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Tablet as human: How intensity and stability of the user-tablet relationship influences users' impression formation of tablet computers

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ABSTRACT

When can computers seem "human"? How do users form identity impressions of computers? In an examination of the ways in which users form impressions of their tablet computers, this study offers a new perspective by allowing users to verbalize their impressions of their products. Findings from in-depth interviews revealed two basic constructs that inform users' impression formation – intensity and stability, which respectively foster social-contextualization and attribute association processes. This study contributes to impression formation and human–computer relationship literature in two aspects. The first is a novel methodological design that was humanistic in nature but was informed by social psychology; the second is a new construct "relationship intensity," which operates jointly with relationship stability in impression formation processes.

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1. Introduction

People form impressions of other people and objects such as computers based on insufficient and peripheral information (Kardes, Posavac, & Cronley, 2004). Impression formation research examines the ways in which information is acquired, used and integrated to form impressions of people (e.g., Anderson, 1973; Asch, 1946; Hastie & Park, 1986). Theoretical models of top-down or bottom-up information processing are developed and tested to understand how people form and retrieve impressions of others and to investigate how those impressions relate to subsequent affect and behavior (Srull & Wyer, 1989). Similar impression formation processes can be applied to human–computer interactions (e.g., Bickmore & Picard, 2005). Computers, in the process of interacting with users, could acquire social-contextualized impressions. Contemporary trade research has shown that the television is considered an "old friend;" the desktop PC is an "older sister or brother;" and a mobile phone is something more intimate (Smith, 2011). Interestingly, personal computers are not explicitly designed to build and maintain a long-term social-emotional relationship with users; instead, they are created to foster users' task performance (Hartson & Gray, 1992) or entertainment experiences (Magerkurth, Memisoglu, Engelke, & Streitz, 2004). However, in the process of human–computer interaction, users can build social-emotional relationships with computers through the symbolic representations of users' selves, others, and their experiences (see Csikszentmihalyim & Rochberg-Halton, 1981). Therefore, an exploration of how a computer acquires social-contextualized impressions and how human–computer relationships help users build or retrieve such impressions is important for understanding the nature of human–computer interaction.

Although impression formation literature has informed our understanding of how information is integrated into mental representations, it cannot help us understand the deeper meanings of computers in users' lives over time. In addition, little human–computer interaction research explores how computers acquire social-contextualized roles in users' lives. To fill this gap, this study set out to understand users' impressions of their tablet computers through in-depth interviews that allow users' voices to illuminate their impressions of their computers.

This study chose the newest media screen - the tablet computer - as the type of computer to be studied. A tablet is a "device with a touchscreen interface, screen sizes ranging from 5 inches to 12 inches, color displays, Wi-Fi or 3G internet connectivity, and advanced mobile operating systems such as Apple iOS, Google Android, Windows 7 or BlackBerry" (Perrin, 2011). Although tablet devices have been available since 2001, it was not until the launch of I-Pad in April 2010 that a mass market developed. Compared with a desktop or laptop, tablet computers encourage more physical attachment (e.g., touch screen; Talk Tablet., 2013) and

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are characterized as more flexible (e.g., light, small; Dooley, 2013) and interactive (Patterson, 2011). Given the newness of the device and its fundamental characteristics, the tablet was selected as the computer for investigation of our research question.

Consequently, we conducted 30 semi-structured in-depth interviews with tablet owners to explore how their tablets were used and how they formed impressions of their tablets. The consumer impression that emerged is conceptualized based on analysis and interpretation of the informants' narratives when they were asked to describe their tablets as a person. The literature review section first provides the theoretical and conceptual foundations by reviewing literature related to impression formation from social psychology literature, and then highlights research related to on personification and social-emotional meanings of computers.

2. Theory

2.1. Impression formation

How people retrieve and integrate information to form impressions or perceptions of other people is a rich area of social psychology (Brewer, 1988; Fiske & Neuberg, 1990; Srull & Wyer, 1989). Asch (1946)'s seminal work on impression formation processes suggested that a single unified impression of a person (i.e., the "essence") is formed by an examination of the meaning of each piece of information and the inter-connections between those pieces of information. The available information is used to create an impression of the personality of the person; subsequent information (e.g., behaviors) is then interpreted in view of the initial impression. This inference process suggests that people move from a more general impression to a more specific and unified portrait of a person once they gain more information (Hamilton & Sherman, 1996). Similarly, the "piecemeal integration" postulation of impression formation contends that individual pieces of information were considered and then summed to form an impression of a target person (Anderson, 1973).

