Contrast and Assimilation in Consumer Software Selection Decisions – An Experimental Study

Full paper

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Abstract

Software selection research has so far mainly focused on corporations and often assumed a rational evaluation of selection criteria. Research on consumers' software selection is still scarce. However, findings from outside IS indicate that consumers' software selection decisions might be biased by the choice alternatives among which software is selected. In an experiment, this study investigates if consumers' selection decisions for software package variants are subject to contrast or assimilation and how this affects purchase decisions. In conjoint-type tasks, subjects evaluate software packages alongside other package-variants with reduced functionality and price. Consumers are found to be susceptible to contrast effects when selecting software. They have a higher likelihood to purchase a software package, when they choose from a set of alternatives that also includes package-variants with reduced functionality. This positive effect disappears when the price of the less functional packages is reduced sufficiently. Implications for research and practice are derived.

Keywords

Software selection, contrast and assimilation, experiment, consumer decision making.

Introduction

Research on software selection addresses methodologies for selecting software packages, software evaluation techniques, software evaluation criteria, and systems that support these decisions (Jadhav and Sonar 2009). The exploration of software evaluation criteria is one of the main areas of interest in this field. This stream of research explores the characteristics (e.g. functionality) of software packages and their impact on the decision to select a particular package from a set of choice alternatives (Keil and Tiwana 2006; Benlian 2011; Benlian and Hess 2011). Existing research has so far mainly focused on selection processes and criteria for *corporate* software packages (Jadhav and Sonar 2009). Despite its high practical relevance, research on *consumer* software selection is still scarce. However, an application of the insights from the research on corporate software selection to consumers' software selection may not be appropriate without adjustments. In particular, software selection research often implicitly assumes a mostly rational evaluation of objective selection criteria. This might not be adequate for consumers' selection decisions. For instance, research on consumer decision making in product choice tasks indicates that the choice alternatives among which a product is selected can bias the purchase decision (Lynch et al. 1991). Referred to as contrast and assimilation effects, such psychological phenomena have repeatedly been identified in various consumer product choice tasks. One implication of the contrast effect is that the purchase-likelihood for a product is *increased* by the availability of a less attractive product when the former is perceived as *different* from the less attractive one. The assimilation effect, on the other hand, suggests that the purchase-likelihood for the same product is *decreased* by the availability of a less attractive product when the former is perceived as *similar* to the less attractive one. Contrast and assimilation thus have contrary effects on the purchase-likelihood and, consequently, on a consumer's product choice (Meyers-Levy and Sternthal 1993). Nonetheless, it remains unclear if such effects are present in the case of consumer software selection and how they might manifest there. Existing research

on contrast and assimilation provides ambiguous predictions under which circumstances either contrast or assimilation might occur. Stapel and Suls (2007, p. 35) note that "we do not have a comprehensive answer about why assimilation or contrast sometimes occurs for one type of outcome dimension but not for others." Therefore, an investigation for the specific case of software selection is required.

Moreover, in the case of software selection, the investigation of contrast and assimilation effects has a particularly high relevance. This is, because in practice, software vendors often offer their customers a range of product variants to choose from. Software packages such as Microsoft's operating system Windows are offered in several variants with different degrees of functionality and at different price points. Security software suites for personal computers from vendors such as Symantec or Kaspersky are another example for this practice (Kaspersky 2015). According to literature on versioning of information goods, vendors do this to target different customer segments and thus increase their profits (Raghunathan 2000). While the versioning literature does provide some general rules of thumb regarding the number and type of versions to offer (Hui et al. 2007; Shapiro and Varian 2013), it remains unclear if such software package variants might induce contrast or assimilation and bias consumers' software selection decisions. Neither the existing versioning literature nor software selection literature provides sufficient predictions regarding these effects. However, a better understanding of contrast and assimilation in customers' software selection decision making would be beneficial for software vendors. For example, if a vendor's current lineup of software packages indeed induces assimilation so that the availability of a "light"-version with lower functionality also reduces the attractiveness of the regular or "pro"-version, this vendor might want to readjust his current product portfolio. This study addresses this gap and raises the following research question:

Are consumers' selection decisions for software package variants subject to contrast or assimilation effects and if so, how does this affect purchase decisions?

