

**Cognitive Absorption:
Literature Review and Suitability in the Context of Hedonic IS Usage**

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Abstract

Cognitive Absorption (CA), an intrinsically motivating state of deep involvement with software, is rooted in technology acceptance research. So far, CA has been mainly applied to investigate the patterns of user behavior – such as the formation of user beliefs and intention to use – in organizational or work-related settings involving utilitarian IS. This paper assesses to what extent CA is also useful in the context of studying hedonic IS usage. Based on a literature review, it suggests that CA is a helpful variable when examining user behavior towards hedonic IS. The paper concludes with a short summary and a recommendation for integrating CA into future research on the design and implementation of hedonic IS.

Keywords: Cognitive Absorption, hedonic IS, formation of user beliefs / intention to use / behavior

1 Introduction

One stream of cognitive research covers topics concerning the adoption and use of IS. It finds that user beliefs and intentions influence user behavior toward IS and thus shape the design and implementation of IS at the organizational, group, and individual level (Adams, Nelson & Todd 1992; Davis, Bagozzi & Warshaw 1989; Robey 1979). Although understanding the patterns of user behavior is crucial for the successful IS design and implementation (Maish 1979; Robey 1979), research has paid only scant attention to the antecedents of user beliefs (Benbasat & Barki 2007). Agarwal, Sambamurthy, and Stair (1997) introduced *Cognitive Absorption (CA)* defined as "a state of deep involvement with software" (p. 294) to gain a deeper understanding of the formation of user beliefs and usage intention (Agarwal & Karahanna 2000; Saade & Bahli 2005; Suki, Ramayah & Suki 2008).

However, so far, the majority of studies on the formation of user beliefs and intention to use IS (Lu, Yao & Yu 2005; van der Heijden 2004; Venkatesh, Morris, Davis & Davis 2003) barely considers CA. Those studies that do include CA mainly focus on utilitarian (or productivity-oriented) IS used in organizational or work-related settings (Lapointe & Rivard 2007; Roca, Chiu & Martinez 2009; Wright & Granger 2001). We would expect that CA – also in the context of hedonic IS – determines the formation of user beliefs and intention to use. Hence we suggest studying CA when examining pleasure-oriented systems which are closely related to home and leisure activities. To that end, the remainder of the paper is structured as follows: We begin by clarifying hedonic IS as research context and explain why we look closely at the concept of CA. After a research brief, we continue with a literature review of CA studies. Then, we assess to what extent taking CA into account contributes to a better understanding of user behavior in the context of hedonic IS. We end with a brief summary and a recommendation for future research.

2 Setting the Stage

2.1 Hedonic IS as Research Context

Hedonic IS stand for predominantly pleasure-oriented systems that are closely related to home and leisure activities (van der Heijden 2004). Using hedonic IS includes watching (Internet) TV and movies, playing video and computer games, downloading and listening to music, reading eBooks and news, and sharing valuables such as photos or videos with friends. Recently the market for hedonic IS has been booming. For instance, 67% of homes in America own either a console and/or a PC used to run entertainment software; 48% of American parents play computer and video games with their children at least weekly (ESA 2010). In 2008, digital platforms accounted for around 20% of recorded music sales, up from 15% in 2007 (IFPI 2009). The international digital music business saw six years of continuous expansion, growing to US\$3.7 billion in trade value.

Hedonic IS differ from utilitarian ones. Utilitarian IS are primarily productivity-oriented systems employed in organizational or work-related settings (van der Heijden 2004). They are typically used to accomplish tasks and provide mainly instrumental value. Examples of utilitarian IS are spreadsheet programs and databases. The usage of utilitarian IS is often restricted by the

organizational context. For example, employees only have limited choice of available systems depending on employers' offerings and they do not take their own IS purchase decisions.

In contrast, hedonic IS are about having a good time, enjoying a pleasant and valuable experience, passing time, or augmenting lifestyle (Turel, Serenko & Bontis 2010). Users of hedonic systems rarely plan the use ahead of time. They have the discretion on systems selection, acceptance, use, and continued use. Hedonic IS usage is mostly voluntary. It is closely connected to individuals' buying decisions (Pavlou & Fygenson 2006). Any buying decision is a reaction to a specific product offering, which is determined by business strategies pursued by the involved players. Following the theory of consumption values (Sheth, Newman & Gross 1991), consumers make informed purchase decisions after considering multiple value dimensions such as enjoyment and productivity.

2.2 Reasons for Investigating Cognitive Absorption in Hedonic IS Research

We suggest paying attention to CA in the context of hedonic IS usage for two main reasons: CA combines affective and cognitive components, and CA constitutes an intrinsic motivator.

