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Does it meet my expectations? Compensation and remorse as data breach recovery actions – An experimental scenario based investigation

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Does It Meet My Expectations? Compensation and Remorse as Data Breach Recovery Actions – An Experimental Scenario Based Investigation

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ABSTRACT

The risk of data breaches increases with the amount of data shared and with the rising number of mobile devices. In particular, mobile devices such as fitness trackers collect a large amount of personal data and share it with other devices and platforms. In many circumstances, the relationship between those affected by a data breach and the company in question ultimately suffers. To positively influence customer behavior in the event of a data breach, companies should begin to investigate recovery strategies such as compensation and remorse. For these reasons, this study examines the effectiveness of different recovery strategies in terms of satisfaction. As a theoretical basis, the applied research model uses the theory of expectation confirmation theory. The results show that customer satisfaction depends significantly on expectations and the correspondence of expectations compared to the recovery action received. In addition, the interrelations of the expectation confirmation theory are supported.

Keywords: *data breach, expectation confirmation theory, recovery action, compensation, remorse, severity, customer satisfaction, fitness tracker*

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INTRODUCTION

The continued development and networking of mobile devices has resulted in functions, which previously required multiple specific devices, that can now be compressed down into one single pocket-sized device. This progression simultaneously allows for information to be tracked, analyzed, and exchanged at any time, a trend which is reflected in the popularity and market size of technologies such as fitness trackers and smartwatches (Chuah et al. 2016). Today, smart wearables are mostly used for personal self-optimization, such as improving physical performance and developing positive habits. To take advantage of the benefits from intelligent technology, consumers are willing to accept the information disclosure and private data sharing with service providers, while also accepting the risk of external vulnerability to data breaches. Fitness trackers in particular are becoming a common target of cyber-attacks due to the measurement and processing of highly sensitive personal data (Liu and Sun 2016). At the same time, the number of incidents of data breaches and the number of companies collecting, storing, and analyzing sensitive data is increasing (Kindervag et al. 2015). Since data breaches are in most cases inevitable, an abundance of literature dealing with the impact of a data breach on the assets of a company has already been composed (Aivazpour et al. 2018). However, the issue of gaining back customer satisfaction after an incident has yet to be focused on by prior research. Although prior studies have found that 40 percent of customers who have been notified of a data breach are considering terminating their relationship with the company due to the unfulfilled service quality expectations (Ponemon 2016), it is particularly important that companies develop effective recovery strategies to repair their relationships with their customers. Above all, there are not enough empirical field studies investigating how companies can use precise recovery strategies as a response to a data breach (Goode et al. 2017).

The objective of this paper is to examine how companies impacted by a data breach should react in order to maximize customer satisfaction and their company's reputation, focusing on the nature of the recovery measures, specifically compensation and remorse, with possible recovery measures being analyzed with regard to the severity of the breach. Therefore, our research aims to explore the following research question:

RQ: How do compensation and remorse as a company's recovery actions affect a customer's perception in the instance of low and high severe data breaches?

To answer this question, we include the theory of expectation confirmation in the overall theoretical context to explain how expectations differ in response to data loss. To test our theoretical model, we conducted a scenario based investigation on data breaches among 507 users of fitness trackers at a local sporting event. We investigated the effectiveness of repentance and compensation as two central recovery strategies for two different severe data breaches.

PRACTICAL MOTIVATION

A data violation affects several different people simultaneously due to a large amount of data is usually encompassing the same variety of individuals. For example, when Sony PlayStation Network was hacked in 2011, more than 77 million user accounts were accessed, along with personal and financial information being stolen (Richmond and Williams 2011). Seven years later in February of 2018, 150 million personal data were affected via Under Amour's MyFitnessPal fitness app (Dickey 2018). Furthermore, this year in August, Mastercard experienced a breach due to a data leak by a third party, resulting in 90,000 users' data from the Mastercard bonus program being released on the Internet. Over the course of time, these data breaches have allowed for the effects of recovery strategies to be witnessed and therein improved upon. In August 2019, Mastercard initially showed no reaction to the data breach, but a few days later, a personal message with an apology was sent out to the data breach victims. That being

