

# Chapter 2

## Theoretical Background

### 2.1 Relevant Communication Theories

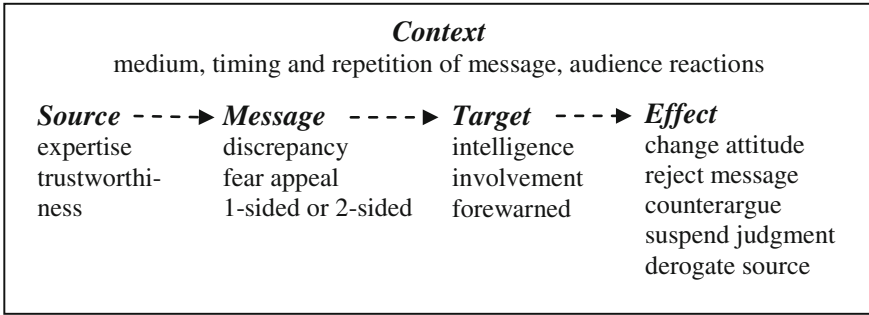
The conceptual framework and the underlying principles for persuasive recommender systems are developed based on theoretical background emerging from two theoretical streams in communication research: the Communication-Persuasion Paradigm and Media Equation Theory.

#### 2.1.1 Communication-Persuasion Paradigm

A recommendation is persuasive when it results in attitude or behavior change. The ultimate measure of success for a recommender system is of course actual choice of the recommended alternative. The extent to which a recommendation influences its receiver depends on (1) its form and content; (2) its source; (3) its receiver and his/her characteristics and (4) contextual factors (O’Keefe 2002). These factors are fundamental components of the communication-persuasion paradigm and are interrelated with each other in persuasion processes (Michener et al. 2004). Figure 2.1 displays this paradigm and shows how these elements are interrelated.

As illustrated in this figure, the persuasive outcomes are influenced by multiple factors within each component. First, the characteristics of the source can influence how the message is perceived by the message receiver. Second, the variables related to the message itself can significantly influence its persuasiveness by determining the way it is processed. Third, the experience or characteristics of the message receiver play a role when he/she decides whether to accept the message or not. Finally, a number of contextual factors can affect the persuasive outcomes throughout the process.

Not surprisingly, a great number of studies have identified these factors and systematically tested their influence on persuasive outcomes (O’Keefe 2002).



**Fig. 2.1** The communication-persuasion paradigm (Michener et al. 2004; O’Keefe 2002)

For example, numerous empirical investigations have found that a communicator’s message is more persuasive when the communicator is perceived as credible and likeable by the message receiver (Andersen and Clevenger 1963; Atkin and Block 1983; Baker and Churchill 1977; Friedman and Friedman 1979; Hovland and Weiss 1951; Kelman and Hovland 1953; Patzer 1983). Many studies also found that more specific recommendations are more persuasive than general recommendations (Evans et al. 1970; Frantz 1994; Leventhal et al. 1966; O’Keefe 1997). Message receivers’ involvement with the issue (Johnson and Eagly 1989; Petty and Cacioppo 1990) and their intelligence (Rhodes and Wood 1992) are also found to be influential in persuasion processes. The factors investigated in past studies are discussed in greater detail in the following chapters.

These persuasive factors identified in traditional communication research have recently been tested in technology-mediated communication contexts and have been found to be equally important when people communicate using technologies. Flanagin and Metzger (2003) noted that it is possible to translate several components of source credibility to the online environment. For example, they suggested that expertise may be communicated through the accuracy and comprehensiveness of a Web site’s information, its professionalism and its sponsor’s credentials while trustworthiness is associated with a Web site’s integrity as demonstrated through its policy statements, use of advertising as well as firm or author reputation. Fogg (2003) also found that source credibility matters when humans interact with computers. In addition, authority cues have been found to enhance online users’ credibility judgments of a computing technology (Fogg 2003) and of online reviewers (Yoo et al. 2007). Online users have also been found to be more easily persuaded by technology that is similar to them in some way (Moon 2002; Fogg 2003). Some studies have found that a physically attractive virtual character was more favorably evaluated by users (Fogg 2003) and served as a more effective sales agent (Holzwarth et al. 2006). The findings of these empirical studies indicate that the persuasive cues investigated in human–human communication could be effectively incorporated in technology contexts to make interactions more persuasive.

Fogg (2003) suggested that understanding the persuasive social role of technology is essential especially when computers take the role of instructing or advising computer users. Since the role of recommender systems involves giving advice in online environments, traditional studies of persuasive factors could provide an important framework to examine the interaction between users and systems as well as users' evaluations of systems.

### ***2.1.2 Media Equation Theory***

It seems obvious that a recommender system is a tool or medium, not an actor in social life. However, media equation theory suggests that individuals' interactions with computers, television, and new media are fundamentally social and natural, just like people's interactions with other people in real life (Reeves and Nass 1996). According to Reeves and Nass (1996), people unconsciously and automatically apply social rules when they interact with media. This theory thus argues that technologies should be understood as social actors, not just as tools or media.

