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HOW TO DIMINISH ADVICE DISCOUNTING WITH MOBILE MULTIMEDIA INTERVENTIONS

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Research

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You know how advice is.
You only want it if it agrees with what you wanted to do anyway.
John Steinbeck (American author, born 1902)

Abstract

The phenomenon of advice discounting in advice taking and the lack of motivational force in advice giving often hamper follow-up actions which are important to satisfy both advice seekers' and advisors' demands. This paper strives to diminish the well-known problem of advice discounting by investing in a design study and creating a new information system supporting advisors. The prototype is mobile and provides multimedia interventions. These enable the advisors to activate advice takers on an emotional level with wow-factor episodes which strengthen advisors' arguments. This study is affected by and evaluated in the practical field of home security advice. The evaluation points to the conclusion that the motivation to utilize given advice is higher in the IS-supported advisory service compared to the conventional approach of plain speech-based advice giving. The paper contributes general design implications facing advice discounting in mobile and collaborative advisory services. Furthermore, it supports home security provider in designing their mobile service encounter to increase the advice implementation.

Keywords: IS design science, persuasive intervention, mobile advisory support, advice discounting.

1 Introduction

Not every advice is utilized: Studies show that advice takers often do not follow advice, because the advice takers have a distancing and depreciating attitude towards the advice. This phenomenon is called "advice discounting" (Tzioti 2010). On average, only 20-30% of advice is adopted and used (Tzioti et al. 2014, Bonaccio and Dalal 2006, Yaniv 2004) although the advice taker would benefit from it (Soll and Mannes 2011, Tzioti 2010). The discounting behavior often does not depend on whether the advice was given by an expert or non-expert (e.g. Tost et al. 2011). Advice discounting can also hamper advice takers in following recommendations which were received in a professional advisory service (Yaniv 2004). However, advice discounting leads to dissatisfaction for both advisors and advice takers. On the one hand, advisors feel disrespected (Goldsmith and Fitch 1997) and concerned about intended follow-up actions, for example the implementation of their advice. On the other hand, advice takers may make wrong decisions because of underweighting given advice (Gino and Schweitzer 2008, Sniezek et al. 2004). Therefore, we strive to diminish the problem of advice discounting by increasing the motivation to utilize and implement given advice using mobile multimedia interventions with emotional appeal.

The adoption and utilization of advice has always led to conflicts between one's own opinion and the advisor's one (Yaniv and Kleinberger 2000). At first, advice takers need to understand advisors opinion and subsequently need to check if it is in line with their own opinion. They need to consider how they will assess the received advice as well as what consequences the utilization of it will have. Afterwards, they need to decide whether to utilize the advice or not. These considerations are, if any, simple as long as the post advice decision is also simple (e.g. which direction should I take to the next railway station), but not for complex decisions (e.g. what the best career opportunities for me are). Research about such and general advice taking situations has induced robust insights that shaped the phenomenon of "advice discounting" (e.g. Yaniv 2004, Yaniv and Kleinberger 2000). The phenomenon illustrates advice takers deviation from received advice in favor of their own opinion (Yaniv 2004). Tzioti (2010) emphasized it as "one of the most reproduced findings in advice literature". More details on this phenomenon follow in the first part of related work.

Since obtaining information has dramatically changed through the internet, advice seekers more often form their opinion before they take advice from an advice giving expert. For example, a health study found that a group of patients trust and value more the information received from online communities than from a doctor (Schaffer et al. 2008). Therefore, advice discounting and its relation to the advice takers' opinion is more present than ever in the ongoing scientific discussion. Summarizing this, experts who act as advice givers are more confronted with situations where advice takers do not follow their advice. As one consequence, advisors have to spend more motivational force to persuade advice takers of advice utilization.

Our investigations are based on several years of experience in the field of home security advice. They show exactly the previous described phenomenon, in which advice taking home owners often do not follow the advice given by home security advisors. Experts from that field assume that the advice utilization is less than 20% (Comes and Schwabe 2016), although home security is an effective measure against the alarming trend in burglary rates. In 2014, the national crime statistics reported a continuous increase in number of cases by more than 43% since 2008 with simultaneous clearance rate of 15.9% in the last year (German Federal Criminal Police Office 2014).

The following exemplary scenario is based on our field study findings. It highlights the problem of lacking motivation to utilize the given advice and indicates possible negative consequences.

John Q. has been a home security expert for more than 25 years. He works for the local city police department, where he offers free and comprehensive advice on home security for interested citizens. The police department recruited him to reduce the rate of occurred burglaries and to increase the average home protection in the city. Tim S. is 45 years old and works as a teacher of informatics in this

city. He has a nice house in the suburbs where he lives together with his wife, his children and his parents. Then, one day, his parents began to feel scared because they heard about break-ins next to their home. They strongly ask their son to do something. Tim is unsure whether this is necessary. Yet he googles for crime statistics and possible home security systems. While searching he finds the offer for free advice on home security by the city police. Tim calls them and gets an appointment confirmed. In the following week John arrives as promised. Shortly after John enters the house he points out what he would steal if he were a burglar. Tim dismisses John's assumption as too exaggerating. He is not wealthy and does not assume that a burglar will find articles of value. John continues his analysis undeterred and next suggests Tim to lattice the single window which faces the neighbor garden. As soon as Tim hears these words he thinks of a prison. This suggestion raises a growing aversion. The discussion of possible security measures has now been going on for 30 minutes and Tim is overwhelmed by the many measures which he should take. He cannot imagine that he can manage this. Nevertheless John finishes his on-site service with a friendly request to utilize his advice. But Tim leaves the current state of his house as it is, because John could not raise a feeling of acute need for action. One month later Tim's home has actually been burgled. When recording the crime, the police hears about the previous home security advisory session with John. They are more and more in doubt about the effectiveness of their home security advisory service.

