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Developing personas to examine older adult engagement with televised direct-to-consumer advertisements: A theory based approach

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ABSTRACT

Background: The average adult in the United States views up to 16 h of direct-to-consumer television advertisements (DTCA) per year, far exceeding time they spend with their primary care team. DTCAs present a unique opportunity to extend medical education beyond traditional medical settings and into the daily lives of patients. This is particularly valuable for populations with changing healthcare needs, such as older adults. As pharmaceutical companies invest in DTCAs, there is a growing need to identify what characteristics make viewers more likely to retain and act on medication information presented in DTCAs.
Objective: This paper presents a theory based approach to developing personas of older adult DTCA viewers that categorize characteristics influencing their approach to healthcare engagement.
Methods: In 2023, 25 older adult participants watched a one minute DTCA followed by a semi-structured interview. The interview guide applied concepts from the human factors engineering Communication-Human Information Processing model (C-HIP). C-HIP provided structure for both identifying personal characteristics that influence cognition and examining how these factors influence older adult's ability and desire to retain information from DTCAs. Personas were iteratively developed using qualitative analysis.
Results: The study yielded three main older adult DTCA viewing personas. These include: 1) medication averse older adults who actively avoid taking medications, 2) information seeking older adults who independently research health information to participate in shared-decision making, and 3) medication adhering older adults who prefer their provider to control decisions.
Conclusion: Constructing older adult personas provides insights into the heterogeneity among older adult approaches to engaging with health information. Each persona represents unique information priorities and personal characteristics of older adults when viewing advertisements, thus presenting a need for tailored patient-centered messaging in commercials.

1. Introduction

Direct-to-consumer advertisements (DTCA) are one of the most prominent means of medication exposure, with the average adult in the United States viewing more than 16 h of DTCAs per year.[1] In contrast, US adults spend an average of 18 min with their primary care provider annually.[2] Beyond primary care, US adults engage with their community pharmacists, often described as the most trusted and accessible health care professionals, just twice as often as primary care providers,[3–5] thus making DTCA exposure one of the most prevalent and accessible forms of medication education for the public.

In the context of the pharmaceutical industry, DTCA is the promotion of medications from the pharmaceutical company directly to patients.[6] This study focuses on televised DTCAs in the United States which are required to follow legal regulations set by the Food and Drug Administration (FDA). Per the FDA regulations, DTCAs must communicate the following in "consumer-friendly language": a "fair balance" of benefits and risks, brand and generic drug name, at least one FDA-approved use, and the most significant risks of the drug.[7,8] Broadcast DTCAs, including those on television, must include a "major statement" that articulates the most important risks in the advertisement audio and must provide either all the risks listed in the prescribing information or direct viewers to a

Abbreviations: DTCA, Direct-to-consumer advertisement; C-HIP, Communication-Human Information Processing model.

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variety of sources to find the drug prescribing information. FDA regulations were updated in 2017 to establish guidelines for product name placement and prominence and again in 2023 to clarify the major statement must be presented simultaneously in both the audio and visual portions of the DTCA "in a clear, conspicuous, and neutral manner".[9,10]

Given their high prevalence and informative content, DTCAs present a unique opportunity for medication education to transcend the clinic walls and educate adults outside the medical setting, in clear language they understand, with actionable prompts enabling them to confidently maximize limited time with their provider.

Despite less than half of patients retaining information supplied in DTCAs, pharmaceutical companies continue to invest in DTCA development with expenditures reaching $8.1 billion in 2022.[11] Amidst their high prevalence, only 30 % of adults find information from DTCAs to be helpful when talking with their providers and physicians report less than 20 % of their patients bring up DTCA information during appointments.[12,13] This means the vast majority of patients exposed to DTCAs are either not retaining the medication information being shared or not perceiving it to be not useful for addressing their healthcare conditions. With the mass expenditure on DTCAs there is a need to understand what characteristics differ between patients that do and do not engage with DTCAs, what elements of DTCAs are resonating with patients, and how they are using information from DTCAs to engage in conversations with their provider.

Current literature published on DTCAs ranges from ethical debates of DTCAs to perceptions of DTCAs and their influence on patient engagement with healthcare.[14] Proponents of DTCAs cite historically advertising has played a role in disseminating drug information and encouraging patient-provider interactions.[15–17] Prominent oppositions to DTCAs raise concerns about deviance from their initial priority of patient education potentially leading to inappropriate prescribing and overdiagnosis.[18–20]While it is crucial to prioritize research and consideration of the influence DTCAs may have on patient-provider relationships and patient safety, it is vital to also investigate how DTCAs are being perceived by their intended patient audience.

Research on older adults and DTCAs has found this age group is more likely to have difficulty comprehending information and recalling risks presented in DTCAs than younger age groups.[21–23] For example, when shown a DTCA with product comparison disclosures prominently featured, only 60 % of older adults accurately recalled the disclosure post-DTCA exposure.[24] When they do resonate, DTCAs have been found to give older adults courage to initiate medication conversations with their providers, facilitate an optimistic bias towards health issues, and increase older adult awareness of medications available to treat common health problems.[25–27] There has also been a demonstrated link between DTCA exposure and medication-related behaviors such as engaging in information-seeking or asking a pharmacist for more medication information.[28–30] This paper contributes to the expanding literature examining how older adults interact with current televised DTCAs and identifying behavioral differences that may shape how patients perceive the DTCAs.

