

Food Product-harm Crisis Response Strategy across Consumer's Brand Commitment

Master Thesis

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Abstract

Product-harm crisis is dangerous for a firm's reputation, revenue and market share, especially in the food industry. How should a food company respond after a product-harm crisis, has been a hot issue during the last few decades, as a proper crisis response strategy may save or restore the affected company. Previous research has identified many important influential factors, which can lead to a successful crisis response strategy. However, recent research has found that consumers with different brand commitment levels would have different acceptance of negative publicity. When we consider product-harm crisis is a negative publicity for a food company, whether the brand commitment of a consumer will affect his/her acceptance to the company's crisis response strategy remains unknown. Thus, the aim of this paper is to: study how consumers process a food company's response to crisis, based on their differences in brand commitment. Data were collected through an online questionnaire from students in Wageningen University, and were analysed and tested through three dimensions brand commitment evaluation, conjoint analysis and Chow test. Results of the present study show the most important influence factor for a response strategy is the response choice. There is a significant difference between high and low brand commitment consumers regards to their preference of response strategy. An implication of this paper's findings is that when a company need to make strategy to get over a crisis, it is necessary to take consumer's brand commitment into consideration.

Key words: crisis response strategy; food product-harm crisis; brand commitment; consumer character; crisis management; Food Company; food brand.

1. Introduction

Product-harm crisis may cause a firm to experience a serious problem with marketing effectiveness, which could lead to a loss of sales and revenue (Van Heerde, Helsen et al. 2007). In recent decades, exposure to product-harm crisis has significantly increased, especially in the food industry. In China, the number of reported food related crises increased from 2 in 2007 to 12 in 2012¹. Many companies involved in food product-harm incidents went bankrupt. Findus, for instance, went bankrupt because of its horse meat indulgent crisis in UK. Another example is Sanlu, one large dairy producer in China, which could not recover from its problematic infant milk powder crisis. Consumers are losing confidence in food chains and becoming anxious about food safety, and food companies suffer from this situation (Bánáti 2011). However, other companies have managed their product-harm crisis properly. Shuanghui, a giant meat producer in China, survived from its Clenbuterol meat crisis. Previous research have identified different crisis response strategies and influences factors, later on they found the success of managing a food product-harm crisis may relate to consumers' characters. Thus, the present study asks the question: how will consumer's brand commitment level influence the preference of crisis response strategy?

Scholars have conducted many studies to explore the reason, why a food company may or may not succeed in confronting a product-harm crisis. Some studies analysed the influence of response choices, including deny responsibility, recall defective product, enhance consumer communication, and invest in advertisement (Stockmyer 1996, Souiden and Pons 2009, Perrow 2011, Siomkos and Malliaris 2011). Other studies analysed crisis response influence factors like time, crisis extent, corporate social responsibility and external effects (known as media or press) (Vassilikopoulou, Lepetsos et al. 2009). Moreover, scholars also

1 http://www.360doc.com/content/11/0601/11/4532650_120914068.shtml

argued that a successful crisis response management may also be influenced by consumer's characteristics (Siomkos 1989, Laczniak, DeCarlo et al. 2001). Brand commitment level, as one of the consumer's characteristics, is particularly interesting for the current study. Brand commitment level is found to be a factor, which can influence consumer's perception of negative information (Ahluwalia, Burnkrant et al. 2000). As product-harm crisis itself is negative information, even a problem with one of a company's products may also cause revenues loss or sales drop of its other products. How would brand commitment level of a consumer influences his/her acceptance of a company's crisis response strategy become an interesting topic, has received less attention in the literature.

Existing food product-harm crises and corresponding response strategies are reviewed in this paper. A conceptual framework is developed based on previous study relates the influence factors in managing a product-harm crisis (Vassilikopoulou, Lepetsos et al. 2009), and studies about the brand commitment effect on consumer's perception of negative information (Ahluwalia, Burnkrant et al. 2000) (see chapter 3).

Data are collected through an online questionnaire in Wageningen University that yields 200 sufficient responses. Responses are analysed by using conjoint analysis and three dimensions commitment evaluation (see chapter 4). The findings of this paper show response choices is the only significant influential factor on consumers' repurchase intention after a crisis, and there is a significant differences between high and low brand commitment consumers regards to their preference of response strategy (see chapter 5). An implication of this research is that when a company need to make strategy to get over a crisis, consumer's brand commitment should be taken into account (see chapter 6). On the basis of the finding from this paper, I propose future research focus on more consumer characters and information sources (see chapter 7).

2. Literature review

2.1. Food product-harm crisis cases

“Product-harm crises are discrete, well-publicized occurrences wherein products are found to be defective or dangerous” (Dawar and Pillutla 2000). From a marketing point of view, product-harm crisis could cause a firm to experience a serious problem of marketing effectiveness (Van Heerde, Helsen et al. 2007). When a product-harm crisis happens, it often results in product recalls, which would have a significant impact on storage cost, communication cost, repair cost and loss of revenues during the recall. Moreover, due to the increased globalization of production, greater complexity of product types and increased quality and safety requirements from consumers, product recall is likely to occur more often than before, which makes the recall cost even more (Berman 1999, Chen, Ganesan et al. 2009).