This short story highlights typical advice discounting behavior in the case of home security advisory services. It exemplifies what can happen when home security advisors are not able to motivate home owners to follow their advice. We assume that this lack of motivational force is often an inherent result of advisors' background. Many experts like John had worked in the operational field, for example as a police detective, before they changed to an advice giving position. Advice giving dialogs with motivational aspects (e.g. Moore and Paris 1989), have never been a part of their original training. As a result advice takers like Tim are not convinced by the received advice and finally do not follow it.

Harvey and Fischer (1997) indicate that advice seekers are driven by motives (e.g. improve judgement for decision making) to take advice. Furthermore, advice takers are likely to utilize advice more if they are motivated to succeed in their final judge (Schrah et al. 2006). Hence, intensifying the motives leading to advice utilization results in a reduced advice discounting (c.f. Bonaccio and Dalal 2006).

We propose a technology-based approach to motivate for actions which prompt advice takers to utilize advice and thus diminish advice discounting. More specifically we use emotions, communicated by multimedia interventions, to motivate advice utilization. In reference to Tost et al. (2011), emotional aspects should be one elementary characteristic in advice giving. For this reason, we decide to build on strategies with emotional appeals in the context of advice giving (Schneider and Kauffeld 2011). We present these strategies with more details before we show their implementation in the proposed information system (IS) design. All in all, we raise the following research question:

> How can emotional appeal be integrated into mobile advisory services to diminish advice discounting by increasing the motivation to utilize the given advice?

The paper continues with a brief explanation of the advice discounting phenomenon and its short history in the research literature. This is complemented with possible solutions based on advice giving methods in psychology. Based on both discounting problem and possible solution theories, we thought that design science as described in the methodology is a suitable approach to give an answer to our research question. As it is described there, we followed creative design steps, resulting in the prototypical information system design. This design is refined in design principles and presented in the design section. Afterwards, we refer to our evaluation and describe its setting. The evaluation section explains how we compared the IS-supported advisory service versus the conventional plain speech-based service. It also shows our positive results regarding the motivation to utilize and implement given advice. However, at the same time, the results leave room for further improvements. We discuss these results and known limitations subsequently.

2 Related Work

This paper is related to research investigations which aim to diminish the problem of advice discounting in conventional advisory services. Advice discounting was first introduced by Yaniv and Kleinberger (2000) in their framework on advice-taking and later integrated in the judge-advisor-system (JAS) by Bonaccio and Dalal (2006). The empirical data, which were collected by Bonaccio and Dalal (2006) in the context of JAS, suggest that the utilization or discounting of advice often differs from objective quality criteria (Rakotoarisoa 2012). In general, advice discounting is defined as any deviation from advisors' argumentation in favor to advice takers' own assessment (Yaniv 2004) and contributes significantly to the extent to which advice takers do not follow the given advice (Bonaccio and Dalal 2006). In the literature (e.g. Bonaccio and Dalal 2006), we find three reasons for the occurrence of advice discounting. Firstly, the internal justification for own decision making is easy to access, while access to the justification of the advisor is not possible. Another reason for advice discounting can be found in the original opinion of the advice taker. This opinion can act as an anchor to prior thoughts which is subsequently difficult to influence. This factor is rather of a temporary than long term nature as it is based on remembering certain experiences. Thirdly, advice takers tend to prefer their own assessment instead of advisors' ones. This personal interpretation of facts, arguments and circumstances in a way which they are beneficial for the advice takers is called egocentric-bias. Fig. 1 illustrates how advice discounting acts as a counterforce to advice utilization on advice takers' site.