Theoretical Foundations

Software Selection

Research on software selection is part of the field IS usage, which comprises pre-adoption activities, adoption, and post-adoption activities (Rogers 1995; Jasperson et al. 2005). Software selection is a pre-adoption activity. It investigates methodologies for selecting software packages, software evaluation techniques, software evaluation criteria, and systems that support these decisions (Jadhav and Sonar 2009). Software selection research is motivated by the problem that a company's decision for unsuitable software may lead to negative impacts on productivity, decision quality of the management and, ultimately, the overall performance of the company. The exploration of software evaluation criteria and their impact on the selection decision for one or another software package is one of the main areas of interest in this field (Keil and Tiwana 2006, Benlian 2011, Benlian and Hess 2011). "Criteria to be considered for software evaluation are usually classified in several groups" (Jadhav and Sonar 2009, p. 560). Recent research distinguishes between package attributes and implementation attributes (Benlian 2011; Benlian and Hess 2011). Package attributes comprise *functionality*, *ease of use*, *reliability*, and *costs*. Implementation attributes comprise *customization*, *ease of implementation* and *support*. Evaluation criteria and their impact on selection decisions have been explored for a variety of software types, including office suites, ERP, ERM, CRM and simulation software (Jadhav and Sonar 2009). While there is a substantive body of research on corporate software selection, there are few studies that investigate consumers' software selection and evaluation criteria (Levin et al. 2003; Jin 2013).

Contrast and Assimilation in Product Choice Tasks

Contrast and assimilation are two related psychological phenomena that affect an individual's perception and subsequent evaluation of a stimulus (Novemsky and Ratner 2003; Priester et al. 2004). They may result in biased decision making outcomes and have been explored in various domains such as social psychology (Herr et al. 1983). One particular field, where contrast and assimilation effects have received increased attention is the evaluation of alternatives in product choice task and purchase decisions by consumers. Consumers have been found to be susceptible to contrast and assimilation effects when making choices between different product alternatives. Depending on either contrast or assimilation being present, attractive choice alternatives can make a product seem more (assimilation) or less

(contrast) attractive. Similarly, unattractive choice alternatives can make a product seem more (contrast) or less (assimilation) attractive. For example, consumers have been found to rate a car delivering 32 miles per gallon (mpg) as "high" in fuel efficiency when judging it among alternative cars with 24 mpg. In a choice set with cars delivering 48 mpg, however, the fuel efficiency of the car delivering 32 mpg is rated "low" (Lynch et al. 1991). This biased evaluation can lead to a change in purchase-likelihoods and affect purchase decisions.

If contrast, assimilation or neither of both occurs, depends on the characteristics of the task, stimuli, and judges (Wedell et al. 2007; Zhu and Meyers-Levy 2009). A prediction on whether contrast or assimilation occurs in a specific case is, however, often difficult. There are competing theoretical explanations for contrast and assimilation which sometimes lead to contradictory predictions (Stapel and Suls 2007). Therefore, domain specific investigations are required. Contrast and assimilation effects in product choice tasks have so far mostly been explored outside of IS, such as for cars (Hutchinson 1983) or food (Cooke et al. 2004). In IS, however, contrast and assimilation effects have been explored sparsely and only in a few environments, such as online shopping and auctions (Chiravuri and Ramamurthy 2002; Tan et al. 2004; Steward and Malaga 2009). Software selection research has so far not addressed contrast and assimilation in the evaluation of software package criteria.

Hypotheses Development

The technical characteristics of software make it easy and inexpensive for vendors to create additional variants of their software packages. After a fully featured flagship product has been developed, vendors can create additional package variants by simply disabling certain features of the flagship product (Chen and Seshadri 2007). In practice, this reduced functionality is usually accompanied by a reduced price for the package (Ghose and Sundararajan 2005). Such policies can be observed in the market for personal computer operating systems (e.g. Microsoft Windows) and security suites for home users (e.g. Symantec Norton), for example. In terms of software selection research, customers then have to make a selection decision among software package alternatives with different levels of *functionality* and *costs* (i.e. price). The other two package attributes—*ease of use* and *reliability*—usually remain the same among the different package versions.

Such versioning schemes might induce a bias in the customers' evaluation of the software package criteria (i.e. attributes). Previous research on contrast and assimilation found that a subject's unidimensional judgment of a specific attribute of an object is influenced by the level of this specific attribute in other, surrounding objects (Herr 1986; Shen et al. 2010). For purchase decisions, that means that a buyer's evaluation of a particular product attribute (e.g. functionality) depends on this attribute's characteristics in other products that are choice alternatives to the focal product. For example, in the domain of cars, it has been shown that a buyer's perception of a car's mileage (in mpg) depends on the mpg levels of other, elsewise similar cars under consideration (Lynch et al. 1991). In this case, these other cars create a *contrast effect* on the focal car such that subjects rate the mpg level of the focal car lower when it is evaluated together with choice alternatives with higher mpg levels. In a reversed logic, this study argues that the degree of functionality of a software should be perceived to be higher by a prospective buyer when this buyer is also offered other variants of this software package with lower (i.e. reduced) functionality. Thus, the following hypothesis is proposed:

Hypothesis 1a: *The degree of functionality of a software package is perceived as higher by a prospective buyer, when it is judged alongside choice alternatives with comparatively low levels of functionality than when it is judged alongside choice alternatives with similar levels of functionality.*

Theory also suggests that these unidimensional judgments of an object's attribute, such as the mpg level of a car, are unaffected by changes in other attributes of the choice alternatives (Lynch et al. 1991). For example, a contrast effect on the perception of mpg of a car due to choice alternatives (other cars) with higher mpg-levels is not affected by price changes in the alternative cars. Translated to the selection among software package variants, that leads to the following hypothesis:

Hypothesis 1b: *The perception of a software package's higher degree of functionality when judged alongside less functional choice alternatives is not affected by changes in other package attributes (specifically costs) of the choice alternatives.*

While these biases in the perception of an individual attribute do not carry over to an object's other attributes, research has found that contrast and assimilation effects in the perception of individual attributes can influence the overall perception of an object. In the case of purchase decisions, the perceived higher level of an attribute due to contrast effects, for example, can make the overall product appear more attractive than it would appear among other product alternatives with lower levels on this attribute. This change in attractiveness has been shown to reflect in a buyer's purchase-likelihood for the product. For example, individuals express a lower likelihood to purchase a particular car, when cars in the choice set have higher mpg levels than the focal car but otherwise similar characteristics than when the choice alternatives have similar mpg levels (Lynch et al. 1991). Following again a reversed logic, this study suggests that software buyers will have a higher likelihood to select (i.e. purchase) a particular software package, when alternative packages with reduced functionality (but similar levels on the remaining attributes, including price) are available. These packages with reduced functionality are suggested to exert contrast, making the focal package appear more attractive. From this, the following hypothesis is derived:

Hypothesis 2a: *A prospective buyer's purchase-likelihood for a software package is higher, when it is judged alongside choice alternatives with comparatively low levels of functionality but similar levels of costs than when it is judged alongside choice alternatives with similar levels of functionality and costs.*

This contrast effect in the overall judgment which translates into an increased purchase-likelihood results from an increase in the overall attractiveness of the software package, relative to its choice alternatives. However, this increased purchase-likelihood should disappear, when the choice alternatives are no longer perceived as less attractive contrasts to the focal software package. Specifically, when the reduced functionality of a software package is accompanied by (sufficiently) reduced costs, the overall package should no longer appear as unattractive choice alternative. A buyer should then no longer perceive this package as being within the same "mental category" as the fully featured variant. According to theory this is, however, a necessary condition for contrast effects to occur (Sherif and Hovland 1961). This study therefore argues:

Hypothesis 2b: *A prospective buyer's purchase-likelihood for a software package is not increased by choice alternatives with both, reduced functionality and correspondingly reduced costs, i.e. by choice alternatives that do not appear to be unattractive, relative to the focal package.*

Method

Following previous research on contrast and assimilation in the evaluation of consumer products, an experiment was conducted (Kim and Meyers-Levy 2008; Cunha and Shulman 2011). It was conducted as an online-questionnaire. Following Lynch et al. (1991), in conjoint-type tasks, participants had to rate a common set of (core) software packages alongside other (context) packages of the same software type but with—depending on their experimental condition—varying attribute levels of *functionality* and *costs*.

Experimental Design and Dependent Variables

The design was a 3 x 2 completely between subjects factorial design with manipulations of context (high functionality vs. reduced functionality vs. reduced functionality and reduced costs) x task-order (evaluation of functionality first, evaluation of purchase-likelihood second vs. the reverse order). Task-order was varied because previous research has raised concerns that contrast or assimilation effects on the purchase-likelihood might be limited to situations where a unidimensional judgment (here the evaluation of functionality) precedes the overall judgment (purchase-likelihood) (Hutchinson 1983). Participants were randomly assigned to the context x task-order conditions, i.e. to one of these six groups.

The stimuli were personal computer security suites for home users, described by the four package attributes that have been identified by previous software selection research: *functionality*, *ease of use*, *reliability*, and *costs* (Benlian 2011). All four attributes had two different levels, each reflecting a level that can be observed in the current market for security suites for home users (Dey et al. 2014, Purch 2015). Using IBM SPSS Statistics 19, a core set of eight software package profiles was developed by constructing a one-half fractional factorial of the 2^4 design shown in Table 1.

In each experimental condition, this core set was augmented by one of three context sets, each consisting of eight profiles that came from half replicates of one of the three sets of 2^4 context designs. In the first

context set (control, A), the specific levels were different but close to the core profiles' attribute levels. In the second context set (B), functionality was reduced. Security suites from this context set (B) offered a smaller set of features but otherwise the same levels of ease of use, reliability and costs as the control set (A). In the third context set (C), both, functionality and costs, were reduced. Security suites from this set (C) offered a smaller set of features but also cost less. Ease of use and reliability in set (C) were the same as in the control set (A). The appendix provides a full list of all profiles used in the study.

