

CONCEPTUALIZING THE SELF: A CRITICAL ANALYSIS OF THE SELF AS A DISCURSIVE TREND IN HUMAN–COMPUTER INTERACTION RESEARCH

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Abstract: *In human–computer interaction (HCI), the human often has been conceptualized as a user. Although this notion has illuminated one aspect of the human–technology relationship, some researchers have argued for the need to explore alternative notions. One such notion becoming increasingly frequent in HCI is the self. In this paper, a study of how the self is described in 88 HCI research publications is presented. Four main aspects of the self are identified: instrumental, communicative, emotional, and playful. These four aspects differ, yet they present the self as stable, coherent, and individual. However, these characteristics have been criticized by several contemporary philosophers. This paper presents arguments from poststructuralist writers as a foundation for advocating the need to develop further these positions within HCI. The theories of Mark C. Taylor, who combines poststructuralism with complexity theory, provide a framework for viewing the self as relational to the extent that interaction becomes an existential process and thus interactive technology constitutes an existential arena.*

Keywords: *HCI theory, literature analysis, the self, human, poststructuralism, Mark C. Taylor.*



INTRODUCTION

Human–computer interaction (HCI) has always been a discipline with a tripartite focus, studying not only technology but also the human and his/her interaction with technology. However, this tripartite focus is not always well represented in the research. Even though a lively discussion is ongoing in HCI circles regarding how to understand and conceptualize technology, the frameworks for understanding the human are less frequently discussed.

Traditionally, the human in HCI has been discussed in terms of the user (see, e.g., Bardzell, 2009; Cooper & Bowers, 1995). Performing a quick search in the ACM Digital Library¹ reveals that approximately 95% of all papers presented at the annual ACM Conference on Human Factors in Computing Systems (CHI) mention the user, a number that has been nearly constant since the turn of the millennium. Moreover, other ways of discussing the human can be found. For example, the *Oxford Dictionary of English* defines the self as “a person’s essential being that distinguishes them from others” (Stevenson, 2010, p. 1613). The self can thus be understood as a word that specifically points to that which characterizes a certain human being. Notably, since the turn of the millennium, the use of the word self has increased significantly in areas of the HCI community, which indicates a possible shift in the way the human is understood and talked about within the HCI field.

This paper is an attempt to describe and analyze the assumptions regarding the human as the self that informs HCI research. The first part of the paper presents the results of a literature analysis on how the self is described in HCI research papers. The second part is a critical analysis of these findings from the perspective of one of the critical traditions in 20th-century philosophy. The third part is a constructive reading of Mark C. Taylor’s philosophical project with the purpose of suggesting that there is a theoretical position in his ambiguous and sometimes contradictory philosophy that can inform HCI research on the self.

The purpose of this paper is thus not to state a number of implications that an HCI researcher can easily apply to his/her research. Rather, the purpose is to contribute to a discussion on what the self might be and to do so by presenting a number of theoretical positions that can function as resources with which a researcher can engage in an ongoing reevaluation of the self in HCI.

METHOD

A study of how discourse functions in a domain can roughly be structured in two different ways. One approach is to choose a phenomenon and investigate which words people use to represent this phenomenon. Another approach is to choose a term and investigate which phenomena are referred to when people use this term. Because this paper is aimed at exploring and understanding what researchers mean when they talk about the self, I have chosen the latter approach. This means that I have focused only on the specific search term *self* rather than also including synonyms or supposedly adjacent terms such as user, person, or human in the search process.

Another demarcation that needs to be made concerns the definition of HCI. Defining the domain of HCI is difficult due to its complex history that has developed through an oscillation among industry, state, and academia. As Jonathan Grudin (2012) showed, HCI has evolved in

relation to several adjacent disciplines focused on the connection between humans and technology. According to Grudin, HCI can be approached from either a broad or a narrow perspective. From a broad perspective, HCI would include human factors, computer science, information systems, and library and information science because they all focus on the relationship between humans and technology and have contributed to the development of journals and conferences that are now considered core to HCI, for example, the CHI conference. From a narrower perspective, the term computer–human interaction could be used to describe computer science, ACM SIGCHI (the ACM Special Interest Group on Computer–Human Interaction), and the CHI conference. When I conducted my literature searches, I approached HCI in what might be called a semi-narrow fashion, focusing primarily on the CHI section of the ACM Digital Library but also including Google Scholar material that claimed to discuss the relationship between humans and technology within an HCI context.

With these two demarcations, I performed a temporally unrestricted literature search (in February 2015) in the CHI section of the ACM Digital Library. I then added literature found in Google Scholar through searches in which I combined the search term “the self” with different variations of HCI (i.e., human computer interaction, human–computer interaction, and HCI). In total, the searches resulted in 126 journal articles and conference papers. After an initial screening in which I excluded articles where the term the self only occurred in reference lists or in marginal comments, 88 articles remained and composed the dataset for the analysis. Although some of the literature was published in the early 1990s, the majority of the articles were published 2004–2014, which is consistent with this paper’s focus on the contemporary use of the self.

The purpose of the analysis of the literature search results was not to construct a taxonomy of mutually exclusive categories into which individual articles could be sorted. Rather, the purpose was to identify patterns and themes within the literature and to use these to formulate qualitative categories that could be used as analytical tools for understanding broader theoretical currents in HCI research. For this purpose, I used a qualitative, inductive content analysis (Elo & Kyngäs, 2008; Thomas, 2006). This approach suggests that a single article can contain many different themes, thus allowing a single article to appear in several different categories. Through an iterative close reading of the material, guided by questions such as “How is the key search term described?”, “What characteristics are mentioned in relation to the search term?”, and “In which context does the text situate the search term?” specific text segments in each article were identified and coded with key labels. Because I did not apply an a priori coding system, the process resulted in a large number of key terms, many of which were redundant. After reducing redundancy through a clustering of the key labels, a number of main themes emerged, from which the final categories were then formulated (see Figure 1).

RESULT OF LITERATURE ANALYSIS

In this section, I present the findings of the literature analysis. I have identified four main categories of literature according to which the self can be described: instrumental, communicative, emotional, or playful. Within each of these categories, I have clustered the description of the articles around two or three main themes.