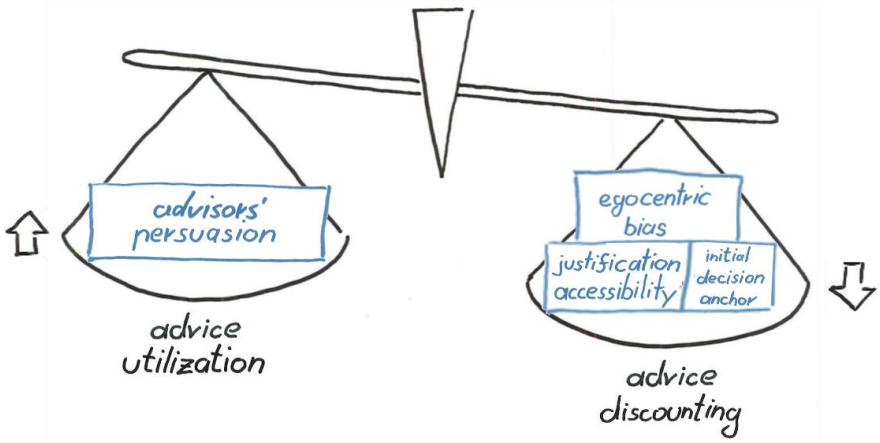

Figure 1. Advice taking: advice utilization vs. advice discounting

Even though the phenomenon of advice discounting is referred to advice takers, Goldsmith and Fitch (1997) argue that advice assessment by advice takers must always be considered in the situational and conversational context. For example, several studies show that if advice takers assign advisors a high level of expertise, then they attribute a higher value to the received advice (e.g. Yaniv 2004, Jungermann and Fischer 2005). This in turn, leads to a reduced advice discounting effect (Bonaccio and Dalal 2006). In contrast, if advice takers have a high level of domain expertise they have more arguments to support their own assessment (Bonaccio and Dalal 2006, Yaniv 2004). This intensifies advice discounting. Besides these situational factors also conversational aspects are crucial for advice assessment. Advice takers, who receive the impression that the advisor is listening carefully to and taking into account their personal needs, respond with a positive assessment of received advice (Goldsmith and Fitch 1997) and avoid advice discounting. Moreover, the effect of advice discounting decreases either when given advice is perceived as having a high quality (Yaniv and Kleinberger 2000) or with increasing complexity of advice takers' problem situation (Schrah et al. 2006). Taking these findings together, it turns out that advice discounting depends on characteristics of advice takers, advisors and the context in which advice is given (Tzioti 2010). The black components in Fig. 2 visualize this.

Domain experts as advisors typically exhibit those characteristics, which have a positive impact on the utilization of advice. For example, they have a high expertise and their advice is considered to be of a

high quality. Nevertheless, experts also struggle with the problem of advice discounting, as this study demonstrates with the example of home security advisory services. One of the reasons why they do so is that advice discounting is strongly connected to the personality and perception of the advice taker (e.g. egocentric bias). These individual characteristics affect advice discounting whether advice was given by an expert or non-expert. However, so far little is known about psychological conditions underlying advice takers' personality (See et al. 2011) and in particular emotions (Tzioti 2010) in advice taking (see Fig. 2). Tzioti (2010) pointed out that until 2010 there was only Gino and Schweitzer's (2008) study that had examined the role of emotions in taking advice. They show that gratitude has a positive effect on the utilization of advice whereas anger has rather an adverse impact.

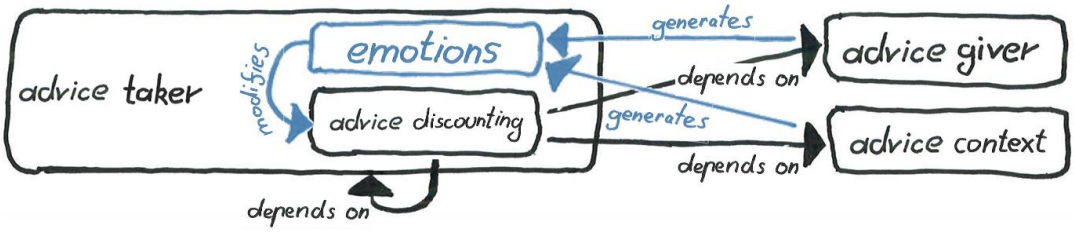

Figure 2. Advice discounting and emotions in advice taker related to advisor and advice context

Previous research comprises more theories that explain why advice discounting occurs rather than systematic approaches that diminish advice discounting. As one approach, Sniezek et al. (2004) show that if advice takers pay for the advice, then they rather adopt and utilize given advice. Gino (2008) supports this statement arguing that advice takers perceive the given money as an economic loss comparable with sunk-costs. However, Bonaccio and Dalal (2006) argue that this conclusion is not always valid and in certain cases can lead to the agency-problem (Eisenhardt 1989) and thus can generate mistrust in taking advice resulting in an increased advice discounting.

Approaches, which try to diminish advice discounting with IS support, exist even more rarely. An example can be found in the work of Gönül et al. (2006) which is related to the field of decision support systems. They used visual prepared stock forecasts with comprehensive explanations to reduce the discounting of investment advice. For their evaluation, they varied the length of the explanation and the way how convincingly they present the advice. But their approach is designed for single usage receiving the advice from the developed system and is not applicable to collaborative settings typical in conventional advisory dialogs.

Although these first approaches exist, far more crucial, however, is that these approaches tend to solve the problem of advice discounting on a rational level instead of addressing the emotional attributes, as suggested by Tzioti (2010). Yet, Schneider and Kauffeld (2011) propose strategies for advice giving with emotional appeal. They define two positive and two negative emotional appeals to influence advice takers strategically. On the one hand, advisors can use positive emotional appeal in 1) an inspirational manner to give advice takers an impression of the desired post advice state or 2) use the appeal confidently to communicate hope that advice takers are able to achieve the desired state. On the other hand, emotional appeal which is negative lets advice takers feel 1) worried or show them 2) deficits in post advice related resources both resulting in an increased pressure to deal with the given advice.

