10-6-2011

INVESTIGATING THE ACCEPTANCE OF ELECTRONIC BOOKS – THE IMPACT OF HAPTIC DISSONANCE ON INNOVATION ADOPTION

Jin Gerlach

Peter Buxmann

INVESTIGATING THE ACCEPTANCE OF ELECTRONIC BOOKS – THE IMPACT OF HAPTIC DISSONANCE ON INNOVATION ADOPTION

Gerlach, Jin, Technische Universität Darmstadt, Hochschulstraße 1, 64289 Darmstadt, Germany, gerlach@is.tu-darmstadt.de

Buxmann, Peter, Technische Universität Darmstadt, Hochschulstraße 1, 64289 Darmstadt, Germany, buxmann@is.tu-darmstadt.de

Abstract

The digitization of the book industry is often said to lead the physical book to an end. Yet, many existing national book markets refuse to adopt the technological change. Consumers' resistance to electronic books is generally viewed as a result of high prices and shortcomings of e-reading technology. The current paper tries to take a step toward a more differentiated view on ebook adoption. There is evidence that the different haptics of a physical book play an important role in ebook acceptance, especially in leisure settings. Therefore, the construct of haptic dissonance is derived from a theoretical basis, conceptualized and hypothesized as being an important antecedent of ebook acceptance. A qualitative study is conducted to show the relevance of haptic dissonance and to make a first proposal for operational measurement. Possible applications involve research on acceptance of or resistance to innovations where haptic attributes are salient.

Keywords: Electronic Books, Innovation Adoption, Cognitive Dissonance, Haptic Aspects

1 INTRODUCTION

The discussion about the future success of ebook technology has led to controversy among market participants. On the one hand, players like Amazon or Apple are pushing toward diffusion, trying to be the "go-to-platform" when it comes to ebooks. Book publishers feel that they are forced to supply digital versions of their books, while being uncertain what the technology's future impact on their business will be. On the other hand, there are the readers. Some are adopting the new way of reading, while the biggest fraction is still resisting the digital trend.

Looking at reasons why ebook acceptance is still low in many parts of the world, one is confronted with a lack of scholarly based insights. Existing literature has to be criticized for two reasons: One, it often fails to differentiate between reading scenarios regarding books, readers and situations (a condition, research on reading and readers has long agreed upon). Two, current research on ebook adoption is difficult to generalize, since it is mostly carried out in academic settings among university students, regarding the use of ebooks supplied by the associated libraries (e.g., Chu 2003; Rowlands et al. 2007; Shelburne 2009).

Although mostly neglected by existing research, there is evidence that haptics (i.e., the tactile feel of reading a printed book) play an important role in attitudes towards books, thus, affecting the acceptance of ebooks where those haptic attributes are missing (Gregory 2008, p. 270; Mangen 2008, pp. 405ff.). Haptic value tends to be more salient in leisure settings than in work or academic situations, since the use of technology could disturb immersion into the book, especially when relaxation is an important factor (Hurst et al. 2009, p. 231; Mangen 2008, pp. 406ff.).

This research aims at getting one step closer toward a differentiated understanding of the factors influencing ebook adoption. Therefore, we concentrate on the impact of haptics on ebook acceptance from the perspective of Cognitive Dissonance Theory (CDT), first proposed by Festinger (1957). The theory basically states that individuals perceive inconsistency between dissonant cognitions as unpleasant and strive for reduction of those dissonances (Festinger 1957, p. 3). Transferred to the domain of ebook adoption, we hypothesize that unfamiliar haptics of digital books are potentially irritating to readers and may be a source of aversion to digital reading. Based on past reading experiences with physical books, an individual may hold certain beliefs about how reading a book should feel like. Different haptic experiences of reading an ebook might conflict with those existing beliefs and create uncomfortable tension. We refer to this constellation as *"haptic dissonance"* and argue that it might not only occur in e-reading scenarios. We believe that it plays a role in innovation adoption of consumer products whenever haptic product characteristics are important to the buyer.

We organize the remainder of this paper as follows. In section 2, we present the results of an extensive literature review, in order to identify existing concepts related to our approach, as well as relevant findings on the influence of haptics on product evaluation. Afterwards, Cognitive Dissonance Theory is presented as a foundation for haptic dissonance (section 3). Accordingly, the construct of haptic dissonance is derived from CDT in section 4. In section 5, we provide evidence for the relevance of haptic dissonance and its existence while reading ebooks by presenting a qualitative survey conducted among readers. It is also shown that haptic dissonance has explanatory power concerning the acceptance of ebooks. We conclude by discussing the value and possible applications of the construct in research and practice (section 6).