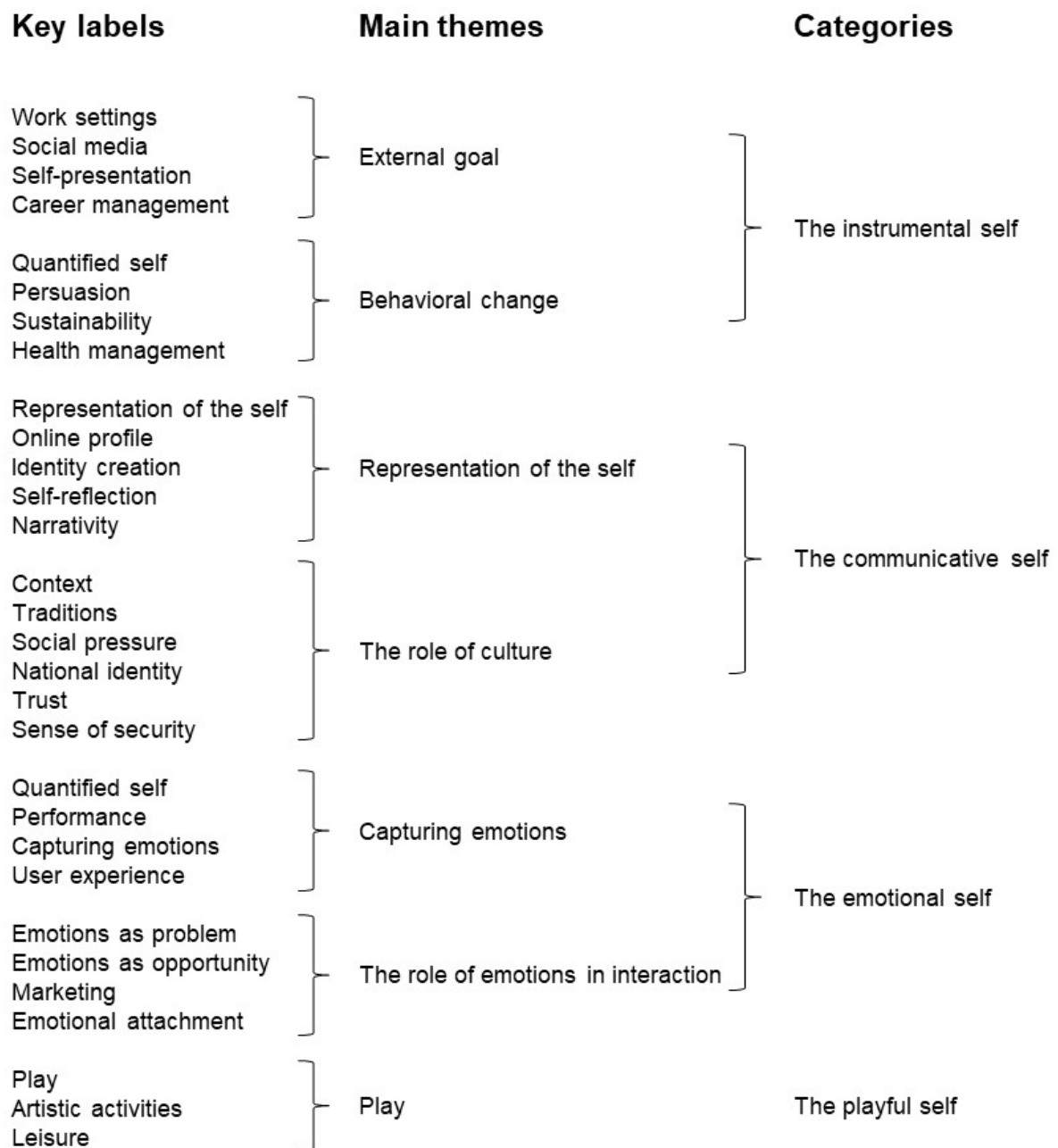


Figure 1. Overview of the clustering process as part of the analysis of the term *self* found in the literature surfaced within the HCI area of the ACM Digital Library.

The Instrumental Self

Since Lucy Suchman’s work in the 1980s (e.g., Suchman 1987), much of the research in HCI has described the self as a contextual being whose actions are governed not only by individual

rationality, but also by social and cultural forces. However, despite this historical emphasis on the context, one of the strongest categories in the discourse on the self analyzed in this paper is research in which the self is described primarily as a being whose thoughts and actions are characterized by rational, instrumental considerations on how to reach particular goals.

External Goal

Many of the articles in this category of research approached instrumental goals as something external to the self. In their article “The Truth About Lying in Online Profiles,” Hancock, Toma, and Ellison (2007) discussed the correspondence between online dating profiles and the people who have created the profiles (see also Fiore & Donath, 2004; Toma, Hancock, & Ellison, 2008). The authors argued that, even though the process of initiating romantic relationships has always been characterized by a tendency to “engineer” one’s self-presentation in order to make a positive impact on a potential romantic partner, the online arena is particularly exposed to such deceptive strategies. The authors compared the online presentations of 80 individuals active on online dating sites with their offline physical appearances and found that deception in these profiles is frequent but that “the magnitude of the deceptions is usually small” (Hancock et al., 2007, p. 449). They explain the latter point as the “anticipated face-to-face interaction” (p. 452), which functions as a force balancing the strategic instrumentality of the self with the given physical facts. Therefore, the self is described as a rational being who strategically balances the risk of being exposed as a liar against the potential positive rewards in terms of a possible romantic relationship. In short, the self is described as a demarcated entity that uses its rational characteristics in strategic manipulation of entities external to the self. Similar results were discussed by Pilcer and Thatcher (2013), who found that people’s Facebook activities are often strongly influenced by instrumental considerations related to strategic career management.

Yet another example of research portraying the self as a strategic being acting to reach instrumental external goals is Nov, Naaman, and Ye (2008), where the authors analyzed the role that various motivators play in the process of tagging content on Flickr. The authors found that the process of tagging was strongly influenced by strategic considerations concerning instrumental goals that the users were striving to achieve in relation to particular social contexts. Thus, to conclude, even though the articles in this theme focus on the social dimensions of technology, they nevertheless describe the self as fundamentally instrumental, acting strategically in pursuit of an external goal.

Behavioral Change

Although the literature described above presents the self as engaged in instrumental acts through which it potentially can change an external object, many articles in the instrumental category focus on instrumental acts where the own self is the object (e.g., Choe, Lee, Lee, Pratt, & Kientz, 2014; Kehr, Hassenzahl, Laschke, & Diefenbach, 2012; Khovanskaya, Baumer, Cosley, Volda, & Gay, 2013; Moraveji, Akasaka, Pea, & Fogg, 2011; Schiphorst, 2011; Scott, Barreto, Quintal, & Oakley, 2011; Zaczynski & Whitehead, 2014). Much of this literature is focused on behavioral change, often in relation to health and bodily fitness (e.g., Gao & Mandryk, 2012; Grimes & Harper, 2008; Lee & Dey, 2014; Mamykina, Mynatt, & Kaufman,

2006; Meyer, Simske, Siek, Gurrin, & Hermens, 2014; Zhou, Sun, & Yang, 2014). For example, Maitland and Chalmers (2010) analyzed technology designed to support cardiac patients in their efforts to change their behavior through increased awareness and self-reflection. The authors argued that, even though enforced rehabilitation programs may result in partial changes in the patients' physical activity, cognitively based motivations are needed to extend this change to other forms of health-related activity and, in this process, self-monitorial technology may be a valuable tool. The authors contended that increasing the patients' knowledge and self-awareness is a powerful tool in the process of achieving behavioral change. Furthermore, it was suggested to be highly ethical to ground behavioral change in an increased self-awareness and acknowledgement of the patient's psychosocial needs: "Facilitating the ability to retake control of one's life is fundamental to the process of cardiac rehabilitation. We therefore suggest that designing explicitly to support the self-determination of behavioural change will not only increase the likelihood of the technology being adopted but will also complement psychosocial aspects of cardiac rehabilitation that are often overlooked in favour of physiological and behavioural outcomes" (Maitland & Chalmers, 2010, p. 1219). This illustrates a conviction that the self, given adequate information, can (a) reach an understanding of what is best for him/her and (b) act rationally based upon that information. Thus, the self is described as a strategic creature that can make informed decisions, gain control over its own life, and practice self-determination. However, this means that questions regarding possible connections between cardiac rehabilitation and things like emotional bindings, substance abuse, and existential anxiety are left unaddressed. So, despite the authors' claims that they included dimensions that have so far often been overlooked in research, achieving behavioral change is still primarily described as a rational, instrumental process.

Maitland and Chalmers (2010) mainly focused on how the individual self can change his/her behaviors through interaction with technology. However, the literature also provided researchers who emphasized the social situatedness of these processes of change with the argument that behavioral change is the result of the self using technology as a mediating tool to connect to other selves. One such example is Laschke, Hassenzahl, Diefenbach, and Tippkämper (2011), who analyzed a technological artifact designed to persuade people to act more environmentally friendly by saving water. Similarly to Maitland and Chalmers (2010), Laschke et al. (2011) emphasized that it is vital that the individual can experience a degree of control over which goals to reach in order to successfully change a particular behavior. However, equally important is the idea that increased self-awareness can be gained through a comparison between one's own behavior and the behavior of others. This utilizes one of the most powerful resources for change, namely competitiveness: "Through its fuzzy, ambient feedback [*sic*] participants were encouraged to set personal goals, to compare themselves to others, and to monitor their progress. This could even result in competition" (Laschke et al., 2011, p. 642). So, while Maitland and Chalmers (2010) primarily described the increased self-awareness as an individual phenomenon, Laschke et al. (2011) focused on the social contextuality of these aspects of human beings, thus indicating that an important part of the behavior of the self is relationally constituted (see also Gabrielli, Sabatino, Munoz, Marchesoni, & Mayora, 2011).

The Communicative Self

The second category of articles presented other elements of the relational aspects of technology. In this line of research, the self is described as a relational being that uses technology for communicative purposes, to establish a connection with other selves. As can be expected, many of the authors of these articles explored social media such as Facebook and Twitter, but some research focused on other kinds of online environments.

