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Measuring the impact of critical incidents on brand personality

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Abstract

To evaluate how occurring critical incidents change customer perceptions of brand personality, this study measures the impact on the basis of an online experiment. For this purpose, 1,132 usable responses are gathered considering the smartphone brands of Apple and Nokia as well as different critical incidents (corruption vs. product failure). Brand personality perceptions before and after these negative incidents are collected using the measurement model of Geuens, Weijters and De Wulf (2009). The measurement model is examined and the group specific factor scores are estimated. Based on these factor scores, latent means are calculated and hence reactions (personality shifts) are evaluated. The findings indicate that brand personality dimensions are not equally affected. Moreover, the results demonstrate that both brand equity and the business relationship before crisis moderate the effect of distinct critical incidents.

Keywords:

Brand personality, critical incidents, negative publicity, online experiment

JEL Classification:

M14, M31, C12, C14, C38, C93

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1 Introduction

In a world where product characteristics are easily copied and consumers take product quality for granted (van Rekom, Jacobs & Verlegh, 2006) a strong brand is essential to enhance firm performance. Consequently, firms try to avoid any brand damaging behavior or events. Although, a complete absence of such negative incidents is impossible. Therefore, marketing research has been intensifying to figure out which incidents destabilize the relationship between individuals and brands (e.g. Keaveaney, 1995) and how this occurs (e.g. Aaker, Fournier, Brasel, 2004; Klein & Dawar, 2004).

Contributing to these questions, this study uses brand personality conceptualized as brand relevant and an applicable set of human personality traits (Azoulay & Kapferer, 2003) to identify relational changes and potential moderators. For this purpose, the recently proposed brand personality scale of Geuens, Weijters and De Wulf (2009) is applied in an online experiment. As a result, the analysis is able to quantify changes per personality dimension in the case of critical incidents.

Roos (2002) defines such critical incidents (CI) as extraordinary events which are perceived or recalled negatively by customers before purchase, during purchase or during consumption. The possible impact of these negative perceptions has led to some quantitative studies which focus mostly on service failures (e.g. Maxham & Netemeyer, 2002; Gustafsson, Johnson & Roos, 2005; van Doorn & Verhoef, 2008). The few remaining studies quantify either effects of product harm crises (Ahluwalia, Burnkrant & Unnava, 2000; Dawar & Pillutla, 2000; Klein & Dawar, 2004; Cleeren, Dekimpe & Helsen, 2008; Dawar & Lei, 2009) or unethical marketing behavior (Ingram, Skinner & Taylor, 2005).

In order to expand knowledge about perceptional and relational changes in the case of a product harm crisis as well as unethical behavior, this study compares reactions using the concept of brand personality. To put it in a nutshell, the study focuses on product brands in order to gain insights into immediate reactions to different critical incidents considering various brand strengths (Ahluwalia et al., 2000; Dawar & Pillutla, 2000; Cleeren et al., 2008) and relations before the incident (Ahluwalia, 2002; Dawar & Lei, 2009; van Doorn & Verhoef, 2008). As a result, the following study is the first which explores an integrated relationship-branding perspective and compares the effect of distinct critical incidents regarding various brands and personality dimensions. Moreover, by analyzing the smartphone brands Nokia and Apple in Germany, this study investigates and confirms the applicability and cross-cultural validity of the new personality scale beyond the Coca-Cola brand as required by Geuens et al. (2009).

The article first reviews the theoretical background of brand personality and critical incidents to continue with the development of hypotheses. The next sections present the research methodology, the sample and the results. Finally, discussion and limitations of this research are presented.

2 Theoretical background

2.1 Brand personality

The concept of brand personality has already been considered in research since 1958, when Martineau uses the word to characterize the special and non-material dimensions of a store. However, only Aaker (1997) revives a broader scientific interest in that animism theory-based concept. She defines brand personality as *a set of human characteristics associated with a brand* which develop by any direct or

indirect brand contact (Aaker, 1997). Following Parker (2009), direct sources of these personality traits are people and their behavior associated with the brand such as celebrities, the CEO or a spokesman. Whereas, indirect sources are all kinds of information, such as product attributes, prices, marketing and communication style, as well as the brand name and the symbol itself (Parker, 2009). These indirect personality associations are assigned to a brand on the basis of perceived brand behavior including the marketing mix and management decisions (Maehle & Supphellen, 2011).

Besides her conception, Aaker (1997) proposes a scale consisting of 42 items which reflect the five dimensions of sincerity, excitement, competence, sophistication and ruggedness. As a result, on the one hand, the proposed measurement model is examined several times, but not always with satisfactory results (e.g. Aaker, 1999; Ferrandi, Valette-Florence & Fine-Falcy, 2000; Aaker, Benet-Martinez & Garolera, 2001; Kim, Han & Park, 2001). On the other hand, Aaker's (1997) conceptionalization and scale have also been heavily criticized due to their inclusion of non-personality items (e.g. Azoulay & Kapferer, 2003; Bosnjak, Bochmann & Hufschmidt, 2007; Geuens et al., 2009), their non-generalizability at the respondent level (Austin, Siguaw & Mattila, 2003) and their cross-cultural non-replicable factor structure (e.g. Bosnjak et al., 2007; Milas & Mlačić, 2007; Geuens et al., 2009). To overcome these issues, Geuens et al. (2009) propose a new brand personality measure using the more strict conception of Azoulay and Kapferer (2003), who define brand personality as *the unique set of human personality traits both applicable and relevant to brands*.

Aaker (1997), Geuens et al. (2009) as well as the other above mentioned factor-analytic based brand personality studies share the idea that a five-factor model is able to reflect all relevant personality dimensions. These five dimensions are called in

many cases analogues to human personality OCEAN and include the dimensions of Openness, Conscientiousness, Extraversion, Agreeableness und Neuroticism (Azoulay & Kapferer, 2003). Goldberg (1990) labels them the Big Five. Inspired by these Big Five, a host of studies identify similar personality dimension (for an overview see Geuens et al., 2009).

Every personality dimension is split into facets to be reflected by various adjectives (also called markers of the Big Five by Goldberg (1992) and Saucier (1994)) which describe human personality traits. This procedure follows the psycho-lexicographical approach of Allport (1937), assuming that each relevant personality trait has become part of vocabulary via socializing and is hence mentioned in a dictionary. For example, the traits up-to-date, modern and innovative (Caprara, Barbaranelli & Guido, 2001) reflect the facets being open to new experiences and intellectual curiosity of the personality dimension Openness (Azoulay & Kapferer, 2003). Emphasizing the latter facet of this dimension, Milas and Mlačić (2007) relabel it Intellect. Also the Neuroticism dimension, including traits such as relaxed, phlegmatic and insensitive, is renamed Emotional Stability by Milas and Mlačić (2007).

Basically, due to the distinction between a sender and receiver perspective, brand personality is a major component of both brand identity (sender) and brand image (receiver). Consequently, on the one hand, Aaker and Joachimsthaler (2000) classify brand personality as one of the four brand identity elements in addition to the product, organization and symbol. On the other hand, following Plummer (1985), Keller (1993) identifies brand personality as one of the non-product related attributes of brand image perceived by consumers. Summed up, the concept of brand identity covers the desired public brand personality of a company (Kapferer, 2008), whereas,

brand image focuses on the perceived one. Therefore, brand personality is an appropriate instrument to manage a brand in a way that consumers build strong relations with it (Fournier, 1998).

2.2 Critical incidents

Flanagan (1954) first uses the term critical incident by labeling a set of observation procedures for human behavior as critical incident technique. These procedures gather observed incidents with special significance meeting systematically defined criteria (Flanagan, 1954). Bitner, Booms & Tetreault (1990) describe such an incident as critical when contributing significantly either positively or negatively to an activity or phenomenon. Focusing on negative incidents as defined by Roos (2002; see introduction), a negatively changed buying behavior can be triggered by these incidents (e.g. Gustafsson et al., 2005; Bitner et al., 1990). This would mean that companies lose operating efficiencies and future revenue streams as a result of customers who reduce their spending and purchase frequency, purchase at discount prices or switch to another supplier.

Different causes may trigger these consequences. In accordance with Keaveney (1995), CI result from either pricing problems, lack of convenience, core service (product) failures, service encounter failures, inadequate responses to failures, attraction by competitors or ethical problems. Concentrating on service failures, Keaveney (1995) distinguishes only two ethical problems while interacting with the customer: dishonest or intimidating behavior and conflicts of interest related to commission-based recommendations.

However, public awareness has changed with regard to what is deemed to be an ethical problem. Furthermore, due to better educated, increasingly skeptical and demanding consumers (Mangold & Faulds, 2009) and their ability to publish negative

incidents easily via the internet, customers do not experience most CI personally nowadays. Instead, people perceive especially ethical problems in the media as negative publicity. As a consequence, Shleifer (2004) takes a more general perspective on ethical problems and differentiates, additionally to Keaveney (1995), between employment of children, excessive executive payments, corporate earnings manipulation, involvement of universities in commercial activities and corruption.

In order to compare perceptional changes of brand personality with regard to two distinct critical incidents, this study quantifies immediate reactions after becoming aware of a product failure and an ethical problem such as corruption.