For example, Shuanghui, the Chinese meat processing giant, was accused of producing meat products that contain chemical residue Clenbuterol. Although Shuanghui did not bankrupt, it spent millions on the recall of pork products. And during the recalling period, Shuanghui’s stock price plummeted 35%, which caused a loss of around 15 billion yuan². A product-harm crisis may severely damage a company if they do not handle it properly (Perrow 2011). For instance, in February 2013, it was revealed that a UK food company, Findus’s beef lasagne products contained horse meat without proper declaration. Test has shown that the meat content of Findus beef lasagne product is more than 60% horse meat. Although Findus claim that they were also victims from the horsemeat crisis, and horsemeat is considered as edible meat in some countries and it will not directly affect human health³, Findus’s

2 <http://finance.sina.com.cn/roll/20110726/095810207620.shtml>

3 <https://web.archive.org/web/20110607112840/http://www.drugs.com/vet/hy-50-can.html>

horsemeat adulteration lead to a large-scale food tracking investigation in Europe, and Findus UK made a full product recall of its own-brand beef lasagne.

When a product-harm crisis transpires, it is very likely that consumers will switch to another similar brands and thus change their purchase behaviour (Ma, Zhang et al. 2010). After the poisoned infant milk scandal in China in 2008, Chinese consumers started to worry about the domestic dairy product. Consumers deeply believe foreign countries' dairy products are definitely better than Chinese domestic products. This situation has led to a big market demand for foreign dairy products.

During and after a food product-harm crisis, the effectiveness of advertisement is not going to work as before (Van Heerde, Helsen et al. 2007), and it may even work negatively for some crisis related companies (Siomkos and Malliaris 2011). After a crisis, every advertisement or media exposure about the company could remind consumer's impression about the crisis. In July 2014, Shanghai television channel exposed a factory of OSI Group⁴, named Shanghai Husi Food Co, and has been selling out-of-date meat to international fast food producers. The international fast food producers like McDonald's, Subway and KFC were on Husi's meat supply list. Soon after the exposure, Shanghai Husi food Co.'s out-of-date products were found in Japan's food market. Japan's McDonald's stopped selling any pre-fried chicken cube in 1340 shops, and soon released an official report to explain this decision. Data shows, around 4300 tons pre-fried chicken cubes were imported from Husi Shanghai. And these 4300 tons pre-fried chicken cubes account for 20% of total Japan McDonald's imported pre-fried chicken products^{5 6}. A few days later, Japan McDonald's made an official apology to its customers for the out-of-date meat problem.

4 http://www.osigroup.com/world_of_osi.html

5 <http://zh.wikipedia.org/wiki/%E7%A6%8F%E5%96%9C%E4%BA%8B%E4%BB%B6>

6 http://www.bbc.co.uk/zhongwen/trad/china/2014/07/140723_jp_shanghai_chicken

On the contrary, Chinese consumers experienced a completely different reply, regards to the responses from KFC China. Hushi was China's KFC's main meat supplier. After the exposure, KFC announced they replaced the meat supplier. Around two weeks after that, KFC released a brand new advertisement, aiming to encourage consumer to believe in KFC, that they have chosen a reliable meat supplier instead of Hushi. But the advertisement did not last long. The release of the new advertisement reminds consumers of the out-of-date meat products⁷. But what did Hushi do? In the beginning, Hushi Shanghai remained silence. Then, Hushi Shanghai's parent company, the OSI Group made a sincerely apology about what happened in China. After that, Hushi Shanghai announced that they would accept Chinese authorities' investigation and would like to wait for the official results. Latest news show, after the Chinese's government announced that Hushi Shanghai's 521.21 tones⁸ "problem products" were destroyed by regulation, Hushi Shanghai denied that figure immediately, and said "this release is misleading our consumers, not all of those products were problem products". Clearly Hushi Shanghai was trying to deny Chinese authorities. What will happen next? Things are still in progress.

A product-harm crisis may be related to "products' defected or dangerous", and it includes all kinds of products like cars, tires, computers and so on. Previous research defined "product-harm crisis" in general, and then defined a minor direction of "food product-harm crisis". A more recent research defined "food product-harm crisis" is similar to "food safety crisis"(Pennings, Wansink et al. 2002). To make it clear, I will use "food product-harm crisis" instead of "food safety crisis" or "food product-related crisis" in this paper.

7 <http://www.xinhuanet.com/fortune/gsb/78.htm>

8 <http://www.chinanews.com/sh/2015/01-04/6933760.shtml>

2.2. Crisis responses

Research has shown that crisis response strategies relate to what an organization will do and say after a crisis, could protect the reputation of the company (Coombs and Holladay 1996). The traditional crisis management approaches like “a ready prepared crisis management team”, “quick acknowledgement of the problem or harmful products” and “provide information to customers” or even an “apology” will not work as managers expected (Coombs and Holladay 1996, Stockmyer 1996). In fact, traditional crisis response strategy “proactive recall of harmed product” may hurt a firm’s financial value even more (Chen, Ganesan et al. 2009). A more recent research indicated consumer’s forgiveness may help company to get through the crisis, and the forgiveness can be restored by affective, functional, and informational efforts (Xie and Peng 2009). But another paper found making use of media to get a consumer’s forgiveness will not work, because it is trying to gain consumer’s sympathy (Stockmyer 1996). For example⁹, researchers do not suggest company to deny any kind of crisis, but Pepsi did once in 1993. There were two reports about finding syringes inside Pepsi’s diet coke³. Pepsi-Cola Co, did not implement any recall in the beginning, because Pepsi’s managers believe “there is no risk”. Within days, negative reports poured into Pepsi’s manager’s office. Pepsi’s managers then realize they must take action. Though Pepsi still denied any kinds of responsibility, they proved the syringe could only be found after a consumer opened the can. It is not normal for a company to deny a crisis responsibility after a crisis report, but Pepsi did, and in the end Pepsi gained back its consumers.