Identifying behavioral nuances of an intended audience, such as patients that engage with DTCAs, can be achieved by constructing patient personas. Personas are a methodological tool frequently used in marketing and user-centered design to segment an audience based on distinct behavioral and demographic characteristics, past experiences, and potential behaviors.[31–34] Qualitative-based personas are created by taking interview data from real consumer characteristics and synthesizing them into fictitious consumer profiles used for designers to better empathize with their intended consumer.[35] Personas are a descriptive, rather than predictive, tool often developed from a small but rich data set of consumers. The persona creates a valuable tool for marketing and design teams to reference when aiming to create effective, consumer centered messaging.[36–38] In regards to DTCAs, constructing personas would provide tangible insights into the heterogeneity among patient approaches to engaging with health information.

In the pharmaceutical industry, personas are an opportunity to leverage patient characteristics to best connect desired medication information with their pre-existing attitudes and behaviors towards DTCAs. Identifying what DTCA factors are salient and how comprehension differs among patient viewers is the next step in enhancing the educational value of DTCAs and empowering patients to take ownership of their healthcare.

Given DTCAs increasing prevalence on television and the untapped potential for them to provide patient-centered education, there is a timely need to assess how older adults engage with and understand DTCAs. To investigate how DTCAs currently resonate with older adult viewers, the objective of this study was to characterize older adult patient demographics, attitudes towards medication and healthcare, and engagement with DTCA content into distinct personas.

2. Methods

2.1. Participants

This study was conducted in April of 2023 at a senior center in Southeast Wisconsin. The senior center provided access to participant recruitment and private rooms to conduct participant interviews. A convenience sample of 25 older adult participants were recruited. Participation criteria required participants to be older adults (aged 55 +), able to wear eye tracking glasses, have a primary care provider, and able to comfortably speak English. All 25 participants met criteria for participation and completed interviews for the persona analysis.[39,40]

2.2. Study design

The primary aim of this study was to create personas by categorizing older adult DTCA viewing behaviors. Participation involved the older adult watching a one-minute DTCA for the prescription medication Eliquis. Immediately following DTCA exposure, participants completed a 10–15 min semi-structured interview.[41] During the interview scale questions were printed out for participant reference. Participants were compensated for their time with $20 immediately upon completion of the study. This paper reports outcomes of the interview and persona development portion of the of a larger project. While eye tracking glasses were used as part of the research, the data was not integral to the persona development. These results will be disseminated in a future manuscript.

A DTCA for the medication Eliquis was selected for a variety of reasons. The first being it's prevalence on television at the time of the study: Eliquis was one of the top ten pharmaceuticals advertised on American television and has consistent annual increases in marketing spending.[42] Secondly, the selected advertisement was part of the "What's Next" campaign released within three years of the study which allowed for analysis of older adult reactions to current DTCAs. In addition to recency, the "What's Next" campaign features older adults as the main actors which was preferable for this study population. In these DTCAs the older adult is talking about living an active lifestyle even though they live with higher stroke risk. Thirdly, Eliquis was selected in hopes of it being a comfortable medication for older adults to talk about with the researcher. Since health information and medications can be a sensitive topic for participants to discuss openly, the research team aimed to prioritize participant comfort throughout participation in study to ensure a positive experience and elicit richer insights.[43]

2.3. Interview guide development and conceptual framework

The study team developed the interview guide with the end goal of creating older adult viewing personas. The interview guide used concepts from the literature and conceptual framework, the Communication-Human Information Processing model (C-HIP).[44]

C-HIP is a human factors engineering model providing structure for

examining how information is cognitively processed by a recipient.[45,46] The model was originally developed to understand how product warnings are understood by their intended audience. In the human factors field, there are varying definitions of warnings, but most agree an effective warning captures recipient attention and changes their behavior in a way that reduces potential negative consequences. This definition is foundational to C-HIP which aims to identify what motivates recipient behavior by synthesizing pre-existing cognitive factors with received warning information. DTCAs can be understood using criteria parallel to warnings for maximum comprehension. In this study, the message is equivalent to the advertisement being broadcast from a pharmaceutical company (the source) to intended patient viewer (the receivers). The channel refers to the mechanism by which the message is delivered which in the case of a DTCA is both auditory and visual. DTCAs must be more salient than other environmental factors to capture and sustain recipient attention (attention switch and attention maintenance). Once attention is secured the DTCA can be encoded into recipient memory (comprehension and memory). Viewers' pre-existing knowledge of medications and health experiences influence if and what they pay attention to in the advertisement (beliefs and attitudes) and can impact how they process the content. Ideally information aligns with viewer's existing knowledge, if information cannot be accommodated easily it will be less likely to hold attention, thus presenting a need to include understandable language and relevant content that resonates with the recipient to motivate a desired behavior. Whether or not the viewer asks their provider about the advertised DTCA (behavior) is the final stage in the C-HIP model.

The C-HIP model is depicted in Fig. 1.

Beyond accounting for the influence of personal factors on end behavior, C-HIP can trace bottlenecks in the message comprehension process and can represent feedback loops in which the "later" stages can influence processing at "earlier" stages of the model.[47] C-HIP has been applied in pharmaceutical education research with a study applying model components to guide investigation of how placement of drug risk information on a prescription drug website affects consumer comprehension of the message.[48]

The interview guide grouped similar topics and concepts together (i.e., DTCA reflections, experience with healthcare, and demographics) and question order began with questions that required more cognitive work by the interviewee and ended with easier, demographic questions.[49] Questions were grouped into the following five sections: 1) memory and perceptions of the DTCA, 2) pre-existing attitudes related to DTCAs and medication information, 3) relationship with primary care provider 4) experience with healthcare, and 5) demographic and health questions. The interview guide can be found in Appendix A.