said, there was no direct compensation for the breach, which made the customers completely dissatisfied in the company's actions (Schier and Henke 2019). In this situation, it can be determined that companies benefit more when they directly apologize to the affected parties for the loss of service, with compensation being a more effective measure in restoring the originally intended service. An apology strategy, such as the one to be mentioned in this paper, is often based on the fact that it is a more cost-effective for restoring services. However, since it has already been determined that it is not the most effective strategy, it remains important for companies to identify the best recovery strategy. In addition, a compensation strategy should identify and determine the appropriate level of compensation for the affected customers to ensure maximum customer satisfaction (Goode et al. 2017). Furthermore, the choice of a recovery action should include consideration of the severity of the breach. Prior studies have found that an explanation is a less adequate reaction in the case of a severe problem compared to a less severe problem (Conlon and Murray 1996). Therefore, it is suggested to adjust the level of recovery based on the severity in order to fully recover customers' perceived justice and satisfaction.

THEORETICAL FOUNDATION

The interplay of a priori expectations and a posteriori evaluation of perceived performances originates from psychology and marketing literature (Oliver 1980), but has been addressed often throughout IS Research (Brown et al. 2014). The expectation confirmation theory (ECT) attempts to predict a customer's buy-back intention and satisfaction by comparing his expectation with his perceived performance. This comparison leads to the confirmation or disconfirmation of beliefs that influence a customer's satisfaction or dissatisfaction. Prior research has adapted this model, for example, in the context of new technology acceptance (Venkatesh and Goyal 2010) or e-commerce service failure (Tan et al. 2016). In the context of data breach recovery actions,

Goode et al. (2017) investigated user compensation for the SONY PlayStation network breach in part due to the application of expectation confirmation models. While the application of the theory has shown conflicting results, Brown et al. (2014) have consolidated and compared the six most common application models of the ECT. Their results show that the assimilation-contrast model has the highest predictive power given their setting. The model assumes that assimilation or contrast reaction depends on the derivation of expectations and perceived performance. On the one hand, the assimilation idea suggests that individuals adjust the result evaluation so that it is consistent with their expectations for very small deviations occurring within a tolerance zone between expectations and perceived experiences. On the other hand, if there is a large deviation between expectations and experience, the direction of the deviation is crucial. It can either lead to an effect of surprise, if experiences greatly exceed expectations, or to an effect of disappointment, if experiences fall short of expectations.

RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

To study customer satisfaction with a company's recovery action after a data breach, a research model based on the ECT was developed, taking into account expectations and the actual recovery strategy to explain customer satisfaction. This model is analyzed by two subgroups to generate findings with regard to the severity of the data breach (see Figure 1). In this study, we have adopted the expectation to be users' expectations regarding the company's response to a data breach. These expectations are first queried in the so-called pre-consumption phase. According to Bhattacherjee (2001), the direct relationship between expectation and satisfaction can be explained by the theory of the adjustment level. Thus, a high initial value of expectation tends to lead to higher satisfaction, while a low expectation tends to reduce satisfaction. This allows us to pose the following hypothesis:

H1: Users' expectations of a data breach recovery action are positively associated with their satisfaction with the actual data breach recovery action.

Moreover, the expectations are compared with the perceived performance. As with our research, this is the recovery measure actually received in the event of a data breach. Thus, this confirmation is defined as the user's assessment of the actual perceived performance compared to a benchmark standard such as expectations. Moreover, we assume an assimilation contrast relationship with low expectations lead to high conformation and vice versa. Therefore, an inverse relationship is assumed by the following hypothesis:

H2: Users' expectations of a data breach recovery action are negatively associated with confirmation.