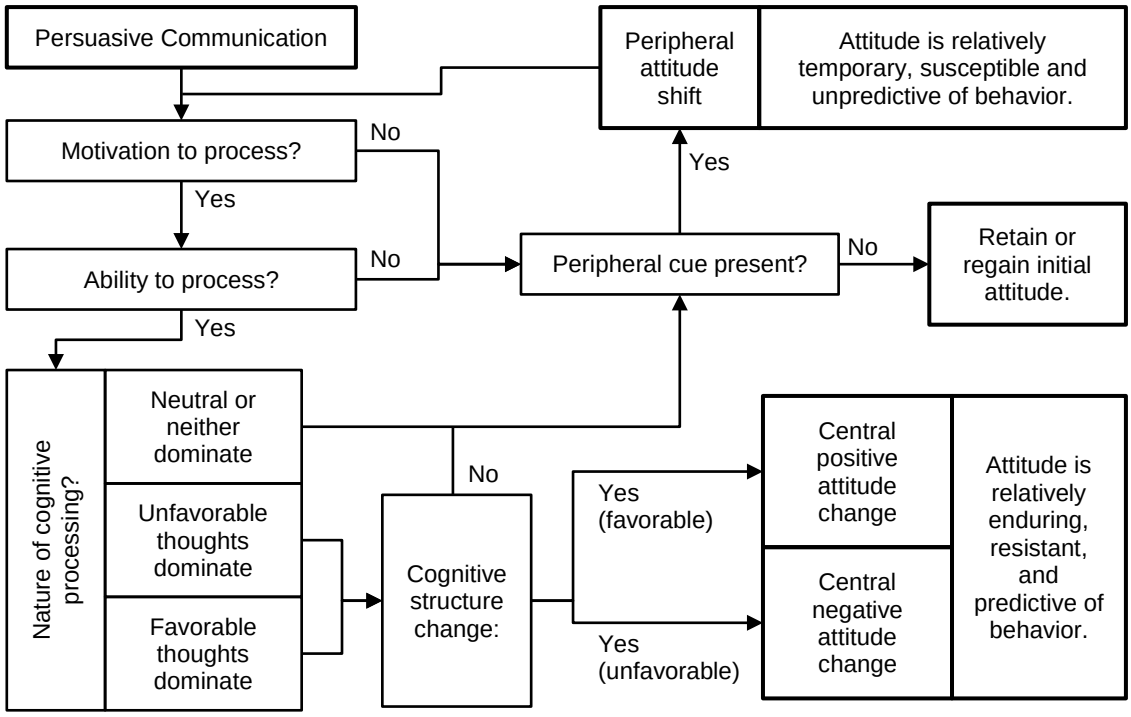
2.3 Information processing (cognitive response theory)

Cognitive response theory respectively the Elaboration Likelihood model (ELM) of Petty and Cacioppo (1986) explains differing reactions to CI and their causes with regard to customer-brand relation and transmitting media. ELM posits a central and a peripheral route of information processing for persuasion (see Figure 1). Depending on the route of information processing, stability of attitudes and hence the willingness to change them when critical incidents occur differ significantly.

Persuasion along the central route implicates an adoption and storage in memory of new cognitions due to dealing intensively with new information. This effortful elaboration implies the motivation and ability to process information which depends on personal relevance, initial attitudes, prior knowledge as well as the quality of arguments. Attitudes formed following this central route are expected to be relatively easily accessible, stable over time and resistant to competing messages (Petty, Haughtvedt & Smith, 1995). In contrast, the peripheral route refers to attitude formation and changes on the basis of simple cues such as source attractiveness,

credibility or message length which are relatively temporary (Petty, Cacioppo, Strathman & Priester, 2005).

Figure 1: Elaboration Likelihood model (cognitive response theory, Petty & Cacioppo, 1986)



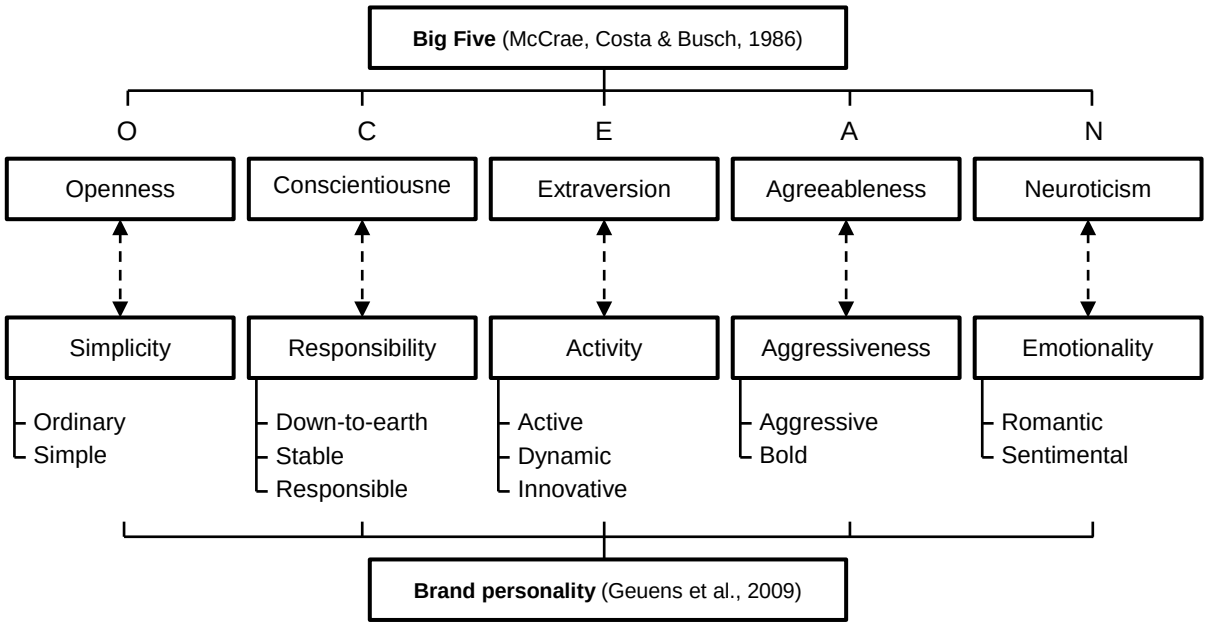
3 Development of hypotheses

3.1 Measurement hypotheses

In order to measure reactions, first, an appropriate measurement model has to be chosen. Due to above mentioned weaknesses of Aaker's (1997) brand personality scale, this study adopts the conception, factor structure and measures of Geuens et al. (2009) to take the within-brand variance at the respondent level into account during analyses. Furthermore, Geuens et al. (2009) have already shown the appropriateness of their scale to measure personality of mobile phone brands in general and of Nokia and Apple (iPhone) in particular. As depicted in Figure 2, their proposed scale consists of 12 items reflecting the dimensions Responsibility, Activity, Aggressiveness, Simplicity and Emotionality.

Figure 2: Measurement model of brand personality derived from a five factor model (Big Five)

(following McCrae, Costa & Busch, 1986; Geuens et al., 2009)



Following Geuens et al. (2009), these 12 markers cover all brand relevant facets of the human personality dimensions (OCEAN) and reproduce the Big Five quite well. They rename the dimensions Conscientiousness to Responsibility, Extraversion to Activity, Agreeableness to Aggressiveness, Openness to Simplicity and Neuroticism (Emotional stability) to Emotionality in accordance with (in line with) John and Srivastava (1999) to reflect more precisely the contained facets (Geuens et al., 2009). Based on the results in Belgium and in the US (iPhone), the following hypothesis is proposed:

Hypothesis 1: The scale of Geuens et al. (2009) is appropriate to measure brand personality of the smartphone brands Nokia and Apple.

This leads to the following sub hypotheses regarding the operationalizing of personality dimensions and their corresponding indicators:

Hypothesis 1a: The traits down to earth, stable and responsible reflect the dimension Responsibility.

Hypothesis 1b: The markers active, dynamic and innovative reflect the dimension Activity.

Hypothesis 1c: The traits aggressive and bold reflect the dimension Aggressiveness.

Hypothesis 1d: The markers ordinary and simple reflect the dimension Simplicity.

Hypothesis 1e: The dimension Emotionality is reflected by the markers romantic and sentimental.

3.2 Reaction hypotheses

Keller (1993) postulates that negative associations are formed on the basis of new negative information (knowledge). Several studies confirm basically this relationship when a critical incident occurs (e.g. Ahluwalia et al., 2000; van Heerde, Helsen & Dekimpe, 2007). However, due to different desired brand personalities and the absence of an optimal one in general, the question arises: What are negative personality associations? Regarding brand personality the negativity of a change depends on the perspective as well as on the desired and perceived personality or rather the gap between them. Consequently, the following more general hypothesis is proposed:

Hypothesis 2: A critical incident induces a change of (perceptional) brand personality.

However, closer examination reveals first indications that perceptions, and hence the impact of critical incidents, vary depending on customer-brand relation, crisis and the medium which transmits the message. These variations are attributable to differing cognitive responses and perceived risks.

3.2.1 Hypotheses due to customer-brand relation

With regard to customer-brand relation, following the ELM (Petty & Cacioppo, 1986), the reaction is expected to be moderated by both the relationship and the level of brand equity before crisis. The moderating relationship-effect is attributable to more favorable and stable attitudes of actual customers which are formed along the central route based on their own experiences and effortful elaboration with the brand. The pre-crisis level of brand equity moderates the reaction because of more often and favorable news coverage of a high equity brand. Consequently, compared to a low equity brand, consumers form more favorable and stable attitudes towards a high equity brand due to repetitions and greater number of senders (message sources and hence credibility increases).

Various studies confirm these moderators using the concepts familiarity (Ahluwalia, 2002; Cleeren et al., 2008; Dawar & Lei, 2009), commitment (Ahluwalia et al., 2000; Ingram et al., 2005) and brand equity (Dawar & Pillutla, 2000; Cleeren et al., 2008). Specifically, this means critical incidents have less influence on familiar customers, customers who are highly committed to a brand as well as customers with substantial brand equity. The authors attribute these buffering effects to more likely biased processing of loyal customers (Ahluwalia et al., 2000), their opportunity to increase their personal experience during crisis (Aaker & Biel, 1993) and their tendencies to resist or discount disconfirmatory information (Dawar & Pillutla, 2000).

Assuming that these concepts indicate an outcome of a more or less intensive elaboration (cognitive response) before crisis, their findings and explanations are in line with ELM (Petty & Cacioppo, 1986). Furthermore, supposing that loyal customers possess more brand knowledge as well as stronger associations (Romaniuk, 2008)

and are hence more familiar and committed compared to potential customers, consistent with prior research, the following hypotheses result:

Hypothesis 3: Compared to non-customers, current customers react and change their personality perception less intensively.

Hypothesis 4: Higher brand equity leads to smaller effects of the critical incident.

Based on the significantly higher brand equity of Apple (see Millward Brown, 2012; BrandZ) and the fact that Apple is considered to be a pioneer in producing smartphones, a more stable brand perception and brand personality is assumed. This stability results from a more often positive reporting with regard to the investigated product category compared to Nokia the less successful brand in 2011. Consequently, hypothesis 4 is refined and split into the following sub hypotheses:

Hypothesis 4a: The critical incidents affect the perceived brand personality of Apple customers less than Nokia customers.