Several empirical studies have supported this notion of computers as social actors. For example, a number of studies (Nass et al. 2000; Nass et al. 1997) has found that people apply gender and ethnicity stereotypes to computers. Nass and his colleagues (1997) found that people evaluated a computer as significantly more competent when it provided tutoring with a male voice rather than a female voice. They also found that the female-voiced computer was rated as a better teacher than a male-voiced computer when the computer discussed love and relationships which is a stereotypically female topic. But, the computer users rated it as a worse teacher when it talked about computers, which is a stereotypically male topic. Other studies (Nass et al. 2000; Qiu 2006) have found that computer users perceived same-ethnicity embodied computer agents as more attractive, trustworthy, persuasive, and intelligent than different-ethnicity agents. This indicates that similarity rules important in offline contexts also apply when humans interact with computers.

The findings of Fogg and Nass (1997) also revealed that people exhibit social behaviors such as politeness and reciprocity toward computers. In their experiment, study participants worked with computers to learn about some facts and then were asked to evaluate the computer they had used. Half of the participants were asked to evaluate the computer's performance using the same computer they had worked with while the other half answered identical questions on a different computer located on the other side of the room. The results showed that participants who answered on the same computer gave significantly more positive responses. This suggests that they showed politeness and reciprocity toward the computers they knew and worked with. In addition, Nass and Moon (2000) found that impacts of authority cues, i.e., information is accepted uncritically when it is given by an authority figure, also occurs when people interact with technologies. They manipulated the labeling of machines to see if the labeling cues influenced

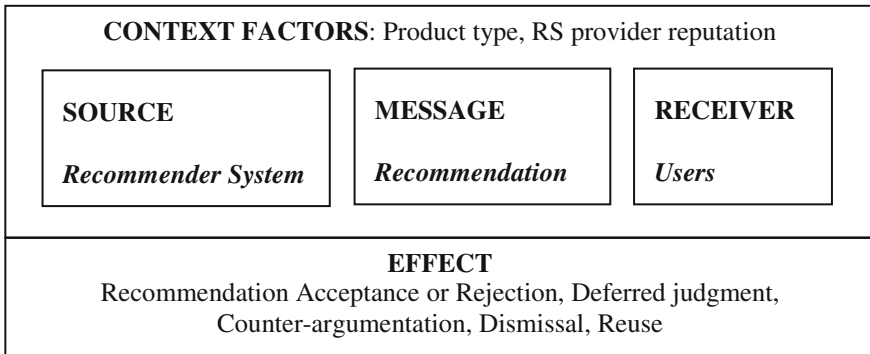
individuals' perceptions of the content the machine presented and found that the content presented by a "specialist" machine was evaluated significantly higher in quality than content presented by a machine labeled as a "generalist".

According to Fogg et al. (2002), computers function in three basic ways: as tools, as media, and as social actors. While previous recommender system studies largely focused on systems as tools, recent studies (Qiu 2006; Wang and Benbasat 2005; Gretzel and Fesenmaier 2007; Yoo 2010) have argued that users often socially interact with recommender systems. Thus, the social aspects of recommender systems need to be better understood. Media equation theory provides a good theoretical framework for such research.

## 2.2 Recommender Systems as Persuasive Social Actors

As discussed above, a growing number of studies emphasize the social aspects of technologies (Fogg 2003; Nass and Moon 2000; Reeves and Nass 1996) and the social role of recommender systems has also been suggested and investigated. Zanker and his colleagues (2006) argued that interactions with recommender systems should not only be seen from a technical perspective but should also be examined from a social and emotional perspective. Wang and Benbasat (2005) found that users perceived human characteristics such as benevolence and integrity from recommender systems and treated systems as social actors. The findings by Aksoy et al. (2006) suggest that the similarity rule is also applied when humans interact with recommender systems. They found that a user is more likely to use a recommender agent when it generates recommendations in a way similar to the user's decision-making process. Morkes et al. (1999) demonstrated that computer agents that use humor are rated as more likable, competent, and cooperative. In addition, trust in recommender systems has also been found to be important to support system users' decision-making (Bauernfeind and Zins 2006) as well as intentions to adopt the recommender systems (Wang and Benbasat 2005, 2008). In addition, Gretzel (2004) revealed that the interaction process between users and recommender systems significantly influences users' perceptions of the system and the recommendations provided by such systems. More recently, Yoo (2010) investigated how embedded virtual agents on system interfaces influence users when they evaluate systems. The study found that users socially interact with the systems and the social cues portrayed by the embedded virtual agents influence system users' evaluations of the agents as well as the overall system quality.

These studies all support the notion of recommender systems as social actors and suggest a need for examining the social aspects of recommender systems. This implies that recommender systems can be understood as communication sources to which theories developed for human-human communication apply. Applying such theories opens up a new avenue for understanding the role of recommender systems and their interactions with users.



**Fig. 2.2** Conceptual framework for persuasive recommender systems

## 2.3 Conceptual Framework

Applying communication theories to recommender systems, the system itself can be seen as a source, its recommendations as messages and its users as receivers of these messages. These process components exist within a certain communication context that influences the way cues are communicated and perceived. The interaction results in communication effects that ultimately encourage or discourage reuse of the system (Fig. 2.2).

In the following three chapters, the specific persuasive factors (source characteristics, message variation and receiver/context factors) found in human and human communications are reviewed and the chapters discuss how the factors have been adopted and examined in technology contexts, particularly in recommender systems. While there are numerous persuasive factors that have been identified in traditional persuasion literature, the review presented in this book is focused on the characteristics relevant to the recommender system context.



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