Attribute	**Core set: high functionality**	**Control set: high functionality (A)**	**Context set: reduced functionality (B)**	**Context set: reduced functionality and reduced costs (C)**
Functionality (Features)	AEFBSPM / AEFBSPMC	AEFBSP / AEFBSPM	A / AE	A / AE
Ease of Use	good / very good	good / very good	same as control	same as control
Reliability (%)	96 / 98	95 / 97	same as control	same as control
Costs (€/12 months)	45.99 / 49.90	46.95 / 48.99	same as control	27.99 / 29.90

Note: A=anti-virus; E=emergency-recovery; F=firewall; B=backup; S=safe surfing; P=privacy-protection; M=anti-spam; C=protection for children; the profiles' presentation in the online-questionnaire stated the full name of each individual feature; "same as control" denotes that the levels used were the same as in the control set.

Table 1. Overview of Stimulus Sets

In the online-questionnaire, each participant thus had to rate a set of 16 security suites (profiles), each with regard to functionality and purchase-likelihood. This set of 16 profiles was therefore presented twice to each participant—once on each of two consecutive pages. One page asked the participants to rate each of the 16 profiles with regard to their functionality on a nine-point-Likert-scale (1=very low; 9=very high). The other page asked the participants to state their purchase-likelihood for each of these same 16 packages on a nine-point-Likert-scale (1=very low; 9=very high). As pointed out before, these 16 profiles consisted of eight core profiles and eight context profiles, the latter depending on the respective experimental condition (control, reduced functionality or reduced functionality and reduced costs). On each of the two pages, the 16 profiles were presented as a list, with core and context profiles mixed and in random order. Right next to each profile, a nine-point-Likert-scale was placed. On an instructional page, before the rating tasks, participants were told to assume that they did not yet have any security suite, sought to purchase one for their own personal computer and a free software package was not an option.

Task-order was varied so that half of the participants rated functionality first and purchase-likelihood second and the other half of the participants rated purchase-likelihood first and functionality second. While rating the profiles on the first page, participants were unaware of the second task. Participants also had to complete the first page before they could proceed to the next page and returning to a previous page was not possible.

Control Variables

Previous research has raised concerns that only subjects who have little knowledge (expertise) about the objects under consideration might fall prone to contrast or assimilation effects (Lynch et al. 1991). Therefore, subjects were asked *whether they had ever bought our downloaded (for free) a security software for their personal computer and if so, how many months this was ago*. Moreover, subjects were

asked *whether they planned to buy or download (for free) a security software for their personal computer in the future and if so, in how many months this would be* (Hutchinson 1983). In addition to these measures, product expertise for security software was also captured on a four item, seven-point semantic differential scale with the items *know very little about/know very much about, inexperienced/experienced, uniformed/informed, novice buyer/expert buyer* (Mishra et al. 1993). Subjects were also asked to indicate which operating system(s) they used on their personal computer(s) if they owned one: *Microsoft Windows, Apple Mac OS, Linux* or *another operating system*. Age, gender, nationality and profession of each subject were also collected.

Participants and Procedure

Prior to the experiment, a pretest with eight subjects was conducted. These subjects had similar demographics as the target sample of the main study and also included users of different operating systems, for example. Based on the pretest comments of these subjects, the questionnaire was revised. Participants of the final experiment were members of a large public university in Germany. 5627 members of the university received an email inviting them to an *online-questionnaire based study on security software for consumers*. The email contained a link to the online survey and announced that, among the participants, 10x 15€ Amazon vouchers were drawn in a lottery after the study had been completed. 202 participants completed the experiment. 113 were females. Subjects took about 12 minutes on average to complete the study. Their age ranged from 18 to 51, with an average value of 25.07 (σ=6.94). The majority of participants were German (n=190). 163 participants were university students, 33 were employees, three were currently seeking work, two were self-employed and one refused to state his profession. The educational backgrounds of the participants were diverse, ranging from physics to law, arts, economics, computer sciences and education, for example. 82% (n=166) of the participants used Microsoft Windows as operating system on at least one of their personal computers. 21% (n=42) of participants used Apple Mac OS, 17% (n=34) used Linux and 3% (n=7) stated that they used another operating system on at least one of their personal computers. There was no subject among the participants who did not use any personal computer at all. Participants who had bought or downloaded a security software (for free) for their personal computer before, did this on average 11.95 (σ=16.51) months ago. Participants who planned to buy or download (for free) a new security software for their personal computer in the future, planned to do this on average in 7.73 (σ=9.12) months. Across the four seven-point semantic differential items, the mean score of the self-stated expertise with security software was 3.93 (σ= 1.53) on average. On each of the three expertise-measures, median splits were performed to classify subjects as "experts" and "novices" for the later hypothesis testing regarding expertise.

Data Analysis and Results

Control Variables

Based on the results of a series of Fisher's exact tests, it can be concluded that there was no significant difference across the six experimental conditions in terms of gender ($p>0.1$), profession ($p>0.1$), operating system use ($p>0.1$) and Hutchinson's (1983) measures of expertise (both $p>0.1$). Furthermore, based on ANOVA tests, no significant differences were found across the six experimental conditions regarding age ($F=1.02$, $p>0.1$) and Mishra et al.'s (1993) self-evaluation of expertise on the seven-point semantic differentials ($F=0.50$, $p>0.1$). It is therefore reasonable to conclude that participants' demographics and task-relevant controls were homogeneous across the six groups and thus did not confound the effects of the experimental manipulations.