Hypothesis 4b: Compared to Apple, potential customers of Nokia change their personality perception more.

3.2.2 Hypotheses due to the nature of crisis

According to Dawar and Lei (2009), the influence of the nature of crisis depends on whether key benefit associations are affected. This implies that different critical incidents influence different brand dimensions. Hence, transferred to brand personality, affected personality traits vary depending on the nature of crisis. This variation is due, above all, to differing customer perceptions of financial, functional, physical, social and/or psychological risks (Weißgerber, 2007).

A product failure goes usually hand in hand with financial (loss of investment) and functional (malfunction) risks, supplemented by physical risks in some cases. Due to the used settings (respondents are not in danger to be directly affected, see Chapter 4.1), only social and psychological risks are relevant for both product failure and corruption. More precisely, the risk is a loss of societal status due to lacking acceptance of brand usage as well as questioning of the emotional bond or self-expression benefits (Weißgerber, 2007).

Corruption as well as a product failure represents misbehavior of management possibly associated with the brand. Whereas corruption is a violation of ethical principles and illegal, a product failure is usually a consequence of lacking duty of care during the development or production of goods. Both incidents do not indicate responsible actions. Thus, the following hypotheses are proposed:

Hypothesis 5a: In the event of corruption, Responsibility (RES) goes down.

Hypothesis 5b: Responsibility (RES) decreases in the case of a product failure.

Moreover, corruption may indicate that a person (brand) is not innovative or dynamic enough to achieve objectives legally. In contrast, a product failure is a lack of action (testing and debugging) and an indicator of being less innovative. Hence, the next hypotheses are:

Hypothesis 6a: In the event of corruption, Activity (ACT) is negatively affected.

Hypothesis 6b: Activity (ACT) decreases in the case of a product failure.

From the customer's perspective, corruption is a deliberate misconduct of management to achieve financial objectives. This action, regardless of ethics, represents an aggressive behavior originated by base motives. Consequently, the following hypothesis is offered:

Hypothesis 7: In the case of corruption, the Aggressiveness increases.

In addition, depending on the nature of crisis, perceived seriousness (criticality) varies due to the potential amount of damage, geographic and chronological proximity as well as whether or not the people are directly affected. Laufer, Gillespie, McBride and Gonzalez (2005) show that perceived severity mediates the impact of critical incidents. Dawar and Lei (2009) confirm this mediation on negative perceptions measuring seriousness. Thus, the following hypothesis is proposed:

Hypothesis 8: Less critically perceived CI affect brand personality less.

3.2.3 Hypothesis due to transmitting medium

With regard to the medium transmitting bad news, in accordance with ELM (Petty & Cacioppo, 1986), the quality of arguments as well as the credibility of the medium (e.g. newspaper, expert) is crucial to affect attitudes. This means the more credible the medium is perceived, the more likely and more extensive the processing of information is. Consequently, the final hypothesis is offered:

Hypothesis 9: Less credibly perceived news affects brand personality less.

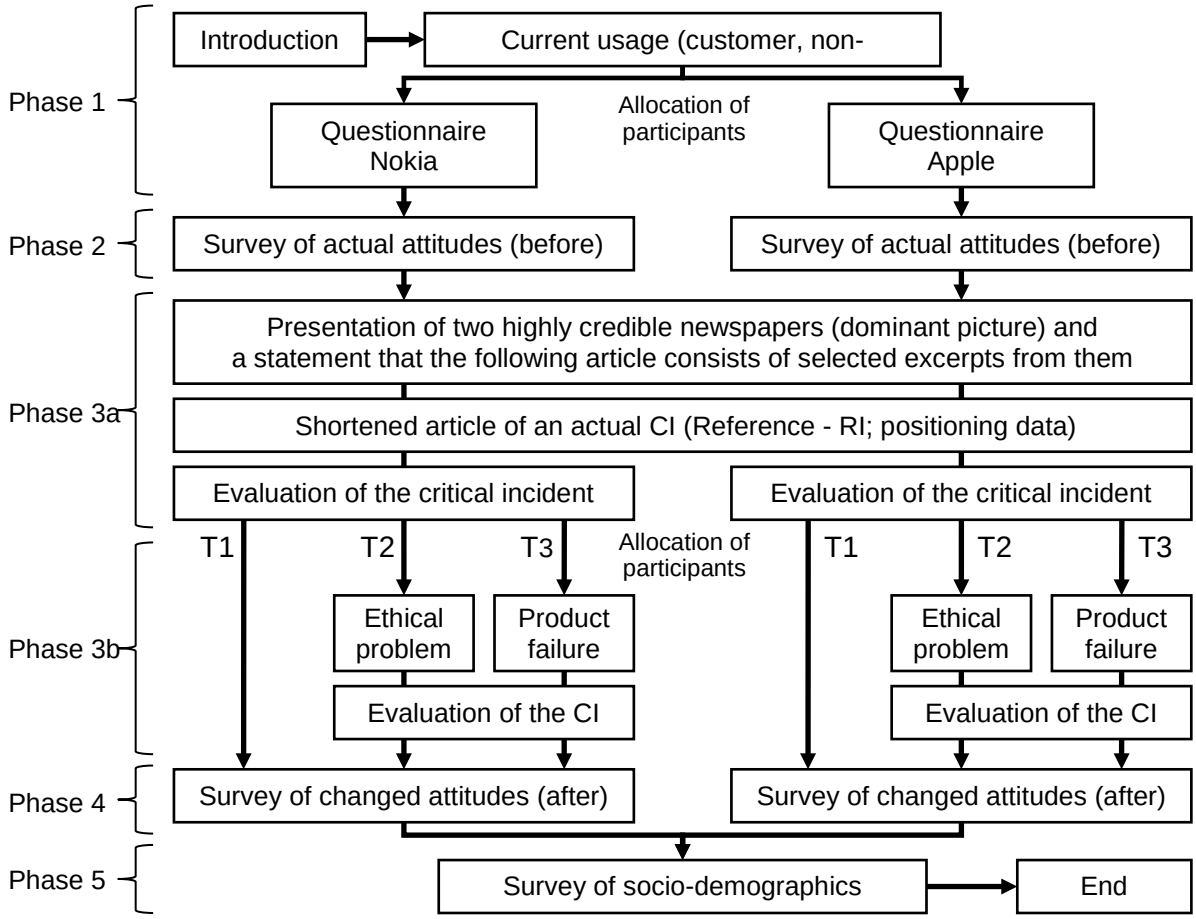
4 Methodology

4.1 Study design

In order to test these specified hypotheses, attitudinal data are gathered via the internet using an experimental pretest-posttest-control design. The experimental design considers additionally three independent variables – level of brand equity (low vs. high, Nokia vs. Apple respectively), current relationship (customer vs. non-customer) and the nature of the critical incident (product failure vs. ethical problem). Consequently, the design consists of 8 treatment and 4 control groups (2x2x3). All

test subjects are assigned randomly to a treatment or control group except current customers of the brands under investigation. Nokia and Apple customers are allocated randomly to a treatment or control group in their respective survey to reach or exceed a minimum threshold of responses in every group. This means, all responses regarding Nokia do not contain the responses of customers who use currently an Apple mobile phone and vice versa (see Figure 3).

Figure 3: Experimental design



The treatments are fictitious articles claiming a product failure or corruption happened recently in and limited to East Asia. Consequently, the incidents do not concern the participants personally. Focusing on attitudinal changes triggered by the incident, these articles exclude any kind of company response. In order to maximize credibility, the articles are created on the basis of past CI in the mobile phone

industry (malfunction of batteries and bribery to receive a government order). Also, all participants are exposed first to a well-known critical incident in the industry. For this purpose, this study takes advantage of the data protection discussion regarding smartphones which collect and save positioning data without the knowledge of its user. To offer or rather recall this information concerning both brands, two existing articles of highly credible German-language newspapers are combined. In addition, respondents are informed about the source and are exposed to a picture of cited newspapers speculating that memories of this picture increase the credibility of the fictional treatments.

Examining the success of manipulation and the influence of these mediators, subsequent to every article presentation, respondents evaluate their knowledge, perceived credibility and criticality of the critical incident. The article presentation (one per control group and two per treatment group) follows a second measurement of all brand equity dimensions. Consequently, pretest results reflect actual attitudes to a specific smartphone brand based on past perceptions and/or direct experiences, whereas, the second measurement covers the reaction to critical incidents. Finally, socio-demographics are collected.

4.2 Model evaluation and hypotheses tests

Before evaluating the measurement model, this study examines first the assumptions of varying perceived personalities with regard to loyal and potential customers as well as distinct brands. For this purpose, descriptive statistics are compared and significances of personality differences between groups are tested using a one-way ANOVA followed up by multiple comparisons with Bonferroni correction.

The evaluation of the measurement model consists of analyses regarding reliability, validity, model fit and invariance across groups. Starting with examinations of reliability and validity, a confirmatory factor analysis is conducted for each group. To assess the model fit, this study uses LISREL (version 8.80) with mean structures (Sörbom, 1974) to consider item means and invariance across samples according to Baumgartner and Steenkamp (2006). The estimated parameters (Maximum Likelihood Estimation) show the effect of variables in an absolute sense and are used to compare similar models in other populations (Bagozzi, 1977). Consequently, configural, metric, strong factorial and strict factorial invariance are sequently analyzed using multi-sample-analyses based on covariances and means.

Model evaluation follows an analysis of potential mediators such as knowledge, credibility and criticality. Between-subject effects are examined using ANOVA and multiple comparisons with Bonferroni correction. Within-subject effects of paired samples are analyzed to identify differences in perceptions of distinct incidents (reference incident (RI) to corruption (T2) or product failure (T3)).

In order to evaluate reactions to critical incidents, relative changes in latent variables are considered. To determine these latent variables, LISREL estimates factor scores taking into account model structure, group segmentation and actual attitudes (first measurement). Based on these factor scores, latent variables are calculated before and after the treatments for each respondent, assuming stable factor scores over time. Finally, changes in latent variables are examined using between- and within-subject analyses as well as parametric and non-parametric tests.