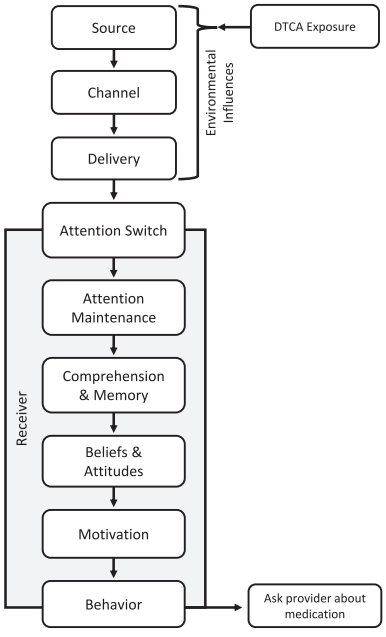

Fig. 1. Diagram of Communication-Human Information Processing Model.

Questions in the first section of the interview guide, centered around participant memory and perceptions of the DTCA, were derived from the C-HIP 'comprehension and memory' stage and intended to explore participant information recall immediately after DTCA exposure. The questions aimed to help determine if older adults differed in which elements of the DTCA they found most memorable.

The second part of the interview guide, focused on participant pre-existing attitudes related to DTCAs, contained questions derived from the 'beliefs and attitudes' stage of C-HIP and aimed to understand older adult attitudes towards DTCAs. Questions in this section also aimed to gather insights on participant television viewing behavior that may alter how they engage with information in advertisements such as frequency of television viewing and their perceived source trust.[50] The trust questions were derived from the 'source' stage of C-HIP to elicit participant perceived credibility of televised health information.

The third section of the interview guide focused on how the participant perceives their relationship with their primary care provider. Questions were derived from the 'receiver' stage of C-HIP. Research has found trust between patient and their provider is foundational to effective treatments and fundamental for patient-centered care.[51,52] Participant trust in their provider and perceived value of their contributions to medical decisions was measured using an adapted version of the validated Patient Satisfaction Scale.[53] Participants were also asked about their ideal relationship dynamic with their provider as it relates to medication decision making. Anticipated responses would determine if patients preferred a collaborative approach to medication decisions or a paternalistic approach where their provider makes a majority of medication decisions.[54]

The fourth section of the interview guide investigated how participants engage with healthcare and health information. Understanding how participants interact with healthcare is essential for informing persona creation and determining their comfort practicing self-advocacy. Information seeking was measured through questions derived from both the 'comprehension and memory' and 'receiver' stages of C-HIP to understand how participants would currently locate health information and their subsequent comprehension. Anticipated comprehension was measured using the Brief Health Literacy Scale (BHLS).[55]

The final section of the interview guide asked demographic questions to provide insights into both sample demographic distribution and how demographic traits may influence older adult intent to ask their provider about Eliquis post-DTCA exposure.

Questions were also asked to determine if after DTCA exposure participants would consider asking their provider about the advertised medication and if they would be eligible for the DTCA medication, Eliquis. This was done by having participants self-report if they were at risk for any of the conditions treated by Eliquis: deep vein thrombosis, pulmonary embolism, or risk of stroke from atrial fibrillation.[41] The DTCA used the aforementioned medical terminology; however when interviewing participants, the research team prioritized accurately capturing participant eligibility for Eliquis by using lay terms recommended by an expert community pharmacist for optimal participant comprehension. These included asking if the participants are at risk any of the following conditions: blood clots in legs, blood clots that get to your lungs, and/or risk of stroke from atrial fibrillation.

2.4. Persona development

To develop the DTCA viewing personas data from the semi-structured interviews were analyzed. All 25 semi-structured interviews were transcribed verbatim and coded in NVivio 12 software. Interviews

were coded using a primarily deductive approach guided by the nine stages of the C-HIP model.[56] When constructing personas the researcher followed published methods for iterative qualitative coding and synthesizing of interview data while maintaining the integrity of distinct differences in older adult experiences with healthcare to generate representative personas.[36,57–61] Transcript coding included the researcher first reading through each transcribed interview and coding participant quotes based on each construct of the C-HIP model. One study team member (EH) coded all the transcripts first using C-HIP model constructs and identified themes. Any questions in coding were shared with the co-investigator (MC) and senior mentors (TW) until reaching 100 % consensus. During review of initially coded quotations, the research team identified discussed nuanced themes emerging relating to how older adults recalled information, attitudes participants held about medicine, and various motivations they described for theoretically inquiring about the medication. Themes and exemplar quotes from the transcripts were shared with the study team to ensure face validity.

After this first round of coding, transcripts were inductively coded a second time for behavioral nuance emerging within each construct that represented differing characteristics for the older adult personas. These subcodes were beneficial for examining tone and language older adults used to describe their attitudes towards medicine as well. For example, the quote "*First I go to MyChart and send a message to my doctor. Then I would go online to Mayo Clinic to research before I see [my provider]*" was initially coded as the C-HIP construct 'receiver' as it was a characteristic of the older adult, then in the second round sub-coded as 'information seeking behavior' as it explains a pre-established research habit the older adult exhibits. After both rounds of reviews, the researchers produced 12 subcodes to capture specific elements of older adult behavior within the C-HIP domains. The codebook followed is provided in Table 2. The codes demonstrated behavior differences among the 25 older adults and therefore were included in persona development. When constructing personas, codes were carefully analyzed and integrated to ensure they accurately reflect the experiences and attitudes of the participants.