CA combines affective and cognitive components: With its multi-dimensional conceptualization, CA combines affective and cognitive components. Control, curiosity, temporal dissociation, and focused immersion represent cognitive dimensions. Heightened enjoyment constitutes an affective dimension (Wakefield & Whitten 2006). Combining the two kinds of dimensions is challenging since it requires integrating components that have distinct relationships with behavior (Breckler 1984; Millar & Tesser 1986; Schachter & Singer 1962). Using utilitarian IS mainly provides instrumental gains and is cognitively driven. Using hedonic IS, however, provides predominantly self-fulfilling gains and is therefore affectively driven. However, the use of hedonic IS may also be cognitively driven, for instance when users, who play World of Warcraft, are interested in gaining experience points and rewards in order to sell them for 'real money' on eBay, or when individuals, who watch user generated videos on YouTube, are primarily interested in being up-to-date.

CA constitutes an intrinsic motivator: Intrinsic motivators are crucial in the hedonic context, probably even at the expense of extrinsic motivators (Turel et al. 2010; van der Heijden 2004). However, only few studies focus on CA in hedonic usage context (Chandra, Srivastava & Theng 2009; Shang, Chen & Shen 2005). So far, CA has been mainly shown to be valuable for understanding the formation of user beliefs and intention to use in work- and productivity-related contexts.

3 Cognitive Absorption: A Research Brief

The development of the CA construct and its position within research models is grounded in research on technology acceptance (Davis 1989; Davis et al. 1989, Davis et al. 1992) and intrinsic motivators (Deci 1975).

3.1 Definition and Foundation of Cognitive Absorption

Cognitive Absorption, a state of deep involvement with software, represents a situation-specific individual state (Agarwal et al. 1997; Agarwal & Karahanna 2000; Tellegen & Atkinson 1974). It is based on three closely interrelated pillars: (1) the state of flow, (2) the trait of absorption, and (3) the notion of cognitive engagement (Agarwal & Karahanna 2000).

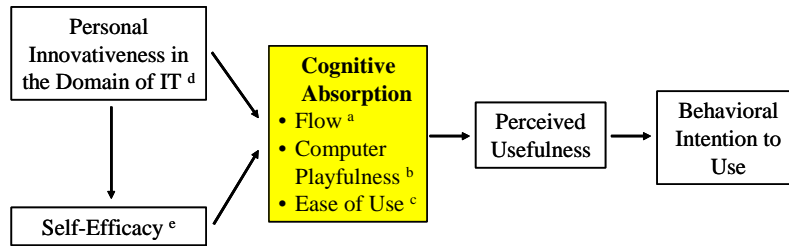
State of Flow: Csikszentmihalyi (1975) introduced the multi-dimensional state of flow as a person's autotelic experience of complete involvement with his or her activity. Flow occurs "when people do intrinsically rewarding activities in which they feel optimal challenged relative to their level of skills" (Hektner & Csikszentmihalyi 1996, p. 1). The concept of flow has been extensively investigated during the 1980s-90s and validated through various studies in the fields of art, science, aesthetic experience, and sports. In human-computer interaction (HCI), Finneran and Zhang (2005), Pilke (2004), and Trevino and Webster (1992) have examined the flow experience with regard to its relevance for the adoption of (new) IT. Results indicate that flow has an important influence on attitudes towards IS and in turn on IS adoption decisions.

Trait of Absorption: Tellegen and Atkinson (1974, p. 268) defined absorption as an "individual's openness to absorbing and self-altering experiences". 'Being absorbed' refers to being in a state of deep attention with the event experienced. The absorption trait is as a person's "disposition for having episodes of "total" attention that fully engage one's representational (i.e., perceptual, enactive, imaginative, and ideational) resources" (Tellegen & Atkinson 1974, p. 268). Absorption influences an individual's total experience with an object such as IS (Agarwal & Karahanna 2000). In psychology, various researchers examined the relationships between absorption, involvement, hypnotizability, hallucinatory experience, and openness to experience indicating that the constructs overlap considerably (for review see Roche & McConkey 1990).

Notion of Cognitive Engagement: Webster and Ho (1997) substantiated the notion of cognitive engagement as a state encompassing the three dimensions 'attention focus', 'curiosity', and 'interest'. Building on HCI research, they assume that the state of engagement is conceptually similar to the state of playfulness, which in turn is identical to the flow experience. Webster and Ho conceptualize cognitive engagement multidimensional and identical to flow, just without the dimension of control. They say that individual control is not necessary for cognitive engagement, because 'passive engagement' (like watching TV) might exist while 'passive flow' is impossible. Within the scope of educational psychology, Greene & Miller (1996) consider cognitive engagement as a learning outcome, particularly in computer-based and multimedia learning environments.