5 Sample

5.1 Data collection and profile of respondents

The data are collected online using a snowball-sampling. For this purpose, an internet link was spread via student mailing lists asking them to forward it via Facebook to friends. A total of 1,132 usable completed responses were gathered. 644 out of these 1,132 respondents (56.9%) used a smartphone at the date of the survey. Remaining treatments unconsidered, in comparison to 269 responses of current customers (CU) and 263 of non-customers (NC) regarding the Nokia survey, 243 current customer and 357 non-customer responses are collected regarding the Apple survey.

The socio-demographics reveal that the sample is balanced with a proportion of 50.7 percent female to 49.3 percent male respondents. In order to test for significant differences in distribution between groups, Pearson chi-square tests are applied followed up by comparisons of column proportions with adjusted p-values (Bonferroni method, $p < .05$). With regard to gender, all four groups are similar ($\chi^2(3) = 5.22$; .156).

Due to the addressing of students first, the sample includes an above-average share of 74.4% being students. Consequently, both the age cohort of 21- to 30-year old respondents and the lowest income group are over-represented. Specifically, 78.5 percent belong to this age cohort whereas 70.5 percent of participants earn less than 1,001€ per month net. However, chi-square test results reveal differences across groups with regard to age ($\chi^2(18) = 30.47$; .033) and monthly net income ($\chi^2(9) = 42.17$; .000). But comparisons of column proportions of age show that only the number of Nokia customers and potential Apple customers differ significantly in the youngest age cohort. Hence, due to the small amount of observations involved, this

difference seems negligible. In contrast, results regarding net income leave no doubt that the Apple-customer group differs significantly from the remaining three comparable groups (see Table 1).

Table 1: Crosstab and comparisons of column proportions (net income and group)

Net income (per month)		Nokia		Apple		Total
		NC*	CU**	NC*	CU**	
0 - 1,000€	Count	180_a	180_a	245_a	114_b	719
	% within net income	75.9%	72.3%	75.4%	54.5%	70.5%
1,001 - 2,000€	Count	45_a	49_a	50_a	66_b	210
	% within net income	19.0%	19.7%	15.4%	31.6%	20.6%
2,001 - 3,000€	Count	9_a	16_a	22_a	16_a	63
	% within net income	3.8%	6.4%	6.8%	7.7%	6.2%
>3,000€	Count	3_b	$4_{a.\ b}$	$8_{a.\ b}$	13_a	28
	% within net income	1.3%	1.6%	2.5%	6.2%	2.7%
Total	Count	237	249	325	209	1,020***
	% within net income	100.0%	100.0%	100.0%	100.0%	100.0%

* Non-customer ** Customer *** Difference to 1,032 responses are missing values ^{a,b} Each subscript letter denotes a subset of group categories whose column proportions do not differ significantly from each other at the .05 level (adjusted p-values, Bonferroni method).

Table 2: Crosstab and comparisons of column proportions (occupation and group)

Occupation		Nokia		Apple		Total
		NC*	CU**	NC*	CU**	
Employees	Count	24_c	$48_{a.\ b}$	$48_{a.\ c}$	54_b	174
	% within net income	9.2%	18.0%	13.6%	22.2%	15.5%
Freelancer	Count	5_a	6_a	13_a	13_a	37
	% within net income	1.9%	2.2%	3.7%	5.3%	3.3%
Civil servants	Count	8_a	2_a	6_a	3_a	19
	% within net income	3.1%	.7%	1.7%	1.2%	1.7%
Students	Count	218_c	$196_{a.\ b}$	$264_{a.\ c}$	157_b	835
	% within net income	83.5%	73.4%	75.0%	64.6%	74.4%
Pupils	Count	1_a	2_a	7_a	5_a	15
	% within net income	.4%	.7%	2.0%	2.1%	1.3%
Others	Count	5_a	13_a	14_a	11_a	43
	% within net income	1.9%	4.9%	4.0%	4.5%	3.8%
Total	Count	261	267	352	243	1,123***
	% within net income	100.0%	100.0%	100.0%	100.0%	100.0%

* Non-customer ** Customer *** Difference to 1,032 responses are missing values ^{a,b} Each subscript letter denotes a subset of group categories whose column proportions do not differ significantly from each other at the .05 level (adjusted p-values, Bonferroni method).

This means, while the proportion of low paid persons earning monthly a maximum of 1,000€ is significant smaller in the Apple customers group, persons with a net income between 1,001€ and 2,000€ are over-represented in comparison to other

groups. These higher incomes reflect the significantly higher proportion of employed persons in the Apple-customer group. Consequently, compared to the groups of potential customers of Apple or Nokia and loyal customers of Nokia, students are under-represented in the Apple customer group (see Table 2). As a result, the chi-square test leads to a rejection of hypothesized similar proportions regarding occupation in the groups ($\chi^2(15)$ = 40.14; .000).

5.2 Missing values

The fact that a forced choice should be avoided results in some missing values. The analysis of missing values regarding measurement models reveals that in only 846 out of 1,132 cases are the data complete. The remaining 286 cases have in total 1,637 missing values across all 24 variables (2 x 12 variables, PRE - POST). Overall, 6.03 percent of data are missing. However, Little´s (1988) test indicates on a five percent significance level that data are missing completely at random (MCAR) for both the overall sample ($\chi^2(3465)$ = 3151.00; 1.000) and the subsamples of Nokia-NC ($\chi^2(1497)$ = 1387.41; .979), Nokia-CU ($\chi^2(1384)$ = 1402.71; .357), Apple-NC ($\chi^2(401)$ = 437.86; .099) and Apple-CU ($\chi^2(850)$ = 848.84; .505). In other words, lack of data depends neither on observed nor on missing values (Rubin, 1976). Based on these results and to keep the sample size, missing values of the measurement model are imputed using the expectation-maximization (EM) algorithm. The imputation procedure is executed separately for the subsamples to avoid a loss of group specific characteristics.

6 Results

6.1 Brand personality (item level)

Table 3 shows descriptive statistics of the first measurement (actual attitudes) for both the whole sample and the subsamples. Furthermore, this table reports for each indicator the results of ANOVA with multiple comparisons. To assess the outcomes of ANOVA the significance level is adjusted to $p < 0.01$ due to shown deviations from a normal distribution and partly absence of homogeneity of variances. Although ANOVA is considered to be robust against such violations, in terms of multiple testing an additional non-parametric test is performed. This Kruskal-Wallis test and ANOVA indicate a significant main effect for group segmentation with regard to each item.

Focusing on item means, differences between both brands confirm the assumption of varying perceptional personalities with some minor exceptions. Comparing loyal customers (CU) of Nokia and Apple, outcomes indicate exceptions only for two responsibility items (RES2 & RES3). In contrast, multiple comparisons between potential customers (NC) reveal insignificant differences in the same responsibility items and in both emotionality items. The results regarding responsibility indicate that current usage is more important to gain new information about personality traits like stability and responsibility.

However, comparisons between loyal and potential customers for both brands show not only significant differences between means of the responsibility items, but activity items also differ significantly between customer segments. Furthermore, just considering Apple, customer segments vary significantly regarding both emotionality items and one simplicity item (SIM1). To conclude, in principle, associations differ between loyal and potential customers for Nokia and Apple.

Based on the higher brand equity of Apple (see Millward Brown, 2012; BrandZ) and the results of Table 3, one could conclude that a brand personality which is perceived more active, dynamic and innovative (Activity) is a competitive advantage. Furthermore, a certain degree of aggressiveness and exclusivity (not ordinary) seems to be useful. In general, the higher relevance of these personality traits (ACT1-3, AGG1 & 2 and SIM1) is supported by the estimated effect sizes of segmentation too. Finally, focusing on more relevant brand associations, the conclusion can still be drawn that both brands differ considerably**.**

Table 3: Descriptive statistics of actual attitudes (first measurement) and test of between-subject effects

PRE means (s.d.)	**Overall**		**Nokia**		**Apple**		**ANOVA******			Kruskal-Wallis-Test
			NC**	CU***	NC**	CU***		η^2		
	n=1132	Skewness / Kurtosis*	n=263	n=269	n=357	n=243	Model	Intercept	Segment	
RES1	**3.69** (1.54)	-.08 / -.76	**3.84**$_a$ (1.50)	**4.46** (1.39)	**2.93** (1.44)	**3.80**$_a$ (1.39)	.14	.87	.14	.000
RES2	**4.46** (1.50)	-.42 / -.39	**4.07**$_b$ (1.51)	**4.73**$_c$ (1.36)	**4.14**$_b$ (1.51)	**5.04**$_c$ (1.40)	.07	.90	.07	.000
RES3	**3.58** (1.54)	.04 / -.64	**3.28**$_d$ (1.48)	**3.82**$_e$ (1.52)	**3.24**$_d$ (1.51)	**4.11**$_e$ (1.46)	.06	.85	.06	.000
ACT1	**4.30** (1.79)	-.23 / -.99	**2.90** (1.31)	**3.46** (1.46)	**4.95** (1.53)	**5.80** (1.20)	.39	.90	.39	.000
ACT2	**4.31** (1.70)	-.25 / -.82	**3.06** (1.33)	**3.63** (1.47)	**4.86** (1.51)	**5.63** (1.20)	.33	.90	.33	.000
ACT3	**4.71** (1.85)	-.41 / -.98	**3.20** (1.37)	**3.74** (1.58)	**5.45** (1.53)	**6.33** (0.91)	.44	.92	.44	.000
AGG1	**3.51** (1.91)	.34 / -1.04	**2.26**$_f$ (1.26)	**2.41**$_f$ (1.28)	**4.63**$_g$ (1.76)	**4.44**$_g$ (1.79)	.34	.83	.34	.000
AGG2	**3.51** (1.69)	.26 / -.83	**2.40**$_h$ (1.18)	**2.63**$_h$ (1.26)	**4.46**$_i$ (1.55)	**4.29**$_i$ (1.53)	.31	.86	.31	.000
SIM1	**3.70** (1.69)	.19 / -.88	**4.86**$_j$ (1.42)	**4.52**$_j$ (1.48)	**3.11** (1.37)	**2.41** (1.25)	.33	.88	.33	.000
SIM2	**4.03** (1.54)	-.15 / -.64	**4.59**$_k$ (1.29)	**4.62**$_k$ (1.31)	**3.51**$_l$ (1.51)	**3.54**$_l$ (1.61)	.12	.89	.12	.000
EMO1	**1.84** (1.08)	1.43 / 2.24	**1.70**$_m$ (1.07)	**1.80**$_m$ (1.02)	**1.76**$_m$ (1.02)	**2.17** (1.17)	.03	.75	.03	.000
EMO2	**2.09** (1.30)	1.10 / .48	**1.67**$_n$ (1.05)	**1.95**$_n$ (1.17)	**2.15**$_n$ (1.34)	**2.64** (1.40)	.07	.73	.07	.000

* Standard Errors: .073 (Skewness), .145 (Kurtosis) ** Non-Customer *** Customer **** All corrected models, intercepts and fixed factors (group) are significant on $p < .01$; Levene-Tests are only not significant for all RES items and the EMO1 item on $p < .05$

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on $p < .01$ using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

6.2 Assessing reliability and validity

Table 4 and 5 report results of confirmatory factor analysis including indicator reliability, composite reliability, average variance extracted (AVE) and correlations between latent variables for each group. According to Bagozzi and Baumgartner (1994) calling for values equal to or greater than .40, all indicators are reliable. Consequently, indicator reliability is considered to be given.

