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It's not what you say, but how you say it

The effectiveness of message frame-tailoring in online computer-tailored health communication

Altendorf, M.B.

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1 Introduction

CHAPTER 1
INTRODUCTION

For decades, health promotion, disease prevention and the combat of health myths was done through word-of-mouth from physicians, healers and the governors of states. In particular, until the early 20th century, disease prevention and health promotion mainly aimed to control infectious diseases. However, during the mid-20th century, non-communicable diseases, such as cancer and cardiovascular disease replaced infectious diseases from the main focus of disease prevention. Many non-communicable diseases can be caused by unhealthy lifestyles like addictive behaviours, such as tobacco smoking and alcohol consumption. This shift in disease pattern – from communicable to non-communicable diseases – subsequently led to a shift in health promotion focus, so that instead of a community focus, individual health behaviours were targeted and new strategies to persuade individuals to change their behaviour evolved (Bingenheimer, Repetto, Zimmerman, & Kelly, 2003; McKeown, 2009; Merson, Black, & Mills, 2011).

Mass communication, such as newspapers, the radio, television, booklets and brochures, was used to expose large audiences to health promotion information (Davis, 2007; Raingruber, 2014; Skinner, 2013; Teutsch & Churchill, 2000). However, this kind of “one-size-fits-all” general health promotion has limited effectiveness, as it is often perceived as not very personally relevant by those exposed (Cacioppo & Petty, 1986; Hawkins, Kreuter, Resnicow, Fishbein, & Dijkstra, 2008; Kreuter, Strecher, & Glassman, 1999; Strecher et al., 1994). As individuals’ beliefs related to behaviour (change) vary widely, generic mass health communication messages would contain a lot of smoking cessation information that might be irrelevant for individual smokers, for instance strategies to quit for smokers not yet motivated to quit. So it could happen that such a general message might be less effective in attracting people’s attention to the message and is processed less thoughtfully. Ultimately, such mass communication messages might be less likely remembered in detail than for instance a message that contains only information considered relevant (e.g., Kreuter et al., 1999; Skinner, 2013).

TAILORED HEALTH COMMUNICATION

Towards the end of the 20th century, more effective forms of large-scale health

communication evolved, such as computer-tailored health communication (De Vries & Brug, 1999; Skinner, 2013). According to health communication scholars, *computer-tailored health communication* is the development of personalised messages based on a pre-assessment of data from or about an individual in regard to specific health outcomes aiming to meet that person's individual information needs (Rimer & Kreuter, 2006a). In other words, tailored communication aims to match a person's demographic characteristics, (information) needs, motivation, and other (socio-cognitive) beliefs and factors with regard to a desired behaviour (Krebs, Prochaska, & Rossi, 2010).

Specifically, the tailoring process in computer-tailored health interventions involves several steps: Firstly, a theory-based questionnaire is developed with which relevant tailoring information (e.g., a person's demographics, beliefs and other psychological factors) is assessed. Then, all answers are stored in a database. Secondly, a computer-tailoring program, which uses tailoring algorithms, matches the respondent's responses with relevant content (i.e., pieces of text, such as a smoking cessation advice) from that database, resulting in tailored feedback messages (Noar, Grant Harrington, Van Stee, & Shemanski Aldrich, 2011).

ONLINE COMPUTER-TAILORED HEALTH INTERVENTIONS

In the beginning, computer tailored health communication materials were disseminated in print media, such as through booklets and letters, to different audiences, but costs for such differentiated health materials were high. Due to the rise of the Internet in the 90s, health promotion materials were made more accessible for the population and could also be personalised for a wide range of individuals at the same time – by means of *online computer-tailored health communication* (Skinner, 2013).

Online computer-tailored health interventions have shown to be effective in helping people to change their health behaviours (Lustria et al., 2013; Smit, De Vries, & Hoving, 2012). Moreover, online interventions are highly accessible for most people with different (socio-economic) backgrounds and can be used at any given time, consequently reaching larger audiences than for instance print media (Cassell, Jackson, & Cheuvront, 1998; Lustria, Cortese, Noar, & Glueckauf, 2009).