The Representation of the Self

A frequent theme in these articles was how online activities, such as creating profiles, relate to the self (e.g., Farnham & Churchill, 2011; Ozenc & Farnham, 2011; X. Zhao et al., 2013; X. Zhao, Schwanda Sosik, & Cosley, 2012). For example, as noted above, Hancock et al. (2007) explored how selves are being represented in online environments. Researchers in this category often describe a representation as something that results from instrumental considerations, indicating possible discrepancies between the self and the online self. This perspective can be found in several other articles as well (e.g., Ducheneaut, Wen, Yee, & Wadley, 2009; Ellison, Heino, & Gibbs, 2006; Nov et al., 2008; Pilcer & Thatcher, 2013; Shami, Ehrlich, Gay, & Hancock, 2009).

However, other approaches to the relationship between the self and its online representation have been identified. For example, Nie and Sundar (2013) argued that the ways people shape their representations online are less motivated by strategies for making a particular impression on others than by an interest in using these technologies as opportunities to articulate one's identity to oneself through a self-reflexive move (for similar discussions, see also Fox, Bailenson, & Tricase, 2013; Helmes, O'Hara, Vilar, & Taylor, 2011; Marathe & Sundar, 2011; Odom, Zimmerman, & Forlizzi, 2011).

Authors of other articles attempted to avoid a focus on instrumental, rational behavior by suggesting that online selves result from unconscious processes and therefore can be seen to accurately reflect aspects of the self. For example, De Choudhury, Counts, and Horvitz (2013), in an effort to understand the connection between online posting and postpartum depression, statistically analyzed patterns of posting, linguistic style, and emotional expression in Twitter posts made by 376 women. Rather than only focusing on identifying explicit references to depression, the authors argued that it is possible to identify indirect markers, that is, linguistic style and frequency of posting, in the Twitter texts. These markers can be used to draw conclusions concerning the psychological status of the women: "Whether in the form of explicit commentary, patterns of posting, or in the subtleties of language used, social media posts bear the potential to offer evidence as to how a person is affected by life events" (De Choudhury et al., 2013, p. 3267). One such indirect marker that the authors mentioned was "the frequency of use of first-person pronouns," which, they claimed, "has been found to be a correlate of depression" (p. 3268). It is important to note, however, that the study was not limited to identifying and describing the connections between posted online patterns and the current status of the self, but also aimed at developing tools that can prognosticate future statuses of the self. Through a comparative analysis of prenatal and postnatal posting patterns, the authors suggested four main measurements (engagement, ego-network, emotion, and linguistic style) that they argued can be used to predict with an accuracy of 71% the risk that an

individual woman who is about to give birth will exhibit extreme emotional changes in the early postnatal period. Because such changes previously have been found to be related to depression, the authors suggested that this research can help identify individuals who have an increased risk of suffering from postpartum depression. Taken as a whole, this line of research indicates that the online representation of the self not only reflects the selves that individuals currently are but also the selves that these people are likely to become.

The Role of Culture

Many studies of the self as communicative emphasized cultural and social aspects. The main thrust of this argument is that the self, far from an isolated being, can be described as fundamentally influenced by, or even constituted by, traditions and norms. These influences are thus seen as having a strong impact on the character of the self as well as the self's engaged interactions. In their study of the differences in social media practices between American and Chinese users, C. Zhao and Jiang (2011, p. 1130) drew on the theory of the bicultural self, which suggests that contemporary Chinese individuals are a combination of a social-oriented self "rooted in a traditional Chinese conceptualization" and an individual-oriented self that has "emerged and developed under Western influences, along with modernization." Based on this view of individuals as combinations of both traditional and modern character traits, the authors posited that this cultural tension would be visible in the profile images that the users posted. They proposed that the collective character of traditional Chinese culture would result in Chinese users being "more likely to use group photos in their profile picture" (C. Zhao & Jiang, 2011, p. 1130), yet, consistent with the emerging individualism in contemporary China, they would be more likely to use the customization opportunities of digital technology to alter the pictures. Contrary to the researchers' assumptions, however, the Chinese users were found not to use any group photos as profile images while the American users did, despite the collectivistic character of the former culture and the individualistic character of the latter. In the case of customization, the authors' assumptions were, however, confirmed; Chinese users showed a tendency to customize their profile pictures and present a "polished" version of themselves far more often than their American equivalents did.

The reasons for these differences are not entirely clear. On the one hand, the results of this study contradict "the western-individualism, eastern-collectivism theory" (C. Zhao & Jiang, 2011, p. 1131), indicating that clear-cut, traditional assumptions of cultural influence may be inadequate as explanatory framework for understanding online practices. On the other hand, however, the research did identify considerable differences in the way individuals from different national cultures represented themselves through profile images. So, although the role of cultural influence is complex, online self-presentation is not just an individually motivated activity. It portrays the individual self as contextualized and fundamentally influenced by cultural norms and societal practices, even though these are continually being renegotiated.

Other studies focusing on the differences between Western and Chinese users' online practices and their connection to national culture have come to similar conclusions (see, e.g., Liao, Pan, Zhou, & Ma, 2010; Scissors, Shami, Ishihara, Rohall, & Saito, 2011). Jiang, de Bruijn, and De Angeli (2009) can be said to further deepen the analysis of the role of culture by emphasizing that cultural norms do have an impact on not only the self's online expressions but also on how those expressions are being perceived by others' selves: "People from different

cultural backgrounds rely on different cues when forming impressions of others” (p. 684). It is important to emphasize that culture, in this context, is not limited to national or regional culture but needs to be understood as a broader concept entailing facets such as corporate or religious cultures and identities and practices associated with demographics or subcultures, and so forth. For example, Raban, Danan, Ronen, and Guy (2012) studied impression formation in a corporate context and suggested that corporate practices and norms often crosscut national boundaries and that these practices could be valuable in order to understand people’s online behavior. Pfeil, Arjan, and Zaphiris (2009) focused on demographics and argued that differences in the way people represent themselves on MySpace can, to some degree, be related to age. Older users tend to express themselves in a formal and official manner, whereas teenagers tend to be informal, emotional, and use more self-references. So, even though the definitions of culture vary in these articles, their authors all suggested that the individual self is embedded within cultural contexts that influence the way the self communicates.

Another aspect of culture is how the trust that exists within communities affects the self (e.g., Riegelsberger, Vasalou, Bonhard, & Adams, 2006; Romero & Markopoulos, 2005). In these articles, the self was described as trying to preserve its own identity while being exposed to otherness, thus emphasizing the difference between the self and the other.

For example, Yarosh (2013) explored the possibility of using technological tools in 12-step programs, such as Alcoholics Anonymous (AA) and Narcotic Anonymous (NA). One of the most important principles in AA and NA is anonymity. The purpose of these groups is to offer a place where anyone can feel free to join and share experiences around his/her substance use without the risk of being identified and perhaps publicly stigmatized as a consequence of his/her struggle with addiction. Moving the AA meetings from the traditional face-to-face context to, for example, an online environment presents specific challenges regarding how the principle of anonymity can be maintained. According to Yarosh (2013), these challenges have two components. First, a question arises regarding an individual’s comfort in trusting the functionality of technology. For example, there might be concerns whether cloud storage of personal data is, in fact, a secure storage location or whether a risk exists that the data could be leaked to people outside the trusted community. Second, some people might question whether it is possible to trust other people’s behavior on a new technology. As a respondent in Yarosh’s (2013, p. 3417) study stated, “Even if there are rules that you don’t post other people’s names, you know somebody will at some point. So what happens then?” So, trust that has been established over time in social contexts is not automatically transferred to their online counterparts, but needs to be reestablished, on both a technical and a social level.

The Emotional Self

The third category of articles focused on emotions. As a core aspect of the self, emotions need to be accounted for in any research trying to understand the self and its interaction with technology.