Table 4: Indicator reliability (First measurement)

PRE (t-value)		RES			ACT			AGG		SIM		EMO	
		RES1	RES2	RES3	ACT1	ACT2	ACT3	AGG1	AGG2	SIM1	SIM2	EMO1	EMO2
Nokia	NC*	.59	.66 (13.09)	.74 (13.61)	.79	.86 (22.03)	.71 (18.31)	.55	.85 (7.82)	.90	.52 (6.67)	.81	.88 (14.54)
	CU**	.67	.74 (15.46)	.69 (14.86)	.77	.83 (21.05)	.79 (20.28)	.52	.83 (8.65)	.94	.40 (5.56)	.72	.90 (11.79)
Apple	NC*	.42	.55 (11.21)	.71 (11.75)	.55	.77 (15.32)	.59 (13.99)	.64	.66 (5.40)	.62	.41 (6.24)	.64	.72 (8.87)
	CU**	.62	.62 (11.75)	.59 (11.47)	.69	.64 (12.64)	.59 (12.13)	.64	.64 (5.00)	.62	.41 (4.84)	.88	.58 (7.15)

* Non-customer ** Customer

For evaluating internal consistency, this study uses Cronbach's alpha, composite reliability as well as the AVE. Cronbach's alpha exceeds the minimum level of acceptability of .70 (Nunnally, 1978) for all groups and constructs except the simplicity construct regarding both Apple groups. In contrast, composite reliability and AVE fully meet the limits of > .60 (Bagozzi and Yi, 1988) and > .50 (Fornell and Larcker, 1981) respectively. Consequently, due to the limited suitability of Cronbach's alpha (see Gerbing & Anderson, 1988) and the successful tests of composite reliability as well as AVE, the exceptions are negligible regarding simplicity. Finally, following Anderson and Gerbing (1988), significance of all t-tests imply indicators which measure effectively the same constructs. Therefore, internal consistency is considered to be given.

Assessing construct validity, first, following Fornell and Larcker (1981), the results of construct reliability imply convergence validity. Second, discriminant validity is given using the Fornell and Larcker (1981) test. AVE of all constructs exceeds the squared correlation between the considered and all other constructs. Third, according to Hildebrandt (1984), overall model fit is indicative of nomological validity (see next section). Finally, content validity is considered to be given due to positive judgments and reapplications of scales by experts (Cronbach and Meehl, 1955).

Table 5: Correlations of latent variables & reliability measures (First measurement)

PRE		NC*					CU**				
		RES	ACT	AGG	SIM	EMO	RES	ACT	AGG	SIM	EMO
Nokia	RES	1.00					1.00				
	ACT	.61	1.00				.59	1.00			
	AGG	.09	.42	1.00			.23	.47	1.00		
	SIM	-.03	-.36	-.18	1.00		.12	-.31	-.15	1.00	
	EMO	.36	.49	.39	-.30	1.00	.34	.37	.46	-.06	1.00
	Cronb. α	.86	.91	.81	.81	.91	.87	.92	.79	.76	.89
	Rel (ξ_j)	.85	.92	.82	.83	.92	.88	.92	.80	.79	.90
	AVE	.66	.79	.70	.71	.85	.70	.80	.67	.67	.81
Apple	RES	1.00					1.00				
	ACT	.64	1.00				.59	1.00			
	AGG	.05	.24	1.00			-.08	.04	1.00		
	SIM	-.06	-.39	.01	1.00		-.09	-.34	.30	1.00	
	EMO	.43	.36	.20	.13	1.00	.41	.29	.19	.30	1.00
	Cronb. α	.79	.84	.78	.67	.79	.83	.83	.77	.66	.83
	Rel (ξ_j)	.79	.84	.79	.68	.81	.83	.84	.78	.68	.84
	AVE	.56	.64	.65	.52	.68	.61	.64	.64	.52	.73

* Non-customer ** Customer

6.3 Measurement model evaluation (fit indices)

Evaluating overall model fit, the fit indices shown in Table 6 suggest an acceptable fit for both multi-sample analysis and all analyses for separate groups applying the combination rules of Hu and Bentler (1999). This means, despite severe criticism against global cut-off values (see e.g. Barrett, 2007; Chen, Curran, Bollen, Kirby and Paxton, 2008), this study uses .95 for NNFI and .08 for SRMR (Hu and Bentler, 1999) as well as .95 for CFI (Carlson and Mulaik, 1993). Additional

frequently-used fit indices are reported. Also NFI (> .90; Arbuckle, 2008), RMSEA (< .10; MacCallum, Browne and Sugawara, 1996) and chi-square-value divided by degrees of freedom (χ^2/d.f. < 3; Homburg & Giering, 1996) indicate an acceptable fit. As a result, hypothesis 1 is supported (appropriateness of Geuens et al. (2009) proposed measurement scale of brand personality).

Table 6: Fit indices of the measurement model

PRE		χ^2	d.f.	p-value	χ^2/df	RMSEA	LO/HI90	P-CLOSE	NFI	NNFI	CFI	GFI	AGFI	SRMR
Multi-Group-Analysis		379.73	176	.000	2.16	.064	.055/.073	.01	.95	.96	.97			
Nokia	NC*	101.40	44	.000	2.30	.071	.053/.089	.03	.96	.96	.97	.94	.89	.046
	CU**	100.80	44	.000	2.29	.069	.052/.087	.04	.96	.97	.98	.94	.90	.048
Apple	NC*	104.81	44	.000	2.38	.062	.047/.078	.09	.95	.95	.97	.95	.92	.053
	CU**	72.72	44	.004	1.65	.052	.029/.073	.42	.95	.97	.98	.95	.92	.053

* Non-Customer ** Customer

After supporting the equality of factor and model structure across groups with multi-sample analyses using same pattern and starting values (configural invariance), Table 7 contains the results of the additionally required invariance tests. Following Little, Card, Slegers and Ledford (2007), the respective invariance across groups is rejected if the descriptive fit index of NNFI changes more than .01 compared to the prior and weaker invariance level. Based on this criterion, the results suggest an absence of factorial invariance with regard to the measurement model. This means, latent variable means are not similar across brands and segments. As a consequence, immediate reactions triggered by various critical incidents are not directly comparable in an absolute sense across groups. Therefore, group specific factor scores are estimated on the basis of the measurement model structure to

compute and compare relative changes across groups and incidents (see Section 6.5).

Table 7: Invariance analysis across groups

PRE	X^2	d.f.	p-value	X^2/df	RMSEA	LO90	HI90	PCLOSE	NFI	NNFI	CFI
Metric invariance	496.51	197	0.000	2.52	0.073	0.065	0.082	0.00	0.94	0.95	0.96
Strong factorial invariance	656.70	218	0.000	3.01	0.084	0.077	0.092	0.00	0.92	0.93	0.94
Strict factorial invariance	1414.38	254	0.000	5.57	0.124	0.120	0.130	0.00	0.82	0.83	0.84

6.4 Investigation of potential mediators

Differences between participants' knowledge of the reference incident (RI) imply that this incident is widely known with regard to Apple and has been lost in the media with regard to Nokia. In contrast to approximately 77% (86%) questioned about Apple, just about 20% (21%) of potential customers (loyal customers) questioned about Nokia know this critical incident. Hence, the Pearson chi-square test indicates that the knowledge differs significantly between the groups ($\chi^2(3) = 414.17$; .000).

Reflected by a chi-square test ($\chi^2(3) = 6830$; .078) the hypothetical case of corruption (T2) is similarly unknown across groups (Nokia-NC - 97%, CU - 99%, Apple-NC - 93% and CU - 96%). Due to better known hypothetical product failure (T3) regarding Apple, variations are unexpectedly significant ($\chi^2(3) = 21.72$; .000). Although this critical incident is based on an event which happened to Nokia several years ago, 27% (31%) of Apple respondents claim to know the incident in contrast to 9% (14%) of potential (loyal) customers of Nokia.

Against this background, varying credibility is expected between brands for the reference incident and the product failure. However, analyses of potential mediators do not indicate significant variations between groups (see Table 8 to 10). Comparing

both hypothetical incidents within groups reveals that only credibility differs significantly between loyal Nokia customers (see Table 11).