2 LITERATURE REVIEW

This literature review aims at the identification of existing research, taking a related approach to innovation adoption, as well as summarizing findings on the influence of haptics on product evaluation relevant for our study. Therefore, we searched general innovation literature utilizing

concepts similar to ours, as well as studies focusing on haptics' impact on product evaluation. Journals in the fields of IS, marketing, human factors and consumer research were searched using the databases Business Source Premier, EconLit, JSTOR and Google Scholar. We considered relevant articles, ranging from 1970 up until today.

Related Concepts

We identified three concepts related to haptic dissonance. First and most prominent, especially in IS research, is the set of literature on innovation adoption, i.e., technology acceptance. Rogers (1995) found the concept of *complexity* to be an important driver of innovation adoption, which he defined as "the degree to which an innovation is perceived as relatively difficult to understand and use" (Rogers 1995, pp. 242f.). A similar concept appeared in almost every approach challenging the question whether technological innovations are accepted by users or not (Davis 1989, p. 320; Moore and Benbasat 1991, p. 197; Thompson et al. 1991, pp. 128f.; Venkatesh et al. 2003, pp. 450f.). Complexity as a construct has proven to be a reliable predictor of technology acceptance. It is assumable that the case of ebooks and e-reading technology might not be an exception. Complexity and haptic dissonance are related concepts as they both investigate the impact of tangible product characteristics on user acceptance. The difference between both concepts is that haptic dissonance sets a more psychological, affective focus, concentrating on the individual's feelings, while complexity is conceptualized more rationally in terms of effort.

Another variable originating from technology acceptance research is the construct of *compatibility* (Karahanna et al. 2006; Moore and Benbasat 1991; Venkatesh et al. 2003). Defined by Rogers (1995, pp. 224ff.) as "the degree to which an innovation is perceived as being consistent with existing values, needs, and past experiences of potential adopters," different operationalizations of the construct have led to conflicting outcomes (Karahanna et al. 2006, p. 783; Kleijnen et al. 2009, p. 346). Karahanna et al. (2006) propose a conceptual distinction between four constructs, namely compatibility with preferred work style, existing work practices, prior experience, and values. This concept relates to haptic dissonance, since it also evaluates an innovation based on existing cognitions. We argue, however, that the use of CDT is a better theoretical foundation for our approach, because it provides an explanation *why* inconsistency leads to tension that might evoke aversion (see: section 4).

Related to innovation adoption research is another broad stream of literature, which explores the question when and why innovations meet resistance among consumers (e.g., Ellen et al. 1991; Kleijnen et al. 2009; Ram 1987; Sheth 1981). Several researchers found that resistance might occur when the use of innovations forces consumers to change their existing behavior, especially when they are satisfied with the current situation, feeling no reason to change (Ellen et al. 1991, p. 305; Kleijnen et al. 2009, pp. 350ff.; Ram 1987, p. 211; Sheth 1981, pp. 277f.). This finding might imply that resistance to ebooks is likely to arise, if readers are used to and satisfied with the haptics of printed books. The construct of haptic dissonance, however, should represent a different concept, which is less evaluative but more affective, describing the irritating internal dissonance a consumer perceives as a result of the different haptics incorporated by an ebook.

The Influence of Haptics on Product Evaluation

Peck and Childers (2003a; 2003b) show that a product's haptics influence product evaluation and that individual consumers differ in terms of their need for haptic information. They develop the two-dimensional "Need for Touch" scale, which they conceptually define as "the preference for the extraction and utilization of information obtained through the haptic system" (Peck and Childers 2003a, p. 431). The first underlying factor incorporates haptic information gathering, used analytically for product evaluation, e.g., concerning product quality. The second dimension covers the more intrinsically motivated need for touch out of hedonic reasons, without need for an immediate purchase intention. These findings provide a cue for a more differentiated look on ebook acceptance. If different

readers value a book's haptics to a different extent, making the physical form more or less valuable, they might also differ in terms of their ebook acceptance.

Krishna and Morrin (2008) have investigated the impact of individual haptic orientation on product evaluation in situations where haptic cues are "nondiagnostic" (cues that do not provide objective information relative to product judgment). More precisely, they analyzed the evaluation of mineral water, served in either high quality or low quality cups or bottles. They found that the product package or serving container can have an effect on quality judgments of the water (Krishna and Morrin 2008, p. 816). This finding is interesting, yet, hard to transfer to the evaluation of ebooks. First, it is not clear, if the "feel" of a book is a nondiagnostic attribute – and if so, for whom. Second, the distinction between high and low quality cannot be made, comparing printed and electronic books. However, for our purposes, it is important to note that the same content, delivered in packaging with different haptics, can be unequally evaluated by customers.