Hypothesis Testing

In order to test the hypotheses, analyses of variance (ANOVAs) with post hoc contrast analyses were conducted. Mean ratings of the functionality of the eight core software packages were analyzed as a function of context, task-order, and expertise in terms of previous purchase or download. There was a significant main effect of context ($F=3.91$, $p<0.05$) but not for the control variables task-order ($F=2.29$, $p>0.1$) and expertise ($F=1.82$, $p>0.1$). To identify group differences between the three contexts (high functionality vs. reduced functionality vs. reduced functionality and reduced costs), post hoc contrast analysis was conducted. It revealed that the core packages were judged to have higher functionality when

judged together with the packages with reduced functionality than when judged together with packages that have a similar level of functionality as the core set ($\bar{x}$'s=7.60 vs. 7.03, F=6.79, p<0.01). The core packages were also judged to have higher functionality when judged together with the packages with both, reduced functionality and reduced costs, than when judged together with packages that have a similar levels of functionality and costs as the core set ($\bar{x}$'s=7.55 vs. 7.03, F=5.09, p<0.05). Hypotheses 1a and 1b are thus supported.

A similar analysis of variance was performed to test hypotheses 2a and 2b. Thus, the mean purchase-likelihood of the eight core software packages was also analyzed as a function of context, task-order, and expertise. There was, again, a significant main effect of context (F=7.28, p<0.01) and no significant effect for the control variables task-order (F=1.59, p>0.1) and expertise (F=1.32, p>0.1). To identify group differences between the three contexts (high functionality vs. reduced functionality vs. reduced functionality and reduced costs), a post hoc contrast analysis was again conducted. It revealed that participants were more likely to purchase core packages when they were judged together with packages with reduced functionality than when judged together with packages that have similar levels of functionality as the core set ($\bar{x}$'s=5.99 vs. 5.01, F=7.04, p<0.01). However, this effect disappeared when the core packages were judged together with the packages with reduced functionality and reduced costs ($\bar{x}$'s=4.68 vs. 5.01, F=0.76, p>0.1). Hypotheses 2a and 2b are thus supported. Table 2 presents a summary of these results.

	High functionality context (control, A) n=60	**Reduced functionality context (B) n=78**	**Reduced functionality and reduced costs context (C) n=64**	**B-A**	**C-A**
Mean rating of functionality of *core set*	7.03	7.60	7.55	**0.57*****	**0.52****
Mean purchase-likelihood of *core set*	5.01	5.99	4.68	**0.98*****	-0.33

*** p<0.01, ** p<0.05, * p<0.1 (two-sided); ANOVA-tests with post hoc contrast analyses

Table 2. Means, Mean Differences and Significance Levels

Planned future purchase or (free) download (Hutchinson 1983) and Mishra et al.'s (1993) scale were tested as alternative measures for expertise. Neither of them had a significant effect on mean ratings of functionality (F=0.47, p>0.1 and F= 0.17, p>0.1) and purchase-likelihood (F=0.55, p>0.1 and F= 0.53, p>0.1).

Discussion and Implications

This study found that the functionality of a software package is perceived to be *higher* when it is evaluated alongside less functional packages than when it is evaluated in the context of packages with similar functionality (context B). That means, contrast effects and not assimilation effects are present. Moreover, this biased perception of functionality does not dependent on other package attributes. Even when the costs of the less functional choice alternatives are reduced (erasing these software packages' overall unattractiveness compared to the core set), the contrast effect with regard to functionality persists (context C).

Furthermore, this analysis found that consumers have a higher likelihood to purchase a particular software package, when they have to choose from a set of alternatives that also includes less attractive variants of this software package with reduced functionality (context B) than when they choose from a set of similarly attractive packages with equal degrees of functionality. However, this positive effect

disappears when—alongside functionality—also the price of the contextual software packages is sufficiently reduced (context C). When the lower level of functionality in a package is matched with correspondingly lower costs, this package loses its comparative unattractiveness and its contrast effect on the fully featured (core) software package disappears. These findings of contrast effects with regard to functionality and purchase-likelihood were robust against manipulations of task-order and three different measures of product specific expertise (Hutchinson 1983; Mishra et al. 1993).