Research indicated that the crisis response strategy should also take timing into consideration (Stern 1999). Some scholars believe the “primary objective of crisis management is to provide ‘accurate information as quickly as possible’ to external publics

⁹ http://www.osigroup.com/world_of_osi.html

affected by the crisis” (Schuetz 1990). But another paper argued a few months after a crisis, consumers tend to be more positive about the affected products, therefore they will be more willing to buy product from the same company (Vassilikopoulou, Siomkos et al. 2009). Specifically, that positive attitude is likely to be even higher after one year than 1 month (Vassilikopoulou, Siomkos et al. 2009). For example, a few days after the horsemeat adulteration scandal, consumers were very hesitating to purchase IKEA meatballs. But after ten weeks, consumers perceived the IKEA meatball products as very safe and were willing to repurchase. During the first ten weeks, IKEA did not issue apology or any detailed explanation, consumers just accepted the meatball after ten weeks (but IKEA recalled its product in Greece) (Vassilikopoulou and Stavroulakis, 2013). Vassilikopoulou, Lepetsos et al. (2009) Pointed out, when the crisis extent is considered as high to medium, time played an important role on consumer’s repurchase intention. But when the crisis extent was considered as low, then social responsibility and external effects start to take the position

To get a clearer image of typical food product-harm crisis and the effects of response strategies, the following Table 1 indicates 6 cases:

Table 1 Food company’s crisis responses (part 1)

Crisis company	Sanlu	IKEA	Pepsi-Cola
When	2008	2013	1993
Where	China	Europe Sweden	USA

The crisis	<p>China's largest infant milk powder producer, Sanlu, was discovered to produce products contaminated with melamine, which could lead to baby's kidney stones. Over 300,000 babies became ill, with 6 deaths¹⁰.</p>	<p>IKEA's meatball products were found contaminated with horsemeat without notification. Nobody was injured¹¹.</p>	<p>Consumers claim they found syringes/needles and other items in Pepsi-Cola's product. Nobody was injured.</p>
Response strategy	<p>Sanlu ignored and denied the first product-harm report, and then stayed silence until national television exposed the problem. After that, Sanlu made an involuntarily recall.</p>	<p>IKEA did not take action, but in the end IKEA voluntarily recalled all meatball products in Greece and made a press-release to inform customers with further details on horsemeat (Aikaterini vassilikopoulou 2013)</p>	<p>Pepsi denied its responsibility with a detailed explanation about its production and supply chain. Pepsi confirmed with a third party agent that there was no possibility to find the syringe in Pepsi's factories. Pepsi arranged 800 employees to take consumer calls, and kept consumer updating¹².</p>
Results	<p>The company went bankrupt. The responsible managers were sentenced to jail.</p>	<p>After 10 weeks, consumers were more willing to purchase meatballs from IKEA.</p>	<p>Pepsi's investigation team found a video record, it shows that there was a woman apparently inserted a syringe into a can of diet Pepsi.</p>

10 <http://star.news.sohu.com/20080912/n259532947.shtml>

11 <http://news.sky.com/story/1049133/findus-beef-lasagne-meals-100-percent-horsemeat>

12 <http://www.holmesreport.com/opinion-info/863/How-the-Pepsi-Syringe-Hoax-Fizzled-1993.aspx>

Table 2 Food company's crisis responses (part 2)

Crisis company	Shuanghui	Findus	Husi Shanghai
When	2011	2013	2014
Where	China	UK, France and Sweden	China
The crisis	Shuanghui, a giant meat producer in China, was found to produce pork that contains chemical residue Clenbuterol. Nobody was injured.	Findus's beef lasagne products were detected to contaminated 60-100% horsemeat without proper declaration. Nobody was injured.	Husi Shanghai's reuse out-of-date meat product to supply international fast food producers including KFC, McDonald, and Subway in China.
Response strategy	Shuanghui voluntarily recalled and destroyed problem products. Shuanghui Group made sincerely apology press to consumers ¹³ .	Findus UK made a public apology, admitted their problems. Findus Sweden organized a voluntary recall.	Husi Shanghai was very silence in dealing with the issue. They announced to accept the investigation from China government, but later on they denied Chinese authorities decision.
Results	Although consumers refused to buy Shuanghui products long time after the crisis, but the company survived until now.	Consumer refused to purchase food products from Findus.	Still in process. But this Husi crisis influenced most fast food restaurant in China

¹³ <http://finance.sina.com.cn/chanjing/gsnews/20110401/01489627445.shtml>

2.3. Brand commitment

“Brand commitment” is defined as “an emotional or psychological attachment to a brand within a product class” (Lastovicka and Gardner 1979). Research found the response patterns for negative information from low to high brand commitment consumers are very different (Ahluwalia, Burnkrant et al. 2000). Low brand commitment consumers exhibits greater attitude change and attitude ambivalence when exposing to negative information. In contrast, high brand commitment consumers are likely to give positive opinion about negative publicity, and therefore resist the attitude change by reducing the likelihood of attitude degradation. What’s more, high brand commitment consumers are likely to perceive negative information as less diagnostic than positive information (Feldman and Lynch 1988). Prior research also suggested consumers who have positive attitudes towards a brand are likely to process information with positive opinion (Edwards and Smith 1996). In other words, consumers who hold positive attitudes towards a brand are more likely to counter argue the negative public information.

In crisis management study, “negative publicity” is list in the crisis response influence factor “media/press effects” or “external effects” (Vassilikopoulou, Lepetsos et al. 2009). Siomkos and Kurzbard (1994) Suggested that reputation, external effect (media or other press) and organizational response (response choices) are three essential factors that influencing the success of a crisis response strategy. Siomkos and Malliaris (2011) also made arguments that when consider company reputation and response choices, high-reputation companies should implement voluntary recall of the harmful product, while companies who face negative external effects should employ the supper effort response, since they need to prove to the public that the company is honest.