3.2 Initial IS Research Models Incorporating Cognitive Absorption

In 1997, Agarwal et al. published one of the first CA research models in IS (Figure 1).



- ^a Exploratory and intrinsically motivating nature of interactions and individual experiences with the software (Agarwal, Sambamurthy & Stair 1997, p. 294)
- ^b Individual's tendency to interact spontaneously, inventively, and imaginatively with new software (Webster & Martocchio 1992, p. 202)
- ^c Individual's perception that the use of the software is relatively free of cognitive effort (Agarwal, Sambamurthy & Stair 1997, p. 294)
- ^d Willingness of an individual to try out a new information technology independent of the communicated experiences of others (Agarwal & Prasad 1996, p. 206)
- ^e Person's beliefs about their personal efficacy to perform a specific activity (Bandura 1997)

Figure 1: Initial CA Research Model (After: Agarwal et al. 1997)

In that, CA encompasses *flow*, *computer playfulness*, and *ease of use*; the more a person experiences flow, computer playfulness, and ease of use, the deeper she will be 'cognitively absorbed'. According to the model, CA influences an individual's *perceived usefulness of IT*, which in turn influences the *behavioral intention to use IT*. The deeper a person is 'cognitively absorbed' while interacting with IT, the more she believes that using the system would enhance her job performance. CA is determined by two individual traits, *personal innovativeness in the domain of IT* and *self-efficacy*. Finally, personal innovativeness in the domain of IT positively influences self-efficacy beliefs. This means that a person who is more innovative in experimenting with IS has greater feelings of self-efficacy.

In 2000, Agarwal and Karahanna offered a revised CA research model (see Figure 2).

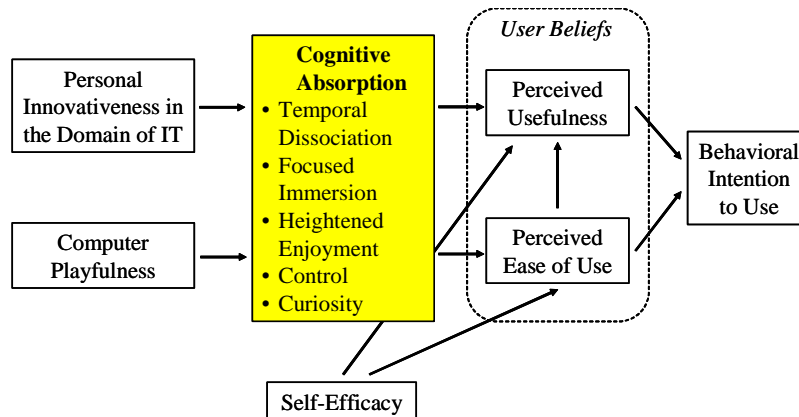


Figure 2: Extended CA Research Model (After: Agarwal & Karahanna 2000, p. 674)

In the revised model, they maintain the definition of CA as a state of deep involvement with software, but they revise the underlying dimensions of the construct. Agarwal and Karahanna (2000) understand *temporal dissociation* as the inability to register the passage of time while being engaged in interaction. *Focused immersion* derives from the experience of total

engagement where other demands are ignored. *Heightened enjoyment* captures the pleasurable aspects of the interaction. *Control* refers to the user's perception of being in charge with the interaction. Finally, *curiosity* describes the extent the experience arouses an individual's sensory and cognitive curiosity. Overall, CA is conceptualized as intrinsic motivator leading to enjoyment or pleasure.

As determinants of CA, Agarwal and Karahanna (2000) posit that two individual traits, *personal innovativeness in the domain of IT* and *computer playfulness*, are important. Personal innovativeness in the domain of IT supposedly exhibits a positive influence on CA since people with a general disposition to be innovative in experimentation with IS are expected to be more likely to experience CA. Borrowing from Webster and Martocchio (1992, p. 204), they describe computer playfulness as "the degree of cognitive spontaneity in microcomputer interactions".