Capturing Emotions

Many of the articles in this category focused on the possibilities for capturing the users’ emotions during interaction (e.g., Cardoso, Romão, & Correia, 2013; Huisman, van Hout, van Dijk, van der Geest, & Heylen, 2013; Pollak, Adams, & Gay, 2011). One such potential is to create better

interactive systems. According to Epp, Lippold, and Mandryk (2011, p. 715), the tendency of interactive systems to “provide inappropriate feedback, interrupt the user at the wrong time, and increase frustration” is often a consequence of the inability of the systems to recognize and adapt to the use context. The obvious solution to these problems would seem to be in developing context-aware systems; but, according to the authors, such systems are often both invasive and costly and are thus not always desirable. Instead of continuing trying to develop systems that can recognize location and other contextual data, Epp et al. (2011) suggested that one possible solution would be to develop systems that can capture the emotional status of the user and then utilize this information for a proper adaptation of the system. These authors explored methods to analyze keyboard input patterns in order to identify connections between these patterns and the emotional status of the user. The results of their study suggested that it is possible to model “six emotional states, including confidence, hesitance, nervousness, relaxation, sadness, and tiredness—with accuracies ranging from 77.4% to 87.8%” (Epp et al., 2011, p. 716). So, the work of Epp et al. suggests that there is a clear connection between emotions and keystroke dynamics and that emotions therefore need to be considered an integral part of the self.

The Role of Emotions in Interaction

While Epp et al.’s (2011) research focused on the positive potentials of emotions (see also Cairns, Pandab, & Power, 2014; Conci, Pianesi, & Zancanaro, 2009; Harbich & Auer, 2005; Karapanos, Zimmerman, Forlizzi, & Martens, 2009; Salminen et al., 2008), other researchers explored the negative aspects of emotions. For example, Sas & Whittaker (2013) studied how people manage digital possessions that are no longer wanted and that are considered having a negative impact on the self and the self’s interaction with computer systems. By interviewing 24 people who had gone through a romantic breakup, the researchers wanted to identify the emotional connections between the respondents’ digital belongings and those of their former romantic partners, as well as how these connections had changed after their relationships had ended. The study explored a broad variety of digital possessions that had played either a communicative or a symbolic role in the relationships (e.g., records of conversations, contact information, relationship statuses in social media, photos, videos, music). The respondents described how, when the relationships ended, they had applied various strategies for establishing distance from their former romantic partners and how they considered erasing digital possessions as an important part of this process. However, due to the nature of digital possessions, implementation of such clean-slate strategies was next to impossible. As formulated by one respondent in the study, “Facebook doesn’t help because he can still contact my family even if I don’t speak to him. He could get in contact with my little sister or auntie on Facebook. That hindered [moving on] because every time I thought I had got to the point of moving on, something would happen that would take me back to square one” (Sas & Whittaker, 2013, p. 1826). So, this study provides an example of how human entanglement with technology creates historical sediment that is experienced not only as a positive aspect of contemporary technologies but also, at times, as challenging and upsetting when the sediment of digital possessions affects the self. (For research reflecting technology as a complex arena impacting both positive and negative emotions, see, e.g., Panger, 2014; Toma, 2010; Vasalou, Joinson, &

Pitt, 2007). Given the increased use of social media, it does not seem far-fetched to suggest that these complex aspects of technology will become an increasing challenge in the future.

Based on the insights into how important emotions are to the self, many researchers have discussed the possibilities of exploiting the positive aspects of emotions related to technology in order to reach certain instrumental goals. For example, in their study of users' emotional attachment to mobile phones, Meschtscherjakov, Wilfinger, and Tscheligi (2014) argued that "mobile attachment emerges when the mobile phone becomes part of the user's self concept [*sic*]" (p. 2317). This suggests that emotional attachment is not limited to brief, temporary sensations, but needs to be understood as something that relates to fundamental processes that constitute the identity of the self. Meschtscherjakov et al. (2014) presented three main components in the causes of mobile attachment. First, they explored the connection between the functionality and reliability of technology and the self's emotional attachment to it, arguing that it is "very unlikely that a person still experiences a strong attachment to his/her mobile phone when it no longer works properly" (p. 2320). Second, they suggested that emotional attachment is related to the way in which a mobile phone enriches the self. Self-enrichment is described as consisting of four components: (a) past self-enrichment, which means that the mobile phone reminds the self of previous experiences, which resembles parts of the discussion from the article by Sas and Whittaker (2013), even though Meschtscherjakov et al. approached the topic from a more positive perspective; (b) private self-enrichment, which means the mobile phone reflects both who the person is and the ideal image of who the person wants to be; (c) public self-enrichment, which is the actions that the individual takes to signal affiliation to a specific group; and (d) collective self-enrichment, which is similar to public self-enrichment, but reflects the affiliation on a more symbolic, ideological level that shows that the self has internalized certain norms and values that are appreciated within a specific group. Third, Meschtscherjakov et al. (2014, p. 2322) indicated that emotional attachment also relates to the way a mobile phone gratifies the self "through any combination of sensorial pleasures experienced during interaction."

So, clearly, the researchers in my analysis approached emotions from many different angles. Many studies presented emotions as being both a potential creative resource and a serious challenge to be overcome. Nevertheless, several researchers expressed the conviction that the emotional dimensions of the self are core to understanding the interaction between humans and technology.

The Playful Self

The fourth category of research explores the playful self, which is a self characterized by aspects of life, such as engagement (Lindtner, Mainwaring, Dourish, & Wang, 2009), fun, enjoyment and immersion (Gerling, Miller, Mandryk, Birk, & Smeddinck, 2014; Gonzales, Finley, & Duncan, 2009; Hwang, Holtzman, & Resnick, 2011; Mekler, Bopp, Tuch, & Opwis, 2014). Although the notion of play is sometimes connected to gaming, it is vital to separate the two. Play, in this context, is defined as a nonutilitarian activity where interaction is its own purpose; that is, it is not motivated by any kind of external teleology, even though there were examples of research where playfulness is used instrumentally to achieve a particular goal (e.g., Lindley, Harper, & Sellen, 2008). Many of the articles on gaming included aspects of nonutilitarian interaction. Others, however, focused more on the instrumental, and in this sense

utilitarian, character of gaming, such as gaming as social activity (Wohn, Lee, Sung, & Bjornrud, 2010) or gaming as an explorative tool (Bardzell, Bardzell, Zhang, & Pace, 2014), which illustrates that playfulness and gaming are not equivalent.

The nonutilitarian character of playfulness must not be taken as an indication that playfulness is something superficial and unrelated to the constitution of the self. On the contrary, many researchers suggested that playfulness is an integral component in the self. For example, Birk and Mandryk (2013) stated that play relates to both the idealized self and the real self, arguing that there is a strong connection between the playful game and the individual's self-perception and cognitive self-reflection. This theme was further developed by Mekler et al. (2014), who performed a review of 87 quantitative studies focusing on game enjoyment in an effort to summarize the field's perspective on this theme. In their study, they often approached gaming as a nonutilitarian activity similar to the suggested definition of playfulness. They argued that the enjoyment a player experiences is not a random momentary sensation but depends on the compatibility between the playful activity enacted in the game and the needs and values of the self. For example, they found research where players described how they had experienced a sense of guilt when playing games that contained components that somehow deviated from the moral beliefs of the player. As a result, games containing violence and torture were often described as less enjoyable, which indicates that portraying play as a mere superficial escapism isolated from everyday life is misleading. On the contrary, play is intimately related to the fundamental constitution of the self. In an effort to express this connection between play and enjoyment on the one hand and the self's identity on the other, Mekler et al. (2014) cited Lazzaro's suggestion to call game enjoyment "serious fun," indicating that play could relate to deeper aspects of the self, such as values, thoughts, and feelings.

Similar argumentation can be found in an article by Seay and Kraut (2007), where the authors discussed negative effects of gaming and how the powerful dynamics of play often utilized in computer games can lure an individual into situations and emotional modes that negatively influence the self. Such negative consequences can be physical (e.g., dry eyes or carpal tunnel syndrome), emotional (e.g., depression or low self-esteem), or social (isolation or detachment from families and friends). Many previous studies suggested that a phenomenon such as escapism is an important factor in developing problematic use, but Seay and Kraut argued that the main factor determining whether a player could develop problematic use is the individual's ability to self-regulate. The concept of self-regulation is described in the article as the ability to see rationally and self-reflexively one's own behavior (self-monitoring), compare that behavior to external standards, such as the behavior of other people (self-evaluation), and to administrate consequences based on those evaluations ("self-consequation"; p. 831).