Summary

Research has shown that a product's haptic attributes can influence its evaluation, although literature in this area is still sparse. Taking an innovation adoption perspective, we found three concepts influencing the adoption process, namely complexity and compatibility of the innovation, as well as satisfaction with the existing situation when the innovation would force consumers to change their behavior. The development of the construct of haptic dissonance is intended to be a complementing means to this end, highlighting the affective state of internal dissonance within the consumer that leads to innovation resistance. To the best of our knowledge, a construct equal to haptic dissonance does not exist.

3 THEORETICAL BACKGROUND

Originally proposed by Festinger (1957), the Theory of Cognitive Dissonance states that individuals strive for consistency between their cognitions, i.e., beliefs, opinions, behavior, etc. If two cognitive elements are in line with each other, the individual is in a consonant state. However, everyday situations can lead to inconsistency when two non-conform cognitions are simultaneously present. CDT states that in this case the individual will take actions in order to return to a state of consonance. A well known example is smoking behavior (McMaster and Lee 1991). People know that smoking is bad for their health. If they continue smoking anyway, their behavior is not in line with their beliefs, creating an unpleasant feeling. This inconsistency is called dissonance by Festinger (1957, p. 3).

Options in order to reestablish consistency usually fall into two categories – attitudinal or behavioral change (Dickerson et al. 1992, p. 842; Festinger 1957, p. 6; Scheier and Carver 1980, pp. 390f.). As an example for attitudinal change, smokers make up arguments why smoking is not as bad as everyone says, or even good – e.g., due to its satisfying effect. A change of behavior to restore consistency could be to just stop smoking. Aronson (1969) describes this mechanism as follows: "Thus, dissonance theory does not rest upon the assumption that man is a *rational* animal; rather, it suggests that man is a rationalizing animal – that he attempts to appear rational, both to others and to himself" (Aronson 1969, p. 3). By "rationalizing," Aronson (1969) addresses the different ways to reduce cognitive dissonance.

There is a great field of research utilizing CDT. In marketing, the theory has been applied to consumer behavior (e.g. Cummings and Venkatesan 1976; Oshikawa 1969). Other researchers use the theory to explain behavioral change (Dickerson et al. 1992; Freedman 1965). Regarding our purposes, CDT states that a person who is feeling dissonance will actively avoid situations that are likely to increase the dissonance, i.e., he or she will change his or her behavior (Festinger 1957, p. 3). We now utilize this notion for our explanation why irritating haptics can lead to resistance to or rejection of innovations.

4 DEFINING HAPTIC DISSONANCE

Overview

Suppose that an individual's salient association with reading is "books." If the individual is reading (printed) books on a regular base, he or she might hold beliefs about how it feels like to read a book regarding tactile perceptions. Those beliefs are cognitions that are preexisting in the individual's belief structure because of personal experiences. When that person is given an ebook on a dedicated device for reading, the haptic experience might be inconsistent with his or her expectations what reading should feel like. According to CDT, this inconsistency should build at least a slight unpleasant tension during the reading process, which we call "haptic dissonance." Some evidence for the existence of haptic dissonance can be found in existing literature on digital reading. Dillon (1992, p. 1307) shows, that readers find it awkward to manipulate text (i.e., page turning, flicking through pages, etc.) on screens compared to printed texts. This is in line with survey results obtained by Noyes and Garland (2006, p. 358) who discovered that readers like how tangible printed books are, how they "feel and look." Mangen (2008, p. 405) states: "Haptic perception is of vital importance to reading, and should be duly acknowledged. (…) When reading digital texts, our haptic interaction with the text is experienced as taking place at an indeterminate distance from the actual text, whereas when reading print text we are physically and phenomenologically (and literally) in touch with the material substrate of the text itself." Arguing from a CDT perspective, it is possible that this difference described by Mangen (2008) is perceived as an inconsistency by the reader.

Conceptual Definition

A construct is "a conceptual term used to describe a phenomenon of theoretical interest" (Edwards and Bagozzi 2000, pp. 156f.). According to Rossiter (2002, pp. 308f.), the conceptual definition of a construct requires the description of a focal object (perceptual or physical), an attribute as dimension of judgment, and a judging rater entity. This structuring allows for an adequate operational measurement in the later development. Thus, *haptic dissonance* is conceptually defined as the perceived unpleasantness an individual experiences because using an object *feels* physically different from other cognitions held by the individual (Table 1). The individual's other cognitions are not further detailed here, since different individual-object-constellations require different cognitions to be taken into account. In the case of reading ebooks, those cognitions are likely to be memorized haptics that have become familiar through past experiences with printed books.