According to the revised model, CA exhibits a positive influence on perceived ease of use because "the intrinsically motivating state of CA creates perceptions of a lower cognitive burden because the individual is experiencing pleasure from the activity and is willing to expend more effort on it" (Agarwal & Karahanna 2000, p. 676). The positive influence of CA on perceived usefulness is justified with cognitive dissonance, a state which arises when there are dissonant or non-fitting relations among cognitive elements (Festinger 1962). To reduce cognitive dissonance a person is likely to rationalize her behavior by attributing instrumental value to it (Agarwal & Karahanna 2000). Derived from technology acceptance research, the effects of CA on behavioral intention are mediated by perceived ease of use and perceived usefulness, whereby perceived ease of use has a positive influence on perceived usefulness (Davis, Bagozzi & Warshaw 1992). In addition, self-efficacy influences perceived ease of use and perceived usefulness.

The revised CA research model proposed by Agarwal and Karahanna (2000) has characterized CA research in IS until today. The majority of later CA research in IS builds on the above conceptualization and model.

4 Studies on Cognitive Absorption in the IS Literature

Table 1 presents selected empirical studies on CA sorted by year of publication. The studies show ambiguous results regarding the determinants of CA and regarding CA consequences. This may reflect the complex and diverse relationships between CA and user beliefs, the intention to use IS, and the actual usage behavior.

Author(s), Journal (Year)	Focus (IS)	Cognitive Absorption Dimensions	Direct Determinants of Cognitive Absorption	Direct Outcomes of Cognitive Absorption
Agarwal, Sambamurthy, Stair AoM Proceedings (1997)	IT adoption, software usage (Windows 95, Lotus 1-2-3)	Flow Computer playfulness Perceived ease of use	Personal innovativeness in the domain of IT ☒ Self-efficacy ☒	Perceived usefulness ☒
Agarwal, Karahanna, MISQ (2000)	Beliefs about IS usage (Internet)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity	Computer playfulness ☒ Personal innovativeness in the domain of IT ☒	Perceived ease of use ☒ Perceived usefulness ☒
Wright, Granger, IAIM Proceedings (2001)	Using the web as strategic resource (Internet)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity		Perceived ease of use ☉
Leong, Ho, Zhang, World Conf. on E-Learning in Corporate Government, Healthcare, and Higher Education Proceedings (2005)	Intention to use online learning environments (Internet-based learning systems)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity	Social presence (?)	Satisfaction (?)
Saade, Bahli, Information & Management (2005)	Intention to use online learning systems (Internet-based learning systems)	Temporal dissociation Focused immersion Heightened enjoyment		Intention to use ☒ Perceived ease of use ☒ Perceived usefulness ☒
Shang, Chen, Shen, Information & Management (2005)	Online shopping beliefs and behavior (Internet)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity		Actual behavior ☒ Perceived ease of use ☒ Perceived usefulness ☒
Thomas, AMCIS Proceedings (2006)	Antecedents and effects of CA (Microsoft Access)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity	Computer playfulness ☉ Normative influence ☉ Personal innovativeness in the domain of IT ☉	Perceived ease of use ☉ Perceived usefulness ☉
Wakefield, Whitten, EJIS Proceedings (2006)	Hedonic and utilitarian mobile device usage (Blackberry PDA)	Temporal dissociation Focused immersion Control Curiosity		Hedonic context: Intention to use ☒ Perceived enjoyment ☒ Perceived usefulness ☒ Functional context: Intention ☒ Perceived enjoyment ☒ Perceived usefulness ☒
Zhang, Li, Sun, HICSS Proceedings (2006)	Extending TAM with intrinsic motivation variables (Internet)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity	Perceived affective quality ☒	Perceived ease of use ☒ Perceived usefulness ☒
Jia, Hartke-Jia, Pearson, ICIS Proceedings	Antecedents of problematic IS usage	Temporal dissociation Focused immersion Heightened	Computer playfulness ☒ Personal innovativeness in the domain of IT ☒	Actual usage ☒ Problematic usage ☒ Social/Leisure use ☒

(2007)	(Internet)	enjoyment Control Curiosity		Study/Work use ☒
Lapointe, Rivard, Organization Science (2007)	Information System Implementation (Enterprise System)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity		Perceived ease of use ☒ Perceived usefulness ☒
Leonhard, Riemenschneider, Electronic Markets (2008)	Factors influencing the individual impact of the web (Internet)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity	Computer playfulness ☒ Personal innovativeness in the domain of IT ☒	Usability ⊖
Suki, Ramayah, Suki, Direct Marketing: An Int'l Journal (2008)	Internet shopping acceptance (Internet)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity		Actual behavior ☒ Perceived ease of use ☒ Perceived usefulness ☒
Chandra, Srivastava, Theng, PACIS Proceedings (2009)	Virtual world usage (Virtual worlds)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity	Computer playfulness ☒ Familiarity ☒ Perceived compatibility ☒ Personal innovativeness in the domain of IT ☒	Intention to use ☒ User trust ☒
Lin, Behaviour and Information Technology (2009)	Intention to use virtual communities (Virtual community website)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity		Intention to use ☒ Perceived ease of use ☒ Perceived usefulness ☒
Roca, Chiu, Martinez, Int'l Journal of Human Computer Studies (2009)	E-Learning Continuance Intention (E-learning system)	Temporal dissociation Focused immersion Heightened enjoyment Control Curiosity	Confirmation ☒	Perceived ease of use ☒ Perceived usefulness ☒ Satisfaction ☒