Seay and Kraut's (2007) account depicted rational, reflexive cognition as an important control mechanism that can organize drives, pleasures, and escapism, and thus protect the well-being of the self. This implies a conflict of interest between the rational, cognitive character of the instrumental self, on the one hand, and the playful self, on the other. In this conflict, these authors seemed to favor instrumental rationality over playfulness.

But What About the Other Selves?

Looking at these four selves (the instrumental, the communicative, the emotional, and the playful), it is obvious that other aspects of the human are not present in this categorization.

One such aspect is the embodied self. As has been pointed out by, among others, Harrison, Tatar, and Sengers (2007), the body has historically been very important in HCI, but the phenomenological approaches common in recent research have brought the embodied self back into the center of attention in a new way (e.g., Dourish, 2004; Höök, Jonsson, Ståhl, & Mercurio, 2016; Klemmer, Hartmann, & Takayama, 2006). However, even though the bodily aspects of the human are important perspectives in HCI, they are almost entirely absent from the discourse on the self analyzed in this paper. With a few exceptions (e.g., Epp et al., 2011; Giraud, Courgeon, Tardieu, Roatis, & Maitre, 2014; Schiphorst, 2011; Wang, Turaga, Coleman, & Ingalls, 2014), discourse on the self does not include the body as a strong analytical component. As I noted in the Introduction, the *Oxford Dictionary of English* defines the word *self* as referring to that which distinguishes a person from others (Stevenson, 2010, p. 1613). Given this assumption in normal usage that the word *self* refers to that which defines an individual human being, it is quite surprising that most HCI researchers discussing the bodily aspects of the human do not use the word *self*. Is this a reenactment of the old Cartesian dichotomy between body and mind where mind rather than body is considered to be that which defines a human being? Or, could the discrepancy between the bodily perspectives of contemporary HCI research and the nonbodily perspectives offered in the discourse on the self be a consequence of the discourse's origins in early research regarding online environments? Much of the research on online environments explored the potentials of the new, abstract, intangible phenomenon that came to be known as cyberspace and, as a consequence, bodily aspects of the interaction between the human and this intangible phenomenon were marginalized to a point where it was sometimes discussed as a limitation from which digital technology could break free.

Because the discourse on the self is becoming increasingly important when discussing the human in HCI, one can ask what this absence of the body in the published discourse reveals about the direction of the domain and the way it understands the human. Will the discourse become a formation for research focusing on nonbodily aspects of the human that can exist parallel to the research focusing on the physical body as an indispensable part of the human? Or will the increasing use of references to the self in HCI research result in a shift away from the bodily aspects central to contemporary HCI and towards something else? Suggesting an answer to those questions is outside the scope of this discussion. Yet, it is important in this context to acknowledge that when HCI researchers talk about the body, they do not primarily refer to it as the self, or conversely, when they talk about the self, they often do not include bodily aspects of human life. Actually, the same thing can be said about many other aspects of the human that are absent from the categorization of the four selves. Nevertheless, even though they may be important perspectives of the human in regard to HCI research and design, they currently are not part of the published discourse on the self.

The Stable, Coherent, Individual Self

Through the literature analysis, I have identified four different descriptions of the self: the instrumental self, the communicative self, the emotional self, and the playful self. These perspectives often blend but they are nevertheless clearly identifiable as different ways of understanding the self. Despite the differences between these categories, they have some

important characteristics in common. Below, I will briefly describe three of these characteristics as presented in the literature.

First, in many of the articles, the self is described as a fairly stable entity. Changes might occur, but such changes often are seen as epiphenomenal to the self, rather than something that affects the fundamental, ontological constitution of the self. For example, in analyzing the effects of interaction, several researchers discussed emotional changes (e.g., Gerling et al., 2014; Panger, 2014; Toma, 2010), cognitive changes (e.g., Fox et al., 2013; Vasalou et al., 2007) or behavioral changes (e.g., Fox et al., 2013; Laschke et al., 2011; Maitland & Chalmers, 2010; Yarosh, 2013). Yet, although emotions, cognition, and behavior are important components of the self, one can question whether these three aspects alone constitute the self. Arguing that the self is reducible to these three components would, for example, exclude someone who is temporarily unconscious and therefore unable to think, feel, or act. So, the literature mainly describes the self as an entity that, behind such epiphenomenal changes, remains a stable, ontological entity.

Second, the self is portrayed as a coherent entity. Some researchers identified and discussed the complexity of the self, but these authors often interpreted this complexity as connected to things such as societal roles (e.g., Farnham & Churchill, 2011; Ozenc & Farnham, 2011; X. Zhao et al., 2012) or different phases in the interaction with technology (e.g., Karapanos et al., 2009; X. Zhao et al., 2013) rather than to the actual ontology of the self. In addition, some research (e.g., Kehr et al., 2012; Yarosh, 2013) focused on people's experience of conflicting drives, for example, someone who both wants to eat chocolate and lose weight or someone who is committed to keeping sober but who realizes that biological and chemical drives work against this decision. However, in these lines of research, the tensions experienced are not acknowledged as constitutive to the self, but rather considered to be exceptions to the norm. As such, they constitute problematic conditions that need to be overcome, rather than something constitutive of the self on an ontological level.

Third, the self is portrayed as an entity that has been, from the start, demarcated from other entities, be they human or nonhuman. Many articles in this review provided studies on how the self is affected by external entities of varying kinds, but the analyses do not describe the self as such to be originally conditioned by these relations. The relational impact is seen as secondary to an already existing individual self. Even in research on the communicative self, the self is described as ontologically separated from other people. Some of the researchers in this analysis portrayed the communicative process in terms of a simple process of transmitting information (e.g., De Choudhury et al., 2013; Hancock et al., 2007; Ozenc & Farnham, 2011; Raban et al., 2012; C. Zhao & Jiang, 2011). Others, however, acknowledged that this process is one of mutual exchange in which the sender is also a receiver and where communication is not only a form of transmission but also a form of relation (e.g., Riegelsberger et al., 2006; Romero & Markopoulos, 2005; Wohn et al., 2010; X. Zhao et al., 2012). However, even in the latter category of research, the separation between subject and object remains firm, and interaction is not seen as having a direct impact on the ontology of the self. In research that focused on the self in online environments, there were examples where the self was described as emerging through interaction, but even in those articles (e.g., Fox et al., 2013; Raban et al., 2012), there was often a clear, ontological distinction between the online selves (i.e., a person may have multiple) and an assumed authentic, actual self. Any impact that an online self might have upon the real self is seen as something purely

additional rather than constitutive to the self. However, a few exceptions to this individualistic approach were found, and these exceptions typically were found in research on the connection between culture and the self (e.g., Jiang et al., 2009; C. Zhao & Jiang, 2011). These authors often positioned the self in relational networks, even though sometimes it was unclear whether the influence of these networks on the self lay on a behavioral level or an ontological level. In other words, is the self a product of its surrounding culture to a degree where it can be seen as ontologically relational or does culture merely influence the way an already existing self communicates?

So, the HCI research literature analysis presented in this paper can be said to sketch a view of the self as a relatively stable, coherent, individual entity whose core characteristics precede interaction. However, this view of the self has been seriously criticized by scholars in various domains. For example, in philosophy, which has been recognized as an increasingly important resource for developing HCI (Bardzell & Bardzell, 2015; Fällman, 2007, 2011), this stable, coherent, individual self has been seriously criticized for a long time. Therefore, in the following section, I will briefly describe such critique from three philosophers who have had a major impact on the philosophical approach to selfhood: Friedrich Nietzsche, Michel Foucault, and Jacques Derrida. I have several reasons for choosing these three. They are usually acknowledged as three of the most powerful critics of modern selfhood. Furthermore, they represent three different philosophical epochs and propose three different philosophical approaches to selfhood. However, even though there are differences in their respective analysis of selfhood, a theoretical continuity exists between them insofar as Foucault and Derrida explicitly built upon and comment on Nietzsche's theories. Thus, they belong to the same critical tradition in European philosophy.