Haptic dissonance is high when the unpleasant inconsistency felt by the individual is strong. When the inconsistency experienced by the individual is weak, haptic dissonance is defined to be low. The emphasis in our definition is on the individual's *feeling*. This distinguishes the definition from related constructs we identified during our literature review (see: section 2).

Object	**Attribute**	**Rater Entity**
haptics of the object	perceived unpleasantness	individual using the object

Table 1. Conceptual Elements of Haptic Dissonance According to Rossiter (2002)

5 CONCEPTUALIZING HAPTIC DISSONANCE

Study Description and Results

The four main purposes of the study presented subsequently were

1) to show the relevance of haptic dissonance,

2) to show that haptic dissonance can occur while reading ebooks,

3) to provide first evidence that haptic dissonance can influence ebook acceptance negatively,

4) and to lay ground for conceptualization and operational measurement of haptic dissonance.

In order to pursue those objectives, we conducted a qualitative survey among readers. Subjects were chosen on the basis of their reading habits to ensure the presence of a minimal sense for the haptics of printed books. Therefore, we selected readers who reported to read at least 10 books per year. The interviews were conducted among customers of a bookstore in the central shopping district within a midsized city in Germany. A total of 30 interviews were conducted, a sample size that was found sufficient, since, after 20 interviews, redundancy in responses was reached without obtaining any more variation. Since we perceived our questions to be uncritical on a moral and personal level, social desirability was not expected to be a problem. The interviews were pretested (and improved) among random book readers and followed the process described below.

After a brief introduction, the customers were asked how many books they read in their leisure time a year and were then handed a hardcover book. We asked the subjects to imagine reading the book at home and to name any aspects that came to their minds regarding what they could feel and perceive only with their fingers, hands, and arms (question 1). This question aimed for sensitizing the subjects for the topic and their haptic perceptions. Any aspects named were written down. Afterwards, the subjects were handed an Amazon Kindle (3rd generation) and explained how they could turn the page forward and backward.[1] We asked for an evaluative comparison of the ebook to each of their aforementioned haptic aspects, how reading felt like on the Kindle, and any other haptic aspects that came to their minds (question 2).[2] All statements were written down. To complete the interview, we asked the subjects whether or not the haptic differences they perceived influenced their preferences for either the printed book or the ebook, and which version they preferred (question 3). Afterwards we collected the subjects' age, and gender.

Figure 1 shows the distributions of age, gender, and books read per year in our sample (n=30). The mean age was 40, 16 participants were female, and the average number of books read per year was 30.

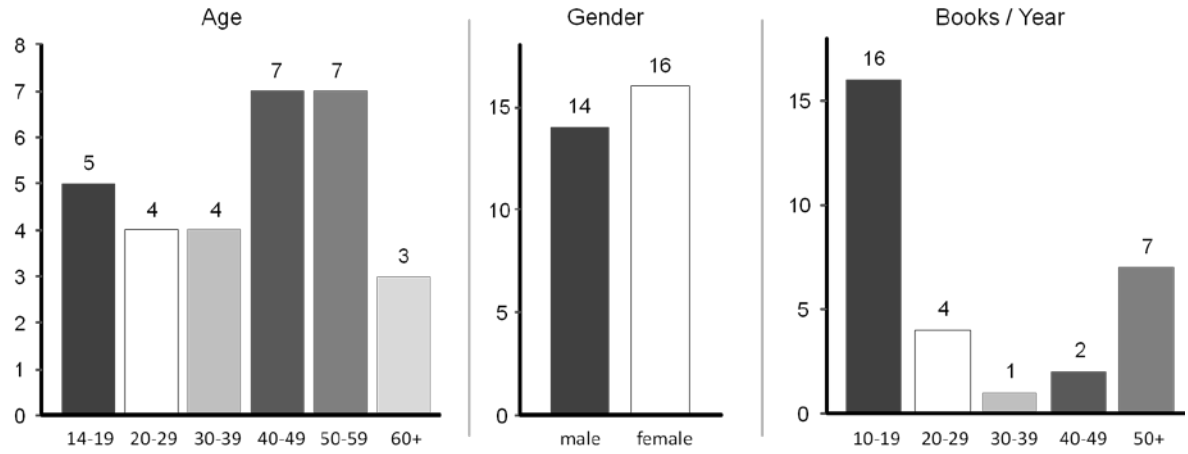

Figure 1. Sample Characteristics

In order to identify important haptic aspects of reading a book, a content analysis was performed on the interview transcripts. Table 2 shows all aspects mentioned, as well as their frequencies of occurrence. We want to stress that the number of occurrences may not be representative for an

[1] The electronic device was kept hidden during the interview until that moment.