Symbols: ☒ confirmed, ☒ rejected, ⊖ inconclusive/partially supporting, (?) not tested yet

Table 1: Selected Empirical Research on Cognitive Absorption

4.1 Literature on Definitions and Dimensions of Cognitive Absorption

Definitions: Lapointe and Rivard (2007), Leong, Ho, and Zhang (2005), Leonhard and Riemenschneider (2008), Shang et al. (2005), and Suki et al. (2008) follow the definition proposed by Agarwal and Karahanna in 2000, that CA is "a state of deep involvement with software". Chandra et al. (2009, p. 3) and Zhang, Li, and Sun (2006, p. 207) change the definition slightly to "a state of deep involvement or a holistic experience an individual has with an IT". Thomas (2006, p. 1093) refers to CA as "a state of involvement in a technology".

Dimensions: Most research incorporating CA uses the initial five-dimensional conceptualization with control, curiosity, temporal dissociation, and focused immersion, heightened enjoyment as developed by Agarwal and Karahanna (2000). Saade and Bahli (2005) refer only to the three dimensions temporal dissociation, focused immersion, and heightened enjoyment. Wakefield and

Whitten (2006) conceptualize CA without the affective dimension heightened enjoyment. To them "combining enjoyment in the CA scale masks the variance unique to this affective construct" (p. 294).

4.2 Literature on Effects of Cognitive Absorption

Most empirical research incorporating CA has focused on effects that CA has on user beliefs such as perceived ease of use and perceived usefulness.

Agarwal and Karahanna (2000), Lin (2009), Lapointe and Rivard (2007), Roca et al. (2006), Saade and Bahli (2005), Shang et al. (2005), Wright and Granger (2001), and Zhang et al. (2006) all find a positive effect of CA on *perceived ease of use*. They explain the effect with the assumption that the state of CA lowers the perceived cognitive burden while interacting with IS. Concerning the influence of specific CA dimensions on perceived ease of use, the literature is scarce. Wright and Granger (2001) find temporal dissociation and especially control to be significant determinants. They indicate curiosity also to be an antecedent of perceived ease of use, but in the opposite direction. They do not show significant effects for heightened enjoyment and focused immersion.

Agarwal et al. (1997), Agarwal and Karahanna (2000), Lapointe and Rivard (2007), Saade and Bahli (2005), Shang et al. (2005), and Zhang et al. (2006) all confirm the positive influence of CA on *perceived usefulness*. Initially, Agarwal et al. (1997) provide evidence for this relationship, albeit their results refer to an early three-dimensional conceptualization of CA. Later Agarwal and Karahanna (2000), Shang et al. (2005), and Zhang et al. (2006) use the five-dimensional conceptualization and also confirm a strong effect of CA on perceived usefulness, mainly justified by dissonance theory. Thomas (2006) is one of the few who studies effects of particular CA dimensions on perceived usefulness. She finds a significant positive relationship between the three CA dimensions temporal dissociation, focused immersion, and control and the perceived usefulness. Wakefield and Whitten (2006), in their study of using Blackberry PDAs, indicate that within a hedonic usage context CA does not affect the perceived usefulness, while in a utilitarian usage context it does. They conclude that when people are having fun with IT, usefulness is less important.

Comparing the effects of CA on perceived ease of use and perceived usefulness, Saade and Bahli (2005) provide evidence for a stronger effect of CA on perceived usefulness than on perceived ease of use. In contrast, Zhang et al. (2006) and Roca et al. (2006) show a stronger effect of CA on perceived ease of use than on perceived usefulness.

Not all researchers distinguish between perceived ease of use and perceived usefulness when examining the relationship between CA and user beliefs. Leonhard and Riemenschneider (2008) apply *usability* as variable, which integrates perceived ease of use and perceived usefulness. They find that CA has some positive influence on usability to significant effects of the three CA dimensions temporal dissociation, heightened enjoyment, and control.