Table 8: Descriptive statistics for evaluations of the actual incident and test of between-subject (group) effects

RI means (s.d.)	**Overall** n=1132	Skewness / Kurtosis*	**Nokia** NC** n=263	**Nokia** CU*** n=269	**Apple** NC** n=357	**Apple** CU*** n=243	**ANOVA**** η^2 Model	η^2 Intercept	η^2 Segment	Kruskal-Wallis-Test
Credibility	**5.06** (1.52)	- .48 / - .46	**5.07$_a$** (1.49)	**5.00$_a$** (1.44)	**5.08$_a$** (1.62)	**5.09$_a$** (1.52)	x	x	x	.702
Criticality	**5.48** (1.54)	- .94 / .19	**5.81$_b$** (1.38)	**5.70$_b$** (1.39)	**5.71$_b$** (1.39)	**4.53** (1.71)	.10	.93	.10	.000

* Standard Errors: .073 (Skewness), .145 (Kurtosis) ** Non-Customer *** Customer **** All shown corrected models, intercepts and fixed factors (groups) are significant on p < .01; Levene's test of equality of error variances is significant for both items (p < .05)

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on p < .01 using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

Table 9: Descriptive statistics for evaluations of corruption and test of between-subject (group) effects

T2 means (s.d.)	**Overall** n=426	Skewness / Kurtosis*	**Nokia** NC** n=107	**Nokia** CU*** n=102	**Apple** NC** n=135	**Apple** CU*** n=82	**ANOVA**** η^2 Model	η^2 Intercept	η^2 Segment	Kruskal-Wallis-Test
Credibility	**4.75** (1.24)	- .08 / - .33	**5.01$_a$** (1.20)	**4.59$_a$** (1.28)	**4.73$_a$** (1.19)	**4.62$_a$** (1.28)	x	x	x	.126
Criticality	**5.20** (1.40)	- .56 / - .11	**5.30$_b$** (1.39)	**5.24$_b$** (1.39)	**5.50$_b$** (1.27)	**4.55** (1.45)	.06	.93	.06	.000

* Standard Errors: .118 (Skewness), .236 (Kurtosis) ** Non-Customer *** Customer **** All shown corrected models, intercepts and fixed factors (segment) are significant on p < .01; Levene's test of equality of error variances is not significant for both items (p < .05)

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on p < .01 using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

Table 10: Descriptive statistics for evaluations of the product failure and test of between-subject effects

T3 means (s.d.)	**Overall** n=457	Skewness / Kurtosis*	**Nokia** NC** n=101	**Nokia** CU*** n=107	**Apple** NC** n=137	**Apple** CU*** n=112	**ANOVA**** η^2 Model	η^2 Intercept	η^2 Segment	Kruskal-Wallis-Test
Credibility	**5.02** (1.46)	- .50 / - .26	**5.11$_a$** (1.62)	**5.07$_a$** (1.41)	**4.99$_a$** (1.41)	**4.94$_a$** (1.43)	x	x	x	.646
Criticality	**4.98** (1.58)	- .54 / - .30	**5.41$_b$** (1.53)	**4.86$_{b,c}$** (1.51)	**5.15$_b$** (1.50)	**4.50$_c$** (1.65)	.04	.91	.04	.000

* Standard Errors: .114 (Skewness), .228 (Kurtosis) ** Non-Customer *** Customer **** All shown corrected models, intercepts and fixed factors (segment) are significant on p < .01; Levene's test of equality of error variances is not significant for both items (p < .05)

[a,b] Each subscript letter denotes a subset of groups whose (observed) mean differences are not significant on p < .01 using Multiple Comparisons (Post-Hoc-Test, Bonferroni)

Table 11: Independent samples test of mean differences (test between subjects within groups - T2 to T3)

T2 to T3			Levene's test			t-test for Equality of Means					Independent-Samples Mann-Whitney U Test
			F	Sig.	EV***	Mean Difference	Std. Error	t	d.f.	Sig. (2-tailed)	
Credibility	Nokia	NC*	10.272	.002	EV not assumed	-.100	.199	-.502	184	.617	.262
		CU**	.917	.339	EV assumed	-.481	.187	-2.566	207	.011	.008
	Apple	NC*	1.977	.161	EV assumed	-.252	.158	-1.592	270	.113	.064
		CU**	.589	.444	EV assumed	-.316	.199	-1.586	192	.114	.077
Criticality	Nokia	NC*	1.625	.204	EV assumed	-.107	.202	-.528	206	.598	.389
		CU**	.138	.711	EV assumed	.375	.202	1.863	207	.064	.078
	Apple	NC*	3.227	.074	EV assumed	.343	.169	2.031	270	.043	.056
		CU**	1.582	.210	EV assumed	.053	.228	.234	192	.815	.834

* Non-customer ** Customer *** Equal variances

Contrary to expectations that a less known product failure is perceived less credible than the reference incident, the results in Table 12 do not reveal significant effects within subjects regarding credibility. In contrast, in the case of corruption (T2), credibility decreases except for Nokia-NC. In short, the experimental design works as intended. Hypothetical incidents are perceived as credible (mean > 4.5).

Considering the evaluations of criticality between groups, the biased information processing of current Apple customers is striking compared to other groups. Apple customers perceive the reference and both hypothetical treatments similar and less critical. However, perceived criticality of hypothetical incidents does not differ significantly for other groups either. Nevertheless, criticality decreases significantly in comparison to the reference for both Nokia groups regarding corruption as well as for Nokia-CU and Apple-NC regarding product failure.

Table 12: Descriptive statistics and test of within-subject effects (reference CI to T1 and T2)

Reference CI (RI) to T2 and T3				Paired Differences			t-value	d.f.	Sig. (2-tailed)	Wilcoxon signed rank test
				Mean***	s.d.	Std. Error				
Credibility	Nokia	NC*	RI - T2	.20	1.62	.156	1.256	106	.212	.149
			RI - T3	.01	1.68	.167	.059	100	.953	.802
		CU**	RI - T2	.35	1.40	.139	2.495	101	.014	.017
			RI - T3	.03	1.49	.144	.195	106	.846	.914
	Apple	NC*	RI - T2	.42	1.66	.143	2.905	134	.004	.007
			RI - T3	.09	1.47	.125	.699	136	.486	.390
		CU**	RI - T2	.66	1.98	.218	3.017	81	.003	.001
			RI - T3	.08	1.62	.153	.526	111	.600	.509
Criticality	Nokia	NC*	RI - T2	.52	1.72	.166	3.152	106	.002	.002
			RI - T3	.35	1.80	.179	1.932	100	.056	.041
		CU**	RI - T2	.72	1.41	.140	5.127	101	.000	.000
			RI - T3	.73	2.15	.208	3.503	106	.001	.000
	Apple	NC*	RI - T2	.01	1.52	.131	.056	134	.955	.814
			RI - T3	.77	1.60	.137	5.662	136	.000	.000
		CU**	RI - T2	-.02	2.05	.226	-.108	81	.914	.884
			RI - T3	.22	2.29	.218	.993	111	.323	.352

* Non-customer ** Customer *** Bigger values represent higher losses (negative differences)

6.5 Reactions to critical incidents (changes in latent means)

Variations between latent means before and after the treatments are the basis to determine reactions. These latent means are calculated construct and group specific using the estimated factor scores (see Appendix Table 16). Table 13 presents the resulting percentage changes of means for each brand personality dimension sorted by groups. Furthermore, the table contains the corresponding significance level of the paired sample tests (see Appendix Table 17 for detailed results). Overall, results clearly demonstrate the impact of CI on perceived brand personality and support hypothesis 2. However, closer examination reveals considerable differences in reactions.

The comparison of reaction intensities between loyal and potential customers within brands reveals that loyal customers react less intensely. These findings indicate that potential customers (NC) lack a comprehensive elaboration

strengthening their associations towards the brand. Therefore, the more intense reactions of potential customers support hypothesis 3.

Table 13: Percantage changes of perceived personality constructs (total effects)

Relative changes (total)			RES	ACT	AGG	SIM	EMO
T1	Nokia	NC* n=55	- 11.4 % $^{+++}$	- 9.9 % $^{+++}$	5.2 %	- 10.2 % $^{+++}$	- 8.0 % $^{+++}$
		CU** n=60	- 7.9 % $^{+++}$	- 7.7 % $^{+++}$	2.5 %	- 7.0 % $^{++}$	- 6.8 % $^{++}$
	Apple	NC* n=85	- 4.6 % $^{++}$	- 3.0 % $^{+}$	1.7 %	- 3.9 %	- 1.7 %
		CU** n=49	- 1.6 %	- 0.7 %	1.2 %	0.2 %	0.1 %
T2	Nokia	NC* n=107	- 19.0 % $^{+++}$	- 14.7 % $^{+++}$	11.7 % $^{+++}$	- 8.1 % $^{+++}$	- 13.0 % $^{+++}$
		CU** n=102	- 14.6 % $^{+++}$	- 11.9 % $^{+++}$	6.3 % $^{+}$	- 5.6 % $^{+}$	- 10.8 % $^{+++}$
	Apple	NC* n=135	- 10.1 % $^{+++}$	- 6.8 % $^{+++}$	4.4 % $^{+++}$	- 3.6 %	- 5.1 % $^{++}$
		CU** n=82	- 5.3 % $^{+++}$	- 3.4 % $^{+++}$	3.3 % $^{+}$	- 2.6 %	- 3.3 %
T3	Nokia	NC* n=101	- 14.7 % $^{+++}$	- 12.2 % $^{+++}$	3.3 %	- 5.2 % $^{++}$	- 5.4 % $^{+++}$
		CU** n=107	- 10.1 % $^{+++}$	- 9.6 % $^{+++}$	1.2 %	- 2.7 %	- 3.6 %
	Apple	NC* n=137	- 6.3 % $^{+++}$	- 4.6 % $^{+++}$	1.1 %	- 2.2 %	- 3.4 % $^{+++}$
		CU** n=112	- 3.1 % $^{+++}$	- 2.2 % $^{+++}$	1.0 %	- 0.7 %	- 1.9 %

* Non-customer ** Customer $^{+}$ $p < 0.1$ $^{++}$ $p < 0.05$ $^{+++}$ $p < 0.01$ (2-tailed paired samples t-test)

Comparing percentage changes in light of hypotheses 4a and b, smaller latent mean shifts confirm the buffering effect of brand equity with regard to Apple. However, assuming additive effects of reference and hypothetical incidents for groups exposed to both (T2 & T3), more intense responses regarding Nokia may be attributable to clearly diverging knowledge of the reference incident. Therefore, based on the assumption that reference incident reactions are comparable across subsamples of one brand and customer group, Table 14 shows the adjusted percentage changes of latent means. Moreover, to examine the significance of the

additional exposure to corruption or product failure, latent mean shifts (delta) are analyzed in comparison to the control groups (T1) which are only confronted with RI (for detailed results see Appendix Table 18 & 19). Taking these adjustments into account, findings support hypotheses 4a and b. More precisely, reactions are more intense (mean differences are bigger) for Nokia comparing loyal or potential customers between brands (see Table 14).