[2] We avoided using the term "haptic" to avoid confusion. Instead we referred to haptic aspects as "everything one could physically feel during the interaction with the book or ebook."

aspect's importance, since it is possible that unconscious aspects influence preferences without being easily elicited.

Haptic Aspect	**Absolute Occurrence**[3]	**Proportional Occurrence**
the feel of a page and the paper	28	93,3%
the feel of turning a page (forward, backward, while skimming)	24	80,0%
the feel of the binding	21	70,0%
the feel of having a book in one's hand while reading	17	56,7%
the feel of the book's (individual) weight	14	46,7%
the natural and nontechnical feel of a book	12	40,0%
the feel of the progress one has made in a book	11	36,7%
the feel of the book's (individual) thickness	8	27,7%
the feel of the stimulation of one's fingers while reading	6	20,0%
the feel of the book's (individual) value	4	13,3%
the feel of opening and closing a book	4	13,3%
the ability to put a finger into a book while reading	3	10,0%
the feel of a book's durability	3	10,0%
the feel of the book's (individual) age and previous usage	2	6,7%

Table 2. Frequencies of Haptic Aspects

Aspects mentioned by the subjects were often accompanied by evaluative additions, e.g., "the paper feels *pleasant*," or "*I like* that I can feel, how far I am and how much is still in front of me." According to the readers, the natural feel of a printed book was perceived in a positive way because feeling something nontechnical in their hands allowed them to "shut out the stress of a work day."

In order to obtain evidence for the existence of haptic dissonance, we analyzed our transcripts regarding the second question of the interview. Asking the subjects for their opinion how the haptic elements of the printed book compared to the ebook, we obtained the statements shown in Table 3.

Statement of Dissonance	**Absolute Occurrence**[4]	**Proportional Occurrence**
"I miss the paper while turning the page."	17	56,7%
"I miss the nice feel of paper while reading."	11	36,7%
"While holding the book, I can't feel the progress I have made."	10	33,3%
"Holding an ebook feels awkward."	8	26,7%
"It doesn't feel like a book."	8	26,7%
"The ebook feels distant / cold / unpersonal."	7	23,3%
"The ebook feels artificial."	7	23,3%
"Missing the feel of a book in my hand is disturbing."	6	20,0%
"The ebook feels like technology (which reminds me of work)."	6	20,0%
"I miss the feel of the individual weight of a book."	5	16,7%
"I miss the feel of the individual thickness of a book."	5	16,7%
"The ebook feels unpleasant."	4	13,3%
"I miss the feel of opening and closing a book."	4	13,3%
"I can't feel skimming through the pages."	3	10,0%
"I miss the feel of the individual age and previous usage of a book."	2	6,7%
"I can't feel anything that indicates the individual value of a book."	1	3,3%

Table 3. Frequencies of Dissonance Statements

[3] Even if mentioned twice by the same subject, aspects were counted only once.
[4] Dissonance statements were also counted only once per subject.

Statements showed that readers *miss* their well known haptic elements (i.e., cognitions), and that the different "feel" of an ebook created unpleasantness, confirming our conceptual definition of haptic dissonance. One reader stated that "the magic of the books' individuality is missing – every book has the same weight, appearance, and thickness." Answers to our third question provide additional support for the construct of haptic dissonance. Being asked whether the haptic differences influenced their preferences for the electronic or print version, some readers stated that the contrary feel created an *unpleasant feeling* toward the ebook and, thus, influenced their preference for the printed book. One reader said that the feeling of the ebook created "a tension, a strong pressure" inside her. Another reader explicated that it was his "experiences how books feel that lead to aversion to this (ebook)." This evidence strongly supports our theoretical foundation of CDT, since it shows inconsistency on the one hand (i.e., favored aspects are missing) and unpleasant feelings on the other hand (i.e., haptic differences create unpleasant tension).

Finally, answers to our third question additionally provide clues that some readers might reduce haptic dissonance by avoidance of the dissonance creating factor (i.e., ebooks). 83% of the subjects stated that the haptic differences between both versions influenced their preference, which was in all cases in favor for the printed book.

Conceptualization and Proposal for Scale Items

On the basis of the results presented above we conceptualize haptic dissonance and perform the first steps for developing a measurement scale for the domain of ebooks (Churchill 1979; Rossiter 2002). In order to find different components of our investigated object (i.e., haptics of an object), the aspects were categorized independently by two experts in the fields of IS and marketing. After unifying the slightly different results, a third expert researcher was asked to allocate all aspects to the identified dimensions. This process resulted in the two different categories, presented in Table 4. The same procedure was undertaken for classifying the attribute (measurement dimension) of haptic dissonance. Therefore we analyzed the dissonance statements, resulting in two underlying categories (Table 5).

