Consumer Acceptance of Recommendations by Interactive Decision Aids: The Joint Role of Temporal Distance and Concrete vs. Abstract Communications

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Abstract:

Interactive decision aids (IDAs) typically use concrete product feature-based approaches to interact with consumers. Recently however, interaction designs that focus on communicating abstract consumer needs have been suggested as a promising alternative. This article investigates how temporal distance moderates the effectiveness of these two competing IDA communication designs by its effect on consumers' mental representation of the product decision problem. Temporal distance is inherently connected to IDAs in two ways. Congruency between consumption timing (immediate vs. distant) and IDA communication design (concrete vs. abstract, respectively) increases the likelihood to accept the IDA's advice. This effect is also achieved by congruency between IDA process timing (immediate vs. delayed delivery of recommendations) and IDA communication design (concrete vs. abstract, respectively). We further show that this process is mediated by the perceived transparency of the IDA process. Managers and researchers need to take into account the importance of congruency between the user and the interface through which companies interact with their users and can further optimize IDAs so that they better match consumers' mental representations.

Introduction

With the increased availability of products and services on the Internet, companies more often employ web-based interactive decision aids (IDAs) to assist consumers in their search for the best fitting product or service [47-50]. Web-based IDAs are online systems that provide personalized recommendations on the basis of active participation by customers who enter their preferences and specifications on the one hand and the firm's own knowledge about the availability of products that it can offer on the other [18, 29, 39, 50]. For example, Travelocity (www.travelocity.com) asks consumers to enter their travel preferences, such as the desired departure plus arrival location and date, and on the basis of this information provides a list of best fitting (last minute) travel alternatives within its assortment.

Many advances have been made in improving the algorithms underlying IDAs and recommendation systems in general [1, 2, 7] and now increasingly attention is directed at consumer evaluations of IDAs [25, 48]. This latter research to date has typically addressed IDAs where consumers reveal preferences for relatively *concrete* features of a product as this is the information format that most online retailers tend to employ in their IDAs [18, 26, 35, 48]. Yet, recent research in the domain of mass-customization suggests that this concrete feature-based preference elicitation process may not always be optimal from the consumers' point of view [10, 40]. In the travel literature, it has been suggested that the languages consumers use when planning their vacation may substantially differ from those found on websites they employ in the planning process [37]. Therefore, some online retailers are currently developing new innovative IDA designs in an attempt to better match consumers' mental representations of the product decision problem [4]. For instance, the IDA ('city-inspirer') of Expedia (www.expedia.com) asks for more *abstract* consumers' needs, such as the preferred theme (e.g., romantic, hip and trendy, etc.) and provides an overview of travel packages that fit the stated theme specifications.

The aim of this current research is to investigate the impact of temporal distance as an important moderating factor of how consumers evaluate the performance of concrete vs. abstract IDA communication designs. Temporal distance is inherently connected to the use of IDAs for two reasons. First, consumers may receive recommendations about temporally close or distant consumption experiences (e.g., a trip they plan to make this weekend or later that year). Second, consumers may receive recommendations immediately after revealing their preferences or with a delay (e.g., when they receive a recommendation right away or in later emails based on an individual profile they filled out when subscribing to a service). Investigating the moderating role of temporal distance is important from both a theoretical and practical perspective. Prior research on construal level theory (CLT) argues that consumers focus on different types of information depending on their psychological distance to the object of evaluation [22, 31], and shows that congruency between temporal distance and the construal level of a decision problem results in greater processing fluency [23, 27] and enhanced evaluations [41]. Therefore, it is important to investigate if and how consumers' evaluations of an IDA's performance depend on the congruency between the IDA communication design (abstract vs. concrete) and consumers' mental representation, which is induced through temporal distance. Because temporal distance is inherently connected to IDAs as well as other interfaces through which companies interact with users, our research also has direct implications for managers that can use our results to (re-)design systems like IDAs through which they communicate with users.

Our research contributes in the following three ways. First, we investigate the impact of the consumption moment (immediate or in the distant future) on consumers' evaluation of the IDA's performance that asks preferences and specifications, and presents recommendations in a concrete vs. abstract way (i.e., a concrete vs. abstract IDA communication design). We draw on CLT to propose that consumers more positively evaluate an IDA's performance when they are exposed to a

concrete (abstract) IDA communication design when the temporal distance between recommendation and consumption is immediate (distant) [23, 27]. Second, we investigate whether the possible time lag in the IDA process may influence consumers' mental representation in a similar way as the moment of consumption. We expect that the timing between the IDA's preference elicitation and recommendation stage (immediate vs. delayed delivery of recommendations) also affects consumers' evaluations of an IDA's performance for a concrete vs. abstract communication design respectively. Finally, we investigate the process underlying the proposed effects by exploring the mediating role of the transparency consumers perceive in the IDA process. More specifically, we anticipate that congruency between the consumer's temporal-based mental representation and IDA communication design increases perceived transparency and that transparency in turn mediates the relationship between IDA communication design and consumers' evaluation of the IDA's performance.

Theoretical Background

On the Internet consumers are exposed to a large product variety which oftentimes is regarded as very useful and beneficial but which can also be a burden and lead to inferior choices or choice deferral [3, 42]. To assist consumers in their online search process, more and more companies are implementing IDAs (e.g., www.dell.com; www.amazon.com; www.netflix.com). IDAs are generally used to help consumers find the product that fits their needs best [18, 50]. They help consumers with navigating through large numbers of different products by asking them about their preferences and matching these to the products offered. Recent research suggests that the way by which an IDA elicits preferences and presents the recommended products (i.e., the IDA communication design) can have an important impact on the perceived outcome and evaluation of the IDA [19, 39, 50].

Concrete vs. Abstract IDA Communication Designs

IDA communication designs can be classified as concrete or abstract [50]. Concrete communication designs are most commonly applied and ask consumers about concrete features (also called attributes) when gathering preference information to find the best fitting product, and uses these concrete features when presenting the recommendation. In this process, consumers need to specify their preference for very specific and concrete information such as the preferred arrival date, time and location when using an IDA for travelling (e.g., www.travelocity.com). An alternative to such concrete IDA communication designs are abstract IDA communication designs that do not ask for concrete features, but rather ask for more abstract users' needs and infers from those the best fitting feature levels. Expedia (www.expedia.com), for instance, introduced the 'city-inspirer' and asks consumers about their preferred theme (e.g., romantic, hip and trendy, etc.) for their next vacation, rather than very concrete travel feature specifications. So, in a concrete IDA communication design, consumers reveal their preferences for observable attributes (e.g., a destination that offers many opportunities to visit sightseeing places), while in an abstract IDA communication design, they describe more higher-level, physiological and psychological needs (e.g., a destination for cultural lovers) [9].

Although most previous research in the field of IDAs has focused on concrete communication designs [18, 26, 35, 48], it has been suggested that abstract IDA communication designs may result in better decision quality for a consumer. The underlying reason for this effect is that many consumers cannot easily indicate their preferences for specific, very concrete product features [12, 50]. A similar reasoning is found in the area of mass customization, where users design a customized product based on their own entered specifications. In particular, recent research on mass customization shows that consumers that are familiar with a product tend to prefer a concrete IDA communication design, while those that are less familiar tend to have difficulties with

understanding the concrete feature levels and prefer an abstract IDA communication design [40]. Travel literature has shown that consumers' mental models are dynamic and dependent on the stage of the decision-making process [43]. It is posited that websites should match their language (interface design) with the mental representation of the adaptive consumer [37].