This study makes three main contributions to the software selection literature. First, it explores selection decisions of consumer software. Research on software selection has so far mainly explored software packages for corporate use. While the general insights from corporate software selection research, such as evaluation criteria for software packages (*functionality*, *ease of use*, *reliability* and *costs*) seem to apply for consumers' software selection decisions as well, consumer software deserves further investigation, particularly because of its growing economic importance (e.g. app ecosystems for mobile devices such as smartphones). Second, by demonstrating the presence of contrast effects, this study highlighted instances of somewhat non-rational decision making in the field of software selection which has previously been dominated by research that assumes mostly rational evaluations of objective evaluation criteria. This study thus contributes to research on pre-adoption activities (Jasperson et al. 2005). Third, software selection research and in particular research on the evaluation criteria of software has so far often focused on the relative importance of attributes using generic attribute levels and paid less attention to specific and realistic attribute levels (Keil and Tiwana 2006, Benlian and Hess 2011). This study has shown that, for better understanding software selection decisions, it may be worthwhile to explore the influence of more specific and realistic attribute levels on the selection decision.

The results of this study also have important implications for practice. First, this study showed that consumers have a higher likelihood to purchase a particular software package when other, less attractive choice alternatives are available (contrast effect, context B). Software vendors could make use of this insight by offering comparatively unattractive package variants with reduced functionality at only slightly lower prices alongside their regular, fully featured software packages. Due to the technical characteristics of software, this is particularly easy to achieve for vendors. Once they have developed a fully featured version of their software, they can easily and at almost no cost create a less attractive version of this software. They simply have to disable features from the software and offer this as an additional version at only slightly lower prices. Because this less attractive software version can be created so effortlessly, it is not even necessary that there is any customer demand for it or that it generates any revenues from sales. It could simply serve as a contrast on display to increase the attractiveness of the fully featured software package. The findings from this study suggest that vendors could thus increase customers' purchase-likelihoods for their fully featured package variants.

Second, before implementing such measures, their implications have to be considered carefully and additional factors have to be taken into account. Many vendors already offer different versions of their software with different levels of functionality and at different price points. They need to consider the possible interdependencies between a to-be-introduced "contrast-version" and their existing product lineup. In the same way, possible interdependencies with competitors' products have to be considered, too (Meyers-Levy and Sternthal 1993). Introducing a "contrast-version" to the own lineup might not only increase the purchase-likelihood for own products (context B) but also support competitors' products. On the other hand, vendors should also carefully monitor their competitors' lineup and changes to it with regard to possible effects on their own software.

Lastly, software vendors should not only think about the number and feature set of their offered package variants but also be aware of how and where their software packages are presented and their customers' selection decisions take place. For example, app stores for smartphones and tablet computers such as the Apple App Store and the Google Play Store have recently gained popularity. While they are seemingly very profitable for developers and the platform operators (Apple 2015), these stores are often the only or at least primary way for developers to present their apps to prospective customers. These app stores could foster contrast effects in customers' perceptions of software packages (apps) and, ultimately, their selection decisions because app stores often present apps in grid-like interfaces with different versions and competitors' apps side by side (Li et al. 2010).

Limitations and Future Research

Three limitations of this study are noteworthy and provide avenues for future research. First, this study relied on an experiment with unbranded software packages. Second, this study did not consider potential interdependencies between competing products. Third, this study exemplarily explored selection decisions for security suites for home users with a sample which primarily comprised German participants. Contrast or assimilation effects in software selection decisions should also be explored for other software categories and in different cultural settings.

REFERENCES

Apple. 2015. "Apple - Press Info - App Store Rings in 2015 with New Records," retrieved January 27, 2015, from https://www.apple.com/pr/library/2015/01/08App-Store-Rings-in-2015-with-New-Records.html.

Benlian, A. 2011. "Is Traditional, Open-Source, or On-Demand First Choice? Developing an AHP-Based Framework for the Comparison of Different Software Models in Office Suites Selection," *European Journal of Information Systems* (20:5), pp. 542-559.

Benlian, A., and Hess, T. 2011. "Comparing the Relative Importance of Evaluation Criteria in Proprietary and Open-Source Enterprise Application Software Selection – A Conjoint Study of ERP and Office Systems," *Information Systems Journal* (21:6), pp. 503-525.

Chen, Y. J., and Seshadri, S. 2007. „Product Development and Pricing Strategy for Information Goods Under Heterogeneous Outside Opportunities," *Information Systems Research* (18:2), pp. 150-172.

Chiravuri, A., and Ramamurthy, K. 2002. "Why do Order Effects Matter in Online Auctions? A Proposed Model," in *Proceedings of the 8th Americas Conference on Information Systems*, Dallas, TX, pp. 264-270.

Cooke, A. D., Janiszewski, C., Cunha Jr, M., Nasco, S. A., and De Wilde, E. 2004. "Stimulus context and the formation of consumer ideals," *Journal of Consumer Research* (31:1), pp. 112-124.

Cunha Jr, M., and Shulman, J. D. 2011. "Assimilation and contrast in price evaluations," *Journal of Consumer Research* (37:5), pp. 822-835.

Dey, D., Lahiri, A., and Zhang, G. 2014. "Quality Competition and Market Segmentation in the Security Software Market," *MIS Quarterly* (38:2), pp. 589-606.

Ghose, A., and Sundararajan, A. 2005. "Software Versioning and Quality Degradation: An Exploratory Study of the Evidence," in *Proceedings of the 26th International Conference on Information Systems*, Las Vegas, NV, pp. 59-70.