3. Conceptual framework

Important influence factors toward response strategy were identified by Vassilikopoulou, Lepetsos et al. (2009). They are “time”, “corporate social responsibility” (CSR), “response choices”, “crisis extents”, and “external effects” (known as media or press). Based on the results from literature, time is the most important influence factor under a high to medium crisis extent. For the medium crisis extent, response choice is a crucial factor in influencing consumer’s purchase intention. CSR and media effects were found to be the most important influence factor dealing with a low-crisis extent. Vassilikopoulou, Lepetsos et al. (2009) Also emphasizes when it is a low extent crisis situation, companies should especially pay attention to positive or negative media effects. In general, response choice is the most important factor in influencing the final success of response strategy no matter in what crisis extent.

Ahluwalia, Burnkrant et al. (2000) Suggested consumes’ differences in brand commitment level may moderate their processing of crisis information. Therefore, different response strategies are likely to be more effective for high and low brand commitment consumers. When consider how would consumers’ brand commitment level influence their perception of a company’s crisis response, I expanded the framework from Vassilikopoulou, Lepetsos et al. (2009) :

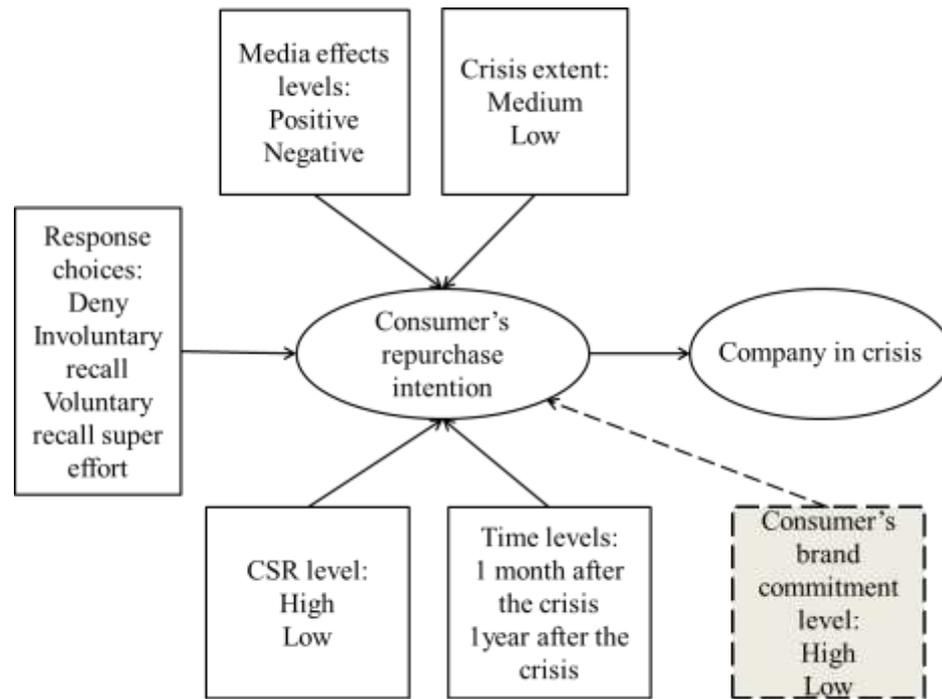


Figure 1 Conceptual framework

As it shows in Figure 1, the central circle represents consumer's repurchase intention, and this repurchase intention is influenced by different factors, including "Crisis extent", "Media effects", "Response choices", "CSR", "Time" and "Consumer's brand commitment level". All these conditions work on consumers' repurchase intention, and finally work on the crisis effected company. In this case, consumer's repurchase intention is the dependent variable, all other influence factors are independent variables. Previous research indicated consumers with different brand commitment level would process negative or positive information differently, and the positive or negative information would influence the success a company's crisis response strategy. When look at all these influence factors, I argue that the acceptance of a company's total crisis response strategy may vary differently among different consumers. Based on above information, I have the following hypothesis:

Hypothesis1 : High brand commitment consumer's repurchase intention will be less influenced by company's crisis response strategy than low brand commitment consumers.

Hypothesis 2: there will be a difference between high and low brand commitment consumers regards to their preferences of different response strategies.

Previous research found high brand commitment consumers committed to a brand with an emotional or psychological attachment, and when this attachment exist, a crisis could be seen as their self-image hurts (Tyebjee 1979, Holman 1980), and they tend to resist the attitude change (Ahluwalia, Burnkrant et al. 2000). Therefore, I propose high brand commitment consumers will be less influence by response strategies than low brand commitment consumers.

High brand commitment consumers are likely to perceive negative information as less diagnostic than positive information (Feldman and Lynch 1988). Prior research also suggested consumers who have positive attitudes towards a brand are likely to process information with positive opinion (Edwards and Smith 1996). In other words, consumers who hold positive attitudes towards a brand are more likely to counter argue the negative public information. On contrast, low brand commitment consumers showed opposite attitude. Therefore, I assume there will be a difference between high and low brand commitment consumers regards to their preferences of response strategy.

4. Methodologies

To answer how consumers' brand commitment levels will influence consumer's repurchase intention under the crisis circumstances, I had three objectives. The first one is separate consumers based on their brand commitment level. The second one is find the most preferred response strategy for each consumer group. The third one is compare the strategy's influence factors' utility values for two consumers groups.

