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An inverted personalization effect when learning with multimedia: The case of aversive content

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A B S T R A C T

The personalization principle states that students learn better with a personalized message than a nonpersonalized message. Whether the personalization principle holds true for instructional material that is emotionally aversive (in this case, content concerning cerebral hemorrhages) was investigated in two experiments ($N = 77$ in Experiment 1 and $N = 71$ in Experiment 2). The text for the nonpersonalized version was in a formal style, whereas the text for the personalized version was in a conversational style, where personal pronouns such as "you" and "your" were used. The results in both experiments showed that students experienced a general increase in state anxiety after learning with both instructional materials, but state anxiety was not significantly different between the experimental conditions. Concerning our main research question and regarding our expectations, the personalization principle did not hold true in either experiment for the emotionally aversive topic used in this study and was even inverted for transfer tasks, where students showed better performance when they learned with a nonpersonalized message compared to a personalized message.

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1. Introduction

Since hundreds of millions of laypeople use the internet to search for health-related information (e.g., Kuehn, 2013), this information should be provided in a comprehensive way. In the context of multimedia learning, based on the Cognitive Theory of Multimedia Learning (CTML; Mayer, 2009, 2014a) as well as on an extension of the CTML, namely the Cognitive Affective Theory of Learning with Media (CATLM, Moreno, 2006; Moreno & Mayer, 2007), several design recommendations have been proposed about how to comprehensively present information. These design recommendations are based on studies that are usually conducted with information that is regarded as emotionally neutral. However, health-related information, − depending on the topic − is not necessarily emotionally neutral but can be perceived as emotionally aversive (e.g., unpleasant, disgusting, threatening or angst-inducing). Emotionally aversive topics in health information include serious or even lethal diseases (e.g., breast cancer, cerebral hemorrhage, hepatitis; cf. Agrawal, Menon, & Aaker, 2007). Since emotions can affect deeper understanding (e.g., Mayer & Estrella, 2014; Plass, Heidig, Hayward, Homer, & Um, 2014), some design recommendations may not hold true for emotionally aversive information and may have a negative effect. This might especially be the case with respect to what is called the personalization principle. In the current study, we therefore

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investigated whether the personalization principle applies to emotionally aversive health-related information and will be explicated in more detail in the following.

1.1. The personalization principle in multimedia learning

The personalization principle in multimedia learning states that when verbal messages are presented in a conversational style (personalized messages) rather than in a formal style (nonpersonalized messages) learners achieve better learning outcomes (Mayer, 2009, 2014b). A conversational style can be realized by directly addressing the learner, for instance, by using personal pronouns such as "you" or "your", whereas this sort of personal pronouns is omitted from a text with formal style. It should be noted that the personalization principle in multimedia learning essentially refers to a conversational style compared to a formal one and is different in this respect to other usages of the terminology "personalization".[1]

One theoretical explanation for the personalization principle is that learners are more likely to relate information in personalized messages (conversational style) to themselves which should result in better processing of the content (Moreno & Mayer, 2000; Reichelt, Kämmerer, Niegemann, & Zander, 2014). This explanation can be traced back to the self-referential effect (e.g., Klein & Loftus, 1988; Rogers, Kuiper, & Kirker, 1977; Symons & Johnson, 1997). According to the self-referential effect, when information relates to the self, it is mentally better organized and elaborated than when the information is not related to the self. Since a personalized message refers to the self, the probability of better elaboration of the instructional content is increased (cf. Moreno & Mayer, 2000). This should in turn result in better understanding (e.g., Craik & Lockhart, 1972; Rogers et al., 1977) and, hence, in better learning outcomes (Mayer, 2009).

The personalization principle in multimedia learning is empirically well supported, especially for transfer tasks, but not necessarily for factual knowledge as assessed by retention (cf. Ginns, Martin, & Marsh, 2013; Mayer, 2014b). The personalization principle has been investigated in a wide range of fields, including meteorology (Moreno & Mayer, 2000), botany (Moreno & Mayer, 2000, 2004), astrophysics (Kartal, 2010), computer technology (Rey & Steib, 2013), psychology (Reichelt et al., 2014), and anatomy (Ginns & Fraser, 2010; Mayer, Fennell, Farmer, & Campbell, 2004; Schworm & Stiller, 2012; Stiller & Jedlicka, 2010).

So far, the personalization principle was solely investigated with emotionally neutral content. However, there may be good reasons that the personalization principle may not hold true and even reverse when inherently emotionally aversive content is conveyed. Hence, this potential boundary condition of aversive content concerning the personalization principle will be explicated next.

1.2. Potential boundary conditions of the personalization principle: emotionally aversive content

The CATLM (Moreno, 2006; Moreno & Mayer, 2007) is an extension of the CTML (Mayer, 2009) and links motivational and affective aspects into learning with multimedia. While the role of affect in learning with multimedia remains largely neglected in the field, several studies have recently addressed this crucial topic (e.g., Heidig, Müller, & Reichelt, 2015; Mayer & Estrella, 2014; Park, Knörzer, Plass, & Brünken, 2015; Plass et al., 2014; Um, Plass, Hayward, & Homer, 2012; see also; Leutner, 2014; Park, Plass, & Brünken, 2014). These studies induced emotions either externally or induced emotions by designing more likeable pictures (emotional design), while the topic in these studies was not considered to be inherently emotional but rather neutral. However, there are also topics that are inherently emotional (cf. topic emotions; e.g., Sinatra, Broughton, & Lombardi, 2014). Such emotional topics have been neglected in the context of multimedia learning. Though, they should be addressed, since the emotional character of a topic may not only influence learning but may also have a moderating impact on some design principles including the personalization principle.

"Suppose you are sitting at your computer, exploring a web site on health information" is the opening line of the article by Mayer et al. (2004) in which they investigated the personalization effect in multimedia learning. The content in this study concerned the inner workings of the respiratory system. However, with respect to health information, unlike in the study by Mayer et al. (2004), there might be topics that you might perceive as displeasing and that may even make you feel anxious. Such topics – like a serious or even lethal disease – may increase a negative emotional state, such as anxiety (cf. state anxiety; e.g., Laux, Glanzmann, Schaffner, & Spielberger, 1981), and can hence be regarded as emotionally aversive. It may well be possible that you would not want to engage deeply with such aversive content, since you feel this to be disgusting or threatening. Hence, it is unlikely, that you would like to relate this kind of content to yourself. A personalized message, which is supposed to initially trigger a reference to yourself (i.e. self-referencing), might thus not work for an aversive topic. Rather, the personalized message might have the opposite effect. To counteract involvement with a personalized message, one might try to keep a distance by avoiding active processing of emotionally aversive content (cf. Witte & Allen, 2000). With a non-personalized message on the other hand, content is conveyed in a formal and neutral style. The learners might not feel too uncomfortable with the content and therefore be more inclined to process the topic. As a consequence, this would result in a

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[1] More precisely, one field of research on personalization deals with addressing learners more directly through naming aspects of their personal life (e.g., name, nickname, birthday, friends' names etc.; cf. Cordova & Lepper, 1996). Another field of research on personalization adapts learning environments on learners' individual preferences (e.g., Klašnja-Milićević, Vesin, Ivanović, & Budimac, 2011). However, in the context of the current study, we mean the usage of conversational style when referring to the personalization principle.