Herr, P. M. 1986. "Consequences of Priming: Judgment and Behavior," *Journal of Personality and Social Psychology* (51:6), pp. 1106-1115.

Herr, P. M., Sherman, S. J., and Fazio, R. H. 1983. "On the Consequences of Priming: Assimilation and Contrast Effects," *Journal of Experimental Social Psychology* (19:4), pp. 323-340.

Hui, W., Yoo, B., and Tam, K. Y. 2007. "The Optimal Number of Versions: Why Does Goldilocks Pricing Work for Information Goods?," *Journal of Management Information Systems* (24:3), pp. 167-191.

Hutchinson, J. W. 1983. "On the Locus of Range Effects in Judgment and Choice," *Advances in Consumer Research* (10:1), pp. 305-308.

Jadhav, A. S., and Sonar, R. M. 2009. "Evaluating and Selecting Software Packages: A Review," *Information and Software Technology* (51:3), pp. 555-563.

Jasperson, J. S., Carter, P. E., and Zmud, R. W. 2005. "A Comprehensive Conceptualization of Post-Adoptive Behaviors Associated with Information Technology Enabled Work Systems," *MIS Quarterly* (29:3), pp. 525-557.

Jin, C. H. 2013. "The effects of individual innovativeness on users' adoption of Internet content filtering software and attitudes toward children's Internet use," *Computers in Human Behavior* (29:5), pp. 1904-1916.

Kaspersky Lab. 2015. "Kaspersky Home Products 2015 | Compare | Kaspersky Lab," retrieved January 27, 2015, from http://www.kaspersky.com/compare.

Keil, M., and Tiwana, A. 2006. "Relative Importance of Evaluation Criteria for Enterprise Systems: A Conjoint Study," *Information Systems Journal* (16:3), pp. 237-262.

Kim, K., and Meyers-Levy, J. 2008. "Context Effects in Diverse-Category Brand Environments: The Influence of Target Product Positioning and Consumers' Processing Mind-Set," *Journal of Consumer Research* (34:6), pp. 882-896.

Levin, A. M., Levin, I. R., and Heath, C. E. 2003. "Product Category Dependent Consumer Preferences for Online and Offline Shopping Features and Their Influence on Multi-Channel Retail Alliances," *Journal of Electronic Commerce Research* (4:3), pp. 85-93.

Li, M.-X., Tan, C.-H., Teo, H.-H., and Wei, K.-K. 2010. "How to Display Branded and Non-Branded Products in the Online Shopping Website," in *9th International Conference on Computer and Information Science*, Kaminoyama (Yamagata), pp. 1-13.

Lynch Jr, J. G., Chakravarti, D., and Mitra, A. 1991. "Contrast Effects in Consumer Judgments: Changes in Mental Representations or in the Anchoring of Rating Scales?," *Journal of Consumer Research* (18:3), pp. 284-297.

Meyers-Levy, J., and Sternthal, B. 1993. "A Two-Factor Explanation of Assimilation and Contrast Effects," *Journal of Marketing Research* (30:3), pp. 359-368.

Mishra, S., Umesh, U., and Stem Jr, D. E. 1993. "Antecedents of the Attraction Effect: An Information-Processing Approach," *Journal of Marketing Research* (30:3), pp. 331-349.

Novemsky, N., and Ratner, R. K. 2003. "The Time Course and Impact of Consumers' Erroneous Beliefs about Hedonic Contrast Effects," *Journal of Consumer Research* (29:4), pp. 507-516.

Priester, J. R., Dholakia, U. M., and Fleming, M. A. 2004. "When and Why the Background Contrast Effect Emerges: Thought Engenders Meaning by Influencing the Perception of Applicability," *Journal of Consumer Research* (31:3), pp. 491-501.

Purch. 2015. "Internet Security Suites Software Review - Reviews and Comparisons," retrieved January 27, 2015, from http://internet-security-suite-review.toptenreviews.com

Raghunathan, S. 2000. "Software editions: An application of segmentation theory to the packaged software market," *Journal of Management Information Systems*, (17:1), pp. 87-113.

Rogers, E. M. 1995. *Diffusion of Innovations*, (4th ed.), New York, NY: The Free Press.

Shapiro, C., and Varian, H. R. 2013. *Information Rules: A Strategic Guide to the Network Economy*, Boston, MA: Harvard Business School Press.

Shen, H., Jiang, Y., and Adaval, R. 2010. "Contrast and assimilation effects of processing fluency," *Journal of Consumer Research* (36:5), pp 876-889.

Sherif, M., and Hovland, C. I. 1961. *Social Judgment: Assimilation and Contrast Effects in Communication and Attitude Change*, Oxford: Yale University Press.

Stapel, D. A., and Suls, J. 2007. *Assimilation and Contrast in Social Psychology*, New York, NY: Psychology Press.