Define commitment of brand

Subjects' commitments towards a brand are measured by a three dimensions brand commitment evaluation. This method was proposed, tested and applied by previous researches (Beatty, Homer et al. 1988, Ahluwalia, Burnkrant et al. 2000)

The three dimensions brand commitment evaluation contains 9 questions. Questions were formulated to define consumers' ego-involvement, purchase involvement, and then brand commitment. Consumers' scores in the upper or lower part of the value scale can be identifying as consumer with high or low brand commitment.

Respondents were informed that they are going to judge their purchase intention about a food brand, and then they will value statements with 10 point scales for each (likely-unlikely), to indicate how much they agree with the statement. Detailed questions structure see below:

Table 3 Questionnaire construct

Constructs	Items
Ego involvement	<p>Q3. I can make many connections or associations between my use of food brand and experiences in my life.</p> <p>Q4. The brands or types of food brands I use say a lot about who I am.</p> <p>Q5. My friends (or family) give me a hard time if I choose the wrong food brand.</p>
Purchase involvement	<p>Q6. I am very concerned about what food brand I purchase.</p> <p>Q7. I care a lot about what brands of food I consume.</p> <p>Q8. Generally choosing the right brands of food is important to me</p>
Brand Commitment	<p>Q9. If my preferred brands of food were not available at the store, it would make little difference to me if I had to choose another brand.(Reversed)</p> <p>Q10. I consider myself to be highly loyal to one brand of food.</p> <p>Q11. When another brand is on sale, I will generally purchase it rather than my usual brand. (Reversed)</p>

Respondent with a lower average score in reversed questions Q9 and Q11 (lower or equal to 6.12 points), and higher average score in the rest questions (higher or equal to 4.29 points) represents a high commitment towards a food brand. Respondent with a lower average score in reversed questions Q9 and Q11, and higher average score in the rest questions represents a low commitment towards a food brand. In this way, respondent with high or low commitment to the brand could be recognized.

Crisis response strategies

In this paper, I used conjoint analysis to test the importance of influential factors for a food company's crisis response strategy. Question design was based on the research from Vassilikopoulou, Lepetsos et al. (2009) .

Conjoint analysis is a statistical technique used in market research to determine how people value different features that make up an individual product or service¹⁴. The basic model for a conjoint analysis is $U=b_0+b_1*Z_1+b_2*Z_2+b_3*Z_3...+b_n*Z_n$, where U is the consumer purchase intention (Utility), Z_n is dummy variables and b_n is the beta weights for the effect factors (see appendix). In this paper, I designed response influence factors as “time”, “CSR”, “Response choice”, “external affect” and “crisis extents”, and gave them high, low, or positive, negative levels, and then made scenarios to describe these conditions. The scenarios of each influence factor and level are following:

Table 4 Conjoint factors

Level	Description
CSR-Low	A company that offers a fine quality food product.
CSR-High	A company that offers a fine quality food product, and cares about environment, employees, charities.
Time- 1 month	The crisis occurs 1 one month ago.
Time- one year	The crisis occurs one year ago.
Media effects-negative	The media negatively commented on the company’s action.
Media effects-positive	The media positively commented on the company’s action.
Crisis extent-Medium	2 people were poisoned, and 5 people feel uncomfortable because of the company's product (food poisoning).
Crisis extent-Low	5 people feel uncomfortable because of the company’s product (sick).
Response choice -voluntary recall	The company voluntarily recalled the product
Response choice-involuntary recall	The recalled the product after the intervention of the Ministry of Health.
Response choice-super effort	The company immediately recalled the product, informed all future customers of potential risk and compensated the victims.
Response choice-deny	The company deny responsibility to the crisis.

Based on the factors and levels, there were: 2 (CSR levels) *2 (crisis extent levels) *4 (response choices)*2 (external effect levels)*2 (time levels) =64 stimulations. Conjoint

14 [http://en.wikipedia.org/wiki/Conjoint_analysis_\(marketing\)](http://en.wikipedia.org/wiki/Conjoint_analysis_(marketing))

analysis considerably decreased this number to 16 (see orthogonal design). Thus, 16 simulation cards were used to develop the response strategy traits.

Table 5 Simulation cards

Card List					
Card ID	CSR	Time	Crisis extent	Media effects	Response choices
1	High	1 year	low	positive	voluntary recall
2	High	1 month	medium	positive	deny
3	Low	1 month	low	positive	voluntary recall
4	High	1 year	medium	negative	involuntary recall
5	High	1 month	low	negative	super effort
6	Low	1 month	medium	negative	voluntary recall
7	Low	1 month	low	positive	involuntary recall
8	High	1 month	low	negative	deny
9	High	1 month	medium	positive	super effort
10	Low	1 year	low	negative	deny
11	Low	1 month	medium	negative	involuntary recall
12	High	1 year	medium	negative	voluntary recall
13	Low	1 year	medium	positive	super effort
14	Low	1 year	medium	positive	deny
15	Low	1 year	low	negative	super effort
16	High	1 year	low	positive	involuntary recall

To let respondents value their opinion, a 10-point scale rating measurement were used.

An example of stimulation card sees below:

Card 9

Company A offers a fine quality food product, and cares about environment, employees, and charities.

Around 1 month ago, there was a food product harm crisis that the company's food product caused 2 people poisoned (food poisoning), 5 people felt uncomfortable (sick).

The company immediately recalled the product, informed all future customers for potential risks and compensated the victims. Public media positively commented on the company's reaction.

How interested would you be in buying from the company A again?

