degree.

Members from the online research panel were invited to participate in this study via an email invitation. Participants could complete the online questionnaire from their own computer, and were given a financial reward comparable to € 1.50 or US $ 1.68. After giving informed consent, participants filled out their age,

gender and education level for stratification. Based on this information, participants were either screened out, or left to continue with the questionnaire. After participants' Internet use was recorded, they were randomized to view one of the five website versions. All participants received the instruction to imagine that they were just informed about a possible diagnosis of colorectal cancer, and that they would have an appointment at the clinic in the near future. Participants were informed that they could view the website as long as they wanted, and that they would receive questions about the website afterwards. Participants were asked to also pay attention to the "look and feel" of the website while viewing. The manipulation check, website satisfaction measures, and prior experience with cancer and the clinic were recorded after exposure to the website.

Participants

After initial screening for age, gender, and level of education for stratification purposes, 794 Dutch participants filled out the questionnaire. Next, participants were screened out if they did not meet our inclusion criteria, being: (1) participants had to select at least one mode of information (i.e., text, visuals, or audiovisual) on the mode-tailored website ($n = 36$); and (2) participants had to be exposed to the website for a minimum of 30 seconds, which was the minimum time needed to view and evaluate the website ($n = 200$). Participants were also excluded if they ignored the instructions, for example when they used a smartphone for viewing the website and filling out the questionnaire ($n = 13$); provided invalid data for stratification (e.g., zip code instead of age) ($n = 9$); or indicated having technical problems with the **questionnaire** or website ($n = 3$). Participants who had received treatment at the clinic were also excluded from data analysis ($n = 5$).

The final sample ($N = 563$, 71%) consisted of 264 younger adults ($M_{age} = 35.31$, $SD_{age} = 6.45$, range 25–45, 47% male) and 299 older adults ($M_{age} = 72.62$, $SD_{age} = 5.66$, range 65–88, 51% male). More younger adults were excluded than older adults, $\chi^2 = 48.69$, $p < .001$. The excluded participants did not differ from the included participants on gender, $\chi^2 = 1.47$, $p = .226$, and level of education, $\chi^2 = 0.73$, $p = .393$. Participants could meet more than one exclusion criterion, therefore the numbers of each exclusion criterion separately do not add up to the total number of participants that are excluded from further data analysis ($n = 231$).

Measures

Website Satisfaction
Website satisfaction was measured using the 10-item version of the Website Satisfaction Scale (WSS: Bol et al., 2015; Van Weert et al., 2011). The scale consists of three reliable subscales, namely satisfaction with the attractiveness (3 items, e.g., "the website is creative," $M = 4.72$, $SD = 1.34$, $\alpha = .89$), satisfaction with the comprehensibility (3 items, e.g., "the website is understandable," $M = 5.89$, $SD = 0.94$, $\alpha = .91$), and satisfaction with the emotional support (4 items, e.g., "the website gives ease of mind," $M = 4.68$, $SD = 1.19$, $\alpha = .92$) with answer options ranging from 1 "totally disagree" to 7 "totally agree". A confirmatory factor analysis (CFA) resulted in an adequate fit index, with $\chi^2 (30) = 3.78$, $p < .001$, standardized root mean square residual (SRMR) = .047,

root mean squared error of approximation (RMSEA) = .070, comparative fit index (CFI) = .981, Tucker-Lewis index (TLI) = .972.

Manipulation Check
The manipulation check comprised one item derived from the perceived interactivity subscale on active control (Voorveld, Neijens, & Smit, 2011); "I could decide how the health information was presented on the website" with answer options ranging from 1 "totally disagree" to 7 "totally agree" ($M = 4.48$, $SD = 1.57$).

Background Information
We recorded participants' Internet use in hours per week, and whether they, or an acquaintance, had been diagnosed with cancer.

Statistical Analyses

The manipulation was checked by a univariate analysis of variance (ANOVA), with additional simple effects analysis to check the manipulation within the younger and older adult group. Chi-square tests were used to check for successful randomization. The hypotheses were tested using ANOVAs. Post hoc comparisons (Bonferroni) were carried out when there was a significant difference between conditions.