We extend prior research by investigating temporal distance as an important moderating factor that can influence consumers' preferences for a concrete vs. abstract IDA communication design. Temporal distance effects are particularly relevant for IDAs. First, because consumers may receive recommendations about temporally close or distant consumption experiences, and second, because they may be asked to reveal their preferences immediately or long before receiving recommendations (e.g., when recommendations are offered right away or via email on an on-going basis).

Construal Level Theory

We propose that temporal distance in IDA use induces shifts in consumers' mental representation of a product decision and that this in turn affects their evaluation of concrete vs. abstract IDA communication designs. To motivate this effect we draw on construal level theory (CLT) which posits that the psychological distance to the object of evaluation influences individuals' focus on different types of information [22, 31]. More specifically, when the psychological distance is low (as is the case in the immediate future) individuals focus on low-level construals (concrete, feature-based aspects), whereas when the psychological distance is high (as in the distant future) focus is placed on high-level construals (abstract, needs-based aspects) [45]. Thus, when making a decision that has immediate consequences, people tend to have a more concrete mental representation and put more weight on low-level aspects of the decision. These low-level construals represent information that is concrete and subordinate, and highlight the 'how' aspects of an

object/action. In contrast, when people make a decision that has more distant consequences, their mental representation tends to be more abstract and focused on the high-level components of the decision. These high-level construals represent abstract and superordinate information and highlight the 'why' aspects of an object/action [45, 46].

A consumer's mental representation, induced for instance through the timing related to the decision problem (immediate vs. distant), can thus be characterized by the increased prominence of a particular kind of information (respectively concrete vs. abstract) and can even impede the usage of other information [13, 33]. So, when consumers are faced with a decision problem about distant alternatives, they tend to have an abstract mental representation, leading to concrete information being used to a lesser extent or being even ignored. Similarly, when consumers are faced with a decision problem about immediately available alternatives, they tend to have a concrete mental representation, leading to lower use or even ignorance of abstract information.

Hypothesis Development

We propose that consumers' evaluations of concrete vs. abstract IDA communication designs are more positive if there is congruency between their mental representation and the information presented. More specifically, we expect that a mental representation match between consumer and IDA system plays a crucial role in the preference consumers have for concrete vs. abstract IDA communication designs. Congruency increases processing fluency and ease of comprehension [23, 27, 36] which has positive effects on evaluation outcomes like attitude and preference [e.g., 14, 41]. For instance, Kim et al. [23] show that responses to a campaign of a fictional political candidate are highly dependent on the congruency between the temporal distance of the campaign launch and the campaign's message design. When respondents were told that the campaign would launch one week from now, they were more in favor of a concrete version of the campaign message. In contrast, when

they were told that the campaign would launch six months from now, an abstract version of the same campaign message was favored. Similarly, Hong et al. [20] apply cognitive fit theory and find that consumers more efficiently search in the information space when there is a match between the information format (i.e., how the information is presented and organized; e.g., list vs. matrix) and the nature of the task (i.e., the shopping task type; e.g., browsing vs. searching). Also the travel literature highlights the importance of congruency between semantic model representations of both user and system. Such congruency may reduce the uncertainty of the process by eliminating the ambiguity in language used, and may increase the usefulness of the system and the efficiency of the retrieval [37].

This leads us to propose that consumers' evaluations of an IDA's performance depend critically on the congruency between the IDA's communication design (concrete vs. abstract) and consumers' mental representation, which is induced through the temporal distance of the decision problem. We expect that consumers using an IDA for a decision about a product or service that is consumed in the immediate future have a more concrete mental representation of their own preferences and put more weight on concrete, low-level aspects [45]. Thus, if the IDA communication design is concrete, there is congruency between the consumer and the system in case of immediate consumption. In contrast, when consumers are considering a product or service that is consumed in the distant future, their mental representation is more abstract [45]. In this case, congruency exists between the consumer's mental representation and an abstract IDA communication design.

In this research, we measure consumers' evaluation of the IDA's performance by their likelihood to accept the IDA's advice. Likelihood of advice acceptance indicates a consumer's belief in the ability of the recommendation system to successfully perform the task and is the ultimate goal for a company offering an IDA since they want consumers to use the recommended information when making a final choice [15]. Thus, we expect that consumption timing moderates the effect of

the IDA communication design on advice acceptance likelihood. This is due to the fact that congruency between the IDA communication design (concrete vs. abstract) and the consumers' mental representation induced by the temporal distance of the consumption (immediate vs. distant respectively) leads to increased processing fluency, reduced uncertainty and positively affects attitude toward the system's performance, including a consumer's assessment of the IDA's ability to successfully perform the recommendation task. We hypothesize:

H1a: When consumption timing is *immediate* a concrete IDA communication design leads to a higher likelihood of accepting the IDA's advice than an abstract communication design.

H1b: When consumption timing is *distant* an abstract IDA communication design leads to a higher likelihood of accepting the IDA's advice than a concrete communication design.

A key characteristic of IDAs is the split between the elicitation and recommendation stage [see e.g., 17], with a possible time lag between these two stages [26]. Besides the consumption moment, the time between entering one's preferences and receiving a recommendation (i.e., IDA response time) constitutes a second important temporal distance factor in an IDA context which may also influence a consumer's likelihood to accept the IDA's advice for a number of reasons. First, temporal distance is not only induced by the distance from actual engagement in a future activity, but can also be triggered by events in the more immediate vs. distant past [45, 46]. Second, when IDA response time is delayed, the original preference elicitation information that consumers provided is no longer available in their working memory when they are provided with the IDA advice later. Consumers must then base their IDA's performance evaluation on the match between the memory representation of their preferences and the IDA's advice. Consequently, this memory representation is more abstract when the IDA response time is delayed than when it is immediate [24].

Thus, the response time of the IDA process may also change consumers' mental

representation of the product decision problem. In particular, events in the distant past foster more abstract mental representations compared to events in the immediate past because concrete, feature-based details tend to fade away from memory more rapidly [24, 45]. Therefore, we expect that, when there is no time lag between elicitation and recommendation, this is more conducive of concrete rather than abstract mental representations. In this case, we expect greater congruency when consumers are exposed to a concrete IDA communication design. In contrast, when there is a time lag between elicitation and recommendation, this induces abstract rather than concrete mental representations. In this case, we expect congruency when consumers are exposed to an abstract IDA communication design. Using these arguments, we propose that not only the consumption timing of the underlying product, but also the process itself moderates the effect of the IDA's communication design on consumers' likelihood to accept the IDA's advice: congruency between the IDA communication design (concrete vs. abstract) and the consumer's mental representation induced by temporal distance (immediate vs. delayed respectively) increases the consumer's assessment of the IDA's ability to successfully perform the recommendation task and ergo the likelihood to accept the IDA's advice. We therefore hypothesize:

> H2a: When IDA advice is presented *immediately* a concrete IDA communication design leads to a higher likelihood of accepting the IDA's advice than an abstract IDA communication design.

