Using personas as an intermediate construct in the development of tailored messages: a Case Study

Sandra VOSBERGEN[a,1] Anne-Marieke WIGGERS[a], Joyca LACROIX[b], Monique JASPERS[a], and Niels PEEK[a]

[a] *Department of Medical Informatics, Academic Medical Center, Amsterdam, The Netherlands*
[b] *Department of Brain, Body & Behavior, Philips Research, Eindhoven, The Netherlands*

Abstract. Tailoring health education messages to patients' preferences for message style is believed to increase patients' susceptibility to the given advice. This paper presents a persona-centered approach towards creating tailored health messages for chronically ill patients. A case study of tailoring messages to the preferences of patients with coronary heart disease illustrates the approach and shows the need for patient-centered data collection so that personas reflect patients' preferences. Based on these personas, a manageable set of tailored messages can be created in a step-by-step approach.

Keywords. Message framing, Personas, Cluster Analysis, Tailoring

Introduction

Patient education plays a crucial role in the care for chronically ill patients and is therefore a key component in many disease management guidelines. Currently, most patient education materials take a one-size-fits-all approach. However, tailoring health education messages to patients' characteristics has been shown to enhance the intention to adopt or change particular health behaviors [1]. Nowadays, tailored health education information is increasingly offered via Information Technology (IT), as this provides the opportunity to reach large groups of patients at low cost and allows for tailoring based on data provided by patients.

Both the style (e.g., adapting the level of complexity of a message to a patient's health literacy) and the content (e.g., not including information content that is only relevant for males for women and vice versa) of messages can be tailored to the characteristics and preferences of individuals. In this study, we focus on tailoring of message style, also referred to as message framing, as it is believed that this increases patients' susceptibility and responsiveness to the given advice. Message framing is commonly used as a persuasive technique. In line with Entman [2] we define message framing as "selecting and highlighting particular aspects of a message, while omitting others, so that this message becomes more salient." We will focus furthermore on tailoring mes-

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[1] Corresponding Author: Sandra VOSBERGEN. E-mail: s.vosbergen@amc.uva.nl

sages to patients' message framing preferences, as we found, in a previous study, that the preferences for message framing of patients with coronary heart disease (CHD) vary and that these variations are related to certain socio-demographic and psychological characteristics [3]. However, a problem with message framing is that the construction of the messages requires a labor-intensive process by human editors to ensure that the messages are suitable for the targeted population. Framing messages to all possible combinations of preferences of individuals of a target population, would quickly lead to a combinatorial problem, requiring an enormous effort to compose all message versions. To allow for a manageable message development process, the number of tailored message versions (i.e., tailorings) should be limited and thus be based on a limited number of user types.

In this study, we explore the use of "personas" as an intermediate construct in the development of tailored education materials for chronically ill patients. In other words, we will explore the use of personas to develop messages that match the framing preferences of particular groups of patients. Personas are concise holistic descriptions of fictional characters created to represent the different types of individuals within a target population [4]. They are typically captured in short descriptions that include a personality's behavior patterns, goals, skills, and attitudes, allowing the readers of the persona description (e.g., system developers) to identify themselves and feel empathy with the individuals these personas represent [4]. These personas can then be used to create specific tools or strategies, (e.g., to tailor educational messages) that fit the needs, goals and tasks of these individuals [4].

1. Description of the proposed method

Figure 1 describes the proposed method to develop tailored health education messages with personas as an intermediate construct (we will refer to the steps in this Figure in the text). The method will be illustrated with a case study in which we created personas to develop a strategy to tailor health education messages to the preferences of CHD patients for message framing. Below, we start with a description of the persona development process. This will be illustrated with an example from the case study. Subsequently, we describe a step-by-step approach to develop tailored health educational messages, which is again illustrated with the case study.