The study sample size was determined a priori and limited by budget resources and time. By the end of analysis, the study team confirmed the data reached saturation as no new themes emerged and the data was redundant.

As with most qualitative research methods, researcher positionality is omnipresent in study design, data collection, analysis, and reporting of qualitative findings.[62] Conceptualizations of positionality are often dichotomously classified as the researcher having an insider or outsider relationship to the population being studied.[63] In this study, the researcher shared demographic traits with a majority of the research participants such as race, language, and cultural background but differed in age generation and previous health and life experiences. This identity mix enabled the researcher to provide relatability and credibility to the participants while still maintaining enough distinction for natural clarification opportunities throughout the interview. The researcher practiced a conscious suspension of personal beliefs and immersion in the field with participants throughout data collection.[64] Further, the researcher practiced taking a reflexive approach to data analysis to limit internalized preconceptions as much as possible and focus on highlighting beliefs shared by participants.[65,66] To reduce researcher bias, throughout data coding and as personas began to emerge, codes were collaboratively analyzed with the diverse research team to determine which characteristics could be grouped around unique goals and motivations of each older adult.

3. Results

3.1. Study population

Table 1 presents demographic characteristics of the 25 participant sample. The mean age of the sample was 75.08 years (SD = 7.54, range 63–91), and 56 % identified as male and 44 % as female. A majority of participants identified as white (96 %). Most participants self-reported having at least one chronic condition (76 %), 40 % of participants self-reported they would be eligible for Eliquis, and 40 % self-rated their overall health as 'very good'. Most participants self-reported adequate health literacy (92 %) and there was a relatively even distribution of educational attainment spanning from completion of a high school degree to master's degree or higher.

Table 1
Participant Demographic Characteristics.

Characteristic	n	(%)
Age, years		
60–69	7	(28 %)
70–79	12	(48 %)
80–89	5	(20 %)
90 +	1	(4 %)
Gender		
Female	14	(56 %)
Male	11	(44 %)
Race		
White	24	(96 %)
Black	1	(4 %)
Education		
High school/GED	7	(28 %)
Associates or technical degree	8	(32 %)
Bachelor's degree	4	(16 %)
Master's degree or higher	6	(24 %)
Health literacy level [a]		
Low literacy	2	(8 %)
Adequate literacy	23	(92 %)
Chronic condition experience		
Yes	19	(76 %)
No	6	(24 %)
Eliquis Eligibility [b]		
Yes	10	(40 %)
No	15	(60 %)
Total health rating		
Excellent	3	(12 %)
Very good	10	(40 %)
Good	8	(32 %)
Fair	3	(12 %)
Poor	1	(4 %)

[a] Health literacy was assessed via the BHLS three-question survey. BHLS defines low health literacy as a summative score of ≤9 and adequate health literacy as a summative score of >9.

[b] Eliquis eligibility determined based on participant self-reporting experience with any of the following health conditions: 1) Blood clots in legs, 2) blood clots that get to your lungs, and/or 3) risk of stroke from atrial fibrillation.

3.2. Persona development

Upon coding all 25 older adult interview transcripts three main personas emerged: 1) medication averse older adults, 2) information seeking older adults, and 3) medication adhering older adults. During persona development it became apparent the root differences in these personas came from their health beliefs and attitudes rather than demographic variables (such as race, gender, and health literacy) or patient provider relationship factors (such as identity concordance or trust in provider). Similarly, the average time spent watching television was negligible between persona groups and all older adult participants reported watching at least one hour of television daily. Persona attributes can be compared in Table 3. Exemplar quotations are presented throughout the persona descriptions and can be compared in Table 4.

3.2.1. Persona one: medication averse

Eight participants were classified as medication averse. Compared to the other two personas, medication averse older adults generally have an associates or technical level of educational attainment and self-report

Table 2
Qualitative Interview Codebook.

Codes by C-HIP Framework	Code Definition
Source	
Trust in DTCA	Indications of attitudes towards DTCA reliability, elaboration on trust in DTCA scale questions
Attention	
Attention capturing DTCA elements	Self-report of what would make older adults pay attention during a DTCA
Comprehension	
Memory of DTCA	Mention of elements from Eliquis DTCA
Receiver	
Eliquis eligibility	Experience with indication symptoms for Eliquis or elaboration on eligibility questions
Experience with healthcare	Reflections on recent experience receiving health treatment
Information seeking behaviors	Mention of routines for gathering health information and how they determine reliability
Provider relationship dynamic	Preference for how medication decisions are made (ex. paternalistic vs collaborative), reflections on who leads conversations in appointment
Beliefs and Attitudes	
Attitudes towards medications	Perception of medications and comfort taking them
Attitudes towards DTCA	Opinions of DTCA content and exposure
Perceived purpose of DTCA	Perception of what message the DTCA is conveying and why
Behavior	
Intention to ask provider	Theoretical intention to or to not ask provider about medication
Intended provider discussion	Theoretical discussion points for initiating discussion about Eliquis with provider

Table 3
Attributes of three older adult DTCA personas.