> H2b: When IDA advice is presented *with a delay* an abstract IDA communication design leads to a higher likelihood of accepting the IDA's advice than a concrete IDA communication design.

To further explore the underlying theoretical explanation for our expected effects in H1 and H2, we draw on transparency as a crucial indicator of congruency between the consumer's mental

representation and the IDA communication design [17, 50]. Prior research has shown that transparency is an important aspect of IDA design evaluation [26]. It refers to consumers' ability to 'see through' the IDA's process and helps in seeing a correspondence between the preference elicitation and the recommendation stage [17, 26]. As such, it is conceptually strongly connected to perceived congruency. Transparency is expected to be an important determining factor in whether the advice of the IDA will be accepted and positively evaluated since it eases the processing of the information and increases confidence in the generated advice [14]. Prior research has indeed shown that transparency can significantly increase the overall acceptance of IDAs [17, 26], and consumers' willingness to act on them [14].

To study transparency as the underlying process for our study, we investigate its mediating role on the relationship between the joint effect of the IDA communication design and temporal distance on the one hand, and the likelihood to accept the IDA's advice on the other hand. Given that more transparent processes are easier to process, increase consumers' confidence in the recommended outcomes, and there is a positive relationship between transparency and the likelihood to accept the IDA's advice [26], we expect that transparency mediates the relationships hypothesized in H1 and H2. Figure 1 illustrates the hypothesized relationships graphically.

H3: Transparency mediates the joint effect of IDA communication design and temporal distance on the likelihood of accepting the IDA's advice.

[Insert Figure 1 about here]

In the following sections, we test H1 in experiment 1, where we manipulate the consumption timing. Next, we test H2 in experiment 2, where we manipulate the IDA process timing. In both experiments, we test the mediating role of transparency (H3).

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Experiment 1

Research Design

Our first experiment consists of a 2 x 2 between-subject design, where we manipulate the IDA communication design (concrete vs. abstract) and the consumption time (immediate vs. distant) and which allows us to test H1 and H3.

Pre-Test

For developing the stimuli, we first did a small-scale pre-study with master students, where we discussed different IDA contexts to find out one that was appealing and realistic. Based on this, we decided to focus on recommendation agents (RAs) as our IDA application for the experiment. RAs explicitly ask users' preferences and use this information to provide personalized recommendations. They are relatively common in practical applications and earlier research [17, 28].

We tested our hypotheses using two different product categories to increase the generalizability of our findings. We selected a vacation package and DVD movie choice task, using the input of the pre-test participants and the practical relevance of these two categories in a setting of RAs (e.g., Expedia or Travelocity for vacation packages, and Netflix or Yahoo Movies Recommendations for DVD movies). A high number of alternatives and large variability in the assortments offered (and the resulting choice complexity) were additional factors that made these two product categories suitable for our study[1].

Based on input from literature and expert interviews as well as practical examples from several websites, we developed a set of aspects for both categories and described them either in an abstract or concrete way. To ensure the mapping between concrete and abstract aspects as well as the

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[1] We selected two product categories that differ in their level of involvement (high for vacation packages [8] and low for DVD movies). Explicitly testing for the differences between the high and low involvement category revealed that product category involvement did not influence the hypothesized effects.

coherency and consistency of consumers' perceptions, we ran a second pre-test to verify equivalence mapping and to check if each description was perceived as intended. Wordings that were not clear to participants or that were not correctly perceived as concrete features or abstract needs were left out and replaced by clearer descriptions. The manipulations were also confirmed in another pre-test across the two product categories where we asked 71 respondents to rate the IDA communication design on a scale from 1='being very abstract' vs. 7= 'being very concrete'[2]. Table 1 gives an overview of the final set of concrete and abstract aspects used in the experiment. In addition to these aspects, we also pre-tested which time frames for vacation packages and DVD movies are considered immediate and distant. This pointed to the use of a one week vs. a six months period for vacations, and a time period of the same evening vs. three to four days for the DVDs.

[Insert Table 1 about here]

Research Set-Up

Participants received an email invitation to fill out an online web-based survey. After reading the introductory text, they were randomly assigned to one of the two categories and one of the four experimental conditions. In the vacation package scenario, participants were asked to choose their next vacation. In case they were in the immediate consumption condition, they were told that they should imagine to be planning a vacation for next week, while in the distant consumption condition, they were told that they were planning a vacation for next summer. In the DVD movie scenario, they were asked to imagine that they were looking for a DVD movie. It was stated that the DVD store offered the possibility to check out the available DVD movies online, and reserve them for pickup at the local store in their neighborhood. In case of the immediate consumption condition, they were told that they were planning to buy a DVD movie for tonight, while in the distant consumption condition, they were told that they were getting a DVD for next week (see Appendix A1 for the scenario

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[2] The responses of 71 confirmed our choice of the abstract vs. concrete descriptions (vacation: $\mu_{ABSTRACT}$=2.29 vs. $\mu_{CONCRETE}$=6.14, $F(1,27)$=31.28; $p<.001$; DVD: $\mu_{ABSTRACT}$=1.65 vs. $\mu_{CONCRETE}$=5.50; $F(1,42)$=54.70; $p<.001$).

descriptions). To control for aspects like trust and credibility, we used fictitious websites for both product categories. By doing so we ensured that there were no ex ante differences in anticipation of the level of trust and credibility attached to these websites. Appendix A2 provides screenshots of the introductory text, the preference elicitation and the recommendation stage for one category (the travel package) and one of the four experimental conditions (the concrete and immediate consumption condition).

After the scenario description, respondents were shown the RA, which asked them to provide their rank-ordered preference on a set of five different aspects for a vacation destination or DVD movie. Depending on the assigned scenario, participants either got the concrete or abstract aspects as listed in Table 1. To make the RA more realistic, we added some additional questions such as the number of people that would accompany them on the vacation or how many people would watch the movie with them. Afterwards, respondents received the advice which was a specific recommendation. Similar to Gretzel and Fesenmaier [17], all subjects received the same recommendation to ensure an equal attractiveness irrespective of the experimental condition. Therefore, the variance in the dependent measures can be attributed to the experimental condition and is not affected by different consumer perceptions regarding different recommendations. A separate pre-test revealed that respondents considered the recommendation to be realistic. Next, respondents were asked about their likelihood to accept the IDA's advice, the transparency of the IDA process, as well as some manipulation checks and covariates as control variables[3]. Finally, respondents were debriefed and thanked for their participation. The survey took on average fifteen to twenty minutes to complete.

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[3] To control for the effect of product category knowledge, we asked respondents the three-item 7-point Likert scale of Beatty and Talpade [6] (α=.94). Results reveal that product category knowledge did not have a significant effect on IDA advice acceptance nor interacted with our other observed effects on IDA advice acceptance. Also controlling for demographic variables (age, gender, education) did not change our results. Therefore these control variables are not discussed in further detail.