A CRITICAL ANALYSIS OF THE SELF

One of the most well-known philosophers discussing the self is Friedrich Nietzsche. Although his philosophy is complex and, according to some (e.g., Müller-Lauter, 1999), contradictory, it is evident that he is highly critical of the notion of a coherent, stable self. According to Nietzsche (1901/1968), what contemporary researchers call the self or the subject is nothing more than a collection of often-contradictory impulses. He suggested that this diversity is something that is veiled by a generalizing dynamic present in language. In his early essay, *On Truth and Lies in a Nonmoral Sense*, Nietzsche (1873/1979) argued that language works by generalizing, by erasing differences, and by ignoring particularity: "Just as it is certain that one leaf is never totally the same as another, so it is certain that the concept 'leaf' is formed by arbitrarily discarding these individual differences and by forgetting the distinguishing aspects" (p. 891). The same generalizing tendency based on linguistics can be seen, according to Nietzsche, in everyday use of the word self as well. Nietzsche (1901/1968) argued that, by using concepts like self and subject, people have come to believe that behind the disparate drives that are observable in human beings, there is some kind of unified entity that can be called the self. This idea can be found in his later writings as well. In a notation from 1887, Nietzsche wrote that the subject (i.e., the self) "is the term for our belief in a unity underlying all the different impulses of the highest feeling of reality"

(Nietzsche, 1901/1968, p. 268). So, according to Nietzsche, the coherent self is not an actual essential being but a linguistic construction.

However, this does not mean that the self is entirely empty or without possibilities for identity. On the contrary, the fact that the self is a linguistic construction means that there is a possibility for establishing new or alternative selves; if the self is a fictional story, then that story can be retold in other, more appealing ways. (For an in-depth discussion on the arguments for and against Nietzsche's view of linguistic selfhood, see Leiter, 2002; Nehamas, 1985/2002). By breaking free from the deceiving, oppressive, socially constructed linguistics (i.e., the relational aspects of language), one's linguistic self can be established as a free-standing entity. The creative potential of language in relation to the self thus lies in an individualizing move that separates the self from being influenced by the group or, in Nietzsche's terminology, the herd. According to Rüdiger Safranski (2003), this is what Nietzsche tried to achieve in his own life. Safranski argued that "self-configuration through language became a passion for Nietzsche" (p. 55) to the extent that he "sought to organize his life as a quotable foundation for his thought" (p. 27). This means that, to Nietzsche, "the essay was a mode of living" (Safranski, 2003, p. 28), a creative possibility that he suggested is available to his reading audience as well, which is evident in Nietzsche urging his readers to become "the poets of our lives" (Nietzsche, 1882/2008, p. 170). Thus, the linguistic foundation of selfhood suggests a malleable character of the self, which constitutes a sharp contrast to the self as a stable entity proposed in much of the HCI research.

Following the fascists' misuse of his writings in the early 1900s, Nietzsche's philosophy was considered obscure by many scholars. However, in the 1950s, his ideas were taken up by, among others, the French philosopher Michel Foucault, who spent a substantial part of his philosophical career—from his studies of madness in early modern Europe during the 1950s through his 1980–81 lecture series on the hermeneutics of the subject at the Collège de France—elaborating Nietzsche's ideas in order to explore the relationship between individuals and society. What is interesting with Foucault's perspective on this relationship is that he did not present the concept as a one-way street (Hutton, Gutman, & Martin, 1988). The individual is not reduced to a societal product nor is society reduced to a construction made by individuals. Rather, the influence is seen as mutual. Society constitutes and changes the individual who, in turn, changes both society and himself/herself. In much of his early work, Foucault focused on the impact of societal structures on the individual. Whether exploring the asylum, the prison, or the education system, he described the individual as contextually situated and thus fundamentally constituted by societal norms. He described how, historically, medical professionals have used medical diagnoses as tools for maintaining societal structures of power by constructing collective identities among groups of unwanted citizens who can then be institutionalized or subjected to other kinds of derogatory or disciplinary treatments (Foucault 1964/1992). He noted how the legal system and the idea of normality that emerged in the 19th century do not only have a repressive dimension, but also a productive dimension through which members of society are encouraged to engage in disciplinary processes that shape the way the individuals think and act (Foucault, 1975/1987). Thus, the cognitive and moral identity of the individual is a result of the person engaging in societal structures. However, society is not the only influence shaping the self. In his analyses of the hermeneutics of the self, Foucault explored how individuals shape their own selves, in other words, how they act upon themselves in order to shape their identities. In these works,

the self is described as a project that the self can finalize through various kinds of exercises (Foucault, 1982/2005).

An objection can be made that, as a historian, Foucault investigated only how the self had been described during different epochs, rather than personally observed, and this does not necessarily tell researchers anything about his view of what the self actually is. However, to Foucault, description is inseparable from essence. A central point in his argumentation is that how one talks about people changes the people and that this change can, in fact, be studied through analyzing artifacts such as medical records and events such as criminal acts. Furthermore, not only does discourse change an already existing identity, but identity is itself a consequence of discourse. According to Foucault, the self is discursively constituted, which means that the self can be understood as neither stable (because discursive practices change over time) nor individual (because discourse is, by definition, a societal function).

Jacques Derrida shares Nietzsche's and Foucault's view of the self as a linguistic construction, although in a slightly different manner. According to Derrida (1972/1982), the subject "is inscribed in language" and, as such, "is a 'function' of language" (p. 15), which means that the self is linked inextricably to the dynamics of linguistics. These dynamics were analyzed by Derrida throughout his philosophical career and have often been described in terms of *différance*. The concept *différance* suggests that meaning emerges through the differential dynamics between codependent signs rather than through simple identity and, because the self is linguistically based, the same differential dynamics characterize the self (Derrida, 1967/1973). In other words, the idea of a unified, individual self needs to be replaced by a view of the self as a relational creature characterized by otherness.

The complexities inherent in the idea of the self were further explored in Derrida's (1967/1973) elaboration of Hegel's discussion on the consequences of deictic expressions. Derrida took a simple example of someone saying, "I see a particular person by the window" (p. 92) and argued that the complexities and uncertainties that occur when such an expression is transferred over temporal and spatial boundaries are not accidental problems to be overcome, but instead should be understood as fundamental characteristics of language. In fact, Derrida suggested that they constitute the very possibility of language. Language functions by referring to a here and now that is never immediately present, which means that language, seen from a referential perspective, refers to things that are actually absent. In that sense, words are traces rather than labels. However, Derrida's substituting *labels* with *trace* does not suggest that presence can be rejected in favor of simple absence. Such either-or claims would only increase the dualistic ontology it aims to disrupt. Instead, trace should be understood as something haunting and disturbing the picture proposed by referential logic, indicating that any representation (including the representation of the self) always entails its opposite, thus contradicting the idea of the unified, individual self.

A similar perspective can be found in the essay "Signature Event Context" from the book *Margins of Philosophy* (Derrida, 1982), where Derrida discussed the breakdown of isolated subjectivity and exemplified this through a discussion of the connection between the self and its linguistic representation. He argued that, in order to be an individual, unique self, the subject needs a unique representation, in other words, a signature. However, the connection between the self and its signature is highly complex. In order for the signature to be recognized, it cannot be entirely unique and particular, but also repeatable. Rather than a unique event, the process of representation therefore is always a process of doubling, of copying, of citing. In its

attempt to secure its uniqueness and originality, the self becomes like everyone else; the self becomes other. The “iterability” of the signature is thus both a requisite for the unique individual and an indication of the impossibility of uniqueness. So, whether the concept is called *différance*, trace, or the iterability [*sic*] of the signature (Derrida, 1988), these concepts all articulate a fundamental critique against the unified, individual self.

These three philosophers all come from similar theoretical positions. The subject-critical arc—from Nietzsche, via Foucault, to Derrida—has been widely discussed and, although the three philosophers differ on important points, they share a skepticism towards the idea of the self as unified, stable, and individual (e.g., Boyne, 2013; Megill, 1987; Peters, Olssen, & Lankshear, 2003). It is important to note that this critique is not limited to these three subject-critical philosophers. Similar arguments have been presented by theorists as diverse as Sigmund Freud (1901/2002), Jean-Paul Sartre (1946/2007), Julia Kristeva (1982), and Paul Ricoeur (1992). Yet, from the literature analyzed in this paper, it seems that the impact of these approaches on the discourse on the self has been quite limited.