Results

Manipulation and Randomization Check

The manipulation was successful. Participants in the mode-tailored condition had higher perceptions of being able to decide on how information was being presented on the website than participants in the non-tailored conditions, $F(4, 552) = 26.58$, $p < .001$, $\eta_p^2 = .16$ (see Table 1 for means and standard deviations). Furthermore, all background variables were equally distributed over the five experimental conditions. The conditions did not differ in age, $\chi^2 (4, N = 563) = 2.10$, $p = .718$; gender, $\chi^2 (4, N = 563) = 0.60$, $p = .964$; education level, $\chi^2 (4, N = 563) = 3.50$, $p = .478$; frequency of Internet use, $F(4, 558) = 1.70$, $p = .148$, $\eta_p^2 = .01$, being diagnosed with cancer, $\chi^2 (4, N = 563) = 3.55$, $p = .471$; and having an acquaintance diagnosed with cancer, $\chi^2 (4, N = 563) = 5.92$, $p = .663$. Additional analyses showed that there was no difference in Internet use between younger ($M = 21.74$, $SD = 17.02$) and older participants ($M = 19.34$, $SD = 14.43$), $t(518.47) = 1.79$, $p = .074$.

Table 1. Manipulation check

	n	M	SD
Text-only	99	3.90[a]***	1.61
Text with visuals	116	4.09[a]***	1.62
Text with audiovisual	126	4.32[a]***	1.38
Combination	119	4.50[a]***	1.47
Mode-tailored	102	5.70	1.11
Total	562	4.48	1.57

Note. The scale ranges from 1 to 7. A higher mean indicates a higher perception of being able to customize the information presentation on the website. *M*, mean; *SD*, standard deviation. Table does not add up to $N = 563$ due to one missing case. [a]Mean differs from mode-tailored condition within the total group (main effect of condition). *** $p < .001$.

General Website Use Information

Participants generally (91.7%) selected multiple modes of information, being a combination of text, visuals and/or audiovisual information (see Authors for a full description, 2017a). More specifically, older adults' modality choices varied more than those of younger adults, as they were more likely to choose visual and audiovisual information than younger adults. Participants spent an average of 3.48 minutes ($SD = 13.74$) on the health website, with no difference between younger and older adults, $t(561) = -51.30$, $p = .462$, and no difference between conditions, $F(4, 553) = 0.75$, $p = .556$, $\eta_p^2 = .01$.

Main Effects on Older and Younger Adults' Website Satisfaction

First, we hypothesized a positive main effect of mode tailoring on satisfaction with the (a) attractiveness of the website, (b) comprehensibility of the website, and (c) emotional support from the website – relative to non-tailored conditions (H1). Mode tailoring had a positive effect on satisfaction with the attractiveness as compared to the text-only, text with video and combination website (H1a), $F(4, 553) = 5.70$, $p < .001$, $\eta_p^2 = .04$. With respect to satisfaction with the comprehensibility (H1b), mode tailoring had a positive effect as compared to the combination website, $F(4, 553) = 3.22$, $p = .013$, $\eta_p^2 = .03$. Finally, there was no main effect of mode tailoring on satisfaction with the emotional support (H1c), $F(4, 553) = 2.01$, $p = .092$, $\eta_p^2 = .01$. To summarize, participants were more satisfied with the attractiveness and comprehensibility of a mode-tailored website, but not with the emotional support of a website, as compared to the non-tailored websites. Therefore, hypothesis one is partly confirmed. Table 2 displays descriptive statistics of website satisfaction for all conditions.

Interaction Effects of Condition and Age Group on Website Satisfaction

Second, we expected that older adults would be relatively more satisfied than younger adults with the (a) attractiveness of, (b) comprehensibility of, and (c) emotional support from the mode-tailored website over the non-tailored websites (H2). There were no interaction effects between condition and age group for satisfaction with the attractiveness (H2a), $F(4, 553) = 1.43$, $p = .223$, $\eta_p^2 = .01$, satisfaction with the comprehensibility (H2b), $F(4, 553) = 0.71$, $p = .585$, $\eta_p^2 = .00$, and satisfaction with the emotional support of the website (H2c), $F(4, 553) = 0.29$, $p = .887$, $\eta_p^2 = .00$. In other words, the effect of the mode-tailored website (vs. non-tailored websites) on website satisfaction was not different for younger and older adults. Therefore, hypothesis two is rejected.