The main dependent variable was the likelihood to accept the advice given by the IDA, measured by an adapted version of the validated three-item scale of Gershoff et al. [16]. Respondents were asked to indicate 'What is the likelihood that you would accept the decision aid's advice?' (1= 'not likely at all' – 7='very likely'), 'How probable is it that you would accept the decision aid's advice?' (1= 'not probable at all' – 7='very probable') and 'How influential do you perceive the agent's advice to be?' (1='not influential at all' – 7='very influential'). We also measured transparency, adapted from Kramer [26] and Gretzel and Fesenmaier [17] by asking respondents to answer: 'Was it easy to understand why the decision aid gave that specific advice?' (1 = 'not easy at all' – 7='very easy'), 'How much did you understand how the decision aid worked?' (1 = 'not at all' – 7='very much'), and 'How clear for you was the way the decision aid produced the outcome?' (1 = 'not clear at all' – 7='very clear).

Given that we expect a mediating relationship of transparency on the likelihood of IDA advice acceptance, we conducted an oblique factor analysis which reflects the fact that the factors can be correlated and produces a more appropriate structure than an orthogonal rotation in our case. The oblique factor analysis reveals that for both product categories the items load on two different factors, with the items measuring likelihood of IDA advice acceptance forming one factor and the ones measuring transparency forming another clearly distinct factor. Moreover, the two factor structure provides a good model fit in a maximum likelihood procedure (vacation: $\chi^2(4)=6.624$; $p=.157$; DVD: $\chi^2(4)=2.57$; $p=.632$). Reliability tests indicate that the two scales are also reliable, enabling us to average them and use them for further analysis (vacation: $\alpha_{ACCEPTANCE}=.93$, $\alpha_{TRANSPARENCY}=.79$; DVD: $\alpha_{ACCEPTANCE}=.91$, $\alpha_{TRANSPARENCY}=.91$).

Sample

In total, two hundred fifty-six (256) respondents from a large, ongoing student panel

participated in our study in return for course credits. One hundred twenty-six (126) respondents were assigned to the vacation package RA and one hundred thirty (130) respondents were assigned to the DVD movie RA. Nearly all participants were younger than 25 (98.4%). The very homogenous distribution of our student sample ensures that effects in the experiments are most likely to have occurred due to our manipulations, and not due to any other external factors [32]. Moreover, there is a relatively equal distribution between males and females (50.4% male). Additionally, nearly 75.4% of respondents answered that their Internet usage is on average around four hours a day, which makes them experienced Internet users. Participants rated their Internet expertise as medium to high, with an average of 5.66 on a 7-point scale (1= 'novice'; 7= 'expert').

Results

Manipulation Checks

To check whether our manipulations worked as intended, we asked respondents two manipulation questions. First, it was checked whether the consumption time manipulation was successful, investigating if there indeed is a perceived difference in temporal distance between the immediate and distant consumption point. We asked respondents whether the time until they would be able to consume the product in the situation just described to them was 1 = 'very long' vs. 7 = 'very short'. The ANOVA test reveals that the manipulation was successful in both product categories as we find a significant difference between the two levels and no interactions with the other dimension (vacation: $\mu_{DISTANT}$=4.12 vs. $\mu_{IMMEDIATE}$=4.95; $F(3,122)$=11.72; p=.001; DVD: $\mu_{DISTANT}$=4.15 vs. $\mu_{IMMEDIATE}$=4.97; $F(3,126)$=15.13; p<.001). To test whether the IDA communication design manipulation was perceived as intended by participants, we asked them to rate the IDA communication design as 1='being very abstract' vs. 7= 'being very concrete'. Again, the ANOVA test reveals that our manipulation worked as intended for both product categories as we

find significant differences between both conditions and no interactions with the other dimension (vacation: $\mu_{ABSTRACT}$=4.34 vs. $\mu_{CONCRETE}$=5.06; $F(3,122)$=7.74; p=.006; DVD: $\mu_{ABSTRACT}$=3.43 vs. $\mu_{CONCRETE}$=5.06; $F(3,126)$=46.05; p<.001).

Analyses and Findings

Table 2, panel A presents an overview of the different means of the likelihood of IDA advice acceptance in the four different conditions and for the two product categories. Figure 2a and b show the results in a graphical format.

[Insert Table 2 about here]

[Insert Figure 2a and b about here]

To test the impact of the consumption time on consumers' evaluations of the IDA for two different IDA communication designs, we conduct an ANOVA test, using the likelihood of IDA's advice acceptance as the dependent variable. We run separate tests per product category. As expected, both the ANOVAs of the vacation packages and DVD movies do not reveal a significant main effect for IDA communication design[4] or the consumption time, but they do reveal a significant interaction effect between both variables on the likelihood to accept the IDA's advice (vacation: $F(3,122)$=19.45; p<.001; DVD: $F(3,126)$=21.31; p<.001). Still, a significant interaction effect only shows that at least one of the means under investigation is significantly different from another one. To further test which scenarios differ significantly from one another, we conduct Scheffe's *post-hoc* tests for statistical comparison [44]. For both vacation packages and DVD movies, the tests reveal a significant difference between a concrete and abstract IDA communication design when the consumption time is immediate (p<.05). Hence, as hypothesized in H1a, respondents that are exposed to the concrete IDA communication design have a significant higher likelihood of IDA's advice acceptance than respondents that are exposed to the abstract IDA communication design

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[4] The inclusion of the main effect for the IDA communication design controls for the potential imbalance in preference for the concrete vs. abstract design. The non-significant effect points out, in line with our pre-test study, that both approaches are equally influential on the likelihood of advice acceptance.

when the consumption time is immediate (i.e., the last minute travel or buying a DVD for the same evening). Furthermore, the difference between a concrete and abstract IDA communication design is also significant when the consumption time is distant ($p<.05$). More specifically, when booking a vacation for next year or when buying a DVD movie for next week, the likelihood of IDA's advice acceptance is higher when exposed to the abstract IDA communication design than compared to the concrete one. Hence, we also find strong support for H1b.

Next, we test H3 regarding the mediating impact of transparency on the effect between IDA communication design and consumption time, and the likelihood of accepting the IDA's advice. Table 2, panel B presents an overview of the different means of transparency in the four different conditions and for the two product categories. To test the mediating effect, we use the 3-step procedure of Baron and Kenny [5]. Like before, we apply this procedure separately for the vacation packages and DVD movies. It is important to mention that the relationship of interest is the two-way interaction of consumption time and IDA communication design, since there are no main effects that might be mediated. First, as already shown by the ANOVA tests, we find that the interaction effect (IDA communication design X consumption time) has a significant impact on likelihood to accept the IDA's advice (vacation: $t=-4.41$; $p<.001$; DVD: $t=-4.62$; $p<.001$). Second, we find that the interaction effect has a significant impact on the mediating variable, transparency (vacation: $t=-5.55$; $p<.001$; DVD: $t=-8.05$; $p<.001$). Third, we find that the interaction on IDA's advice acceptance likelihood is no longer significant (vacation: $t=-1.57$; $p=.119$; DVD: $t=-.58$; $p=.56$) when also including transparency, while the latter is significant (vacation: $t=6.76$; $p<.001$; DVD: $t=6.43$; $p<.001$). We further conduct a Sobel-Test for testing whether the direct effect of the independent variable (i.e., the proposed interaction effect), is significantly reduced when adding the mediator (i.e., transparency) to the model [38]. We indeed find a significant reduction of the direct effect of the interaction between the IDA communication design and consumption time on the likelihood of

accepting the IDA's advice when transparency is introduced (vacation: z=-4.29; p<.001; DVD: z=-5.01; p<.001). This shows that, as expected and hypothesized in H3, the effects of the interaction between IDA communication design and consumption time is (fully) mediated by transparency.