Haptic Aspect	**Haptics of a Book as an Object (O1)**	**Haptics of the Reading Process (O2)**
the feel of the book's (individual) weight	x	
the feel of the book's (individual) thickness	x	
the feel of the book's (individual) value	x	
the feel of the book's (individual) age and previous usage	x	
the natural and nontechnical feel of a book	x	
the feel of a book's durability	x	
the feel of the binding	x	
the feel of the stimulation of one's fingers while reading		x
the feel of a page and the paper while reading		x
the feel of turning a page (forward, backward, while skimming)		x
the feel of having a book in one's hand while reading		x
the feel of the progress one has made in a book		x
the ability to put a finger into a book while reading		x
the feel of opening and closing a book		x

Table 4. Categorized Haptic Aspects

The first component of our construct's object O1 (haptics of a book as an object) refers to all haptic beliefs (i.e., memorized cognitions) that could describe a book as one physical unit. These aspects can be felt outside the reading process. The second category O2 (haptics of the reading process), on the contrary, subsumes all haptic experiences that can be felt during reading.

Statement of Dissonance	Feels of Deprivation (A1)	Negative Affectivity (A2)
“I miss the paper while turning the page.”	x	
“While holding the ebook, I can’t feel the progress I have made.”	x	
”It doesn’t feel like a book.”	x	
“I miss the nice feel of paper while reading.”	x	
”I miss the feel of the individual weight of a book.”	x	
”I can’t feel skimming through the pages.”	x	
”I can’t feel anything that indicates the individual value of a book.”	x	
”I miss the feel of the individual thickness of a book.”	x	
”I miss the feel of the individual age and previous usage of a book.”	x	
”I miss the feel of opening and closing a book.”	x	
”Holding an ebook feels awkward.”		x
”Missing the feel of a book in my hand is disturbing.”		x
”The ebook feels unpleasant.”		x
”The ebook feels distant / cold / unpersonal.”		x
”The ebook feels artificial.”		x
”The ebook feels like technology (which reminds me of work).”		x

Table 5. Categorized Dissonance Statements

Analyzing the readers’ dissonance statements, items that fall into category A1 (feels of deprivation) reflect the cause of haptic dissonance (i.e., the inconsistencies between the ebook and existing cognitions – see: section 4). According to CDT, these inconsistencies lead to unpleasant feelings, represented by the statements in category A2 (negative affectivity). Thus, category A2 constitutes the measurement attribute of haptic dissonance, defined as the “perceived unpleasantness” in section 4.

We argue that these reactions could occur in other product scenarios as well. One could consider the example of two sweaters – a very soft one compared to one that feels uncomfortable and scratchy, wearing it. Another illustration could be two different gaming console controllers. The first one that just feels nice holding and using it – compared to the second one with less pleasant haptics.

For scale formation purposes, concrete items need to be introduced. Based on our conceptual definition of haptic dissonance (*haptics of the object x perceived unpleasantness*) and the according components identified by our study (*O1, O2 x A2*), we propose 6 (2x3) items, presented in Table 6.

Object Component	Attribute Component
O1: Holding an ebook (reading device) …	…feels *unpleasant*.
	…I find the missing feel of a printed book in my hand *disturbing*.
	…feels *artificial*.
O2: Reading an ebook (on an ebook reading device) …	…I cannot establish a connection to the book, because it feels *distant* not being able to touch the actual book.
	…the feel of technology instead of a natural product in my hand *disturbs* me.
	…feels *artificial* because there is no paper that stimulates my fingers.

Table 6. Proposed Scale Items for Measuring Haptic Dissonance

Since the rationale underlying our way of scale construction assures pre-development content validity (Rossiter 2002, p. 309), our proposed items should all properly represent the construct of haptic dissonance within the ebook context. The next steps for developing the haptic dissonance scale should be the identification of appropriate rating scales, expert rating, and pre-testing of all resulting items.

Afterwards, the construct needs nomological validation in terms of a causal relationship between haptic dissonance and a dependent variable, reflecting a way of dealing with dissonance, as proposed by CDT. One example in the context of ebooks could be showing a causal link between haptic dissonance and a construct reflecting ebook acceptance (e.g., attitudes, intention to use, etc.).

6 CONCLUSION AND DISCUSSION

In order to show that haptic differences to printed books can influence the acceptance of ebooks, we developed the construct of haptic dissonance derived from Cognitive Dissonance Theory. By conducting a qualitative survey among readers, we showed that haptic dissonance could occur while reading ebooks and might influence ebook acceptance negatively. Beyond that, adoption of innovations in more general settings where haptic attributes are salient might also be influenced by haptic dissonance. Therefore, we provide an instrument for investigation. We found the construct to consist of the two object components "haptics of the product as an object" and "haptics of using the object", as well as the two attribute components "feels of deprivation" and "negative affectivity." By conceptualizing haptic dissonance and making an initial proposal for scale items, we created a solid basis for further scale development (Churchill 1979, pp. 67ff.; Rossiter 2002, pp. 319ff.).