2. Persona development

2.1. Data-based persona identification and development

The procedure of Haas and Kunz [5] was used to create the personas, focusing specifically on data segmentation and persona identification. In brief, data segmentation was realized by means of a cluster analysis of survey data that assessed patients' characteristics and preferences for message framing. Persona identification was based on an analysis of the differences between the resulting clusters and by complementing these results with a corpus of quotes from a qualitative study. Below, we describe these steps in more detail.

A survey was distributed in the Netherlands via an online market research company (Step A). This survey included questions on socio-demographics, disease history,

social support, health literacy, monitor-blunter coping style, explicit preferences for information type and information source (Step A-I), and message framing preferences (Step A-II). Message framing preferences were assessed using nine sets of texts that differed with respect to (1) language style, (2) level of abstraction, (3) actionability of the advice, (4) source of information, (5) viewpoint (present or future), (6) amount of disease-specific details, (7) amount of treatment-specific details, (8) explicit health risks, and (9) behavioral cues (positive or negative). K-means cluster analysis was used to partition this data set by patients' message framing preferences (Step B). Prior to the analysis, preferences were coded as numerical attributes. The appropriate number of clusters (k) was assessed by the researchers with respect to their suitability for persona creation with a maximum of five. Five was considered the maximum number of personas to keep the tailoring process manageable.

After choosing the value of k, each of the resulting clusters was prepared in three steps for persona creation. First, message framing preferences were limited to attributes with pronounced values (<0.2 and >0.8) in the cluster centroid (Step C-I). Second, differences between clusters were explored statistically for all other patient variables. Variables with significant differences between the clusters were added to the persona descriptions (Step C-II). Finally, every persona concept was complemented with quotes from transcripts of a qualitative focus group and interview study (Step D). All patient quotes referring to their information needs were selected, and subsequently linked to the message framing preferences studied in the survey (Step E-I). For each quote two researchers independently determined the best corresponding message framing preference; in cases of disagreement a third researcher was consulted (Step E-II). Finally, these quotes were assigned to a persona if it fitted the persona's distinguishing preferences (Step E-III).

2.2 Case study: from clusters to personas

Five message framing preference clusters were identified amongst CHD patients in the survey data (Step B). Clusters varied mainly on patients' preferences with respect to language style, viewpoint and explicit mentioning of health risks (Step C-I). Patient characteristics that differed significantly between clusters were the availability of social support, what patients wanted to know about their disease or treatment (i.e., as much of possible or only a particular part), health perception and age (Step C-II). Based on these differences the personas were labeled as follows: the 'actionable, future-focused monitor', the 'direct confrontation avoider', the 'evidence oriented monitoring go-getter', the 'well-informed, feel-good, social blunter' and the 'present-focused monitoring go-getter'. These personas were complemented with quotes from a study regarding the self-management experiences of CHD patients. The 'actionable, future-focused monitor' persona was characterized as follows:

The actionable, future-focused monitor is relatively young for getting a heart disease. Although he has had a heart attack, he feels he is in good health now and receives sufficient support from others. However, he wonders what else to expect from his disease and its treatment, and what the accompanying risks are for the future. He wants to know as much as possible about these risks. "If I will die next week, I rather want them to tell me immediately, because then I can do something to improve my parting." He also likes to know, if he has a choice, what to change in his behavior to improve his health.
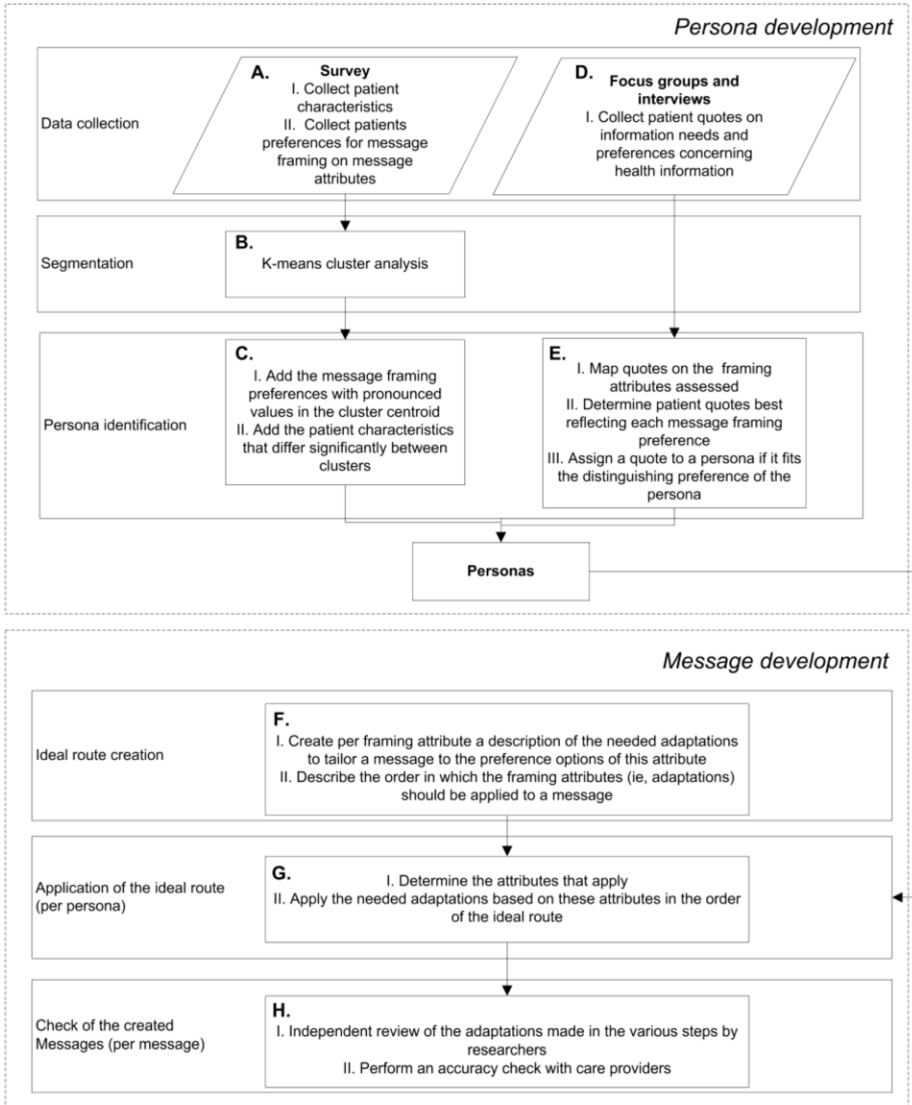
Figure 1. Step-by-step process of the persona and message development of health educational messages.

3. Message development

3.1. Step-wise tailoring method

Message tailoring was particularly focused on patients' preferences for message framing and not on the other patient characteristics. The focus was not on the other patient characteristics, because these were included in the personas with another purpose; to

make it easier to emphasize with the personas and to, in the future, tailor message *content* to.

Every text set in the survey assessed one particular message framing attribute for which patients could choose between either two or three preference options. To develop a tailored health education message for every persona various steps were taken. First, the adaptations needed to frame the messages to every preference option of a particular message framing attribute were described (e.g., adaptations needed for patients preferring the actionable advice or non-actionable advice) (Step F-I). To define this strategy, we consulted the literature describing how messages are to be framed concerning the framing attributes studied. Second, to develop a tailored message for every persona, text adaptations needed for each of these attributes are to be combined (Step F-II). For efficiency reasons, we developed an ideal route defining the order in which text adaptations for each of the attributes should be applied to frame a message. For example, if two message framing attributes apply to a persona, with the persona having a preference for an actionable message that does not describe explicit threats, it would be best to first frame the complete text by excluding the description of explicit threats and subsequently frame the message to make it actionable. Framing the message first to actionability would mean extra work, as text would be framed that would be removed afterwards. Third, we applied this ideal route to frame the messages for every persona separately (Step G). For every attribute applicable to a particular persona, messages were framed in the order of this ideal route. Message adaptations were made by one researcher and reviewed by four other researchers; this was followed by a consensus meeting to solve disagreements (Step H-I). Afterwards, all message texts were checked for accuracy by care providers (e.g., a cardiologist) (Step H-II).