Discussion

In summary, our results indicate that consumers' evaluation of the IDA's performance critically depends on the congruency between the IDA's communication design (concrete vs. abstract) and their mental representation triggered by the consumption moment (immediate vs. distant, respectively). The likelihood to accept the IDA advice increases when consumers are offered a concrete IDA communication design in immediate consumption situations (e.g., last minute for a vacation package, or the same evening for a DVD movie), or when they are exposed to an abstract IDA communication design in distant consumption situations (e.g., next year for a vacation package, or next week for a DVD movie). Our findings therefore strongly support H1a and H1b.

Second, we find support for H3 as we show that the effect of temporal distance on the effectiveness of the IDA communication design is fully mediated by the transparency that consumers perceive the IDA process to have. When consumers perceive an IDA process as more transparent (which is the case when their mental representation that is triggered by the temporal distance is matched with the IDA communication design), they are more likely to accept the advice given by IDAs. This not only shows that transparency is an important aspect of IDA design evaluation [17, 26], but also provides support for the fact that congruency between the temporal mental representation and the IDA communication design increases the ability to 'see through' the process, and that this in turn increases the likelihood to accept the IDA's advice.

In addition, by demonstrating the findings of the effectiveness of congruency (H1) and the mediating effect of transparency (H3) for two distinct product categories, vacation packages and

DVD movies, we increase the generalizability of our results.

Experiment 2

Since another important temporal distance aspect that may affect the consumer's mental representation is the moment consumers obtain the recommendation after eliciting their preferences, experiment 2 was designed to test if the IDA process timing also leads to expected differences in consumers' preference for IDA communication designs.

Research Design

Experiment 2 also follows a 2 x 2 between-subject design. This time, however, not consumption time, but process time (immediate vs. delayed) is manipulated, allowing us to test H2 and H3. Moreover, to further control possible confounding effects of differences in product preferences between respondents, respondents were not asked to indicate their own preferences in this experimental task, but were asked to perform a principal-agent-task instead [11], where they were asked to evaluate an IDA on behalf of another individual using a pre-selection on five different (concrete or abstract) features that reflected the preferences of that individual [21].

Ensuring the generalizability of our findings to various settings, we looked for an additional relevant IDA context. In addition to the previously mentioned product categories, a pre-test pointed to the automobile industry as an appealing category. Examples from practice (e.g., www.myproductadvisor.com) further support the relevance of this product category in a RA context. To check whether each aspect was perceived as intended, i.e., concrete vs. abstract, and both aspects were mapped on their equivalence, we ran a second pre-test. Small changes were implemented to ensure that user perceptions were coherent and consistent, and aspects were balanced. The

successfulness of the manipulations was confirmed by another pre-test[5]. Table 3 gives an overview of the aspects used in the experiment.

[Insert Table 3 about here]

In the experiment, respondents were asked to evaluate an IDA on behalf of another individual interested in buying a car (Larry). First they were shown the preference elicitation information Larry had filled out based on one of the two IDA communication designs (his preferences in a concrete vs. abstract format). Next, to manipulate the delay in process timing in the experiment, we used a filler task between the preference elicitation and recommendation stage, which was unrelated to the experiment at hand. Similar to other experiments, we used several anagrams that respondents had to solve [34]. The filler task was pre-tested and refined to use in the experiment with a total of twelve neutral anagrams. The average time the filler task took was around ten to fifteen minutes. Following the filler task, respondents were given the recommendation of the car that suited the preferences of Larry based on the aspects shown to them before. Respondents that were not exposed to a delay in the process timing received the recommendations directly following the preference elicitation stage (no filler task). Appendix A3 provides screenshots of the preference elicitation stage, the filler task and the recommendation stage for one of the four experimental conditions (the concrete and delayed recommendation condition).

Once more, we used a fictitious website to control for aspects like trust and credibility in our experiment. Similar to Gretzel et al. [17] and our previous experiment, all subjects also received the same recommendation. Afterwards respondents were asked about their likelihood to accept the IDA's advice, the transparency, as well as some manipulation checks and possible covariates as control variables[6]. All measures were the same as the ones from our first experiment, the validity and

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[5] 48 respondents of the second pre-test also confirmed our choice of the abstract vs. concrete descriptions ($\mu_{ABSTRACT}$=2.71 vs. $\mu_{CONCRETE}$=4.46; $F(1,46)$=24.53; $p<.001$).
[6] We measured product category knowledge (α=.94, high involvement conditions; α=.90, low involvement condition) and included this variable as well as demographic variables in our analyses. These control variables did not change the

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reliability of which was confirmed by an oblique factor analysis and reliability tests. Finally, respondents were debriefed and thanked for their participation. The survey took in total on average twenty-five to thirty minutes to complete.

One hundred forty-two (142) respondents from a large online volunteer panel run through our university were asked to participate in our study. In return for their participation, they had the chance of winning one out of three vouchers worth 15€. The participants' mean age is 30 years and gender is distributed relatively equal between males and females (53.5% male).

Results

Manipulation Checks

First, we check whether the IDA process timing manipulation was perceived as intended, consequently investigating if the time delay between elicitation and recommendation is indeed seen as relatively long. Therefore, we asked respondents whether 1='quite some time' or 7='little time' passed by between the preference elicitation and the recommendation stage. The ANOVA test reveals that the manipulation worked as intended and we find significant differences between the two levels ($\mu_{DELAYED}$=3.21 vs. $\mu_{IMMEDIATE}$=5.14; $F(3,138)$=81.34; $p<.001$). To test whether the IDA communication design manipulation was perceived by participants as intended, we asked them to rate the IDA communication design as 1='being very abstract' vs. 7='being very concrete'. Again, the ANOVA test reveals that our manipulation worked as intended as both conditions are significantly different from one another ($\mu_{ABSTRACT}$=3.01 vs. $\mu_{CONCRETE}$=4.40; $F(3,138)$=33.48; $p<.001$).

Analysis and Findings

Table 4, panel A presents an overview of the different means of the likelihood to accept the IDA's advice in the four different conditions. Figure 3 shows the results in a graphical format.

substantive results.

[Insert Table 4 about here]

[Insert Figure 3 about here]

To test the impact of the IDA process timing on the likelihood of IDA's advice acceptance under two different communication designs, we conduct an ANOVA test, using the likelihood of IDA's advice acceptance as dependent variable and IDA communication design, the process timing and their interaction as independent variables. The ANOVA test reveals that there are no main effects of IDA communication design[7] or process timing, but that there is a significant interaction effect between the two variables on consumers' likelihood to accept the IDA's advice ($F(3,138)=21.98$; $p<.001$). To further test how scenarios differ, we conduct Scheffe's *post-hoc* tests for statistical comparison [44]. The tests reveal a significant difference between a concrete and abstract IDA communication design when the IDA process timing is immediate ($p<.05$). Hence, as hypothesized in H2a, respondents exposed to the concrete IDA communication design are more likely to accept the IDA advice than respondents that are exposed to the abstract IDA communication design when the IDA process is immediate (i.e., no delay between elicitation and recommendation stage). Furthermore, the difference between a concrete and abstract IDA communication design is also significant when the IDA process timing is delayed ($p<.05$). More specifically, when there is a delay between the elicitation and recommendation stage, respondents are more likely to accept the IDA's advice when exposed to the abstract than to the concrete IDA communication design. This provides support for H2b.