Attribute	Medication Averse	Information Seeker	Medication Adhering
Age	73.75	73.60	78.71
Gender	Split female (n = 4) and male (n = 4)	Primarily female (n = 7), male (n = 3)	Split female (n = 3) and male (n = 4)
Race	White	Primarily white	White
Health literacy	11.18	12.75	11.85
Health rating	3.88	2.87	3.43
Education	Associates degrees	Distribution between high school and graduate degrees	College and graduate degrees
Visit frequency (visits/year)	1.25	2.65	2.67
Patient/ provider identity	Perceived discordance	Perceived discordance	Perceived discordance
Trust in doctor	8.43	8.9	8.71
Trust in DTCAs	5.25	6.4	5.14
Decision making dynamic	Collaborative	Collaborative	Paternalistic
Chronic conditions	No	Yes	Yes
Most memorable DTCA element	Scenery	Drug information	Mix of scenery and drug information
Perceived purpose of DTCA	To sell Eliquis	To inform people about Eliquis	To sell Eliquis and spread awareness

the highest overall health rank of 'very good'. Medication averse older adults would not ask their provider about Eliquis. Older adults were identified as being medication averse if they exhibited most of the following characteristics: 1) Self-identified as a 'non-medication' person, 2) actively reduce the number of medications they consume, 3) use a negative vocabulary when discussing medications, 4) avoid medications due to side effects, 5) were skeptical about DTCAs, and 6) scenery was most memorable DTCA element. Fig. 2 shows Medication Averse persona traits mapped onto the C-HIP model.

Table 4
Persona Exemplar Quotations.

Persona	Exemplar Quotation
Medication Averse	*"I am a non-medication person."* – Participant 6, self-identified white male, age 81
	"I'm working towards dropping my medications." – Participant 4, self-identified white male, age 63
	"I don't want to take drugs unless I absolutely have to." – Participant 1, self-identified white female, age 67
	"I would avoid [Eliquis] as much as I possibly can because of the side effects." – Participant 18, self-identified white male, age 75
	"I'm generally skeptical about [DTCAs], you know, years ago drug companies weren't allowed to advertise, and now they create a happy commercial like this [drug] is going to be wonderful and well, I'm skeptical about that." – Participant 18, self-identified white male, age 75
	"I enjoyed looking at the scenery more than listening to the ad." – Participant 22, self-identified white female, age 72
	"[I remember] all of the dangerous things that will happen to you if you take [Eliquis.]" – Participant 9, self-identified white male, age 91
Information Seeker	*"I go to WebMD or Mayo [Clinic] to just get some general information before I talk to my physician so that I'm informed with the background of treatment for symptoms and can discuss it with her."* – Participant 21, self-identified black female, age 70
	"[My Doctor and I] will come up with a plan and I make that a very important part of my visit. My body, my plan, but we're going to do this together." – Participant 19, self-identified white female, age 67
	"My two sources that I trust online are WebMD and MayoClinic.com." – Participant 11, self-identified white female, age 74
	"I would ask [my doctor] about the benefits and side effects and how that would affect my lifestyle." – Participant 3, self-identified white male, age 72
	"I think they [the advertisement source] wants you to see your doctor, they want you to know if you got this or if you have any of the effects of it." – Participant 13, self-identified white female, age 89
	"The drug was Eliquis and it was a blood thinner." – Participant 2, self-identified white female, age 79
Medication Adherent	*"I'm easy with taking medications, I just go with the recommendation of my physician."* – Participant 10, self-identified white male, age 77
	"They haven't brought up [Eliquis] so they must not want me on it so I wouldn't ask about it" – Participant 10, self-identified white male, age 77
	"If I should be taking [a medication] the doctor will tell me that." – Participant 12, self-identified white female, age 75
	"I guess I don't trust ads. I just trust my doctor and that they're working for me and not for the drug companies." – Participant 24, self-identified white male, age 86
	"You know I've heard in Europe they don't allow ads for drugs on TV and I think that would be a real good idea, just go to your doctor." – Participant 8, self-identified white male, age 77
	"I know it was Eliquis. What's it help with high blood pressure? Boy, that's bad. I don't even know, but I liked the scenery." – Participant 16, self-identified white female, age 76

Older adults in this persona had a common theme of prefacing medication related comments with a qualifier that they do not like medications, for example stating: "*I am a non-medication person*." Identifier comments arose when qualifying answers related to current medication taking behaviors. When medication averse older adults do have to take a medication, they do not intend on taking a medication continuously for health maintenance and set personal goals for going off of the medication eventually, for example "*I'm working towards dropping my medications*."

Medication averse older adults use negative connotations and

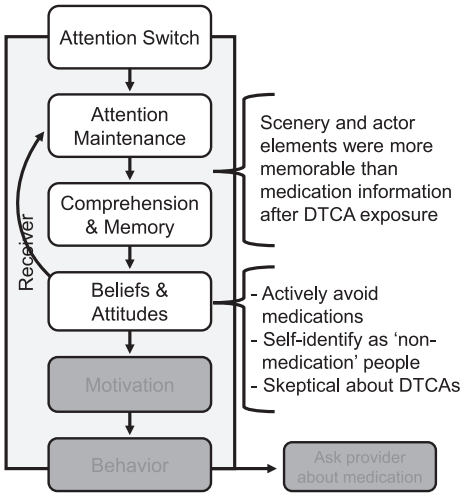

Fig. 2. Diagram of Communication-Human Information Processing Model tailored to Medication Averse persona cognitive processing.

vocabulary when answering questions about their medication taking habits. Most salient examples include referencing medications as a last resort, "*I don't want to take drugs unless I absolutely have* to." While most older adults did indicate a degree of concern surrounding side effects, the medication averse older adults were unique in using mention of side effects in a DTCA as a primary reason for avoiding a medication all together: "*I would avoid [Eliquis] as much as I possibly can because of the side effects*."