HCI LITERATURE PROBLEMATIZING THE SELF

Although fewer in number, several HCI researchers addressing the discourse of the self acknowledge the need to explore alternative aspects of the self (e.g., Bardzell, 2009; Bardzell & Bardzell, 2008a; Schmidt, 1997). An early attempt was Sherry Turkle’s studies of virtual reality (Turkle, 1994, 1996, 1997). These studies explicitly drew on postmodern philosophy; yet even though they often have been discussed and quoted in HCI (e.g., Bardzell & Bardzell, 2008b; Suchman, 2007), there are few explicit traces of that influence in the articles analyzed in this paper. Nevertheless, more recent research seems to be exploring these aspects. For example, among the researchers discussing the complexity of the self in relation to professional or societal roles, some do so in ways that tend to challenge the boundaries between roles and ontology to an extent that suggests that interaction can actually change or even constitute the ontology of the self, even though this is seldom explicitly claimed in these texts (e.g., Akah & Bardzell, 2010; McCarthy & Wright, 2005; Nóbrega & Correia, 2011; Park & Zimmerman, 2010; Petrelli, Van den Hoven, & Whittaker, 2009; Zimmerman, 2009). Others have taken it even further. In Bardzell et al. (2014), Foucault’s notion of the care of the self (Foucault 1982/2005) is used as an analytical lens in order to understand how the self establishes and changes itself through participation in the online environment Second Life. Through the online interaction, the individual is given opportunities to explore new sides of himself/herself; this process turns out to be not only epistemological but also ontological because it has a radical effect on the most fundamental constitution of the self. Foucault’s theoretical framework has also been used in a similar way by Leshed and Sengers (2011), who discussed online calendars and other technological productivity tools as “technologies of self” (p. 912). Their study showed that people do not use tools like these only to “organize what they do, but also who they are” (p. 912), which means that, far from a given ontological being, the self is a continuously changing project.

Similar problematizations of the notion of the self can be found in articles focusing on aging and illness. For example, in recent research that explored the possibilities of technology for improving life for patients suffering from dementia, the self is described as something malleable, historical, and social, for which interpersonal relationships are described as “sites

where self is maintained and constructed” (Wallace, Thieme, Wood, Schofield, & Olivier, 2012, p. 2629) “through reflection, storytelling and dialogue” (Wallace et al., 2013, p. 2617). This suggests that the self is radically relational on an ontological level (see also Eriksson, Artman, & Swartling, 2013; Sun, Ding, Lindtner, Lu, & Gu, 2014). Sas et al. (2013) explored the function of autobiographical memories for maintaining a sense of the self’s identity, indirectly implying that the self is a malleable construct rather than something given. A similar proposition on the narrative character of the self has been made by Andronico, Marti, and Martinelli (2007), who emphasized “the importance of storytelling in the creation of the self” (p. 662). This does not necessarily imply an entirely fragmented self on an ontological level, but it nevertheless illuminates the constructive aspects of the self.

So, there are examples, albeit relatively peripheral, of HCI research that approaches the self from alternative positions that can be seen as part of a subject-critical tradition. Even though it is important to acknowledge and further explore these resources, the HCI discourse on the self still draws primarily upon what can be called a modern view of the self, emphasizing qualities like stability, coherence, and individuality.

Given the philosophical critique that has had such an impact on the way the self is understood in many other academic disciplines, I propose that we as HCI researchers would benefit from revisiting and questioning our own assumptions regarding the self. One possible philosophical resource to use in such a project is the philosopher and media scholar Mark C. Taylor. Much of Taylor’s research consists of attempts to explore how the challenges of Nietzschean philosophy apply to the self in contemporary, technology-based societies. These explorations, in which Taylor draws upon a broad variety of theoretical resources outside of traditional philosophy, such as information theory and complexity theory, often focus on the relationship between the individual and the system. In many ways, this coincides with the fundamental interest of HCI: to understand the relationship between humans and computer systems. The cross-disciplinary character of Taylor’s work, his interest in contemporary technologies, and his focus on how individuals relate to systems make his work particularly interesting to use when trying to understand the conditions for the self in the 21st century and how that relates to the self upon which HCI focuses.

THE SELF ACCORDING TO MARK C. TAYLOR

Mark C. Taylor is highly influenced by the theories of Jacques Derrida and draws on Derrida’s ideas of language as a differential play between a sign and an otherness that “haunts language as a strange exteriority ‘within’ discourse” (Taylor 1993, p. 11). Taylor (1987) argued that, because the subject “is a ‘function’ of language” (p. 135), the self must be understood as characterized by the same differential play between the self and other as language. The consequence of this is that the idea of the individual self as separated from the other must be revised. Just as Ferdinand de Saussure (1916/1986) argued that all meaning occurs through the difference between signs, Taylor argued that all selfhood and all identity occur when confronted by that which is different: in other words, by otherness. This otherness can take various forms: other people, other ideas, other traditions, and other practices. This means that the idea of separating oneself from others in order to establish identity is fundamentally flawed and only leads to loss of identity.

This differential, linguistic play is something that occurs not only between the self and the other but within the self as well, which relates to Nietzsche's critique of the coherent subject (Nietzsche 1901/1968). Taylor (1987, p. xi) wrote: "If authorship is never original but is always a play that is an interplay, then clearly 'I' did not write this text. Or at least 'I' alone did not write it.... If, as some critics have argued recently, the author is an 'institution,' then institutions can, in some sense, 'author.'" Another example is when Taylor (2003) stated, "I, Mark C. Taylor, am not writing this book. Yet the book is being written. It is as if I were the screen through which the words of others flow and on which they are displayed" (p.196). In these excerpts, Taylor suggested that it is impossible to define the boundaries between different individuals when it comes to literary influences, thus implying that it is equally impossible to define the boundaries between individuals as such. So, in echoing Nietzsche, Taylor claimed that underneath the "I" is a multitude of voices and identities that have become hidden through the use of the generalizing term *I* and, thus, a more correct way of describing an author is in terms of an institution or as a screen onto which the words of others are displayed, an argument that is similar to that which Foucault formulated in *Archeology of Knowledge* (Foucault, 1969/1972). In that book, Foucault argued that an author is not a person but a function. While acknowledging that, most often, a text can be attributed to one specific, physical person who has produced the text materially onto a piece of paper, Foucault denied the claim that this person is a homogenous self whose thoughts are a result of the self's creative originality. It is to this critical tradition that Taylor adheres, which is also evident in his foreword to *The Moment of Complexity: Emerging Network Culture* (2003), in which he argued "A work is never the creation of a solitary individual but is always the product of a 'colony of writers' whose thoughts and words circulate through the author" (p. xi). This analysis of authorship suggests that otherness is not something external to which one can relate in different ways. Rather, otherness is something within human beings, something that makes it impossible to assume the existence of a coherent self. Human beings are heterogeneous rather than homogeneous.

Ever since his early works on Hegel and Kierkegaard in the late 1970s (Taylor, 1975, 1980/2000), Taylor has focused much of his research on how to understand this intrapersonal heterogeneity, often through exploring poststructuralist theory. Arguing that poststructuralism offers a way of saving otherness from oppressive identity, he also claimed that it suffers from an inability to acknowledge that systems are not totalizing per se but are rather a necessary condition for selfhood. Insisting on the linguistic constitution of the self, Taylor assumed Gregory Bateson's classical formulation that "information can be defined as a difference that makes a difference," and that "Inasmuch as information is differential, it increases with an increase in differences. Differences, however, can multiply only as interconnections grow" (Taylor, 2003, pp. 139–140). This means that, paradoxically, difference can only exist in connectivity. Isolation inevitably reduces heterogeneity to homogeneity and, therefore, if difference is to be preserved, this difference must be positioned in relation to other parts of a system. To Taylor, this means that systems constitute a presupposition for difference and not a threat to it. To the extent that difference is a core characteristic of the self, this also means that the self does not precede its interaction with the system but is instead a result of the interaction. Thus, the constitution and stability of the self is something temporary that emerges through the interaction between the self and the other.