Discussion

This study aimed to investigate the effect of mode tailoring on older (≥ 65) and younger (25–45) adults' website satisfaction. The results showed that mode tailoring – enabling users to self-tailor the preferred mode of information delivery via text, visuals, and/or audiovisuals – enhanced satisfaction with the attractiveness and comprehensibility of a website as compared to various versions of the non-tailored websites (H1ab). This effect was not visible for satisfaction with the emotional support from the website (H1c). Furthermore, the effects of mode tailoring (vs. the non-tailored websites) on website satisfaction were not stronger for older adults than for younger adults (H2).

As expected, we found that mode tailoring had a direct positive effect on satisfaction with the attractiveness and comprehensibility of the website (H1ab), indicating that mode tailoring can enhance satisfaction with health websites, regardless of age. However, based on the post hoc analyses, it is important to note that the effect of mode tailoring on satisfaction with the comprehensibility of the website was only marginal. Our findings are consistent with existing tailoring literature, which posits that when individuals receive information corresponding to their preferences, this motivates them to process information and enhances their satisfaction (e.g., Rimer & Kreuter, 2006). On the mode-tailored website, participants could self-tailor through which mode(s) they would like to receive the information. This makes it likely that participants received the information tailored to their preference, enhancing satisfaction with the attractiveness, and, but to a lesser extent, satisfaction with the comprehensibility of the health website.

Relatedly, participants were able to compare the different modes (i.e., text, visuals, and/or audiovisual) on the tailored website in

Table 2. Effects on website satisfaction

	n	Attractiveness		Comprehensibility		Emotional support	
		M	SD	M	SD	M	SD
Text-only	99	4.54[a]*	1.29	5.88	0.91	4.66	1.28
Text with visuals	116	4.93	1.24	6.03	0.79	4.89	1.09
Text with audiovisual	127	4.45[a]***	1.53	5.76	0.96	4.54	1.21
Combination	119	4.63[a]*	1.35	5.73[a]†	1.05	4.54	1.20
Mode-tailored	102	5.10	1.10	6.07	0.93	4.82	1.14
Total	563	4.72	1.34	5.89	0.94	4.68	1.19

Note. Website satisfaction consists of three subscales: (1) satisfaction with the attractiveness, (2) satisfaction with the comprehensibility, and (3) satisfaction with the emotional support. The subscales range from 1 to 7, where a higher mean indicates more satisfaction with the website. M, mean; SD, standard deviation. [a]Mean differs from mode-tailored condition within the total group (main effect of condition) based on post hoc comparisons.

† $p < .10$. * $p < .05$. *** $p < .001$.

order to make a decision about which information to attend to. Previous research has shown that offering the possibility to compare choice options enhances satisfaction with the choice made (Zhang & Fitzsimons, 1999). Post hoc analyses showed that *perceived control* over the customization of presentation mode mediated the effect of mode tailoring on website satisfaction, compared to all non-tailored conditions (see Appendix A). If users feel in control and are able to select the personally relevant information elements that motivate them to engage with the health materials, this is likely to trigger favorable evaluative outcomes. However, as we only measured one item of this scale (Voorveld et al., 2011), we are unable to draw firm conclusions based on our data. Nevertheless, studies investigating effects of customization of content, structure and presentation of online information have shown similar favorable effects (e.g., Kalyanaraman & Sundar, 2006; Bright & Daugherty, 2012, Marathe & Sundar, 2011). Although our data hint that perceived active control – a concept well-explored in the literature on interactivity of online content – might be a driver of mode tailoring effects on website satisfaction, further research should establish if this or other mechanisms are at work in explaining mode tailoring effects.

There was no effect of mode tailoring on satisfaction with the emotional support of the website (H1c). Emotional support from the website might be more defined by content-related matters, and less by the aesthetics of the website and how information is being presented. Furthermore, it could be that no effect was revealed, because we used analogue patients (i.e., disease-naïve participants) whose emotional involvement might differ from clinical patients. Although previous research suggests that the responses of disease-naïve participants can be largely comparable to those of clinical patients (Van Vliet et al., 2012; Visser et al., 2016), it could be that our participants had difficulty imagining the scenario. Nevertheless, previous studies by Bol (2015) have shown that the way in which health information is presented (via textual, visual, and/or audiovisual information) can influence satisfaction with the emotional support from a website in both disease-naïve and clinical patients. Future research should aim to explore whether and how mode-tailored information might also enhance satisfaction with emotional support, as this is important for health outcomes such as recall of information (Bol et al., 2014).