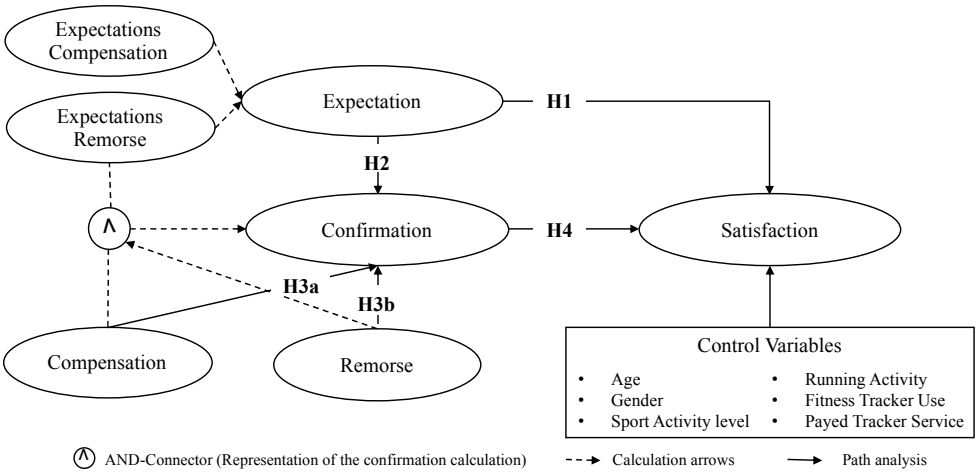

Figure 1. Research Model

Underlining the assumption that confirmation is the degree between expectation and perceived performance, the actual performance also influences the confirmation. Based on the theory of justice, we propose to examine the effects of compensation and repentance. Walster et al. (1973) have shown that compensation remains an essential strategy for these purposes. In addition, various studies relating to distributive justice, which deals with the elimination and compensation of losses and includes claims for recovery and compensation, have been demonstrated as evidence that distributive justice has a positive effect on customer satisfaction

(Maxham and Netemeyer 2002). Our study, therefore, should examine whether compensation is possible within the framework of distributive justice. Likewise, remorse is assigned in the same manner because it can be understood as a subset of compensation (Gelbrich and Roschk 2011). Therefore, apologies can increase interactional justice, which positively influences customer satisfaction (Wirtz and Mattila 2004). An apology given along with information about the data breach is considered as an alternative, and when paired with compensation it becomes a recovery action. Past research has shown that fairness-based interpersonal relationships have a positive effect on post-event satisfaction (Smith et al. 1999). Hence, it is argued that the explanation and exchange of emotions about the incident similarly have an impact on the eventual confirmation. This results in the following two hypotheses:

H3a: In the event of a data breach, compensation offered by the company is positively associated with confirmation
H3b: In the event of a data breach, a remorseful apology by the company is positively associated with confirmation

ECT assumes that user satisfaction is explained by the confirmation of the expectation of actual use (Oliver 1980). Thus, the confirmation is positively related to the satisfaction, since it results in the conformity of reality and expectation in satisfaction, while at the same time a non-conformity implies that the expectation was not achieved. Within this conclusion lies a differentiation depending on whether the perceived achievement is greater than the expectations. If this is the case, it leads in this way to a positive confirmation and thus to a high satisfaction. However, if the performance is below the expectations, this leads to a negative confirmation and a low level of satisfaction. Hence, the satisfaction is the result of a process of evaluation and comparison (Bhattacherjee 2001). Thus, we hypothesize the following:

H4: Users' extent of confirmation is positively associated with their satisfaction with the actual data breach recovery action.

Considering the severity of the data breach incident, it is suggested to adjust the recovery action based on the severity of the data that is breached (Smith et al. 1999). Liao (2007) has revealed that the severity can be tested via a moderation effect. Therefore, we expect that the breach severity moderates the relationship between recovery action and satisfaction.

METHODOLOGICAL APPROACH

The defined hypotheses were tested by an online experiment. A vignette design with three independent variables was created to query the independent variables by experimental manipulation scenario based. Eight scenarios were randomly assigned to the participants by means of an intermediate design. The scenarios included a change of the variables on two levels each by a 2x2x2 design. For this purpose, a fictitious data breach of a fitness tracker was described to participants of two city runs in July 2019. In the following, we describe the data collection of the sample, as well as the experimental design and the dependent measurements.

Data-Collection Procedure and Sample

The survey participants were asked to imagine they own a fitness tracker that they regularly use for running; this could be an app on their mobile phone or a wearable device like a smartwatch. The user is informed that they once provided the fitness tracker with personal data such as their e-mail address, date of birth, height, weight, etc. In addition, the tracker collects GPS live data at each run to evaluate the running performance. Furthermore, participants were asked to imagine that they want to go for a run, but just before they begin, a message from the fitness tracker provider appears stating that some of your personal information has been breached by an unauthorized third party. All participants received exactly the same introductory information as stated above. Next, participants randomly received the second part of the message concerning the

experimental condition about the reaction of the provider with regard to the data breach. Each participant then received the same questionnaire, including a manipulation check. Invalid answers were removed for the analysis of the data and a sample size of n = 507 participants aged 13 to 79 years (M=28.52, SD= 9.14 years). The sample size can be divided into two quantities: one with high severity (n = 247) and the other with low severity data breach (n = 260).