These older adults also displayed skepticism about the intention and legality of DTCAs. This skepticism is rooted in historic advertisement exposure with older adults explaining, "*I'm generally skeptical about [DTCAs], you know, years ago drug companies weren't allowed to advertise, and now they create a happy commercial like this [drug] is going to be wonderful and well, I'm skeptical about that.*" These older adults rely on historic exposure to DTCAs when forming beliefs about information they see in DTCAs.

After DTCA exposure, medication averse older adults most prominently recall of scenery DTCA elements. This was exemplified by them sharing they tend to engage with visuals in an advertisement more than auditory content as it brings them more joy: "*I enjoyed looking at the scenery more than listening to the ad.*" When medication averse older adults did remember drug information, it was related to negative elements in the advertisement, for example recalling: "*all of the dangerous things that will happen to you if you take it.*" Since they actively avoid medications, learning about potential medication is not of high priority or salience to them when compared to watching the pleasant visuals. This is an example of where a later stage in C-HIP, attitudes towards medications, influences an earlier stage, attention maintenance, which perpetuates older adult attention fixations on scenery and actor elements rather than switching to retain medication information.

3.2.2. Persona two: information seeker

Ten participants were classified as *information seekers*. Compared to the other personas, information seekers had the largest span of educational attainment from high school to graduate education and lowest self-reported overall health score averaging at 'good'. Information seekers were the most likely to ask their provider about Eliquis and be eligible for the medication, per self-reporting health conditions treated by Eliquis. Older adults were identified as being information seekers if they exhibited most of the following characteristics: 1) proactively prepare for medication discussions with their provider, 2) collaborate about medication decisions, 3) have established health information seeking habits, 4) use side effects as research or discussion starting points, 5) perceived DTCAs as informational, and 6) drug information is most memorable DTCA element. Fig. 3 shows Information Seeker persona traits mapped onto the C-HIP model.

Older adults in this persona commonly were proactive when planning appointments with their provider. Prior to an appointment they spend time gathering information about medications so they feel adequately informed and prepared for talking with their provider, for example explaining: "*I go to WebMD or Mayo [Clinic] to just get some general information before I talk to my physician so that I'm informed with the background of treatment for symptoms and can discuss it with her.*" Information seekers prefer to be collaborative and actively involved in medication decision making. When developing medication plans they ensure their voice is heard in decision making, for example sharing: "*We'll come up with a plan and I make that a very important part of my visit. My body, my plan, but we're going to do this together.*"

These older adults have pre-established routines for gathering medication information they deem high quality and accurate. In contrast to the other personas, information seekers have go-to websites for their independent online research explaining: "*My two sources that I trust online are WebMD and MayoClinic.com.*" Information seekers use side effects to inform their independent medication research and discussions with their provider. When prompted to share how they would theoretically ask their provider about Eliquis, these adults tend to bring up side effects in tandem with potential benefits: "*I would ask about the benefits and side effects and how that would affect my lifestyle.*"

Information seeking older adults perceived the primary purpose of the DTCA to be informational. Some of the older adults perceived the DTCA purpose was as broadly spreading awareness of the condition Eliquis treats and promoting seeing a provider regularly, for example: "*I think they want you to see your doctor, they want you to know if you got this or if you have any of the effects of it.*"

After DTCA exposure information seekers tended to remember drug information more than other elements of the advertisement. Information seekers had the highest instance of recalling the name of and purpose of the medication, for example recalling: "*The drug was Eliquis and it was a blood thinner.*" This is likely due to their acceptance of medications and interest in proactively acquiring knowledge about medication treatments prior to appointments with their provider. Learning about a medication aligns with their pre-existing beliefs and attitudes which facilitates the DTCA message to motivate older adults of this persona to

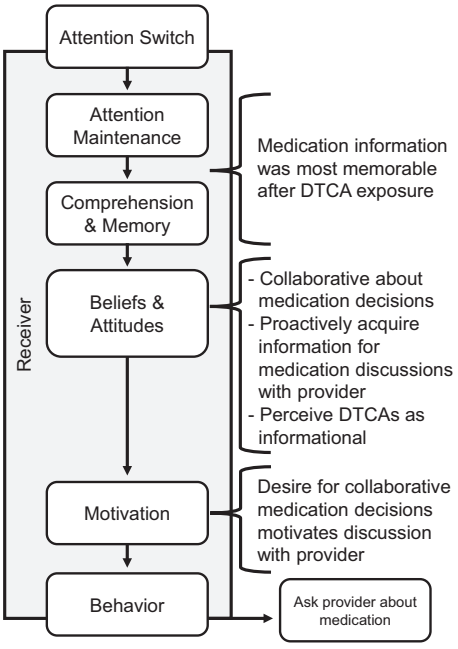

Fig. 3. Diagram of Communication-Human Information Processing Model tailored to Information Seeker persona cognitive processing.

ask, or consider asking, their provider about the medication.

3.2.3. Persona three: medication adherent

Seven participants were classified as *medication adhering*. Compared to the other personas, medication adherers had college or graduate level degrees and were an average of five years older than the other two personas. Medication adherers would not typically ask their provider about Eliquis. Older adults were identified as being medication adhering if they exhibited most of the following characteristics: 1) prefer provider to make medication decisions, 2) rely on provider for new medication information, 3) distrustful of DTCAs, 4) perceived DTCA purpose was to sell Eliquis, and 5) scenery was most memorable DTCA element. Fig. 4 shows Medication Adherent persona traits mapped onto the C-HIP model.