0	1	2	3	4	5	6	7	8	9	10
Definitely would not buy						definitely would buy				

The stimulation cards in this paper were designed by using Orthogonal Design. Orthogonal Design¹⁵ generates a data file that containing an orthogonal main-effects design. Instead of asking respondents all possible combinations, orthogonal design permits marketers to have the smallest manageable combination for potential profiles to test with respondents, and those combinations are orthogonal contrast. In other words, among the smallest manageable combination, each influential factor's levels will appear equal time, and they will only meet other influential factors' levels once. By doing this orthogonal contrast, orthogonal design helps marketer to find the smallest group, but the most efficient combinations of all attribute levels.

Compare two groups

To test the difference between two consumer groups, I made use of Chow test. Chow test¹⁶ is a test method that used to test whether the coefficients in two linear regressions on different data sets are equal. A function is used to calculate the chow value:

15 <https://dobneyresearch.wordpress.com/2014/05/12/orthogonal-designs-in-conjoint-analysis/>

16 http://www.iuj.ac.jp/faculty/kucc625/method/panel/chow_test.pdf

$$\frac{(S_C - (S_1 + S_2))/(k)}{(S_1 + S_2)/(N_1 + N_2 - 2k)}$$

In this function, S_C , S_1 and S_2 stands for the sum of squared residuals from combined data, squared residuals from group 1, squared residuals from group 2 respectively. K stands for the total number of parameters, N stands for the observations in each group.

5. Results

Respondents were separated by their brand commitment level. See Table 6:

Table 6 Descriptive statistics

	N	Range	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Std. Error	Statistic
Q3 I can connect or associate food brand with many life experiences.	200	10	5,03	,180	2,543
Q4 The brands of food or types of a food brand I use say a lot about who I am.	200	10	4,77	,186	2,637
Q5 My friends give me a hard time if I choose the wrong food brand.	200	8	2,06	,154	2,177
Q6 I am very concerned about what brands of food I purchase.	200	10	4,58	,204	2,878
Q7 I care a lot about what brands of food I consume.	200	10	4,76	,199	2,820
Q8 Generally choosing the right brands of food is important to me	200	10	4,91	,199	2,815
Q9 Choosing another brand makes no difference to me when my preferred food brand was not available...	200	10	5,78	,184	2,607
Q10 I consider myself to be highly loyal to one brand of food.	200	10	3,94	,183	2,593
Q11 When another brand is on sale, I will generally purchase it rather than my usual brand.	200	10	6,46	,172	2,431
Valid N (listwise)	200				

From the table we can see the mean of each question. This research received 200 respondents in total, including 66 high brand commitment consumers, 59 low brand

commitment consumers, and 75 in between. This research focused on high and low brand commitment consumers.

Table 7 and 8 show the results for high brand commitment consumers. Response choice is found to be the most important influence factor, following with media effects, crisis extent, time and CSR.

Table 7 Utilities for high brand commitment consumers

		Utilities			
		Utility	Std.		
		Estimate	Error	t-statistic	P-value
CSR	High	0.070	0.164	0.43	0.660
	Low	-0.070	0.164	-0.43	0.660
Time	1 Month	-0.093	0.164	-0.57	0.570
	1 Year	0.093	0.164	0.57	0.570
Crisis	Medium	-0.036	0.164	-0.22	0.820
	Low	0.036	0.164	0.22	0.820
Media	Positive	0.248	0.164	1.51	0.130
	Negative	-0.248	0.164	-1.51	0.130
Response	deny	-1.250	0.284	-4.40	0.000
	involuntary recall	0.598	0.284	2.11	0.039
	voluntary recall	0.689	0.284	2.43	0.018
	super effort	1.114	0.284	3.92	0.000
(Constant)		3.568	0.16	21.76	0.000

Table 8 Importance values for high brand commitment consumers

Importance Values	
CSR	4.363
Time	5.778
Crisis	2.241
Media	15.48
Response	72.170

Table 9 and 10 show the results for low brand commitment consumers. Response choice is the most important influence factor, following with media effects, crisis extent CSR and time.

Table 9 Utilities for low brand commitment consumers

		Utilities			
		Utility Estimate	Std. Error	t-statistic	P-value
CSR	High	0.024	0.203	0.12	0.900
	Low	-0.024	0.203	-0.12	0.900
Time	1 Month	-0.009	0.203	-0.04	0.960
	1 Year	0.009	0.203	0.04	0.960
Crisis	Medium	-0.134	0.203	-0.66	0.511
	Low	0.134	0.203	0.66	0.511
Media	Positive	0.308	0.203	1.52	0.133
	Negative	-0.308	0.203	-1.52	0.133
Response	deny	-1.461	0.352	-4.15	0.000
	involuntary recall	-0.81	0.352	-2.30	0.025
	voluntary recall	0.987	0.352	2.80	0.007
	super effort	1.284	0.352	3.65	0.001
	(Constant)	4.017	0.203	19.79	0.000

Table 10 Importance values for low brand commitment consumers

Importance Values	
CSR	1.284
Time	0.467
Crisis	7.235
Media	16.686
Response	74.329

For both high and low brand commitment consumers, response choices were found to be the only significant influence factor in determining consumers repurchase intention after a food product harm crisis ($p < 0.05$).

Table 11 Chow test output

Regression coefficient for	SSE	Chow statistic	P-Value
Both high and low brand commitment consumers	18124.4		
High brand commitment consumers	6577.955	565.1824	0<0.01
Low brand commitment consumers	5250.186		

Table 11 shows the output of Chow test. The difference of two regression coefficients (also called utility value in Conjoint analysis) between high and low brand commitment consumers is significant ($p < 0.01$).