Table 14: Percantage latent means changes of perceived personality constructs (adjusted effects)

Relative changes (adjusted)			RES	ACT	AGG	SIM	EMO
T2	Nokia	NC*	- 7.6 % +	- 4.8 %	6.5 %	2.2 %	- 5.0 %
		CU**	- 6.7 % ++	- 4.3 %	3.9 %	1.3 %	- 4.0 %
	Apple	NC*	- 5.4 % ++	- 3.8 % +	2.7 %	0.2 %	- 3.5 %
		CU**	- 3.7 %	- 2.7 %	2.1 %	- 2.8 %	- 3.4 %
T3	Nokia	NC*	- 3.3 %	- 2.3 %	- 1.9 %	5.0 %	2.6 %
		CU**	- 2.2 %	- 2.0 %	- 1.2 %	4.3 %	3.3 %
	Apple	NC*	- 1.7 %	- 1.6 %	- 0.6 %	1.7 %	- 1.7 %
		CU**	- 1.5 %	- 1.5 %	- 0.3 %	- 0.9 %	- 1.9 %

* Non-customer ** Customer + $p < 0.1$ ++ $p < 0.05$ +++ $p < 0.01$ (2-tailed independent samples t-test)

Furthermore, in addition to noticeable simplicity reductions of loyal Apple customers, reaction intensities in Table 14 reveal a clear rank order except once (see T3, Apple - emotionality). This rank order corresponds considerably to brand equity order.

Table 13 indicates responsibility decreases after all CI, with one exception. In conformity with the theory that new information only induces a revaluation, Apple customers do not change their responsibility perception in the case of the well-known reference incident. Focusing on hypothesis 5a, despite significant total effects in the case of corruption, comparisons between control and treatment groups show a significant responsibility decrease in 3 out of 4 groups (all except Apple-CU, see Appendix Table 18). In contrast, results regarding product failure reveal insignificant

responsibility shifts (see Appendix Table 19). Consequently, hypothesis 5b is not supported.

Considering activity perception changes with regard to hypotheses 6a and b, the results are similar. Despite significant and negative total effects in both cases, t-tests for equality of means (delta of latent means) between control and experimental groups support hypothesis 6a only once and never hypothesis 6b. However, non-parametric test results do not confirm support for hypothesis 6a (see Appendix, Table 18). Therefore, hypothesis 6 is considered to be not supported.

Although aggressiveness increases in conformity with hypothesis 7, only the positive total effects are significant in the event of corruption (see Table 13 & 14). Consequently, hypothesis 7 is not supported.

To evaluate hypothesis 8, that less critical perceived incidents induce a less intense perceptional change of brand personality, only seven treatment combinations are available with significantly differing criticality judgments (see Table 11 & 12). Assessing reactions based on the number of less affected personality dimensions, all combinations support this hypothesis. This means, lower criticality perception diminishes critical incident effects.

With regard to hypothesis 9, presuming that less credible incidents have a minor effect on brand personality, results are contradictory. On the one hand, focusing on reactions between RI and T2 regarding Nokia customers (see Table 13 & 14), findings support this hypothesis. On the other hand, evaluating reactions for the remaining 4 significant credibility changes (see Table 11 & 12), supportive results do not exist. However, criticality and credibility effects overlap comparing reactions to hypothetical incidents. But significant findings regarding criticality imply that perceived criticality dominates the effect over credibility.

Overall, corruption results in a more intense immediate reaction compared to the product failure for all groups except the customers of Apple. In conclusion, the following table presents all results with regard to reaction hypotheses.

Table 15: Overview of results (reaction hypotheses)

Reaction hypotheses		**Corruption**	**Product failure**
2	CI induce a perceptional change of BP	Supported	
3	Customers react less intensively than NC	Supported	
4a	Brand equity buffers negative effects (CU)	Supported	Supported
4b	Brand equity buffers negative effects (NC)	Supported	Supported
5a	Responsibility goes down (corruption)	Support in 3/4	X
5b	Responsibility goes down (product failure)	X	Not supported
6a	Activity decreases (corruption)	Support in 1/4	X
6b	Activity decreases (product failure)	X	Not supported
7	Aggressiveness increases (corruption)	Not supported	X
8	Less critically perceived CI affect BP less	Support in 1/5	
9	Less credibly perceived CI affect BP less	Supported	

7 Discussion

Nowadays, critical incidents occur quite often and are present in the media. Consequently, consumers are frequently confronted, deliberately or otherwise, with negative publicity. Therefore, in order to be able to minimize negative impact and to manage marketing response adequately, companies have to understand customer reactions in such a case. For this reason, this paper addresses the essential questions: When and to which extent do such critical incidents change brand perception? More precisely, this study examines which brand personality dimensions are affected depending on the nature of CI and which moderators are relevant.

For this purpose, an online experiment is conducted whose design increases external validity and overcomes some criticisms of previous experiments (e.g. Cleeren et al., 2008; van Heerde et al., 2007, Grewal, Roggeveen & Tsiros, 2008).

Therefore, first, participants receive information about the critical incidents via internet as negative publicity (Ahluwalia et al., 2000) in their familiar surroundings. Second, incidents are based on actual historical events and are transmitted via real credible media. Third, the analysis considers simultaneously various customer segments, incidents and brands on the basis of a large sample. Finally, effects are examined taking into account real brands and business relations.

What determines the impact of critical incidents? First of all, the nature of crisis and the degree to which people are personally affected play an important role. Regarding the nature of CI, reactions measured indicate corruption induces greater perceptional changes than product failure. This finding verifies the increase in importance of ethical behavior today (Shleifer, 2004). But this rank order may differ when people are personally affected. Moreover, criticality perception and the customer-brand relation in terms of strength (customer based brand equity) and status (business relation) moderate the impact according to findings.

The comparison of moderators shows that high brand equity is the best buffer against negative impacts of critical incidents as hypothesized earlier (Hess, Ganesan and Klein, 2003; Tax, Brown & Chandrashekaran, 1998). However, as supposed by Dawar and Pillutla (2000), the current usage of a brand also reduces clearly the negative effect. In other words, if a critical incident occurs, then actual customers shift their attitudes less due to the attitude stabilizing anchor - their current usage. But this reaction intensity order may be the other way around when personally affected.

In principle, the obtained results confirm indirectly the existence of moderators such as commitment (e.g. Ingram et al., 2005) and familiarity (e.g. Ahluwalia, 2002). Taking for granted that commitment is a key factor for successful sales (Morgan & Hunt, 1994), loyal customers possess a high commitment because they have already

bought the brand. Overall, all these moderators have in common that more stable attitudes reduce the effect of external and potentially attitude changing incidents. Furthermore, cognitive response theory (Petty & Cacioppo, 1981) explains both the underlying cause of stable attitudes (perceptions) and their buffering effect as results of prior necessary intensive elaboration.

With regard to affected personality dimensions, findings suggest that the number and type as well as the effect size depend on the type of CI and the above mentioned moderators. The reactions to corruption and the reference incident indicate that responsibility is more affected when companies or their staff consciously behaves incorrectly. Moreover, such misbehavior seems to affect aggressiveness as well but not significantly.

However, assuming that responsibility is a key dimension of personality to commit to a business relation, the perceived responsibility shifts are crucial for future development of companies. Also, robust personality perceptions of Apple customers in both hypothetical incidents imply that critical incidents do not have to affect perceptions negatively. But the lacking of strong reactions following the reference incident with regard to Apple is attributable to prior elaboration of the incident.

Significant reductions of simplicity (SIM) and emotionality (EMO) triggered by the RI regarding Nokia contradicts the statement of Dawar and Lei (2009) that core associations shift only when directly affected by crisis. When respondents are personally affected, immediate reactions imply a general linear downgrade of positive associations towards the brand. However, apparently most respondents interpreted simplicity (SIM) as a negative trait and not in terms of easy to handle (higher association level of Nokia compared to Apple).

Finally, if CI and the corresponding bad news occur rarely for a company, then appropriate handling can be an opportunity to improve brand personality perceptions in the long run. In principle, post crisis communication should focus especially on significantly damaged dimensions of personality. Additionally, post crisis communication should address potential customers differently due to their lacking opportunity of perception stabilizing usage of the brand.

8 Limitations and future research

This analysis may be subject to some limitations. First, this study focuses on one product class with basically utilitarian products and high involvement choice processes. Therefore, future research has to figure out whether and in which ways effects vary in other combinations of utilitarian, hedonistic as well as low and high involvement goods.

Second, personality shifts considered here are immediate reactions. Effects in the long run may differ considerably. Differences may result from more frequent confrontations with a CI or a more intensive and compensating personal experience during crises. As a result, a more intense elaboration can lead to different outcomes (Petty et al., 2005).

Third, data are collected using snowball-sampling and a self-administered online experiment. Consequently, sample composition and representativeness might raise some concerns about the generalizability of results. However, taking the typical target group of smartphones into account, the used sample seems adequate containing mainly young technically inclined people and an above average share of smartphone users (56.9%).

Fourth, the experimental design and the context of research possibly limit the external validity and generalizability of findings. On the one hand, immediate shifts may differ to reactions in the long run. Moreover, being exposed more often to a critical incident may lead to modified attitudinal changes. On the other hand, people personally affected by a critical incident probably react more emotionally and hence differently.

Fifth, the applied methodology requires multivariate normal distributed variables, but variables of the used sample are not even univariate normal distributed. However, following Boomsma and Hoogland (2001), Yuan, Bentler and Zhang (2005), Ryu (2011) and West, Finch and Curran (1995), violations are less critical for large samples (> 200) and positive or negative skewness and kurtosis below 2.0 and 7.0 respectively.

Finally, these limitations, other types of critical incidents, other cultures, brands and branches as well as other measurement models are possible fruitful lines for further research.