Contributions for Research

Our study has implications for research. First, it looks on innovation adoption from the perspective of haptic differences. We state that, according to CDT, the dissonance caused by haptic differences may be an important factor, influencing innovation resistance regarding products where haptics play a role. Consumers' responses to our third question, whether they thought that haptic differences, affectively evaluated, influenced their preferences, provide initial evidence. This is in line with findings from innovation adoption and innovation resistance literature: In addition to implying that consistency with existing cognitions and the fact that forced behavioral change can lead to resistance, our approach presents an affect-oriented explanation why dissonance can lead to aversion. This distinguishes our construct from the concept of compatibility which lacks this kind of explanation.

The construct of haptic dissonance also contributes to the yet small set of literature examining the influence of haptics on product evaluation. Our research supports existing findings that products' haptic attributes can influence product evaluation and that evaluation depends on individual differences (i.e., existing cognitions), thus, strengthening the findings in this field.

Managerial Implications

Participants looking to secure their share of the ebook market mostly seem to overlook important aspects of printed books that cannot be easily provided by ebooks. Our results show that for some readers haptic dissonance can keep them from reading ebooks in leisure settings, since – at least regarding the haptic differences – they are inconsistent with existing cognitions, leading to unpleasantness and creating "distance" to the content (also described by Mangen 2008, p. 408). Thus, our study reveals important obstacles for ebook adoption which need to be considered by marketers.

Regarding their haptics, ebooks differ from physical books by definition. Attempts to provide ebook reading devices with the "same" look and feel readers are used to might be in vain and even yield negative results by evoking associations with printed books, only facilitating haptic dissonance. Alternatively, we suggest that managers concentrate efforts on aspects that differentiate ebooks from printed books in a positive way rather than trying to imitate them.

Limitations and Future Research Directions

Our findings underlie several limitations, suggesting areas for further research. Besides the possibility that the subjects chosen in our sample might not be an accurate representation of the population (i.e., readers who have experience reading printed books), we also have to consider that readers might not be fully aware of the haptics of a book. Thus, there might be other haptic aspects taking effect on a deeper level of consciousness which our survey methodology was not able to reveal. Perhaps, in-depth interviews, or experimental studies could verify or complement the set of aspects we found.

An interesting research direction is, of course, the examination of effects and antecedents of haptic dissonance. Using CDT as the underlying theoretical concept makes it relatively easy to identify some possible causal links. Existing cognitions are likely to be precursors and attitudes or behavior likely to be successors. In the domain of ebooks, haptic dissonance might increase with the amount of printed books read (i.e., experience), because exposure to the medium might strengthen haptic beliefs. On the other hand, haptic dissonance is likely to influence attitude or intention to read ebooks.

Another interesting aspect to investigate is to embed haptic dissonance into a broader concept of sensory dissonance. Since most human beings rely on five different senses, it could be argued that haptic dissonance is only a part of a more general multidimensional concept, where inconsistencies perceived in combination of all different senses might not only influence product acceptance, but also interact among each other. Different findings in literature support these considerations (e.g., Childers et al. 2001 or Hirschman and Holbrook 1982). In order to provide an example from our survey – 7 out of 30 subjects stated that, although explicitly asked for haptic aspects, the smell of books is an enjoyable factor to them.

Conceptualizing the construct of haptic dissonance constitutes an important step toward a differentiated understanding of ebook acceptance. Further research is needed in order to provide an applicable measure for this concept.

Acknowledgements

This work was supported by Buchhandlung Hugendubel (Darmstadt, Germany) where the interviews for our study took place. The authors would also like to thank Dr. Gisela Bieling for her conceptual help on this paper.

References

Aronson, E. (1969). The Theory of Cognitive Dissonance: A Current Perspective. In Advances in Experimental Social Psychology (Berkowitz, L. Ed.), 4, 1-34.

Childers, T. L. and C. L. Carr and J. Peck and S. Carson (2001). Hedonic and utilitarian motivations for online retail shopping behavior. Journal of Retailing, 77(4), 511-535.

Chu, H. (2003). Electronic books: viewpoints from users and potential users. Library Hi Tech, 21(3), 340-346.

Churchill Jr., G. A. (1979). A Paradigm for Developing Better Measures of Marketing Constructs. Journal of Marketing Research, 16(1), 64-73.

Cummings, W. H. and M. Venkatesan (1976). Cognitive Dissonance and Consumer Behavior: A Review of the Evidence. Journal of Marketing Research, 13(3), 303-308.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319-340.