Table 4, panel B presents an overview of the different means of transparency in the four different conditions. To test whether transparency has a mediating effect on the interaction effect between the IDA communication design and the process timing on the likelihood to accept the IDA's advice in experiment 2 (H3), we use the 3-step procedure of Baron and Kenney [5]. First, as shown

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[7] The non-significance again points to both concrete and abstract IDA communication designs having a similar effect on the likelihood of advice acceptance, which is an indicator for the equivalence mapping between both approaches.

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before, the interaction effect (IDA communication design X process timing) has a significant impact on the likelihood of accepting the IDA's advice ($t=4.69$; $p<.001$). Second, we find that the interaction effect has a significant impact on the mediating variable, transparency ($t=6.19$; $p<.001$). Third, we find that the interaction is no longer significant ($t=.75$; $p=.47$) when also including IDA transparency, while the latter has a significant effect on the likelihood of IDA advice acceptance ($t=10.10$; $p<.001$). We further conduct a Sobel-Test to investigate whether the direct effect of the interaction effect is significantly reduced when adding the mediator (IDA transparency) to the model [38]. We indeed find a significant difference between the direct and indirect effect of the interaction effect between the IDA communication design and process timing on the likelihood of IDA advice acceptance ($z=5.28$; $p<.001$). This shows that, as expected, the effects of the interaction between IDA communication design and process timing is (fully) mediated by transparency. Hence, in experiment 2 we also find support for H3.

Discussion

The results of experiment 2 show that not only a future consumption timing can influence consumers' mental representation of a product decision and hence their preference for either a concrete or abstract communication design, but that also the IDA process timing is a crucial factor in the preference for the IDA communication design. The consumer's mental representation is influenced if the recommendation is presented immediately (immediate past event) versus delayed (distant past event) which leads to a reversal of which IDA communication design is more effective in increasing the likelihood to accept the IDA's advice. When there is no delay between the recommendation and elicitation stage, the likelihood to accept the IDA's advice is highest when consumers are exposed to more concrete aspects during the IDA process as this ensures congruency. In contrast, when there is a delay between elicitation and recommendation, exposure to the abstract

IDA communication design implies congruency with the consumer's mental representation and results in a higher likelihood to accept the IDA's advice.

Moreover, like in experiment 1, we find that the interaction effect of temporal distance and IDA communication design on the likelihood of IDA advice acceptance is fully mediated by the level of perceived transparency of the IDA process. This provides further support for the notion that congruency between the consumer's mental representation (as triggered by the timing of the IDA process) and the IDA communication design (concrete vs. abstract) increases transparency, which in turn increases the likelihood to accept the IDA's advice.

General Discussion

The goal of this article was to investigate if differences in temporal distance serve as an important moderator of how consumers evaluate the performance of different web-based IDA designs, due to the impact of temporal distance on consumers' mental representation of a product decision problem. The objectives of this research were threefold. First, we examined whether consumption timing moderates consumers' evaluation of concrete vs. abstract IDA communication designs. Second, we investigated whether similar differences between IDA design preferences can be found for temporal distances triggered by the timing of the IDA process itself. Third, we investigated the mediating role of transparency on these relationships. From a theoretical analysis of the underlying mechanisms found in construal level theory (CLT) and other related literature, we derived hypotheses which we tested using two experiments where consumption timing and process timing were manipulated and consumers' likelihood to accept the IDA advice was measured.

Academic Contributions

As hypothesized, we find that congruency between the IDA's communication design and the

consumer's mental representation (concrete IDA communication design and immediate event; abstract IDA communication design and distant event) leads to increased levels of IDA advice acceptance likelihood. This finding is consistent with the cognitive psychology literature on CLT [30, 31, 45] and with research demonstrating that congruency between communications and mental representations results in increased processing fluency which leads to higher levels of liking [36, 37, 41]. Therefore, we extend prior literature on CLT by testing its premises in a management information systems context that is inherently connected to temporal distance situations and where companies typically communicate with users at the moment they are making their choice as opposed to situations that try to influence consumers' temporal distance decisions well-before the actual purchase/event (such as for political advertisements [24]). We also add to literature that stresses the importance of matching the mental representations of users and the information systems they use in their decision-making process [20, 37].

We further show that a consumer's mental representation when interacting with web-based IDAs is influenced by the consumer's future orientation (captured by the consumption moment of the product or service; Experiment 1), as well as by the passing of time (captured by the response time in the IDA process; Experiment 2). While CLT research has previously shown that both future and past temporal distance may have an important effect on consumers' mental representations [31], it was not investigated whether these orientations do indeed vary between different instances when using IDAs as we have done in our study.

We also extend the research on perceived transparency within the field of IDAs [17, 26] by showing that it is mediating the relationship between the mental representation that consumers have and the IDA communication design, and consumers' likelihood to accept the IDA's advice. Hence, we show that perceived transparency may be a good indicator of perceived congruency. Increased transparency due to congruency results in higher evaluations of the IDA's performance. In addition

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to more transparent designs, which should lead to better IDA performance, we show that the IDA communication design (concrete vs. abstract) and the underlying product or service consumption/process timing can influence transparency as well, resulting in better IDA performance with consumers being more likely to follow the IDA's advice.

Managerial Implications

Because temporal distance is inherently connected to IDAs as well as other interfaces through which companies interact with users, our research has important implications for practice. First, companies offering IDAs may design their IDAs differently based on knowledge about the consumers' objectives with the IDA and their related mental representation. Companies that have insights in the consumption patterns of consumers should ensure that IDAs that are used for immediate consumption use a more concrete, feature-based design whereas IDAs that are used for distant consumption use a more abstract, needs-based design. For instance, a company offering last minute vacation packages should use a concrete IDA communication design, listing concrete features of the vacation (such as detailed descriptions about the location). In contrast, a company offering vacation packages for future travel occasions (e.g., offering summer trips in winter) should use an abstract IDA communication design, listing abstract needs of a vacation (such as the preferred theme). Since current practice is mixed in its design of IDAs, we have a clear instance that seems to support our contention. For instance, the IDA offered on Travelocity.com focuses on last minute travels, which are immediate events and therefore the communication design of the IDA is very concrete, listing the location and hotel category. In contrast, the 'city inspirer' of Expedia focuses on long term travel plans, representing more distant events and – in line with our findings – using an abstract-oriented IDA communication design.

Second, companies should also assess the time lag between the preference elicitation and

recommendation stage in their IDA process. Companies that offer IDA advice to customers at a later point in time (distant past event) should use an abstract rather than a concrete communication design when presenting the offer. In contrast, companies employing IDAs that give fast feedback to the disclosed preferences (immediate past event) should use a very concrete, feature-based design when presenting the offer.

Finally, companies should realize the importance of consumers' ability to see through the IDA process (captured via perceived transparency). Given that an increase in understanding the underlying IDA process positively influences consumers' evaluations of the IDA's performance, companies should investigate tools and communications that further enhance transparency. We show that a match between a consumer's mental representation and the IDA communication design is a powerful way to increase transparency. To further increase transparency, companies could use an IDA design that is appropriate for the underlying consumption/process and describe why they are recommending a certain product on the basis of arguments that match consumers' mental representation.