Regarding hypothesis 2, the effect of mode tailoring on website satisfaction was not different for older adults and younger adults, which could be a result of that both age groups had equal Internet experience in our sample (Hill, Dickinson, Arnott, Gregor, & McIver, 2011; Loos, 2011). In fact, the Internet use among the older adult group was relatively high, which is likely because our sample comprised of an online panel of participants. Similar studies involving both online participant panels and clinical samples have shown that older patients are more frail and generally use the Internet less than participants from online research panels (Bol, 2015). Replicating this study in a clinical sample, for example in chronically ill patients or cancer patients, might yield different results. Perhaps, tailoring the mode of information presentation is a particularly valuable addition for the frail patient population. In that case, the differences between older patients and younger patients could be more pronounced than in a disease-naïve sample as with the current study.

Alternatively, the novelty of the tailoring tool might also explain why there were no differences between younger and older adults' satisfaction with the health website. The mode tailoring tool is a novel and innovative addition to mainstream health websites. It is likely that older adults were not able to use the mode-tailored website to its full potential at the first encounter, and that this might have attenuated website satisfaction scores. Older adults are generally less computer-literate than younger adults, and therefore need more time to adapt to new technologies (Laguna & Babcock, 1997; Poynton, 2005). Although the mode-tailored website is partly designed to compromise for age-related limitations, visual, auditory and cognitive impairments that come with age might still influence the ease with which computer technologies are used (e.g., Chen & Chan, 2011). If older adults would have had the opportunity to use the mode-tailored website multiple times, and were able to learn from experience and optimally use the mode-tailored website, their satisfaction scores might have been higher. Future research could examine the effects of repeated use of such a mode-tailored website.

Implications and Future Research Directions

While previous computer-tailoring studies have mainly focused on tailoring website content (e.g., matching topics of health information), many scholars have suggested to investigate additional tailoring strategies such as tailoring the mode of information presentation (e.g., Smit et al., 2015). The current study is one of the first to operationalize mode tailoring as a new tailoring strategy, and to investigate the effects thereof on evaluative outcomes. The results suggest that mode-tailored websites, where users can self-tailor their preferred mode(s) of information presentation via textual, visual and/or audiovisual information, can be an effective tool to increase satisfaction with the attractiveness and comprehensibility of health websites. This study, therefore, does not only contribute to existing literature on online tailoring interventions, but also provides practical suggestions for web design in general.

The current study is only a first step toward a better understanding of mode tailoring as a (senior-friendly) strategy of tailored information provision. Although this study gives insight into the effects of mode tailoring on website satisfaction, knowledge on which underlying processes drive these effects is still lacking. For example, is mode tailoring effective because message recipients have – and perceive to have – active control over the information presented, and are able to select the personally relevant information elements on the website? To deepen our understanding of mode tailoring, we encourage researchers to further explore the effects as well as potential underlying mechanisms such as perceived active control over the website (Akrimi & Khemakhem, 2014; Liu & Shrum, 2009; Voorveld et al., 2011), engagement with the website (Oh & Sundar, 2015), cognitive load (Eveland & Dunwoody, 2001), perceived personal relevance (Jensen, King, Carcioppolo, & Davis, 2012; Lustria et al., 2016), and the fit between individual preference or processing style and information modality (Smit et al., 2015).

Next to investigating "why" mode tailoring might be effective, it is also important to investigate when, for which audience, and for which outcomes, mode tailoring can be utilized to design more effective messages. This includes replicating this study in other contexts and samples, such as participants with low and high cognitive ability or clinical patients, in order to ensure the generalizability of the results. In addition to investigating the effects and mechanisms of mode tailoring, qualitative usability research and eye tracking studies might provide valuable insight into how older adults interact with mode-tailored websites. Nevertheless, the results of the current study are promising, and call for further research on mode tailoring as a novel, additional tailoring strategy that can further maximize the effectiveness of health messages and health interventions.