These strategies correspondent very well to the intended research goal. However, there are no design templates or implementation approaches for these strategies. As Tzioti (2010) argues that the application of appropriate emotions can reduce advice discounting, we want to implement this practice in a design solution supporting mobile home security advisors. In addition, with this study we follow Bonaccio and Dalal's (2006) call for the individual examination of the many factors influencing advice discounting. We thus contribute to the existing advice giving literature by diminishing advice discounting in face-to-face settings and provide design knowledge about mobile emotion processing.

3 Research Methodology

We started this study as a part of a larger research project which in general strives to improve the persuasion skills of advice givers. This project aims at the development of a new mobile IS design that supports advice givers and advice takers in the entire advisory process, e.g. communication, documentation or follow-up actions. Since 2013 three separated design iterations have already been accomplished and evaluated within this research project. A detailed description of the overall design research methodology is published in Comes and Schwabe (2016). In contrast to the work presented here, Comes and Schwabe (2016) focus on the persuasion dimension of ability, as it is defined in Fogg's behavioral model (Fogg 2009). With this study, we draw on a further dimension of his behavioral model and concentrate on the motivation dimension of persuasion. But data were collected using the same procedure. Therefore, we describe our approach here from the perspective of the last evaluation conducted in 2015 and respond more to the actual design in the next section.

As we have already described above, we aim on diminishing the problem of advice discounting. Therefore, our research endeavor is based on the design science approach (Hevner et al. 2004) which is well-known for its problem-solving paradigm. Design science, among others, creates artifacts like prototypes which solve such real world problems and are useful to humans (March and Smith 1995). Our approach uses a more profound way and follows the six concrete steps as described by Peffers et al. (2007) to conduct a scientific methodology of designing information systems.

In the first step (Identify Problem & Motivate) we analyzed conventional home security advice situations, discovered the underlying problem of advice discounting and came up with our research question. Furthermore, we brought light into the relevance of the goal for home security advice and advisory services in general. All these findings are mainly located in the first two sections of this paper. They have been validated in interviews with field experts.

Secondly (Define Objectives of a Solution), we formulated first scenarios of an IS-based solution in the form of storyboards. The technique of storyboarding is described in Maguire (2001). Also these solution scenarios were enhanced in an iterative manner and validated by the field experts. The scenarios have been elaborated and clarified in advance by experienced researcher for advice giving. The ideas for the proposed solution arose from the prior analysis in the first step, but were also inspired by the advice strategies from Schneider and Kauffeld (2011). With this solution objective in mind we were convinced that an appropriate designed IS can support advice giver to overcome the problem of advice discounting and improves conventional advisory dialogs.

In the subsequent step (Design & Development), we implemented the solution scenarios in a testable prototype. For this purpose, we brought all findings from the problem analysis and solution draft together and designed a mobile information system using the engineering method of scenario based development (Rosson and Carroll 2002).

Once we finished our development iterations we tested the prototype in the practical field where home security advice is given (Demonstration). We focused in the test on the influence of the designed prototype on differences in advice takers motivation to utilize and implement given security recommendations. As a result of the inherent mobile and dynamic character of home security advisory services, as described in the initial problem scenario, we struggled with the observance of the consistent conditions and gathering of comparable data during the test. Hence, we recorded all test advice episodes on video as well as created audio recordings from all conversations. Thus we were able to reconstruct all individual advice sessions.

We analyzed and discussed the results of the test in the fifth step (Evaluation). In this context, we derived the abstract design principles from the final prototype design in line with the advisory strategies of Schneider and Kauffeld (2011). These principles are presented in the design section. The evaluation design itself is described in the evaluation section enabling a better interpretation of the collected data.

Finally, we followed the step (Communication) which transforms the collected findings into disciplinary knowledge. This is defined as the publication of the design principles for diminishing advice discounting in collaborative face-to-face advisory situations using multimedia interventions.

4 Design

In order to diminish the problem of advice discounting while giving advice, we aim on a design solution which motivates advice taker to utilize and implement received advice. As Hevner and Chatterjee (2010) emphasize, design research is suitable to solve such real-world problems. But for this it is absolutely essential to communicate the design underlying the logic so that the addressed audience understands how the IS artifact "should become" (Pries-Heje and Baskerville 2008). Typically, this is achieved through a formulation of design principles representing the primary contribution of design research (Hevner and Chatterjee 2010). We uphold the claim that design principles assist theorizers in reaching a deeper understanding of the phenomenon, support field practitioners in value creation and guide artifact designers in their implementation process.

4.1 Design Principles

The design principles are based on the assumption that advice giving is effective if and only if advisors use adopted discursive elements (cf. Goldsmith and Fitch 1997). In other words, we try to complement the conversational context mentioned by Goldsmith and Fitch (1997). Moore and Paris (1989) show that especially motivation for a particular action (e.g. implementation of advice) is an important element in advisory dialogs. We embed such motivational elements inspired by the emotion-related advice strategies of Schneider and Kauffeld (2011). More specifically, we implemented multimedia interventions evoking emotions which correspond to advisors' goals. These interventions support advisors instantly on demand in the advisory dialog. For example, when home security advice takers are not worried about mentioned threat.