Medication adhering older adults uniquely preferred a paternalistic relationship with their provider as it relates to medication decision making. They are tolerant of being prescribed medications and trust their provider to make the best decisions for their health, for example stating: "*I'm easy with taking medications, I just go with the recommendation of my physician*." These older adults tend to rely on their provider to introduce them to new medication and seldom do independent research on new treatment options. Their pre-existing health beliefs are if they need a medication their provider will let them know, so they would not ask their provider for information about an advertised medication, for example stating: "*They haven't brought up [Eliquis] so they must not want me on it so I wouldn't ask about it*" and "*if I should be taking [a medication] the doctor will tell me that.*"

Medication adherers indicated a low trust in DTCAs and spoke negatively about them during the interview. Some of the DTCA distrust was rooted in personal attitudes towards drug manufacturers and medication adherer's tendency to trust their provider's knowledge over information shared by a pharmaceutical company: "*I guess I don't trust ads. I just trust my doctor and that they're working for me and not for the drug companies*." Their distrust is also driven by societal comparisons between the US and other nation's policies surrounding DTCAs. This knowledge contributes to their suspicion towards DTCAs: "*You know I've heard in Europe they don't allow ads for drugs on TV and I think that would be a real good idea, just go to your doctor*."

After DTCA exposure, medication adhering older adults most prominently recall scenery DTCA elements. They shared they found the scenery was most engaging and overshadowed their memory of drug information, for example stating: "*I know it was Eliquis. What's it help with high blood pressure? Boy, that's bad. I don't even know, but I liked the scenery.*" Given their pre-existing disinterest in engaging in medication discussions, receiving medication information is not a priority for this persona group. Thus, their beliefs and attitudes towards medication, being accepting but not interested in pursuing self-advocacy, present a barrier to motivating them to retain and act upon DTCA information. Instead, a feedback loop is enacted enabling attention maintenance on non-drug information presented in the DTCA since they do not have to prioritize fixating on drug information, they trust they will get from their provider.

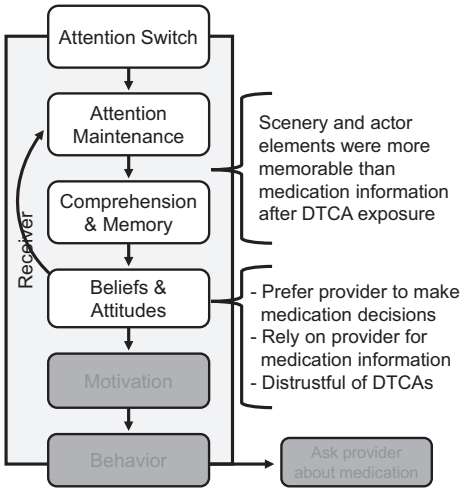

Fig. 4. Diagram of Communication-Human Information Processing Model tailored to Medication Adherent persona cognitive processing.

4. Discussion

The persona analysis revealed the three distinct categories of older adult viewing behaviors that facilitated their engagement with DTCAs. A primary distinction between older adult's approach to DTCA comprehension is in their pre-existing beliefs and attitudes towards medications. The medication averse and medication adherent older adults both had barriers to behavior in the 'beliefs and attitudes' stage of C-HIP as the information being communicated did not align with their pre-existing beliefs of how medication decisions should be carried out. In contrast, the information seeking older adults were more open to researching new medications and engaging in collaborative decisions about medications with their provider, so information could be more easily encoded into their memory and the desired behavior aligned with their pre-existing beliefs and attitudes.

Literature has demonstrated older adults prefer educational materials explicitly targeting the geriatric population.[15] While some tailoring exists to incorporate content familiar to older adults, they often get treated as a homogenous population in regards to what information is presented in marketing and educational materials. In both virtual and print marketing, attempts to resonate with older adults often includes portraying them through generalized beliefs and judgments about aging and older adults.[67,68] This study provides evidence of older adults having distinct characteristics that forge the way they engage with advertising, healthcare, and medical education. Additionally, this study demonstrates some groups of older adults are open to receiving medical education through DTCAs, despite assumptions that patients are skeptical and opposed to information shared in DTCAs. DTCAs are already a successful mechanism for exposing patients to medication information, but they need to be reconstructed to optimally serve an educational purpose and target discerning populations who are willing to listen.

One opportunity for increasing utility and comprehension of DTCAs is integrating patient-centered communication that resonates with the intended patient audience. Patient-centered communication has become a priority for a majority of health professions, yet pharmaceutical marketing trails behind when including understandable language for their audience.[69] This recommendation for patient-centered language is supported by the latest FDA guidance that aims to position patients as informed-decision makers in their healthcare through incorporation of "consumer-friendly" language.[10] While language used in a DTCA must still align with drug prescribing information, older adults may be able to comprehend DTCA content more effectively if there is less technical jargon and more alignment with vocabulary from information sources they already trust and comfortably comprehend.[70,71] The personas provide an opportunity to identify which components of the current sample DTCA resonate with various patient types. Beyond language, one critique of DTCAs is their frequent inclusion of positive imagery that is incongruent with simultaneous audio or smaller text detailing drug risks.[72] This strategy persists despite FDA guidelines suggesting the avoidance of distracting imagery during presentation of drug risk.[73] The persona results support this recommendation by demonstrating older adult recollection of the advertisements being the scenery in two of the personas. In order to both move towards "consumer-friendly" language and optimize patient comprehension, DTCAs could take cues from frequented, trusted health information sources and tailor their content to fit within the older adult information seeking frame of reference.