3.2 Case study: applying the proposed method to tailor health messages

Original health information from www.apotheek.nl (a website developed by the Dutch professional organization of pharmacists containing information on various diseases and medication) was framed to the persona described previously in six iterations (Step G), as this persona had a pronounced preference for six of the nine message framing attributes (Step G-I). Messages were framed to the preferences of this persona concerning these attributes in the following order (Step G-II): (1) large amount of disease-specific details, (2) large amount of treatment-specific details, (3) including explicit health risks, (4) future viewpoint, (5) positive cues, and (6) actionable advice. In each iteration, message framing was performed for one framing attribute. Table 1 shows an example of a part of the original text and the results after framing this text to fit this persona's preference for positive text cues, and then to fit this persona's preference for actionable advice.

4. Discussion and conclusions

Personas can be used to tailor health education messages to the preferences of chronically ill patients. With these personas the needed adaptations to the original health messages became manageable and more obvious. Ultimately, the proposed method can be helpful in composing health education messages that better fit patients' preferences and increase their engagement with, and attention to, the message content.

Table 1. Example of framing the original text first to fit to the persona's preference for positive text cues and second to fit to the persona's preference of receiving actionable advice.

Original health message	Framing for positive text cues	Framing for actionable advice
Exercise is healthy. It decreases the chances of heart and vascular diseases. Nevertheless, most people do not exercise enough. Daily physical exercise decreases the risk of heart and vascular disease because it improves the flexibility of the blood vessels and the condition of the vascular walls. It furthermore improves the transport of waste products. This all diminishes the chance of obstruction.	Exercise is healthy. It creates a strong heart and blood vessels, and makes people feel strong and in good spirit. Exercise improves the health and the body becomes stronger because the immune system is raised. It is healthy because it increases the combustion of fats in the body, it strengthens the muscular tissue and enlarges the absorption of oxygen. This makes people feel fitter and improves their stamina. And that all together is healthy for heart and blood vessels.	Exercise regularly, it is healthy. Exercise at least five days a week for 30 minutes; it strengthens your heart and blood vessels and makes you feel strong and in good spirit. Exercising improves the health, and the body becomes stronger because the immune system is raised. It increases the combustion of fats in the body, it strengthens the muscular tissue and enlarges the absorption of oxygen. This makes people feel fitter and improves their stamina. And that all together is healthy for heart and blood vessels, so exercise!

Although there are studies that discuss the effectiveness of personas within development teams, to our knowledge our study is the first to explore the use of personas as in intermediate construct in the task of tailoring educational material. The creation of personas by use of quantitative and qualitative data facilitates the process of message tailoring. It also allowed for a concretization of our, previously collected, rather abstract dataset that contained the multidimensional preferences of CHD patients. However, our paper is based on the experiences of one case study and should therefore be seen as an initial exploratory step of which the results need to be validated in a wider CHD patient population. Also, case studies are limited in their generalizability, and the application of our methodology may be limited to the disease population and application domain for which it was originally created. The proposed methodology is still quite time consuming and becomes more complex with the number of personas increasing. Finally, although the message development process consists of a standard procedure, the process is susceptible to inter-variability as it is performed by a team of human editors.

Taken together, the results suggest that once created, personas are helpful to define subgroups of a target population on which decisions about how to design services for their use can be grounded. They support gathering and prioritizing the preferences of patients and therefore, could be used to keep the tailoring process manageable while accounting for patients' preferences. In the future, a complete set of health education messages will be developed for each persona. These messages will be integrated into a web-based self-management system for CHD patients to provide patients with educational messages tailored to their preferences. With this system the effectiveness of these messages on patients' intention to comply with the advice will be studied. Although we apply this method for creation of tailored health messages to be provided by a self-management system for CHD patients, this method finds application in any computerized tailored health education program to be offered to patients.

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