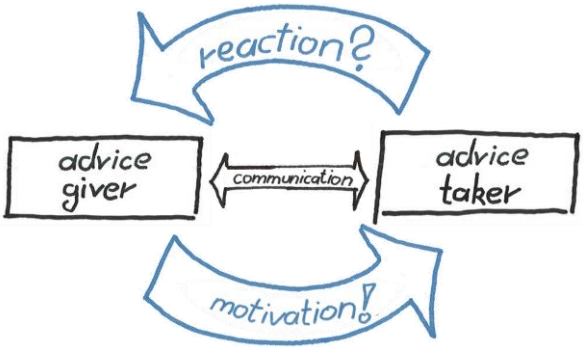

Figure 3. Intervention cycle of motivational advice giving

We argue, that when advisors are able to complement their verbal advice with goal-oriented emotions, then they either a) can directly motivate advice taker to utilize the advice, or b) observe a non-desired reaction (e.g. not worried) and motivate afterwards. Depending on advice takers reaction, advisors address emotions on their site to achieve the desired emotional effect. This introduces a motivation and reaction cycle during the whole advisory service (see Fig. 3).

Schneider and Kauffeld (2011) propose four different emotional appeals within their advisory strategies: 1) inspirational, 2) worrying, 3) confident and 4) deficient appeals. We integrate these strategies into our design and accordingly formulate the following design principles. Each design principle is accompanied by a preceding explanation.

Typically, implementing advice entails a future state. This could be for example the desired replacement of the weak door with a safe one. During advice taking, the future state exists only as pure imag-

ination in advice takers mind. Let's take a look back on the introductory problem scenario to exemplify this: "As soon as Tim hears these words [lattice the window] he thinks of a prison. This suggestion raises a growing aversion". We claim that visualizations of a possible future state sharpen advice takers mind. Furthermore, linking this optimized imagination with positive emotions can lead to an increased motion toward the future state. For this purpose, inspirational appeals are useful, that's why we name and formulate the first design principle (DP) as follows:

DP1 "Inspirational wow factor": provide multimedia intervention episodes which enable advice takers to experience an emotional imagination of the target future state.

In general, people tend to have an egocentric bias in interaction behavior. For advisory situations this means that the advice takers overweight prior investigated or received information. Using the scenario example of Tim who "dismisses John's assumption as too exaggerating" in case of the threat assessment, we can show this behavior. Schneider and Kauffeld (2011) argue that worrying appeals encourage the psychological pressure for rethinking one's own opinion. Therefore, the second design principle is set as follows:

DP2 "Worrying wow factor": provide multimedia intervention episodes which enable advice takers to experience an emotional imagination of their actual problem situation.

Moreover, unknown and difficult tasks increase the feeling of uncertainty regarding a successful outcome. Same applies to post advice tasks, such as perceived by Tim in the problem scenario with: "He cannot imagine that he can manage this". The emphasis of confident appeals may motivate the advice takers to go about implementation of advice as it was desired by the advisor. We formulate this design principle in our paper as follows:

DP3 "Confident wow factor": provide multimedia intervention episodes which enable advice takers to experience the emotional imagination to be able to achieve the target future state as well as to be successful in it.

Often the given advice is not directly utilized because advice takers do not recognize possible disadvantages of a late implementation. In order to make the advice more attractive, advisors should communicate that the necessary resources become unavailable soon. The psychologist and persuasion researcher Cialdini (2009) describes this as the scarcity principle where "opportunities seem more valuable to us when their availability is limited". If Tim perceived limited implementation resources it would seem rather unlikely that he would act as he did in the problem scenario and left his house "as it is because John could not raise a feeling of acute need for action". For example, highlighting that the availability of craftsmen will be limited in future, can increase the motivation to tackle the target state as soon as possible. Schneider and Kauffeld (2011) specify, temporal, material or institutional limitations which can be emphasized. With regard to this strategy, we include the following design principle in the motivation supporting concept:

DP4 "Deficient wow factor": provide multimedia intervention episodes which enable advice takers to experience the emotion of limited implementation resources.

4.2 Exemplary Design Instantiation

Design principles are instantiated in prototypes to evaluate their usefulness (Hevner and Chatterjee 2010). We, therefore, integrate the previously listed four design principles in an information system which we call "*SmartProtector*". The system consists of an 11.6-inch tablet PC ensuring the necessary flexibility while moving through and around the examined buildings. Advisors typically hold the tablet PC in their hands but can also place it on a table or hand it on to the advice takers for input. The usage scenario envisages that the system forms a shared information space between advisor and advice taker (cf. Seifert et al. 2012). This enables a transparent communication of all information during the service (Comes and Schwabe 2016).

From the perspective of home security advice giving, advisors are supported in the whole advisory process. At the beginning of each on-site service, the system assists the advisor in needs elicitation and

stores the needs for later conclusions. Afterwards, the advisor applies the system to record and to explain identified weak points. Moreover, the system allows the advice taker to notice in which step of house exploration progress they both are. When the exploration is finished, they sit down at a table. There they jointly repeat all problems while the advisor adds solutions provided by the system. Following up, *SmartProtector* sends the advisory results via email to both advice taker and advisor.

In pursuit of our design goal, we have extended a prior prototype using the four design principles. When advisors assume or perceive advice discounting behavior, we expect that they intervene with the appropriate emotions addressed by the design principles.