Limitations and Avenues for Further Research

Some limitations of our study are worth noting and open up avenues for possible further research. First, our respondents were shown a hypothetical buying situation, which did not have direct consequences for them, and we used fictitious websites to control for aspects like trust and credibility. Although we ensured the use of relevant IDA settings, used several different product categories, and tried to mimic reality as closely as possible, consumer decision-making might differ in the real world. It would be interesting for example to investigate real-world behavioral outcomes such as choice and choice deferral as measures for IDA performance evaluations instead of the likelihood to accept IDA advice. It would also be interesting to explore to what extent trust or

credibility could be dominant factors in IDA performance evaluations that would offset the findings of our research, using real-life, existing websites.

Second, a point that might inhibit the external validity of our findings was the use of a non-representative sample. Notwithstanding the advantage of a homogenous group of participants to keep control of other external factors [32], the use of a student sample in experiment 1 might not be representative of the real users (e.g., because they have high levels of computer literacy and product knowledge). We partly overcome this limitation by using a volunteer panel run through our university in experiment 2, thereby broadening the sample to a non-student one.

Third, respondents were asked to evaluate an RA which is interactive and where respondents need to actively state their preferences to obtain recommendations. Although we believe that our results are relevant for a wide range of contexts, it would be interesting to extend our research for other types of IDAs such as comparison matrices or ordering and ranking tools. It would also be interesting to investigate how temporal distance affects consumer evaluations of passive recommendations (i.e., where preferences are not actively elicited).

Fourth, we used concrete or abstract IDA communication designs in our study. Previous literature has indicated that designs using a mixture of concrete product features and abstract product-related needs may also be promising [50]. Investigating the moderating effect of temporal distance for such hybrid IDA communication designs may be a very interesting avenue for future research.

Fifth, we find indications that perceived transparency may be a good indicator for perceived congruency, but recognize that it would be worthwhile to explicilty investigate the conceptual (causal) relationship between these two variables, as well as their joint effect on IDA advice acceptance likelihood.

Finally, we focused on temporal distance in this article. CLT research has previously shown

that other forms than temporal distance can influence psychological distance. Future research could investigate to what extent other types of distances, such as social, sensory and spatial, shift the mental representation at different stages of the IDA process [22, 31].

Conclusion

To summarize, we find clear support for the critical importance of congruency between the user's mental representation and the interface through which companies interact with their users: a concrete IDA communication design leads to increased levels of IDA advice acceptance likelihood when consumers' mental representation is triggered by an immediate event, whereas an abstract IDA communication design leads to increased IDA advice acceptance when consumers' mental representation is triggered by a distant event. We show that both future temporal orientation (e.g., the consumption moment), as well as a past temporal orientation (e.g., the response time of the IDA) shift consumers' mental representation to a concrete, feature-based mindset with an immediate consumption point or an IDA process that immediately presents the advice and a abstract, needs-based one with a distant consumption point or an IDA process that presents the advice with a delay. Additionally, we show that transparency is mediating the congruency effects between the mental representation that consumers have and the IDA communication design, and consumers' likelihood to accept the IDA's advice. We hope our research can stimulate further work in the promising area of optimally assisting consumer decision-making online and matching IDAs to consumers' mental representations of decision problems.

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Figure 1: Conceptual Model

IDA
Communication
Design
(Concrete vs.
Abstract)

X

Temporal Distance
(Near future vs. Distant future)

*Consumption
Moment
(H1)*

*IDA Process
(H2)*

Transparency

**`DA's Advice
Acceptance
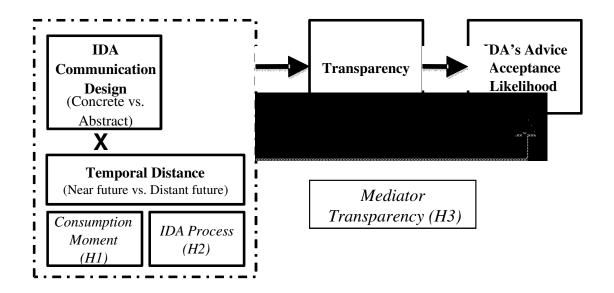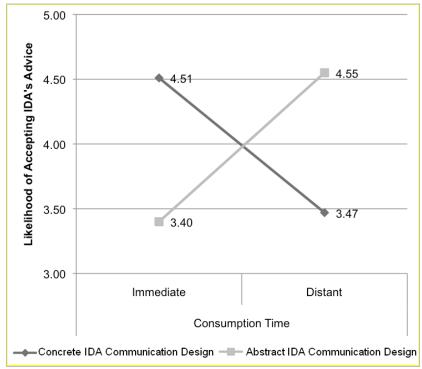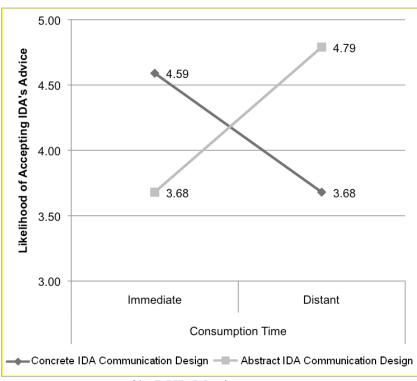Likelihood**

*Mediator
Transparency (H3)*

Figure 2: Results Experiment 1

2a: Vacation packages

2b: DVD Movies

Figure 3: Results Experiment 2

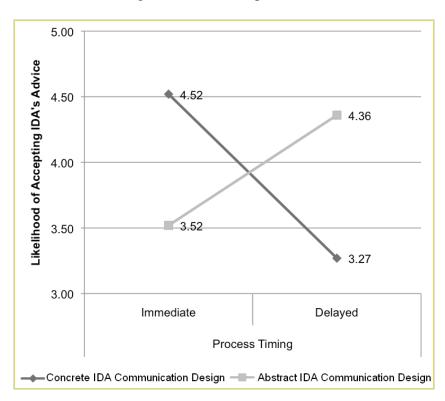Table 1: Final set of Concrete and Abstract Aspects used in Experiment 1

Vacation package	
Concrete	Abstract
Visiting many sightseeing places	Cultural
Lying on the beach and enjoying the sun	Relaxing
Visiting Nightclubs/Bars	Exciting
Candlelight Dinner	Romantic
Walking	Active

DVD movie	
Concrete	Abstract
Family problems	Moral issues
World War II	Violence
Kissing characters	Romance
Betrayal by a friendly character	Unexpected events
Roles that involve controversial characters	Provocative

Table 2: Results Experiment 1[a]

Panel A: Likelihood of Advice Acceptance		
IDA Communication Design	Consumption Time	
	Immediate	Distant
Vacation Package		
Concrete	4.51	3.47
	(1.49)	(1.46)
Abstract	3.40	4.55
	(1.34)	(1.22)
DVD Movie		
Concrete	4.59	3.68
	(1.19)	(1.34)
Abstract	3.68	4.79
	(1.41)	(1.02)

Panel B: Transparency		
IDA Communication Design	Consumption Time	
	Immediate	Distant
Vacation Package		
Concrete	5.10	3.74
	(0.90)	(1.24)
Abstract	3.90	4.84
	(1.12)	(1.26)
DVD Movie		
Concrete	5.33	3.39
	(1.18)	(1.60)
Abstract	3.36	5.26
	(1.50)	(1.12)

[a] The table presents the mean scores for the four different experimental conditions and the two product categories for the outcome variables (respectively likelihood of IDA advice acceptance, panel A and perceived transparency, panel B) with the standard deviations in parentheses.