Whereas Agarwal and Karahanna (2000) and Zhang et al. (2006) examine the general influence of CA, perceived ease of use, and perceived usefulness on the intention to use IS, Shang et al. (2005), in contrast, investigate the influence of CA, perceived ease of use, and perceived usefulness with regard to a specific usage behavior such as online shopping.

Investigating a direct relationship between CA and the *intention to use*, Saade and Bahli (2005) or Chandra et al. (2009) detect that CA positively influences the intention to use the respective IS. However, Lin (2009) finds no significant link between CA and the intention to use.

Few studies have investigated the direct impact of CA on the *actual behavior*. From their study investigating the antecedents of user's intention to shop online, Suki et al. (2008) conclude that CA does not have a positive direct effect on online shopping behavior. Jia et al. (2007) in contrast demonstrate that CA influences actual use. Actual technology usage is significantly higher for deeply absorbed individuals. Comparing between technology use for social/leisure and for work/study purpose, they find CA to be a more significant predictor for social/leisure purposes. They explain their results with the assumption that many users may have lower intrinsic motivation – and thus a lower state of CA – in IS use for work purposes.

When Wakefield and Whitten (2006) examine the effect of CA (without the dimension of heightened enjoyment), users show significantly greater *perceived enjoyment* when CA is high. More precisely, users in hedonic contexts indicate greater perceived enjoyment than perceived usefulness, whereas users in utilitarian contexts with high CA indicate greater perceived usefulness than perceived enjoyment. So, similar to Jia et al. (2007), Wakefield and Whitten (2006) conclude that the effect of CA on user beliefs is influenced by usage context.

Chandra et al. (2009) investigate the relationships between CA and *user trust*, when examining intentions to collaborate in a virtual world. They stress the importance of user trust for technology adoption and behavioral intention, and they identify CA as key for building user trust. To them, a person who is 'cognitively absorbed' perceives virtual worlds to be useful and easy to use, which results in increased user trust in the usage of virtual environments.

Leong et al. (2005) and Roca et al. (2009) investigate *satisfaction* when researching CA. Roca et al. (2009) examine the influence of diverse variables on user satisfaction. They find that CA only has a weaker positive effect on satisfaction, than on confirmation and perceived usefulness. Overall, they underline a strong influence of CA on perceived usefulness, which in turn positively influences user satisfaction.

In summary, research investigating effects of CA, illustrates the complex and diverse relationships between CA and users' beliefs, their intention to use IT, and their actual usage behavior. It consistently shows that CA positively influences perceived ease of use, perceived usefulness, perceived enjoyment, user trust, and user satisfaction.

4.3 Literature on Antecedents of Cognitive Absorption

Computer playfulness is "an individual's tendency to interact spontaneously, inventively, and imaginatively with new software" (Webster & Martocchio 1992, p. 202). It is a significant determinant of flow and thus of CA (Agarwal & Karahanna 2000; Chandra et al. 2009; Jia, Hartke Jia & Pearson 2007; Leonhard & Riemenschneider 2008). In the context of virtual collaboration, computer playfulness has been labeled perceived playfulness (Chandra et al. 2009).

Personal innovativeness in the domain of IT is an individual trait, which reflects the willingness to try out any new technology (Agarwal and Prasad 1996). The effect of personal innovativeness in the domain of IT on CA is widely acknowledged (Agarwal & Karahanna 2000; Jia et al. 2007),

even if Leonhard and Riemenschneider (2008) and Chandra et al. (2009) find the influence of personal innovativeness in the domain of IT on CA to be insignificant.

Self-efficacy represents an individual's beliefs in her ability to perform a specific activity; computer self-efficacy refers to individuals' judgment of their capabilities to use computers in diverse situations (Compeau, Higgins & Huff 1999). Agarwal et al. (1997) validate (computer) self-efficacy as determinant of CA. They explain the positive influence of self-efficacy on an individual's state of CA by the positive relationship between self-efficacy and flow experience plus the characteristic of self-efficacy to lower the perceived cognitive burden while performing a task. Further, Agarwal and Karahanna (2000) and Roca et al. (2009) confirm a direct effect of self-efficacy on perceived ease of use.

Perceived affective quality means an individual's perception that an object has the ability to change his affective state. Applied to IS usage, perceived affective quality addresses how pleasant (valence value) and interesting (arousal value) IS are experienced (Zhang et al. 2006). Zhang et al. (2006) validate perceived affective quality as a strong antecedent of CA. By examining the cross-factor loading, they demonstrate that perceived affective quality and CA are different constructs.