Figure 4. Inspirational wow factor implementation

We implemented the first design principle (DP1) by enabling the advisors to take photos of the security situation on-site and by giving them the possibility to manipulate these photos (see Fig. 4). For example, to improve the prior problem scenario, home security advisor John could suggest to lattice the window. John marks the best positions for the installation with his fingers, what provides Tim a realistic impression. In addition, Tim feels personally closer connected to his own window on the photo than to verbal and abstract description given by the advisor. The advice discounting scene from the problem scenario could change in the way that "Tim is positively surprised of how John's suggestion keeps a nice look of the window".

The second design principle (DP2) was implemented by giving home security advisors an access to various video clips of successful break-ins (see Fig. 5). These videos impressively show how easy it is to break in through weak doors and windows. While advisors can explain objectively what is going on in the break-in scene, the video clip triggers the desired emotion on advice takers' site (e.g. worry). As an alternative to the problem scenario, the advisory dialog could be as follows: "My goodness! I've never thought that burglars choose houses like that and can break in so easily."

Figure 5. Worrying wow factor implementation

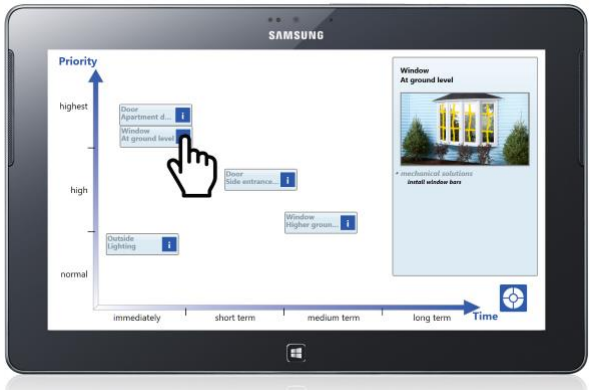

Figure 6. Confident wow factor implementation

Further, Figure 6 shows the implementation of the third design principle (DP3). It visualizes a simple chart of post advice tasks arranged according time and task priority. This enables advice takers to envision upcoming tasks easily. Thus, advice takers feel able to manage and achieve these tasks. With the help of Smart Protector, the following future scenario can occur: "John shows Tim suggested solutions for each security problem in the overview. Only now, Tim gets a full picture and doesn't feel uncertain anymore."

In order to encourage a prompt implementation we integrated multimedia interventions presenting lacks of implementation resources (DP4). The multimedia interventions offer government financial support as an incentive (see Fig. 7). An exemplary list of programs, supporting German citizens investments in home security can be found in DFK (2016). These funding programs are constrained by application deadlines or limited in capital expenditure. For example, one program has a time deadline of twelve month after final completion of a new house or a limited number of 10.000 applicants. When they're gone – they're gone. For advice taking house owners such limitations could evoke feelings of possible losses. They could feel that they miss an opportunity. We assume that an improved scenario takes place as following: "While John scrolls through the proposed solutions for the weak windows, he notices an appropriate funding offer. Once John and Tim have both become aware of the limited time to apply and limited number of applicants, John just needs to attach the offer to the email to maintain the attractiveness of a quick advice utilization".

Figure 7. Deficient wow factor implementation

Access to the multimedia interventions is simple and intuitive, because they are placed where advisors are typically confronted with a related advice discounting situation. For example, the videos showing successful break-ins are presented by the problem screen on which advisors record each single weak point.

5 Evaluation

We estimated a sample size of at least nineteen subjects for matched pair t-tests using G*Power (Faul et al. 2007) and assuming a medium to large effect size with alpha error (α) = 0.05 and power (1-β) = 0.8. Based on this and for symmetry reasons we selected a convenience sample of twenty subjects (eleven female and nine male, M(age) = 53.5, SD(age) = 17.3) who participated as advice takers in individual evaluation sessions. In order to compensate them for their time effort we emphasized the value of given security advice. Ten home security advisors were chosen to participate in the evaluation as test advisors (3 female and 7 male, M(age) = 48.9, SD(age) = 6.4). These experts are all police officers from two German police departments with many years of experience (M(year_experience) = 9.7, SD(year_experience) = 4.2) related to break-ins. We assigned each participating advice taker to one advisor randomly. Together, the combination of advice taker and advisor formed an advisory pair. All single evaluation sessions proceeded in within-subject experiments, in which each advisor and advice taker underwent two advisory variants. The two variants are the conventional speech-based advice giving and the novel IS-supported approach using *SmartProtector*. Thus, we declared the motivation for utilization and implementation of given advice as the dependent variable. We uniformly alternate the sequence of both variants between all evaluation sessions to avoid order effects.

In March 2015, we conducted the evaluation in the two German cities Mannheim and Frankfurt which were easy to reach for all test participants. We found locations with show houses only for presentation purposes in each city which turned out to be suitable for our evaluation. The need for advice came from these unsafe houses. In briefings each advice taker was instructed to play the role of a house owner. We confronted them with a situation in which they feel a bit worried about the security in their house because of recent break-ins in the closer neighborhood. In addition, we induced specific security needs, e.g. high security requirements for all bedrooms.