Table 3: Final set of Concrete and Abstract Aspects used in Experiment 2

Automobile	
Concrete	**Abstract**
Efficient Gas Consumption	Sustainability
Technical Extras	Freedom/Mobility
Nice colors	Certain Status
High Horse Power	Self fulfillment
Many Seats	Self esteem

Table 4: Results Experiment 2[a]

Panel A: Likelihood of Advice Acceptance		
IDA Communication	Process Timing	
Design	Immediate	Delayed
Concrete	4.52	3.27
	(1.19)	(1.11)
Abstract	3.52	4.36
	(1.53)	(1.44)

Panel B: Transparency		
IDA Communication	Process Timing	
Design	Immediate	Delayed
Concrete	5.23	3.43
	(1.46)	(1.36)
Abstract	3.85	4.87
	(1.54)	(1.02)

[a] The table presents the mean scores of the four different experimental conditions for the outcome variables (respectively likelihood of IDA advice acceptance, panel A and perceived transparency, panel B) with the standard deviations in parentheses.

Appendix A1: Scenario descriptions

Vacation, distant [immediate]

It is currently November and you are planning to have a vacation next summer. [next week.]

You decide to look for travel offers online. You go to www.travelonline.nl, an online travel agency,

to book your trip. You do not know what exact travel package you would like to book. Therefore,

you go to their website and use the decision aid to book a trip for next summer. [next week.]

DVD, distant [immediate]

It is Wednesday and you are currently at the University wondering what to do next Wednesday.

[tonight.]

You decide to look for a DVD movie. You go to www.DVDshoppers.nl, a DVD store chain. One of

their stores is just on the way home from University. You decide to buy the DVD online and pick it

up at the store. Therefore, you go to their website and use the decision aid to find a good movie for
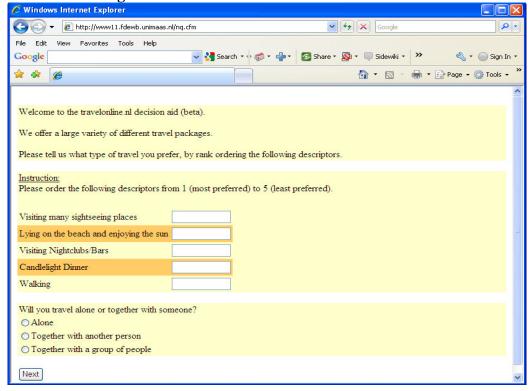
next week. [tonight]

Appendix A2: Screenshots Experiment 1

Below you see three screenshots of the experimental design for the travel package, concrete and immediate consumption condition.
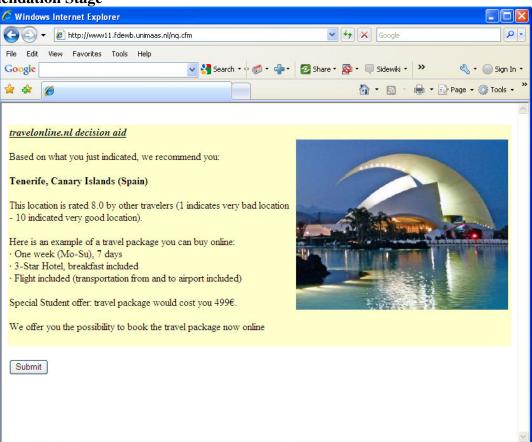
Introductory text (see Appendix A1)
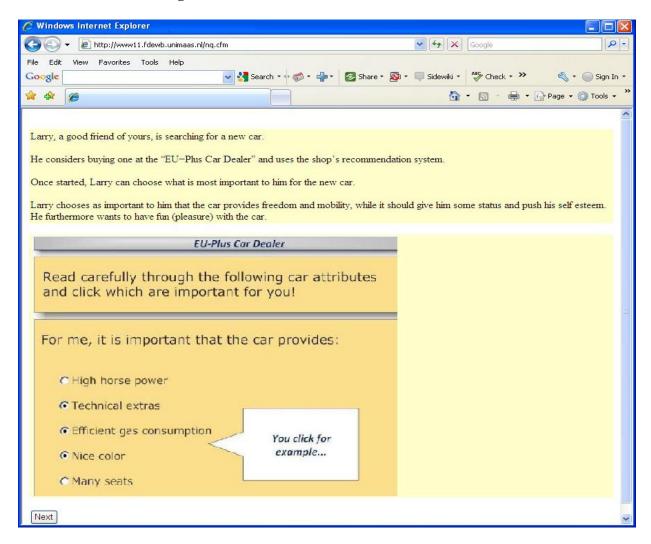

Preference Elicitation Stage
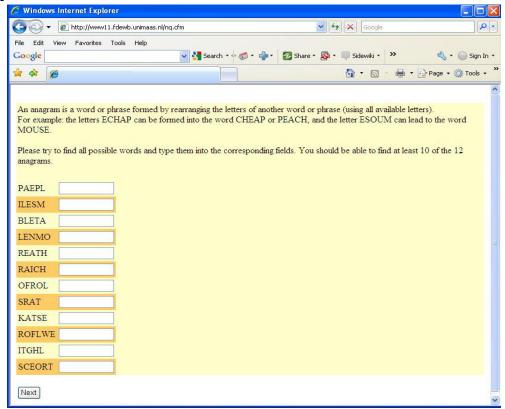
Recommendation Stage

Within the browser window:

travelonline.nl decision aid

Based on what you just indicated, we recommend you:

Tenerife, Canary Islands (Spain)

This location is rated 8.0 by other travelers (1 indicates very bad location - 10 indicated very good location).

Here is an example of a travel package you can buy online:
· One week (Mo-Su), 7 days
· 3-Star Hotel, breakfast included
· Flight included (transportation from and to airport included)

Special Student offer: travel package would cost you 499€.

We offer you the possibility to book the travel package now online

Submit

Appendix A3: Screenshots Experiment 2

Below you see three screenshots of the experimental design for the concrete and delayed condition (the filler task is not shown in the immediate condition).
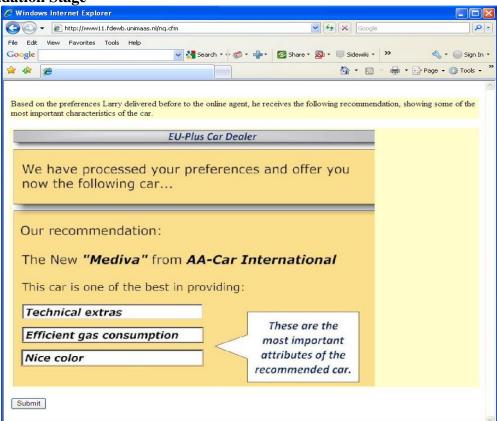
Preference Elicitation Stage

Filler Task

Recommendation Stage

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