More recent models of impression formation differentiate between category-based impression and piecemeal impression and the level of automaticity of information retrieval and use (e.g., Brewer, 1988; Fiske & Neuberg, 1990). Category-based impression relies on larger categories into which a particular object/person fits. Category is defined as the "abstract representations of conceptually related information" (Bargh & Pietromonaco, 1982, p. 437). Piecemeal impression relies on attributes that a particular object/person possesses. Attributes are the inherent characteristics or qualities owned by an object/person. These models assume that without specific motivation to process information thoroughly or sufficient information of the person/object to be judged, people generally rely on stereotype information (e.g., gender, occupation, or other individuating information), resulting in top-down processing styles. On the other hand, if motivation to form accurate impressions is high and people have sufficient information to make a judgment, then bottom-up processing occurs where individual attribute information is processed and combined to form a judgment.

Fiske and Neuberg (1990) also proposed several steps through which impressions could be formed. The first step is initial categorization, which emphasizes salient physical features (e.g., color of an object). If the object/person is relevant and of interest, step two is taken, in which confirmatory categorization (i.e., effortful interpretation of information that is consistent with initial categorization) or re-categorization (i.e., accessing a new category due to knowledge that a person/object is categorizable but not in terms of the initial category) can be initiated. If an attempt for overall categorization is not successful, a piecemeal integration is applied, in which attributes are individually and mechanically assessed and accounted for an overall impression.

To what extent the information is encoded, stored, retrieved and used in different impression formation processes is presented in the seminal work by Srull and Wyer (1989). During impression formation, people tend to use and interpret attributes that have already been stored in memory. When no attributes are available, people tend to use accessible and applicable attributes on the spot. The strength and valence of the initial information are more important than later information in determining the formation of a general evaluative impression. Once a general impression is formed, people interpret behaviors and relationships based on this general impression and retrieve it later when needed for further judgments. One important contribution that Srull and Wyer (1989) made is clarification between impression formation and impression retrieval. Impressions can be formed on the spot due to lack of pre-existing attributes or impressions. However, when an impression has been formed in the mind, it can be easily retrieved when it is required for decision-making.

One limitation of the impression formation body of research is that the studies almost exclusively used an experimental approach where subjects were asked in a laboratory setting to form impressions of a target person based on listed behaviors that have been manipulated by the researcher to highlight certain types of information while controlling or constraining other types (see Srull & Wyer, 1989). The manipulated information may be based on a list of character traits, a scenario or even a grocery-shopping list (e.g., Haire, 1950; Shavitt & Nelson, 2002). Although this work has generated extensive knowledge about specific processes, it does not necessarily help us understand how multiple and competing sources of information, social contexts, or time constraints may operate in impression formation situations in real-life settings.

Albeit important, there is a lack of research on how users form impressions of their computers and how different impression formation processes reflect human–computer relationships. Computers have been considered one of the most important inventions in the 20th century (MIT News., 2002) and they are becoming increasingly pervasive in individuals' daily lives. Future technology trends exclusively emphasize enhancement in human–computer interaction (see Satell, 2013). Human–computer interaction research shows that a computer not only fulfills users' utilitarian needs such as productivity, but also takes on an important social role in users' lives, such that it is endowed with human personalities (e.g., Nass, Moon, Fogg, Reeves, & Dryer, 1995) and loyalty/commitment (e.g., Sundar, 2004). Therefore, a better understanding of computers' acquisition of social-emotional roles and impressions is of critical importance for improving human–computer interactions.

2.2. Social-emotional meanings of computer

A significant body of research has examined how computers can acquire social-emotional roles in users' lives. Past research on social-emotional roles of computers mainly examined attribution of human qualities to computers (e.g., Nass & Lee, 2001) and social-emotional rules/responses that could be applied to human–computer interaction (e.g., reciprocity, Fogg & Nass, 1997; self-disclosure, Nass & Moon, 2000; consistency in behavior, Isbister & Nass, 2000; loyalty, Sundar, 2004).

Computers can take on human identities or personalities through the process of personification, which is a form of metaphor that can elicit feelings of anthropomorphism (Delbaere, McQuarrie, & Phillips, 2011). As Waytz, Cacioppo, and Epley (2010) note, the term anthropomorphism has been used rather loosely across academic fields, but more or less adhering to the dictionary definition of "attributing human characteristics or behavior to a god, animal