Confirmation (of user expectancies) refers to the extent to which a product or service meets a user's expectations. Roca et al. (2009) detect the confirmation of user expectancies as another antecedent with a positive effect on CA when confirmation, in turn, is influenced by the quality of information, system, and service.

Normative influence refers to "how an individual views the importance of others with respect to adopting the IT" (Karahanna et al. 1999). Thomas (2006) finds strong support for the importance of normative influence, as an antecedent of CA, even if not all dimensions of normative influence are significant.

Perceived compatibility refers to the perception of an individual that IS are compatible with his needs, beliefs, and ideas about the IT. It addresses the technology's role in satisfying individual beliefs about IT. *Familiarity* refers to an individual's cognizance based on her past accumulated experiences. Chandra et al. (2009) find perceived compatibility to be important antecedents of CA. If individuals perceive IS to be compatible with their needs and ideas, they are likely to have an immersive experience with IS and become totally absorbed in their activity. Perceived compatibility had a significant relationship with CA. Familiarity, however, has no significant relationship with CA.

Social presence describes "the degree of salience of the other person in the interaction" (Leong et al. 2005, p. 2170). It is a characteristic of the communication medium. Leong et al. (2005) explain a positive influence of social presence on CA with the assumption that the more salient a person is, the deeper the user becomes involved with the software.

In summary only few studies in IS explicitly consider the concept of CA. Overall, they identify positive effects of computer playfulness, self-efficacy, perceived affective quality, expectancy confirmation, and perceived compatibility on CA. The positive relationship between personal innovativeness in the domain of IT and CA and the one between normative influences and CA is only partly confirmed so far. The hypothesis that familiarity also drives to CA is not yet supported by empirical data; and the effect of social presence on CA has not been examined yet.

5 Cognitive Absorption for Research on the Use of Hedonic IS

The conceptualization of CA as multi-dimensional construct helps understanding the formation of user beliefs and intention to use different technologies in different contexts. Being grounded in social and individual psychology (Agarwal & Karahanna 2000), CA aims at capturing the user's experience with IS by combining affective and cognitive components. This is of particular value in the context of hedonic IS usage that is affectively and cognitively driven. When interacting with hedonic IS, users often report losing track of time (Chen 2007). This is partly attributed to the fact that the interaction arouses their curiosity. Typical for hedonic IS usage is that the interaction is perceived as pleasurable. Because using hedonic IS relates so closely to the dimensions of CA, the consideration of CA suggest itself. Besides, as an intrinsic motivator, CA is assumed to be an important predictor for the intention to use (van der Heijden 2004).

5.1 Conceptualization of Cognitive Absorption for Hedonic IS Research

Hedonic IS usage is, partly by definition, closely related to the five CA dimensions suggested by Agarwal and Karahanna (2000) – focused immersion, temporal dissociation, heightened enjoyment, control, and curiosity. Although Agarwal and Karahanna (2000) note a low factor loading of the control dimension of CA when examining user behavior towards the Internet, suggesting that the control dimension is less relevant when studying the Internet, Roca et al. (2009) maintain the original five dimensions of CA. Saade and Bahli (2005) drop the dimensions of control and curiosity; they justify the with their experiment setup and the Internet-based learning system used. Wakefield and Whitten (2006) also deviate from the five CA dimensions and separate between heightened enjoyment and CA due to the affective and cognitive nature of components. Thus, they significantly change the initial meaning of CA as an intrinsic motivator.

5.2 Cognitive Absorption as Determining Variable in Hedonic IS Research

Concerning hedonic IS usage, the application of CA is particularly suitable for investigating the determination of variables such as *user satisfaction and enjoyment*. As hedonic IS are mainly used for having fun, such variables are of more central interest than variables relating to instrumental gains such as perceived usefulness. However, so far only few studies (Leong et al. 2005) analyzed fun-oriented variables such as user satisfaction resulting from the state of CA.

CA research has traditionally also examined an individual's perception of being in control with the interaction. In hedonic contexts, a *user's trust* in the interaction gains importance, for instance, with regard to private data. Many hedonic systems and applications such as Apple's iTunes are able to store personal information and monitor usage behavior. Thus, paying attention to CA as antecedent of trust (Chandra et al. 2009) or related variables such as perceived risk helps to illuminate the patterns of user behavior in the hedonic context.

Incorporating the concept of CA when investigating the user behavior towards hedonic IS requires that users already have used the technology. Therefore, CA is inappropriate when one is interested in studying the *intention to use IS for the first time*, i.e., in gaining new users / customers.