The participating advisors were asked to perform their usual activities as home security experts. Their tasks in each advisory variant were to explore a new test house (each house only once to prevent a

memory bias), to suggest solutions to increase the security and to persuade the advice taker to utilize their advice. While the conventional variant was mainly shaped by plain verbal advice giving situations, we complemented the IS-supported variant with the prototype. Advisors were instructed to use the system as we have taught them in prior one day training sessions. With this training we could ensure that the advisors know and use the design principles in each evaluation session. The aim of the IS-supported variant was to improve the given advice with the designed multimedia interventions evoking emotions. Therefore, we also encouraged the advisors to pay attention to advice takers' reactions to intervene with the appropriate appeal, if needed.

The evaluation sessions were launched by us, whereby each session lasted approximately 60 minutes. During the sessions, we were particularly interested in advice discounting impacts. Especially for this purpose, we focused on differences in the motivation to utilize given advice between the conventional speech-based and the novel IS-supported variant. In order to measure whether we had been successful we interviewed advice takers as well as advisors after they finished the session. With the help of a questionnaire, we could measure how well the corresponding advisory variant had motivated advice takers to utilize and implement the received advice. Advice takers and advisors could express their answers to our questionnaire in a 5-point Likert scale. The used items were structured in two different ways: 1) see for example Fig. 8, "conv++" = the conventional variant applies very strongly, "conv+" = the conventional variant applies stronger, "neutral" = there was no difference between conventional and IS-supported variant, "IS+" = the IS-supported variant applies stronger, "IS++" = the IS-supported variant applies very strongly. 2) As you can see in Fig. 9, we also asked to give answers as following: "1" = I strongly disagree, "2" = I disagree, "3" = I am undecided, "4" = I agree and "5" = I strongly agree.

Furthermore, we discussed perceived differences between both variants with each participant afterwards. These were semi-structured interviews and included several questions about satisfaction, emotions and subjective feelings on motivation.

With all this, we followed the evaluation step from Peffers et al. (2007) and measured how well the designed system supports a possible solution, i.e., we reached our research goal of increasing the motivation for utilization and implementation of given advice. With this evaluation practice we did not evaluate each design principle isolated but rather observed the implications of the initiated system as a whole. The obtained results follow next.

5.1 Results

The participating advice takers described IS-supported advice giving as more motivating for utilization and implementation of received advice than the conventional plain speech-based variant (see fig. 8). The mean accumulation rate of answers tends with 3.7 (+0.7 = 35%) from neutral = 3.0 towards IS-support advice giving = 5.0 (+2 = 100%). This result is significant (one-sided paired t-test, $T(19)=1.73$, $p<0.01$). Only one person (5%) rated the conventional variant as more motivating. With the predominant larger proportion of twelve people (60%), advice takers rated the IS-supported variant as more motivating or even highly motivating. Seven participants (35%) did not prefer any of the two variants.

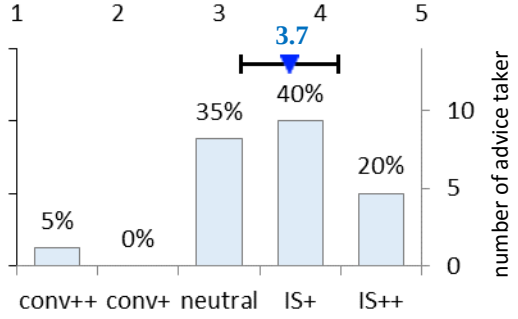

Figure 8. Perceived motivation of advice takers for implementing received advice

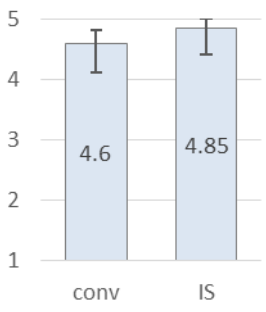

Figure 9. Perceived ability of advice takers to remember the recommendations

In answer to the question which recommendation in received advice was better remembered, participating advice takers rated IS-supported advice giving in average 0.25 points higher than the conventional variant (see Fig. 9). This result is also significant (one-sided paired t-test, $T(18)=1.69$, $p<0.05$).

During one test day, we observed an increase in advisors' perceived motivational force. However, the rise of 7% (+0.3 points) after the first session was not significant (see Fig. 10). But in the subsequent session (see Fig. 11), we measured a 15% (+0.6 points) higher motivational force in IS-supported advice giving (one-sided paired t-test, $T(18)=1.73$, $p<0.05$).

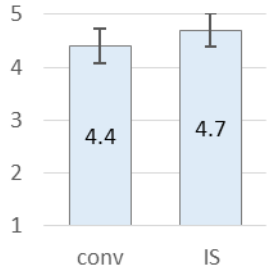

Figure 10: Perceived ability to motivate advice takers after first session

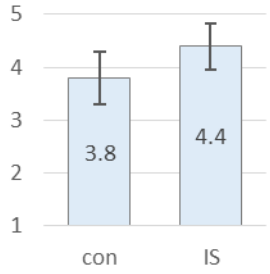

Figure 11: Perceived ability to motivate advice takers after second session

6 Discussion and Conclusion

We believe that as long as people seek for advice and other people give advice, advice discounting will remain a problem. Nevertheless, the results indicate that an information system like *SmartProtector*, based on appropriate design principles, is able to diminish this problem.