Online computerised content-tailoring (i.e., tailoring the type of information content) enhances perceived relevance of a message and deep message processing, subsequently improving motivation to perform desired behaviours (Hawkins et al., 2008; Kreuter & Wray, 2003; Lustria et al., 2009; 2016). To date, however, effect sizes of such computerised content-tailored interventions remain small leaving opportunities for further enhancement of intervention effectiveness and ultimately more successful persuasion of people to make healthy lifestyle choices. To this end, next to content-tailoring, it might be beneficial to explore different types of tailoring. One promising alternative way of tailoring in online computer-tailored health interventions is to consider personal differences in people's preferences for how health information is presented (Resnicow et al., 2008, 2014; Smit, Linn, & van Weert, 2015); message frame tailoring.

THE MESSAGE FRAME AS POTENTIAL FOR TAILORING

Before I outline the concept of message frame-tailoring, it is necessary to clarify what message framing is. Message framing, based on Entman's (1993) definition, is the selection of some aspects of a perceived reality and make them more salient in communicating text, such that a problem, fact or a circumstance is promoted or highlighted. Thus, by means of message framing, we can make some bits of text salient while making other parts less salient and consequently steering the message receiver's thought process in a certain direction (Entman, 1993). For instance, a message can contain or miss certain key words, signal words (e.g., must versus could), sources of information or images while communicating the same fact. To illustrate, one can say that "*it might be wise to consider quitting to smoke as it is healthier*" or one could put it as "*you must quit smoking to not get sick*". The core message in both sentences is that quitting smoking is healthy, yet this message is framed differently; i.e., it uses another tone of voice and emphasises different aspects of the same so-called reality. Subsequently, the message frame may determine how people notice and understand the topic in the message – and maybe act upon it.

Matching the message frame according to an individual's preference for a message frame (e.g., their need for cognition or need for autonomy) is

called *message frame-tailoring*. In this dissertation, message frame-tailoring is based on a pre-assessment of people's individual need for autonomy, with the message delivered being adjusted accordingly. To illustrate, people with a higher need for autonomy would prefer – and thus receive – suggestive messages that offer choice of how to best quit smoking, whereas someone with a lower need for autonomy would prefer to receive a clear-cut expert advice about smoking cessation.

USING THE NEED FOR AUTONOMY FOR MESSAGE FRAME-TAILORING

Self-Determination Theory (SDT; Deci & Ryan, 1985a, 2000; Ryan & Deci, 2000) suggests that all people have a need for autonomy – the need to perceive a certain degree of freedom in own behaviour, which is shown to be crucial for a self-determined motivation and successfully changing and maintaining (health) behaviour (Deci & Ryan, 2000; Ryan & Deci, 2000). SDT-related research supports the notion that individual differences in people's need for autonomy exist and relate to message effectiveness (Deci & Ryan, 1985a, 1985b; Legault, 2016; Resnicow et al., 2008, 2014; Ryan & Deci, 2000; Smit & Bol, 2019; Williams-Piethota, Schneider, Pizarro, Moward & Salovey, 2004); people with a higher need for autonomy would benefit more from being provided with *autonomy-supportive messages*, as opposed to people with a lower need for autonomy who would benefit more from receiving *controlling messages*. To illustrate, autonomy-supportive messages provide a behavioural choice (e.g., “Would you like to receive these tips (yes or no)?”) and use implicit language (e.g., words like “would” and “could”) (Markland, Ryan, Tobin, & Rollnick, 2005; Resnicow et al., 2008, 2014). Controlling messages do not provide choice to the reader and are explicit and directive, rather like a command (e.g., words like “should” and “must”) (Mclaughlin, Schutz, & White, 1980; Miller, Lane, Deatricks, Young, & Potts, 2007a). Specifically, people with a higher need for autonomy prefer to perceive freedom in actions, as well as having the opportunity to choose actions for oneself. Those with a lower need for autonomy would, in turn, rather prefer to receive clear-cut advice from expert, friends or family instead (e.g., they would prefer to receive instructions from others how to best reduce their alcohol consumption or how

to quit smoking) (Resnicow et al., 2014; Ryan & Deci, 2006; Smit & Bol, 2019). Therefore, it seems to be promising to not only tailor the content of health messages, but also to tailor how a health message is presented to people, based on the preferred communication style, e.g., the need for autonomy, in order to enhance intervention effectiveness.