Additionally, the personas offer guidance for pharmaceutical

marketing teams to begin understanding how their communication may resonate with various audiences based on health attitudes and beliefs. While mass marketing is inherently generalized, applying findings from the personas may equip marketing teams with necessary context to tailor advertising content to best resonate with their intended patient audience. For example, this study found information seeking older adults have established self-research habits to frequent medical education websites, DTCAs could incorporate language that mirrors sources older adults frequent to increase familiarity. Additionally, emphasizing the symptoms and disease a drug is indicated to treat in lay terminology and providing information for the older adult to use when advocating for themselves in conversations with their primary care team may help promote educational application of information shared in DTCAs.[74]

These personas are also an initial step in primary care providers understanding the varying contexts with which older adult patients approach medication discussions. Even among a relatively similar sample, attitudes towards medication and health comprehension were heterogeneous. This confirms the need for communication with older adult patients, from pharmaceutical companies and providers alike, to be tailored to an individual's perspective of healthcare rather than generalized to the older population. The personas offer a first step in how to uncover complex patient attitudes and navigate communicating information in a way that will resonate with particular perspectives.

Future work could go in several directions to integrate and build off of this study's persona findings. This study represented a first step in applying personas to older adult DTCA comprehension and resulting behavior. Additional work could be done following a similar research methodology to validate the personas with a more extensive and diverse older adult population. Studies could also apply the knowledge gained from the personas when developing DTCA and other educational materials. The personas demonstrated the information seeking older adults are more likely to remember drug information presented in DTCAs and conduct independent research in preparation for appointments with their providers. This provides an opportunity to move towards the FDA recommendation of "consumer friendly language" by testing and incorporating language that aligns with their current trusted information sources to facilitate content relatability and retention.[8,10,75] Additionally, older adult health information seeking behavior is often influenced by their perceived community norms.[76] There is an opportunity to connect with medication adhering older adults by showing scenes that demonstrate older adults having a positive experience talking with their provider. The sample advertisement included visuals of the older adult and child enjoying nature, which was effective in capturing attention, but lacked the ability to foster familiarity and confidence in the patient during a discussion about the medication. While this persona group was unlikely to initiate a medication discussion, they remembered visual scenery presented in the DTCA, so there is potential for visual cues to begin shifting perceived social norms through repeat exposure to positive self-advocacy during appointments. This could be done by exchanging the typical non-health related scenery in DTCAs for scenes that reflect a positive older adult engagement with health care providers.

There are a few limitations to this study. First, these findings reflect the type of participants recruited in the study, the local senior center used for recruitment caters to a primarily white, middle-class population of older adults, and may not be generalizable to other demographics. In addition to limited diversity, there was also a limited sample number, which inhibits generalizability of findings to larger populations. Second, when investigating older adult attention and information recall of DTCAs, it is important to recognize the study environment is different than a natural setting where exposure occurs, such as in their home. The study environment was controlled with limited distractions, which is not necessarily representative of a home environment where there are personal behaviors, such as walking away from the television, and external distractions, such as other noise, limiting focus on a DTCA. However, the research team found that despite elimination of distraction, some older adults still reported "zoning out," or not recalling information, which potentially indicates results were comparable to a natural environment. Third, criticism of personas in the literature include personas being susceptible to bias from the research team, including stereotypes, and lacking data validation.[37] While the personas created in this study attempted to reduce bias and accurately reflect the older adult sample, there is potential of researcher positionality influencing the persona development process. Additionally, since this was an initial development of the personas for exploration and feasibility, the personas have yet to be rigorously validated. Fourth, the interview guide used a self-reported measure of health literacy, which may have led to over-representation of health literacy among the participant sample. Answering some of the questions required reflection on their last clinic encounter, and admitting to challenges with understanding health information to an unknown researcher may have contributed to some participants reporting a higher confidence level than they truly have throughout the health literacy screening. The three personas presented serve as a starting point for comprehensively understanding how older adults engage with medical information shared with them outside of the medical setting. Future studies could consider replicating the methodology with a larger, more diverse population of older adults. Additionally, research could be done to examine methods for promoting DTCA engagement from older adults falling into medication averse or medication adhering personas. While they may not always pay attention to or retain medication information on television, DTCAs still present an opportunity to bring medical education to the population outside of the clinical setting.

5. Conclusions

To optimize education and support patient engagement, DTCAs need to be redesigned to emphasize elements that support older adult cognitive processes and to facilitate retention of medication information. Understanding how information seeking older adults were more responsive to information presented in DTCAs provides an opportunity to achieve effective education, as well as encourage patient engagement by emphasizing elements that supported their cognitive processes and viewing behaviors. This study of older adult engagement with DTCAs presents a great deal of possibilities for future research that can enhance DTCA educational value, patient self-advocacy, and collaborative relationships between patients and their provider.

Ethics approval and consent to participate

All human subjects research described was reviewed and approved by the University of Wisconsin – Madison Institutional Review Board.

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CRediT authorship contribution statement

Emily L. Hoffins: Writing – original draft, Visualization, Methodology, Investigation, Conceptualization. **Taylor L. Watterson:** Writing – review & editing, Conceptualization. **Michelle A. Chui:** Writing – review & editing, Supervision, Resources, Methodology, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rcsop.2025.100589.

Data availability

Not applicable.

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