Twelve times more advice takers were rather motivated to utilize and implement advice given in IS-supported sessions than those who received their advice in a conventional speech-based variant (see fig. 8). We attributed this to the fact that *SmartProtector* is based on emotional advisory strategies (Schneider and Kauffeld 2011) implemented as design principles. Thus, we agree with Tzioti (2010), that emotions are useful to diminish advice discounting. Together, our detailed problem analysis in the field and the proposed four design principles *inspirational wow factor*, *worrying wow factor*, *confident wow factor* and *deficient wow factor* explain how strategies diminishing advice discounting can be implemented in IS design.

As Touré-Tillery and Fishbach (2014) argue, motivation can also be measured by the cognitive memory for goal-oriented constructs, e.g. recommended tasks derived from given advice. Our findings show an enhanced memory of given recommendations in the IS-supported variant. The actual increase of 0.25 points is not high. But as we asked the advice takers right after their evaluation sessions, we emphasize this value. We expect an essential difference after an extended period of time. One advisor attributed this improvement to the IS-supported advice giving variant because of its higher personalization of delivered advice.

However, further research is needed to provide the empirical evidence that taken advice has actually been utilized and goes beyond the prior motivation for implementation. This is aggravated by the limitation that in this study advice takers were not the real owners of the used show houses. It is, therefore, to be assumed that the strength of emotional attachment is lower and, thus, according to Tzioti (2010), has less influence on advice discounting.

Another finding from the study is that the implemented design principles increased significantly the perceived motivational force of advisors. In the interviews an advisor described the support with the words: "the effect of the videos is incredible […] I could recognize this due to the wow factor [on advice takers' site]". Already in the second evaluation comparison between IS-supported and conventional advice giving we observed 15% increase in advisors' perceived motivational force (see Fig. 11).

This means that they can quickly use *SmartProtector* as we intend. We regard the fact that the advisors perceived substantially less motivational force in the conventional variant of the second session as a result due to reflection effects. The advisors could better estimate their motivational force in the second session because they have reflected it for the first time after the first session. However, since they have previously rated their performance very high (4.4 and 4.7 on a 5-point Likert scale), they decided to downsize the motivational force for the conventional variant to express the difference.

Previous research has shown that the expertise of advisors is perceived differently by advice takers, e.g. depending on their own expertise as Tost et al. (2011) argue. We conclude that complementing advisors' experiences and skills with the presented multimedia interventions fosters a positive and stable assessment of advisors. However, to our best knowledge there has been no research that examined human advisors supported by information systems regarding to advice discounting and advice assessment. This work extends the existing literature by contributing the first empirical insights to this collaborative perspective on IS-support against advice discounting.

Furthermore, this lack in findings also applies to the endeavors in the stream of design research trying to diminish advice discounting. The current studies only deal with single-user scenarios as Gönül et al. (2006) with their improvements in structuring explanations in decision support systems. However, we are of the opinion that by far the most advice giving situations occur in conventional face-to-face dialogs. Therefore, we explain design implications on systems supporting face-to-face advice giving situations for the first time.

In addition, we contribute to the general discussion of emotions in advice taking. As we mention in related work, there exist so far few empirical findings about the influence of emotions in advice taking situations. Our results extend previous studies, such as Gino and Schweitzer (2008) who examined the influence of anger and gratitude, with insights about inspirational, worrying, concerning and deficit feelings. We consider these results as limited, because this study did not examine the emotions individually but together implemented in the IS-supported advice giving variant.

Besides the theoretical contributions, providers of advisory services such as home security advice presented here can benefit from our work. Especially the home security advisory service offered by many police departments is affected by the problem of advice discounting. Recognizing that this public service for citizens is often free of charge, it seems to be a cost effective solution to increase the effectiveness of the service by complementing the police with *SmartProtector*. Such an increased effectiveness would reduce the doubts regarding this service as mentioned at the end of the introductive problem scenario. This is one of the reasons why both participating police departments have decided to run an extended pilot with *SmartProtector*, but also, to create a productive system.

The advisors, especially the police officers, are rather experts in security issues than trained and convincing advice givers. *SmartProtector* can support them in motivation-oriented advice giving relatively quickly and without prior knowledge. This support is based on the advice giving strategies from Schneider and Kauffeld (2011). As we discussed before, already after one day training and two evaluation sessions advisors perceived an increased motivational force. Moreover, diminished advisory discounting has a positive effect on the job satisfaction of advisors. As we mentioned at the beginning, Goldsmith and Fitch (1997) state that the less advice is discounted the more advisors feel respected. This increases their self-confidence and give them the feeling of gratitude.

In order to provide the aforementioned IS-supported advice, integrating all design principles in one specialized system like *SmartProtector* provides the best value for advisors and clients. Although some design principles (e.g. play a video) could be implemented by an off the shelf standard tool, bringing all information together, providing the right motivational support at the right time as well as adopting simple functions adequately (e.g. drawing on taken photos) are better suited for advisors.

Furthermore, the presented design principles can be used in other motivation related situations. These could be situations in which persuasive face-to-face advisory dialogs are crucial (e.g. fitness advice, nutrition counselling, career counselling etc.).

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