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Appendix A
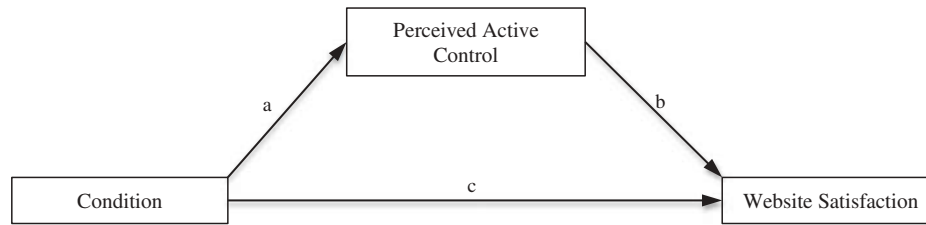Post hoc mediation analyses "Perceived Active Control"

Figure A1. Tested mediation model using PROCESS Model 7 (Hayes, 2012): Direct and indirect effect of condition on website satisfaction. The a-path refers to the effect of condition on perceived interactivity. The b-path refers to the effect of perceived interactivity on website satisfaction. The c-path refers to the direct effect of condition on the website satisfaction subscales. Age group was included as a moderator.

Table A1. Mediating effect of perceived active control

Condition (reference group = mode-tailored condition)	Indirect effect of X on Y [95% BCBCI]		Effect of X on M (a)	Effect of M on Y (b)	Direct effect of X on Y (c)
	Younger adults	Older adults			
Satisfaction with the attractiveness					
Text-only	**−0.82 (0.15)**	**−0.60 (0.11)**	−2.02***	0.41***	0.17
	[−1.14, −0.56]	**[−0.84, −0.41]**	(0.26)	(0.04)	(0.18)
Text with illustrations	**−0.78 (0.13)**	**−0.53 (0.11)**	−1.92***	0.41***	0.48**
	[−1.05, −0.54]	**[−0.77, −0.34]**	(0.25)	(0.04)	(0.17)
Audiovisual	**−0.52 (0.12)**	**−0.58 (0.10)**	−1.29***	0.41***	−0.11
	[−0.77, −0.31]	**[−0.80, −0.39]**	(0.25)	(0.04)	(0.16)
Combination	**−0.45 (0.11)**	**−0.48 (0.10)**	−1.12***	0.41***	0.02
	[−0.69, −0.26]	**[−0.71, −0.30]**	(0.24)	(0.04)	(0.16)
Satisfaction with the comprehensibility					
Text-only	**−0.32 (0.07)**	**−0.24 (0.05)**	−2.02***	0.16***	0.09
	[−0.48, −0.21]	**[−0.36, −0.14]**	(0.26)	(0.03)	(0.14)
Text with illustrations	**−0.30 (0.07)**	**−0.21 (0.05)**	−1.92***	0.16***	0.22†
	[−0.45, −0.19]	**[−0.32, −0.12]**	(0.25)	(0.03)	(0.13)
Audiovisual	**−0.20 (0.05)**	**−0.23 (0.05)**	−1.29***	0.16***	−0.07
	[−0.34, −0.12]	**[−0.35, −0.14]**	(0.25)	(0.03)	(0.13)
Combination	**−0.18 (0.05)**	**−0.19 (0.05)**	−1.12***	0.16***	−0.15
	[−0.29, −0.09]	**[−0.29, −0.11]**	(0.24)	(0.03)	(0.13)
Satisfaction with the emotional support					
Text-only	**−0.67 (0.13)**	**−0.50 (0.09)**	−2.02***	0.33***	0.44**
	[−0.95, −0.45]	**[−0.70, −0.34]**	(0.26)	(0.03)	(0.16)
Text with illustrations	**−0.64 (0.11)**	**−0.44 (0.09)**	−1.92***	0.33***	0.60***
	[−0.86, −0.45]	**[−0.63, −0.28]**	(0.25)	(0.03)	(0.16)
Audiovisual	**−0.43 (0.09)**	**−0.48 (0.09)**	−1.29***	0.33***	0.17
	[−0.64, −0.27]	**[−0.66, −0.33]**	(0.25)	(0.03)	(0.15)
Combination	**−0.37 (0.09)**	**−0.40 (0.09)**	−1.12***	0.33***	0.12
	[−0.56, −0.22]	**[−0.58, −0.24]**	(0.24)	(0.03)	(0.15)

Note. Mode-tailored condition = 0, non-tailored condition = 1. X = condition, M = perceived interactivity, Y = website satisfaction subscale. Unstandardized *b*-coefficients (with boot *SE* between parentheses); BCBCI = bias-corrected bootstrap confidence interval using 5000 bootstrap samples; significant indirect effects are bold. Total $N = 562$, due to one missing case. $N_{younger\ adults} = 264$, $N_{older\ adults} = 298$.
† $p < .10$. * $p < .05$. *** $p < .001$.