Experimental Scenarios

We chose a 2x2x2 between subject experimental design comprising two dimensions for the data breach recovery action of the provider: compensation (receive compensation/no compensation), and remorse (receive apology/no apology), as well as an additional dimension regarding the data breach severity (general personal data/live-tracked GPS data), as visualized in Table 1. Thus, the experiment contained eight different scenarios, with each participant being assigned to one of the eight scenarios. A data breach of a fitness tracker was introduced and the participant was informed about the breach by a message. Eight different messages for our experimental conditions were created. First, the severity of the breach was mentioned. For a low severe breach, the personal data such as name, e-mail address, date of birth, and number of runs were all affected, while for a high severe breach, all of the GPS data of the runs, including date and time (i.e., the movement profile with information about when and where the customer ran with the app) were also included. Second, a paragraph was added in the case of remorse scenario. The message contained an apology by the provider, including a statement of regret for the incident having occurred, and the promise that the company will work on the issue to prevent any reoccurrence. Third, the paragraph offering compensation was added for the compensation scenarios, being that the provider offered the option for the customer to use the premium version free of charge for three months with no further obligations.

Table 1. Scenarios

		Compensation			
		Neutral		*Compensation*	
Remorse	*Neutral*	**Control Case (low Severity)** *n=50*	**Control Case (high Severity)** *n=57*	**Compensation (low Severity)** *n=56*	**Compensation (high Severity)** *n=42*
	Apology	**Apology (low Severity)** *n=51*	**Apology (high Severity)** *n=44*	**Compensation and Apology (low Severity)** *n=52*	**Compensation and Apology (high Severity)** *n=54*

DATA ANALYSIS AND RESULTS

We have used a Structural Equation Modeling (SEM) approach to evaluate our data. It is a statistical method with which hypothesis-based causal relationships can be tested and evaluated (Hair et al. 2016). The variant based Partial Least Square (PLS) method has already been used in various research disciplines and offers several advantages, for example, it has fewer constraints on the data sample (Ringle 2014). The SEM techniques are suitable for our research as they allow the analysis of relationships between latent variables measured with several indicators. Furthermore, paths for measuring the latent variables and the hypothesized relationships between the latent variables can be estimated simultaneously. The analysis was performed with the SmartPLS 3 and other calculations were performed with R (Version 3.5.1).

Measurement Validation

In the model, the variable expectation was reflectively modeled on confirmation and satisfaction and vice versa. The variable expectation consists of a formative higher order construction from the expectations of remorse and confirmation. Moreover, the confirmation was not queried, but calculated using the formula in line the assimilation-contrast idea: ($Recovery$ ($COMP \otimes$ REMO)

$*$ 10) – ($Expectation$ (EXP_COMP $\otimes$ EXP_REMO) $*10/7)^2$. It was found that all element loads, and internal consistencies of reflection modeled constructs are above the threshold. Furthermore, the reliability and validity requirements of Composite Reliability (CR) and Average Variance Extracted (AVE) were met (Fornell and Larcker 1981). Thus, it can be stated that our model has acceptable and significant measurement characteristics.

Hypotheses Testing

The PLS method was applied to estimate the theoretical structural model for two subgroups of severity. The bootstrapping resampling method with 2000 samples was used to assess the significance of the paths. Based on split samples, we performed multigroup analyses using a Welch–Satterthwaite test to assess the difference of the path coefficients. Table 3 shows the estimates of the path coefficients and the test statistics. Also, it was concluded that expectation (.163; significant at .01) and confirmation (.264; significant at .01) have a significant positive effect on satisfaction. A significant negative effect was observed from expectation on confirmation (-.394 significant at 0.01), while the recovery actions have both a significant and positive effect on confirmation (0.699 and 0.589 significant at 0.01). Hence, all hypotheses can be confirmed and are in line with ECT. The SEM itself was tested for moderating effects of the control variables age, gender, athletic activity level, running activity level, use of a paid app, and use of the fitness tracker. Except for tracker use (.097 significant at .05), these control variables had no significant effect on satisfaction. To investigate the moderation effect of severity, the data was divided into two subgroups according to the scenarios given. The path coefficients vary in

[2] The Recovery Scenario is a binary variable (0 or 1) and is generated to scale between 0 and 10. The expectation construct is measured by 3 items on a 7-point Likert scale. The mean of items is used and generated to the same scale. In cooperation with the idea of the assimilation contrast model, the difference of both values is considered.

significance level for two hypotheses; however, the difference could not be supported by the Welch–Satterthwaite t-test.