As nearly all people have used any kind of hedonic IS at least once, the question should be less about understanding adoption or initial use (Lyytinen 2010), i.e., intention to use, but more about how to foster consumer's *repeated use*. CA is a helpful construct for researching consumers' repeated use, or variables such as continuance intention (Bhattacharjee 2010) and positive word-of-mouth (Turel et al. 2010).

5.3 Utility of Cognitive Absorption Antecedents for Investigating Cognitive Absorption

The initial focus of investigating the CA determinants in user behavior research lay on technology-related user traits such as computer playfulness and personal innovativeness in the domain of IT. Besides those two traits, *personality traits* such as the 'big five', agreeableness, extraversion, neuroticism, openness to experience, and conscientiousness (McCrae & John 1992) move to the forefront in the context of hedonic IS. As many hedonic IS have a close connection with art, adventure, and imagination an individual's openness to experience should be an important driver of CA and thus user behavior. Individuals with a distinctive trait of openness, a general appreciation for art, emotion, adventure, unusual ideas, imagination, curiosity, and variety of experience, are more likely to experience the state of CA than less open and more 'down-to-earth' individuals. In turn, individuals with a strong conscientiousness value, showing a preference for planned rather than spontaneous behavior are less likely to lose track of time and hence are less likely to experience CA when using hedonic IS.

When using hedonic IS, *users' cognitions* such as attention (Horvitz, Kadie, Paek & Hovel 2003; Lee & Benbasat 2003) and perceived affective quality (Zhang et al. 2006) are likely to influence the state of CA more than in the utilitarian context. While watching traditional TV has always been a mix of 'lean forward' and 'lean back' (Silverstone 1994), using technologies such as hybrid platforms or game consoles encourage a more active engagement and require more user attention. An individual's perception that a system has the ability to change his affective state (perceived affective quality) is highly relevant in the context of hedonic IS usage which is closely related with having fun, relaxing, and killing time. (Computer) self-efficacy, in turn, appears to be a less suitable CA antecedent in the context of hedonic IS. It refers to individuals' beliefs about their abilities to competently use computers which is more important in the context of work-related usage of utilitarian IS.

As emotions and moods are a major motivation for the consumption of hedonic products (Hirshman & Holbrook 1982), the consideration of a *user's emotions or mood* is advisable. There are various evidences that a user's emotion and mood influences his state of involvement while interacting with a system.

User demographics such as age, gender, and computer experiences also play an important role. Already with regard to the utilitarian context, prior research has shown that gender has an influence, for instance, on the perception of a technology (Gefen & Straub 1997). The different preferences and perceptions of males and females have been even more striking when it comes to use hedonic IS such as online games or ring tones (Wilska 2003).

Environmental characteristics such as culture, ethics, and social norms are important. Typical for hedonic contexts and known from the world of social media, the more using a specific technology belongs to the common norm, the more it is respected and valued, the more likely people will experience deep involvement with such technology.

Attributes and features of hedonic IS such as visual appeal, content quality, speed, navigability, interactivity, interoperability, and security mechanisms, are likely to influence the state of CA and therefore are important for studying the use of hedonic IS. Content that is perceived as valuable, up-to-date, and interesting can stimulate the rise of curiosity, focused immersion, and losing track of time. Quick system responses and easy navigability contribute to the emergence of focused immersion and temporal dissociation while interactivity features stimulate a user's feeling of being in control with the interaction.

Overall, a user's personality traits, cognitions, emotions, and demographics, as well as several environmental characteristics and attributes of hedonic IS constitute antecedents when investigating CA in the hedonic context.

6 Summary and Future Research

In this paper, we have shown that CA is a helpful construct when examining user behavior toward hedonic IS. CA combines affective and cognitive components and constitutes an intrinsic motivator. An extensive review of prior research on CA mainly in the utilitarian context underlines how valuable the construct of CA has been for understanding the formation of user beliefs and usage intention preceding user behavior. The paper discusses the suitability of CA for research on the patterns of user behavior in hedonic contexts and finds that encompassing CA in research on hedonic IS usage would be helpful.

From our findings we conclude that CA should be integrated into future research on the design and implementation of hedonic IS so that the resulting systems encourage user engagement and introduce a state of focused immersion and temporal dissociation. Taking into account the importance of CA for actual user behavior such as repeated use, for user cognition such as trust and perceived affective quality, and finally for the formation of emotions such as satisfaction may help system providers to increase their revenues, market share, and brand loyalty and at the same time strengthen user satisfaction.

7 References

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