6. Discussion and conclusions

The purpose of this paper is to study how consumers process a food company's crisis response strategy, based on consumer's differences in brand commitment. Result shows, response choice is the only significant factor that influence consumers repurchase intention. This is consist with previous study from Vassilikopoulou, Lepetsos et al. (2009) that the choice of responses is the most important influence factor in determining consumer's attitudes and opinions about the crisis company. But the results from this paper did not show significant influence from other factors, including CSR, time, external effects, and crisis extent. Therefore those factors are not able to be used for compare different consumer groups. On the other hand, there is a significant difference between high and low brand commitment consumers regards to their preference of response strategy. More specifically, low brand commitment consumers are more influenced by company's response strategy than high brand commitment consumers. This is also consist with previous study that, low brand commitment are more influenced by public information, and have greater attitude change towards the crisis brand (Ahluwalia, Burnkrant et al. 2000).

A further discussion is due to the fact that response choice is the only significant influential factor that influencing consumer's preference of a response strategy, and there is a significant difference between two consumer groups, we could say the difference between two consumer groups, regards to their preference of response strategy, were caused by the response choices. Moreover, among the four response choices, involuntary recall showed a positive influence on high brand commitment consumers' repurchase intention, but a negative influence on low brand commitment consumers' repurchase intention.

In summary, when a company is going to make a crisis response strategy, it is necessary to take consumer's brand commitment into consideration.

7. Limitations and recommendations

The present study analysed how would consumer's brand commitment level influence their preference of a company's response strategy. However, there are some limitations of this paper.

The first limitation is the definition of respondents' brand commitment level. This paper did not give a specific brand name when asking respondents brand commitment level, which lead to a confusion for respondents to value the brand commitment statement. This may be why there were more respondents who were neither high nor low brand commitment. The second limitation is the language usage. Based on the feedback on the questionnaire, there is a difference between British English and American English. Because some American respondents report that "food brand", "Food Company" may confuse them, and suggested to make use of "food label". The third limitation is the definition of crisis extent. In this paper, crisis extent was set as medium to low, this arrangement aims to find the maximum influence from media effect, but the definition of sick and uncomfortable were not clearly explained, this may be a reason why there were no significant differences among consumers regards to time issue.

A further study could be focus on the influence from crisis extent to a crisis response strategy. If the crisis extent is high, how will it influence different consumers' preference of the strategy. When consider the media effects and crisis company itself, it is also interesting to look at the information sources. If the same positive/negative information was offered by the company, or authorities, or media and press differently, will there be a difference when consumers are processing it. Recommendation for future study could also be look into to the response preference differences between female and males.

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9. Appendix

Conjoin analysis

In principle, conjoint analysis helps marketers to find the most preferred combination of product features, which particular features most influence the preference of the total product, and the relative importance of each feature. The basic model in the conjoint analysis is $U=b_0+b_1*Z_1+b_2*Z_2+b_3*Z_3...+b_n*Z_n$, where U is the consumer's purchase intention (Utility), Z_n is dummy variables for the influence factors; b_n is utility value for each level. The output of conjoint analysis offers a regression equation, which shows the importance of each influence factor

For example, when preparing a new product, marketers need to find the best features that will make the product attractive to consumers. Three features are considered, while each feature is divided into three levels: size (small, medium, big), price (10euros, 20 euros, 30 euros) and colour (black, white, blue). A dummy variable Z_n is set to each feature level:

Table 12 Example for Conjoint analysis

Features	Feature level	Z_1	Z_2	Z_3	Z_4	Z_5	Z_6
Size	Small	0	0	..	..	..	..
	Medium	1	0	..	..	..	..
	Big	0	1	..	..	..	..
Price	10 euros	..	..	0	0	..	..
	20 euros	..	..	1	0	..	..
	30 euros	..	..	0	1	..	..
Colours	Black	..	..	..	..	0	0
	White	..	..	..	..	1	0
	Blue	..	..	..	..	0	1

To get consumers' responses on each feature, a series of products are designed with different combination of the features. These products are then scored by consumers based on their willingness to buy. For example, "product 1" contains features of "small" size, "20 euros", and colour "blue". "Consumer 1" scores the "product 1" with 20 out of 100. Thus, the specific utility equation for "product 1" as scored by "consumer 1" can be expressed as $b_3+b_6=20$. The same procedure will be repeated to all the products designed, also by all the consumers involved. Consequently, the utility for each feature level can be derived through the regression analysis. The utility shows which product feature values the most, i.e. which feature is the most influential factor to consumers' willingness to buy.

The survey

Online link: https://wur.az1.qualtrics.com/SE/?SID=SV_787Ruf1CHdSEXJP

Q1 Dear all, you are going to answer a questionnaire from a master thesis research. This research focuses on how to manage a food product-harm crisis. This questionnaire contains around 25 questions, and it will take you around 15 minutes. You have the chance to win 10 euros for filling the questionnaire. If you are interested in getting the bonus, please fill in your E-mail address at the end of this questionnaire. All your information will be only used for this research. Looking forward for your answers! Thank you!

Q2 what is your gender?

- Female
- Male

Q3 what is your age?

- 15-24
- 25-34
- 35-65

Q4 In the following part, you will be asked questions related to your daily consumed food brand. Please give your score based on your personal similarity of the statement.

Q5 I can connect or associate food brand with many life experiences.

0 1 2 3 4 5 6 7 8 9 10
Not at all likely extremely likely

Q6 the brands of food or types of a food brand I use say a lot about who I am.

0 1 2 3 4 5 6 7 8 9 10
Not at all likely extremely likely

Q7 my friends give me a hard time if I choose the wrong food brand.