Table 2. Structural Model with Path Coefficients

Hypothesis	Total Model	Low severe Model	High severe Model	Severity Difference
	Path coefficient *t-value*	Path coefficient *t-value*	Path coefficient *t-value*	Δ Path coefficient
H1:EXP → SAT	0.163*** *(3.247)*	0.206** *(2.610)*	0.091 n.s *(0.083)*	0.115 *(1.004)*
H2:EXP → CON	-0.393*** *(15.199)*	-0.405*** *(3.436)*	-0.368*** *(11.141)*	0.037 *(-0.302)*
H3a:COMP → CON	0.589*** *(5.684)*	0.510 n.s. *(1.409)*	0.595*** *(10.968)*	0.085 *(-0.232)*
H3b:REMO → CON	0.699*** *(12.201)*	0.794*** *(0.139)*	0.657*** *(12.926)*	0.136 *(0.925)*
H4:CON → SAT	0.264*** *(5.189)*	0.319*** *(3.426)*	0.201*** *(2.882)*	0.0118 *(1.014)*

Notes: *significant at .1, ** significant at .05, *** significant at .01

DISCUSSION AND IMPLICATIONS

Implications for theory

The present work provides three theoretical contributions in which the results complement the existing literature. First, we put the expectation confirmation theory into an overall theoretical context together with the justice theory to get a better understanding of what consumers expect from a perceived data breach in terms of recovery measures. Second, our study provides not only insight into recovery actions in general, but also insight into incorporating the severity of a breach. Third, our study complements the existing security literature by illustrating how further research can explain customer responses and identify the right recovery measures such as compensation and remorse in response to a data breach. Although previous research has focused on how organizations can prevent data breaches and how security policies can be managed, it is particularly important for research and organizations to continue understanding and applying suitable recovery measures.

Practical Implications

Besides the theoretical contribution, the identified results help organizations optimize their strategies towards future recovery actions after a data breach. While Goode et al. (2017) found that the right amount of compensation is necessary when trying to avoid the generalized negativity effect, this paper has maintained a specific focus on the two recovery actions of compensation and remorse. As has been discussed, that expectation, as well as the perceived compensation and/or remorse, directly influence customer satisfaction. It is apparent in our research that remorse and compensation generally lead to customer satisfaction in the end. The results suggest that a remorseful apology after an incident is strongly recommendable because it is consistently expected by the majority of study participants and therein leads to satisfaction. While the expectation for compensation is not as strong as it is for remorse, compensation is still appropriate. Participants who did not expect but perceived compensation are even more satisfied than those participants who expected it. In addition, when there is confirmation for remorse or compensation, the customer tends to be particularly satisfied with the recovery action. Because of this, companies should consider investigating customer expectations in order to gain the ultimate recovery effect in case of a potential data breach to try to generate the correct interplay.

Limitations and Opportunities for Future Research

Our study has some important limitations that need to be considered, while also providing opportunities for future studies. Even though participants in the experiment owned a fitness activity tracker, the experiment was based on a fictitious data breach situation in which the participants had to empathize with the given situation. In the ideal case, future studies also offer a comprehensive validation of the measurements in which participants are actually affected by a data breach. Furthermore, two recovery measures were applied in the present work. As

mentioned above, injured parties have received either a fixed compensation and/or a defined apology. It cannot be excluded that different formulations would have had another effect on satisfaction. Hence, in the future, different formulations of apologies, as well as different forms and levels of compensation, should be given more focus in order to most accurately determine the extent of a participant's satisfaction. Moreover, a similar problem occurs with severity. The authors have freely chosen the definition of lower and higher severity, which needs to be further investigated as to whether these categories exist in relation to the severity of a data breach. In addition to satisfaction, which was studied as a dependent variable, other variables, such as loyalty or trust, could be studied to obtain a overview of the impact of recovery strategies.

CONCLUSION

In this study, we investigated the impact of data breach recovery measures on customer satisfaction, taking into account the severity of the data breach. For the investigation, we chose a 2x2x2 vignette design with 507 participants. The results demonstrated that different recovery strategies have a positive impact on customer satisfaction. Thus, with our study we can complement the growing knowledge base on how to recover after a data breach, as well as identify and derive initial strategies for future applications. Finally, the results can be applied to and extended by future research on data breach recovery actions and practical applications.

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