Appendix

Table 16: Latent variable means (calculated on the basis of estimated factor scores)

Latent means (s.d.)			RES		ACT		AGG		SIM		EMO	
			PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Nokia	NC*	**T1** n=55	3.45 (1.09)	3.06 (1.24)	2.84 (1.15)	2.56 (1.31)	2.02 (.95)	2.13 (.95)	4.45 (1.16)	4.00 (1.48)	1.58 (.97)	1.46 (.87)
		T2 n=107	3.17 (1.03)	2.57 (1.02)	2.79 (1.12)	2.38 (1.05)	1.95 (.86)	2.18 (.94)	4.38 (1.25)	4.03 (1.43)	1.51 (.95)	1.31 (.64)
		T3 n=101	3.27 (1.20)	2.79 (1.15)	2.66 (1.08)	2.33 (1.03)	1.97 (.98)	2.04 (.95)	4.58 (1.44)	4.34 (1.27)	1.55 (.87)	1.47 (.78)
	CU**	**T1** n=60	3.87 (1.00)	3.57 (.99)	3.34 (1.03)	3.08 (1.02)	2.18 (.89)	2.23 (.92)	4.24 (1.32)	3.94 (1.26)	1.39 (.71)	1.29 (.71)
		T2 n=102	3.77 (1.08)	3.22 (1.09)	3.01 (1.23)	2.65 (1.16)	1.96 (.86)	2.09 (.98)	4.43 (1.37)	4.18 (1.28)	1.32 (.74)	1.17 (.62)
		T3 n=107	3.85 (1.05)	3.46 (1.23)	3.20 (1.29)	2.90 (1.31)	2.02 (.86)	2.04 (.93)	4.30 (1.52)	4.18 (1.55)	1.35 (.77)	1.30 (.72)
Apple	NC*	**T1** n=85	2.57 (.77)	2.45 (.79)	3.76 (1.05)	3.65 (1.15)	4.44 (1.30)	4.52 (1.13)	1.75 (.91)	1.68 (.89)	1.35 (.61)	1.33 (.65)
		T2 n=135	2.61 (.83)	2.35 (.87)	3.84 (1.04)	3.58 (1.18)	4.37 (1.28)	4.57 (1.16)	1.80 (.86)	1.73 (.98)	1.41 (.60)	1.34 (.61)
		T3 n=137	2.57 (.85)	2.40 (.86)	3.75 (1.12)	3.58 (1.17)	4.47 (1.40)	4.51 (1.26)	1.79 (.95)	1.75 (.91)	1.42 (.65)	1.37 (.66)
	CU**	**T1** n=49	4.46 (.89)	4.39 (1.10)	6.10 (.86)	6.05 (.88)	4.76 (1.43)	4.82 (1.32)	1.10 (.77)	1.10 (.80)	2.16 (.84)	2.16 (.95)
		T2 n=82	4.45 (1.02)	4.21 (1.09)	6.09 (1.00)	5.89 (1.12)	4.45 (1.29)	4.60 (1.26)	0.98 (.80)	0.95 (.78)	2.15 (.94)	2.08 (.93)
		T3 n=112	4.50 (1.09)	4.35 (1.17)	6.13 (1.03)	6.00 (1.01)	4.56 (1.43)	4.61 (1.34)	0.94 (.79)	0.93 (.81)	2.20 (1.14)	2.16 (1.19)

* Non-customer ** Customer

Table 17: Latent variable means (calculated on the basis of estimated factor scores)

Paired samples test (PRE – POST)			NC*					CU**				
			RES	ACT	AGG	SIM	EMO	RES	ACT	AGG	SIM	EMO
Nokia	T1	Mean (s.d.)	.39 (.75)	.28 (.72)	-.11 (.83)	.46 (1.15)	.13 (.30)	.31 (.48)	.26 (.38)	-.05 (.69)	.30 (1.00)	.09 (.35)
		t	3.880	2.897	-.946	2.947	3.098	4.899	5.211	-.598	2.303	2.064
		df			54					59		
		Sig.***	.000	.005	.349	.005	.003	.000	.000	.552	.025	.043
	T2	Mean (s.d.)	.60 (.49)	.41 (.53)	-.23 (.72)	.35 (1.05)	.20 (.52)	.55 (.83)	.36 (.67)	-.12 (.64)	.25 (1.43)	.14 (.43)
		t	12.582	7.952	-3.283	3.497	3.858	6.697	5.462	-1.970	1.761	3.338
		df			106					101		
		Sig.***	.000	.000	.001	.001	.000	.000	.000	.052	.081	.001
	T3	Mean (s.d.)	.48 (.62)	.32 (.58)	-.07 (.87)	.24 (.97)	.08 (.31)	.39 (.72)	.31 (.52)	-.03 (.50)	.12 (1.05)	.05 (.45)
		t	7.761	5.655	-.760	2.470	2.739	5.638	6.113	-.516	1.139	1.118
		df			100					106		
		Sig.***	.000	.000	.449	.015	.007	.000	.000	.607	.257	.266
Apple	T1	Mean (s.d.)	.12 (.47)	.11 (.54)	-.07 (.61)	.07 (.58)	.02 (.34)	.07 (.60)	.04 (.42)	-.06 (.56)	.00 (.76)	.00 (.57)
		t	2.355	1.890	-1.108	1.079	.625	.828	.739	-.730	-.022	-.015
		df			84					48		
		Sig.***	.021	.062	.271	.284	.534	.412	.463	.469	.982	.988
	T2	Mean (s.d.)	.26 (.45)	.26 (.68)	-.19 (.76)	.07 (.67)	.07 (.33)	.24 (.69)	.21 (.62)	-.15 (.73)	.03 (.50)	.07 (.51)
		t	6.740	4.461	-2.931	1.143	2.524	3.125	3.009	-1.813	.456	1.276
		df			134					81		
		Sig.***	.000	.000	.004	.255	.013	.002	.003	.074	.649	.206
	T3	Mean (s.d.)	.16 (.35)	.17 (.49)	-.05 (.71)	.04 (.52)	.05 (.21)	.14 (.54)	.14 (.41)	-.04 (.69)	.01 (.46)	.04 (.55)
		t	5.376	4.146	-.785	.890	2.658	2.744	3.576	-.691	.158	.787
		df			136					111		
		Sig.***	.000	.000	.434	.375	.009	.007	.001	.491	.875	.433

* Non-customer ** Customer *** 2-tailed test

Table 18: Independent samples test (comparing reactions of control group and product failure – T1 to T2)

Control Group - Corruption			Levene's Test			t-test for equality of means					Independent-Samples Mann-Whitney U Test
			F	Sig.	EV***	Mean Difference	Std. Error	t	df	Sig. (2-tailed)	
Delta-RES	Nokia	NC*	5.059	.026	EV not assumed	.207	.112	1.841	79	.069	.019
		CU**	12.925	.000	EV not assumed	.242	.103	2.351	160	.020	.026
	Apple	NC*	0.024	.876	EV assumed	.144	.064	2.264	218	.025	.037
		CU**	0.373	.543	EV assumed	.166	.119	1.397	129	.165	.147
Delta-ACT	Nokia	NC*	4.706	.032	EV not assumed	.129	.110	1.167	85	.246	.260
		CU**	9.369	.003	EV not assumed	.104	.082	1.271	160	.206	.295
	Apple	NC*	4.828	.029	EV not assumed	.148	.083	1.789	205	.075	.133
		CU**	3.303	.071	EV assumed	.162	.100	1.613	129	.109	.208
Delta-AGG	Nokia	NC*	0.204	.652	EV assumed	-.124	.126	-.984	160	.326	.663
		CU**	0.363	.548	EV assumed	-.070	.107	-.657	160	.512	.861
	Apple	NC*	3.225	.074	EV assumed	-.117	.098	-1.198	218	.232	.387
		CU**	2.059	.154	EV assumed	-.088	.122	-.725	129	.470	.551
Delta-SIM	Nokia	NC*	0.012	.914	EV assumed	-.102	.179	-.571	160	.569	.325
		CU**	2.382	.125	EV assumed	-.046	.210	-.219	160	.827	.811
	Apple	NC*	0.320	.572	EV assumed	-.002	.088	-.025	218	.980	.906
		CU**	8.257	.005	EV not assumed	.027	.122	.225	73	.822	.872
Delta-EMO	Nokia	NC*	3.377	.068	EV assumed	.069	.076	.904	160	.367	.396
		CU**	0.475	.492	EV assumed	.048	.066	.735	160	.463	.219
	Apple	NC*	0.333	.564	EV assumed	.050	.046	1.074	218	.284	.178
		CU**	0.273	.603	EV assumed	.073	.097	.759	129	.449	.496

* Non-customer ** Customer *** Equal variances

Table 19: Independent samples test (comparing reactions of control group and product failure – T1 to T3)

Control Group - Product failure			Levene's Test			t-test for equality of means					Independent-Samples Mann-Whitney U Test
			F	Sig.	EV***	Mean Difference	Std. Error	t	d.f.	Sig. (2-tailed)	
Delta-RES	Nokia	NC*	0.739	.391	EV assumed	.086	.112	.765	154	.445	.498
		CU**	3.436	.066	EV assumed	.083	.104	.805	165	.422	.777
	Apple	NC*	3.691	.056	EV assumed	.044	.055	.786	220	.432	.421
		CU**	0.786	.377	EV assumed	.069	.096	.718	159	.474	.353
Delta-ACT	Nokia	NC*	2.163	.143	EV assumed	.042	.106	.400	154	.689	.797
		CU**	2.003	.159	EV assumed	.053	.077	.687	165	.493	.848
	Apple	NC*	0.340	.561	EV assumed	.060	.070	.857	220	.393	.477
		CU**	0.000	.986	EV assumed	.092	.070	1.315	159	.190	.420
Delta-AGG	Nokia	NC*	0.342	.560	EV assumed	.039	.143	.275	154	.784	.218
		CU**	4.512	.035	EV not assumed	.029	.102	.280	94	.780	.321
	Apple	NC*	0.671	.414	EV assumed	.026	.093	.284	220	.777	.570
		CU**	2.039	.155	EV assumed	.014	.111	.123	159	.902	.994
Delta-SIM	Nokia	NC*	0.402	.527	EV assumed	-.218	.173	-1.255	154	.211	.260
		CU**	0.005	.945	EV assumed	-.180	.167	-1.079	165	.282	.355
	Apple	NC*	0.149	.699	EV assumed	-.028	.075	-.376	220	.708	.317
		CU**	10.576	.001	EV not assumed	.009	.117	.079	64	.937	.877
Delta-EMO	Nokia	NC*	0.793	.375	EV assumed	-.042	.051	-.824	154	.411	.806
		CU**	0.099	.754	EV assumed	-.046	.067	-.689	165	.492	.417
	Apple	NC*	10.703	.001	EV not assumed	.026	.041	.636	127	.526	.928
		CU**	0.965	.327	EV assumed	.042	.095	.442	159	.659	.575

* Non-customer ** Customer *** Equal variances

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