Yet, no study so far has tested the effectiveness of message frame-tailoring based on the need for autonomy in online computer-tailored health communication. This, while not accounting for individual differences in need for autonomy could lead to less effective/efficient message processing as health messages that do not match people's information processing needs (e.g., the need for autonomy), could be considered as less relevant by the receiver (Petty & Cacioppo, 1986). Moreover, a mismatch between individual information needs and message frames could lead to resisting the message and maybe even engagement in counter behaviours, such as purposely ignoring the health message and not changing behaviour (e.g., Pavey & Sparks, 2009; Rains & Turner, 2007; Ringold, 2002).

Accordingly, it is proposed that next to tailoring the message content (what information is communicated), tailoring the message frame (how the information is communicated) according to people's needs for autonomy is an innovative and potentially effective way to increase the effectiveness of online tailored health interventions, which has not been studied yet.

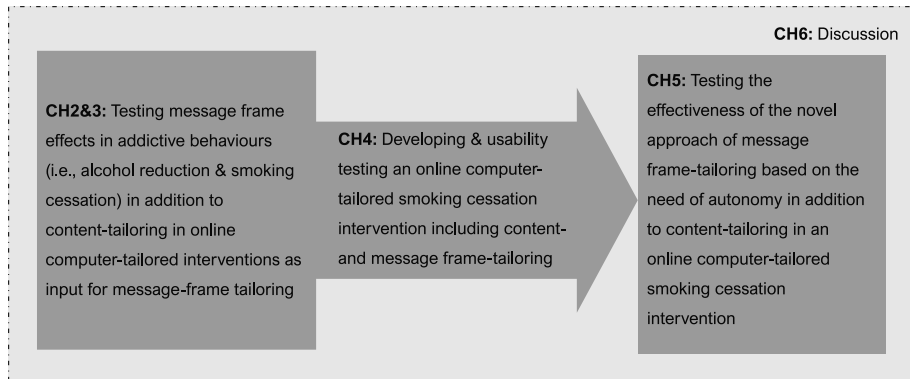
OBJECTIVE AND OUTLINE OF THE DISSERTATION

Objective

The overall aim of my dissertation is to systematically develop and explore the potential of message frame-tailoring based on the need for autonomy in isolation and in addition to content-tailoring in online computer-tailored health communication.

Outline

My dissertation consists of four studies outlined in four chapters. Figure 1 provides a graphical overview of the outline of this dissertation.

Figure 1. Outline of the dissertation

Note. CH = Chapter

My dissertation begins with descriptions of two individual online experiments in the context of alcohol consumption reduction (**Chapter 2**, $N = 521$) and smoking cessation (**Chapter 3**, $N = 626$). The aim of **Chapter 2** “*Should or could?*” is to test the effects of autonomy-supportive versus controlling message frames on individuals’ perceived autonomy-support and reactance arousal towards content-tailored alcohol reduction messages. Moreover, participants’ individual need for autonomy was considered as a potential moderator of these effects. Then, in **Chapter 3** “*A smoker’s choice?*”, the alcohol-study’s findings are supplemented by testing autonomy-supportive versus controlling message frame effects in the context of an online computer-tailored smoking cessation intervention. Message frame effects on perceived autonomy-support are again tested under consideration of the individual need for autonomy as a potential moderator. Moreover, it is investigated whether the effect of autonomy-supportive message frames on intention to quit smoking is mediated through increased perceived autonomy-support, more self-determined motivation and socio-cognitive measures.

Next, in **Chapter 4** “*The integration of message frame-tailoring in digital health communication*”, the integration of message frame-tailoring in an existing online content-tailored smoking cessation intervention is described. In total, findings from two pilot tests ($N = 19$; $N = 16$) and a usability test ($N = 12$) are presented.

Chapter 5 “*Effectiveness of message frame-tailoring in an online smoking cessation programme*” reports on the effectiveness testing of the novel tailoring approach of combining message frame-tailoring (based on the individual need for autonomy) with content-tailoring on message processing, socio-cognitive factors and smoking abstinence rates in a randomised controlled trial ($N = 273$).

Chapter 6 concludes with a summary and general discussion of the findings, in which I put the results into a broader perspective with suggestions for future research and implications for online health promotion practice. Moreover, I highlight general methodological considerations.