In order to deepen his understanding of how such nontotalizing systems function, Taylor started exploring different kinds of complexity theory (e.g., works by Henri Atlan, Stuart Kauffman, John Holland, and Stuart Gell-Mann) in the late 1990s. Since that time, he has written several books where he used theories on complex adaptive systems to analyze phenomena as diverse as art (Taylor, 1999), financial systems (Taylor, 2004), theology (Taylor, 2007), and environmental systems (Taylor, 2014). According to Taylor (1999), “Complexity theory constitutes a third alternative between structuralism, in which fixed universal structures exclude time and repress specific differences, and poststructuralism, in which the criticism of the purportedly totalizing propensities of all systems leads to a valorization of differences that share nothing in common” (p. 119). Taylor’s explorations into the field of complexity have attracted the interest of many researchers from mathematics and physics, resulting in the 2004 special issue of *JAC (A Journal of Composition Theory)*; Blakesly & Rickert, 2004), where his analyses and applications of complexity theory were discussed.

Describing what characterizes complex adaptive systems (CAS), Taylor quoted computer scientist John Holland: “The agents in CAS are not only numerous, they are also diverse.... This diversity is not just a kaleidoscope of accidental patterns. The persistence of any given part (agent) depends directly on the context provided by the rest. Remove one of the agent types and the system reorganizes itself with a cascade of changes.... Moreover, the diversity evolves, with new niches for interaction emerging, and new kinds of agents filling them” (Holland, quoted in Taylor, 1999, p. 122). This quote illustrates three points regarding complexity theory that are important to Taylor. First, it offers a possibility to understand difference as an integral part of a systemic structure rather than as something that needs to be excluded in order to establish that structure. Second, not only does the system accept difference but it actually stimulates it through enabling the interaction between multiple components. Third, this interaction is what creates emergent structures, an idea that positions organizational agency among a variety of decentered, differential components rather than with one centralized, hierarchical power.

Viewed through the lens of complexity theory then, the relation between the self and the other, individual and system, is one of mutual dependency. The self is created through its interaction with the system as much as the system is constituted by the interaction between its distributed parts. From this perspective, collapsing difference into identity, heterogeneity into homogeneity, would destroy rather than constitute order, structure, and meaning.

To conclude, Taylor’s specific blend of poststructuralism and complexity theory constitutes a radical critique of the stable, coherent, individual self found in much of HCI discourse. Through his writings, a picture of the self as malleable and relational emerges and suggests new interpretations of the self as well as its interactions.

DISCUSSION

From this brief overview, it is evident that Taylor considers the critiques that Nietzsche, Foucault, and Derrida posed against the modern self to be too substantial and too important to ignore for understanding the conditions for the self in the 21st century. Although Taylor often situated his analyses within traditional linguistic contexts, such as literature studies, information science, and media studies, his conclusions are not limited to these domains:

They apply to any and every analysis of the self, including HCI research on the interaction between humans and computers. What would the consequences be, then, if his theories were applied to the four selves identified in the literature analysis? From my research perspective, his theories do not oppose describing the self as instrumental, communicative, emotional, or playful. However, a strong argument could be made that Taylor offered an alternative interpretation of the connections between these four selves and the qualities of stability, coherence, and individuality.

First, Taylor emphasized that the self is not coherent but always characterized by that which is different from it. Therefore, the demarcations between the various aspects of the self function as membranes rather than as strict boundaries. This has been implied occasionally in the HCI literature, for example, in the articles describing a communicative act as often influenced by instrumental motives (e.g., Ducheneaut et al., 2009; Ellison et al., 2006; Nov et al., 2008; Pilcer & Thatcher, 2013; Shami et al., 2009). However, these kinds of cross-quality influential flows are seldom applied in HCI research as explanatory frameworks for how to understand the interaction between humans and technology. When viewed through Taylor's theoretical lens, interaction is a complex combination of instrumental, communicative, emotional, and playful (and perhaps other) components. No interaction is ever reducible to one mode only. Although this perspective might complicate the analytical task, it might also help designers and researchers understand certain behaviors and interactional outcomes that might otherwise fall outside of the explanatory framework. Thus, this perspective might help researchers avoid a reductionist approach to the studied phenomena.

Second, given how important Taylor considers the interaction between the self and the other to be for the constitution and maintenance of the self (be it instrumental, communicative, emotional, or playful), it is reasonable to suggest that, in his philosophy, interaction serves an existential purpose. This also means that interactive technology becomes an existential arena that is compatible with what many HCI researchers describe but do not always emphasize: Technology today is not an additional layer in society but rather something that permeates all levels of society to the point where it has become increasingly difficult to draw the line between technology and life in the 21st century. Framing interactive technology as an existential arena suggests that designers and researchers steer away from dichotomies in interpreting the relation between the self and technology. The dominating paradigmatic interpretation of the human as a user with its instrumental connotations has sometimes veiled the fact that all interaction (technological as well as nontechnological) changes the self and is a primary precondition for selfhood. Acknowledging this relation between technology and the constitution of the self might deepen the understanding of the role that technology plays in people's lives in contemporary society. Furthermore, it might also contribute to developing the interface to other academic disciplines that focus on existential aspects of human life, for example, the humanities and social sciences.

Given the literature analysis and the philosophical critique presented in this paper, I propose that we as HCI researchers need to reinvestigate our own assumptions regarding the self. How do we perceive and theorize the self and its relation to its surrounding world? The way we answer this question brings not only philosophical implications but also determines the way we approach the self in research, both in terms of the questions we ask and the way we interpret our research results. For example, if researchers assume that the self is an individual entity whose constitution precedes interaction, young people's continual urge in being

connected to, communicating through, and confirmed in social media will be interpreted quite differently than if the assumption is that the self is constituted by its relations.

Furthermore, the understanding of the self also affects researchers' ability to provide relevant contributions to society at large, as well as to other scientific disciplines. I suggest that Taylor's corpus is a valuable philosophical resource for such a reflexive project. The way that he combined the critical tradition of the 20th century with complexity theory and insights into 21st-century technologies makes him particularly relevant to contemporary HCI.

IMPLICATIONS FOR RESEARCH

This research focused on the discourse on the self in HCI publications. Through an inductive content analysis, the paper illustrated how the dominant discourse in recent literature on the self in HCI is rooted in what can be called a modern view of the self. Drawing on poststructuralist theory, the paper then revealed blind spots in this discourse and illustrated how Mark C. Taylor's philosophy can provide theoretical resources for addressing these blind spots and engaging in a reconceptualization of the self. Thus, the findings presented can be used for a renewed, critical discussion on how the notion of the self is conceptualized in HCI theory and research practice. Such a discussion may lead to the identification of new fields of research and alternative interpretations of the motivations underlying people's interaction with technology. One such focus area, which the article identifies as key to understanding the relationship between humans and technology, is the exploration of technology as an existential arena and, relatedly, interaction as an existential practice.

CONCLUSIONS

Through studying the use of the term the self in HCI research literature, I identified four main approaches to the self: the instrumental self, the communicative self, the emotional self and the playful self. Despite the many differences between them, these four selves are described as having three core qualities in common: stability, coherence, and individuality. However, as discussed within the paper, several philosophers during the last century have questioned these assumptions, and I therefore argue for a reconsideration of the current understanding of the self in HCI. I drew on Mark C. Taylor's critical approach to the self and suggest that his philosophy can serve as an interpretative lens illuminating parts of the self that previous HCI research has not recognized. In highlighting Taylor's blend of poststructuralism and complexity theory, I therefore suggest that the self should be understood as radically relational, which means that interaction is an existential constitution process and, as a result, interactive technology is an existential arena.

ENDNOTE

1. The ACM Digital Library can be accessed at <http://dl.acm.org>

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Author's Note

I thank Professor Ann Lantz and Associate Professor Anders Hedman for their valuable comments and support during the writing of this article.

The material in this article is based on research previously published (2016) in the author's doctoral thesis *Interaction as an existential practice: An explorative study of Mark C. Taylor's philosophical project and its potential consequences for HCI research*.

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Human Technology: An Interdisciplinary Journal on Humans in ICT Environments
ISSN 1795-6889
www.humantechnology.jyu.fi