0 1 2 3 4 5 6 7 8 9 10
Not at all likely extremely likely

Q8 I am very concerned about what brands of food I purchase.

0 1 2 3 4 5 6 7 8 9 10

Not at all likely

extremely likely

Q9 I care a lot about what brands of food I consume.

0 1 2 3 4 5 6 7 8 9 10
 Not at all likely extremely likely

Q10 Generally choosing the right brands of food is important to me

0 1 2 3 4 5 6 7 8 9 10
 Not at all likely extremely likely

Q11 Choosing another brand makes no difference to me when my preferred food brand was not available at the store.

0 1 2 3 4 5 6 7 8 9 10
 Not at all likely extremely likely

Q12 I consider myself to be highly loyal to one brand of food.

0 1 2 3 4 5 6 7 8 9 10
 Not at all likely extremely likely

Q13 When another brand is on sale, I will generally purchase it rather than my usual brand.

0 1 2 3 4 5 6 7 8 9 10
 Not at all likely extremely likely

Q14 the next group of questions regard to a food Company A. Company A is facing a food product-harm crisis. There are several influence factors to take into consideration when they are making response strategies. Each card stands for an independent scenario. Please value each combination with your personal opinions.

Q15 Card 1 Company A offers a fine quality food product, and they care about environment, employees, and charities. Around 1 year ago, Company A's food product caused 5 people feel uncomfortable (sick). The company voluntarily recalled the product. Public media positively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q16 Card 2 Company A offers a fine quality food product, and they care about environment, employees, and charities. Around 1 month ago, Company A's food product caused 2 people poisoned (food poisoning), 5 people feel uncomfortable (sick). The company denied their responsibility in this crisis. Public media positively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q17 Card 3 Company A offers a fine quality food product. Around 1 month ago, Company A's food product caused 5 people feel uncomfortable (sick) The Company voluntarily recalled the product. Public media positively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q18 Card 4 Company A offers a fine quality food product, and they care about environment, employees, and charities. Around 1 year ago, Company A's food product caused 2 people poisoned (food poisoning), 5 people feel uncomfortable (sick). The company voluntarily recalled the product. Public media negatively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q19 Card 5 Company A offers a fine quality food product, and they care about environment, employees, and charities. Around 1 month ago, Company A's food product caused 5 people feel uncomfortable (sick)... The company immediately recalled the product, informed all future customers for potential risk and compensated the victims. Public media negatively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q20 Card 6 Company A offers a fine quality food product. Around 1 month ago, Company A's food product caused 2 people poisoned (food poisoning), 5 people feel uncomfortable (sick). The company voluntarily recalled the product. Public media negatively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q21 Card 7 Company A offers a fine quality food product. Around 1 month ago, Company A's food product caused 5 people feel uncomfortable (sick). The company recalled the product after the intervention of the Ministry of Health. Public media positively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q22 Card 8 Company A offers a fine quality food product, and they care about environment, employees, and charities. Around 1 month ago, Company A's food product caused 5 people feel uncomfortable (sick). The company denied responsibility of this crisis. Public media negatively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q23 Card 9 Company A offers a fine quality food product, and they care about environment, employees, and charities. Around 1 month ago, Company A's food product caused 2 people poisoned (food poisoning), 5 people feel uncomfortable (sick). The company immediately recalled the product, informed all future customers for potential risk and compensated the victims. Public media positively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q24 Card 10 Company A offers a fine quality food product. Around 1 year ago, Company A's food product caused 5 people feel uncomfortable (sick). The company denied their responsibility of the crisis. Public media negatively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10

Defiantly would not buy

definitely would buy

Q25 Card 11 Company A offers a fine quality food product. Around 1 month ago, Company A's food product caused 5 people feel uncomfortable (sick). The company recalled the product after the intervention of the Ministry of Health. Public media negatively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q26 Card 12 Company A offers a fine quality food product, and they care about environment, employees, and charities. Around 1 year ago, Company A's food product caused 2 people poisoned (food poisoning), 5 people feel uncomfortable (sick). The company voluntarily recalled the product. Public media negatively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q27 Card 13 Company A offers a fine quality food product. Around 1 year ago, Company A's food product caused 2 people poisoned (food poisoning), 5 people feel uncomfortable (sick). The company immediately recalled the product, informed all future customers for potential risk and compensated the victims. Public media positively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q28 Card 14 Company A offers a fine quality food product. Around 1 year ago, Company A's food product caused 2 people poisoned (food poisoning), 5 people feel uncomfortable (sick). The company denied the responsibility of the crisis. Public media positively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
 Defiantly would not buy definitely would buy

Q29 Card 15 Company A offers a fine quality food product. Around 1 year ago, Company A's food product caused 5 people feel uncomfortable (sick). The company immediately recalled the product, informed all future customers for potential risk and compensated the

victims. Public media negatively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
Defiantly would not buy definitely would buy

Q30 Card 16 Company an offers a fine quality food product, and they care about environment, employees, charities. Around 1 Month ago, Company A's food product caused 2 people poisoned (food poisoning), 5 people feel uncomfortable (sick).The company denied their responsibility in this crisis. Public media positively commented on company's action. Under all those considerations, how interested would you be in buying from the company A?

0 1 2 3 4 5 6 7 8 9 10
Defiantly would not buy definitely would buy

Q31 Thank you for your cooperation, if you are interested in getting the bonus, please fill in your E-mail address here:

SPSS manual

<http://www.docs.is.ed.ac.uk/skills/documents/3663/SPSSConjoint17.0.pdf>