Dickerson, C. A. and R. Thibodeau and E. Aronson and D. Miller (1992). Using Cognitive Dissonance to Encourage Water Conservation. Journal of Applied Social Psychology, 22(11), 841-854.

Dillon, A. (1992). Reading from paper versus screens: a critical review of the empirical literature. Ergonomics, 35(10), 1297-1326.

Edwards, J. R. and R. P. Bagozzi (2000). On the Nature and Direction of Relationships Between Constructs and Measures. Psychological Methods, 5(2), 155-174.
Ellen, P. S. and W. O. Bearden and S. Sharma (1991). Resistance to technological innovations: An examination of the role of self-efficacy and performance satisfaction. Journal of the Academy of Marketing Science, 19(4), 297-307.
Festinger, L. (1957). A theory of cognitive dissonance, Stanford (CA): Stanford University Press.
Freedman, J. L. (1965). Long-Term Behavioral Effects of Cognitive Dissonance. Journal of Experimental Social Psychology, 1(2), 145-155.
Gregory, C. L. (2008). "But I Want a Real Book" – An Investigation of Undergraduates' Usage and Attitudes toward Electronic Books. Reference & User Services Quarterly, 47(3), 266-273.
Hirschman, E. C. and M. B. Holbrook (1982). Hedonic Consumption: Emerging Concepts, Methods and Propositions. Journal of Marketing, 46(3), 92-101.
Hurst, S. and K. R. Messner and A. Revelle and A. K. Shrimplin (2009). Conflict and Consensus – Clusters of Opinions on E-books. ACRL 14th National Conference, 226-234. Seattle (WA).
Karahanna, E. and R. Agarwal and C. M. Angst (2006). Reconceptualizing Compatibility Beliefs in Technology Acceptance Research. MIS Quarterly, 30(4), 781-804.
Kleijnen, M. and N. Lee and M. Wetzels (2009). An exploration of consumer resistance to innovation and its antecedents. Journal of Economic Psychology, 30(3), 344-357.
Krishna, A. and M. Morrin (2008). Does Touch Affect Taste? The Perceptual Transfer of Product Container Haptic Cues. Journal of Consumer Research, 34(6), 807-818.
Mangen, A. (2008). Hypertext fiction reading: haptics and immersion. Journal of Research in Reading, 31(4), 404-419.
McMaster, C. and C. Lee (1991). Cognitive Dissonance in Tobacco Smokers. Addictive Behaviors, 16(5), 349-353.
Moore, G. C. and I. Benbasat (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. Information Systems Research, 2(3), 192-222.
Noyes, J. and K. Garland (2006). Explaining students' attitudes toward books and computers. Computers in Human Behavior, 22(3), 351-363.
Oshikawa, S. (1969). Can Cognitive Dissonance Theory Explain Consumer Behavior? Journal of Marketing, 33(4), 44-49.
Peck, J. and T. L. Childers (2003a). Individual Differences in Haptic Information Processing: The "Need for Touch" Scale. Journal of Consumer Research, 30(3), 430-442.
Peck, J. and T. L. Childers (2003b). To Have and To Hold: The Influence of Haptic Information on Product Judgments. Journal of Marketing, 67(2), 35-48.
Ram, S. (1987). A Model of Innovation Resistance. Advances in Consumer Research, 14(1), 208-212.
Rogers, E. M. (1995). Diffusion of Innovations, Fourth Edition, New York: The Free Press.
Rossiter, J. R. (2002). The C-OAR-SE procedure for scale development in marketing. International Journal of Research in Marketing, 19(4), 305-335.
Rowlands, I. and D. Nicholas and H. R. Jamali and P. Huntington (2007). What do faculty and students really think about e-books? Aslib Proceedings: New Information Perspectives, 59(6), 489-511.
Scheier, M. F. and C. S. Carver (1980). Private and Public Self-Attention, Resistance to Change, and Dissonance Reduction. Journal of Personality and Social Psychology, 39(3), 390-405.
Shelburne, W. A. (2009). E-book usage in an academic library: User attitudes and behaviours. Library Collections, Acquisitions, and Technical Services, 33, 59-72.
Sheth, J. N. (1981). Psychology of Innovation Resistance: The Less Developed Concept (LDC) in Diffusion Research. Research in Marketing, 4, 273-282.
Thompson, R. L. and C. A. Higgins and J. M. Howell (1991). Personal Computing: Toward a Conceptual Model of Utilization. MIS Quarterly, 15(1), 125-143.
Venkatesh, V. and M. G. Morris and G. B. Davis and F. D. Davis (2003). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27(3), 425-478.