Stewart, K. J., and Malaga, R. A. 2009. "Contrast and Assimilation Effects on Consumers' Trust in Internet Companies," *International Journal of Electronic Commerce* (13:3), pp. 71-94.

Tan, C.-H., Chan, Y.-P., Yang, X., Chan, H.-C., and Teo, H.-H. 2004. "Effects of Choice Contrast and Order Sequence on Consumer Judgment and Decision in Comparison-Shopping Assisted Environment," in *Proceedings of the Third Annual Workshop on HCI Research in MIS*, Washington, D.C., pp. 90-94.

Wedell, D. H., Hicklin, S. K., and Smarandescu, L. O. 2007. "Contrasting Models of Assimilation and Contrast," in *Assimilation and Contrast in Social Psychology,* D.A. Stapel and J. Suls (eds.). New York, NY: Psychology Press, pp. 45-74.

Zhu, R., and Meyers-Levy, J. 2009. "The Influence of Self-View on Context Effects: How Display Fixtures can Affect Product Evaluations," *Journal of Marketing Research* (46:1), pp. 37-45.

Appendix: Security software package profiles used in the study

Note for functionality (all profile sets): A=anti-virus; E=emergency-recovery; F=firewall; B=backup; S=safe surfing; P=privacy-protection; M=anti-spam; C=protection for children.

The profiles' presentation in the online-questionnaire stated the full name of each individual feature (functionality). The abbreviation with single letters is only used for the purpose of this overview.

Core set: high functionality

Profile 1: Functionality AEFBSPMC / Ease of Use very good / Reliability 96% / Cost 49.90€
Profile 2: Functionality AEFBSPM / Ease of Use good / Reliability 98% / Cost 49.90€
Profile 3: Functionality AEFBSPMC / Ease of Use good / Reliability 96% / Cost 49.90€
Profile 4: Functionality AEFBSPMC / Ease of Use good / Reliability 98% / Cost 45.99€
Profile 5: Functionality AEFBSPM / Ease of Use very good / Reliability 98% / Cost 49.90€
Profile 6: Functionality AEFBSPM / Ease of Use good / Reliability 96% / Cost 45.99€
Profile 7: Functionality AEFBSPMC / Ease of Use very good / Reliability 98% / Cost 45.99€
Profile 8: Functionality AEFBSPM / Ease of Use very good / Reliability 96% / Cost 45.99€

Control set: high functionality (A)

Profile 1: Functionality AEFBSPM / Ease of Use very good / Reliability 95% / Cost 48.99€
Profile 2: Functionality AEFBSP / Ease of Use good / Reliability 97% / Cost 48.99€
Profile 3: Functionality AEFBSPM / Ease of Use good / Reliability 95% / Cost 48.99€
Profile 4: Functionality AEFBSPM / Ease of Use good / Reliability 97% / Cost 46.95€
Profile 5: Functionality AEFBSP / Ease of Use very good / Reliability 97% / Cost 48.99€
Profile 6: Functionality AEFBSP / Ease of Use good / Reliability 95% / Cost 46.95€
Profile 7: Functionality AEFBSPM / Ease of Use very good / Reliability 97% / Cost 46.95€
Profile 8: Functionality AEFBSP / Ease of Use very good / Reliability 95% / Cost 46.95€

Context set: reduced functionality (B)

Profile 1: Functionality AE / Ease of Use very good / Reliability 95% / Cost 48.99€
Profile 2: Functionality A / Ease of Use good / Reliability 97% / Cost 48.99€
Profile 3: Functionality AE / Ease of Use good / Reliability 95% / Cost 48.99€
Profile 4: Functionality AE / Ease of Use good / Reliability 97% / Cost 46.95€
Profile 5: Functionality A / Ease of Use very good / Reliability 97% / Cost 48.99€
Profile 6: Functionality A / Ease of Use good / Reliability 95% / Cost 46.95€
Profile 7: Functionality AE / Ease of Use very good / Reliability 97% / Cost 46.95€
Profile 8: Functionality A / Ease of Use very good / Reliability 95% / Cost 46.95€

Context set: reduced functionality and reduced costs (C)

Profile 1: Functionality AE / Ease of Use very good / Reliability 95% / Cost 29.90€
Profile 2: Functionality A / Ease of Use good / Reliability 97% / Cost 29.90€
Profile 3: Functionality AE / Ease of Use good / Reliability 95% / Cost 29.90€
Profile 4: Functionality AE / Ease of Use good / Reliability 97% / Cost 27.99 €
Profile 5: Functionality A / Ease of Use very good / Reliability 97% / Cost 29.90€
Profile 6: Functionality A / Ease of Use good / Reliability 95% / Cost 27.99 €
Profile 7: Functionality AE / Ease of Use very good / Reliability 97% / Cost 27.99 €
Profile 8: Functionality A / Ease of Use very good / Reliability 95% / Cost 27.99 €