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Paper prepared for presentation at the 99th EAAE Seminar 'Trust and Risk in Business Networks', Bonn, Germany, February 8-10, 2006

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Trust: The Importance of Distinguishing between Different Actors and Dimensions

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Abstract

Many consumers lack insight into today's complex food production systems. This paper investigates the relationship between consumer confidence in the safety of food in general and consumer trust in particular institutions and organisations. The first aim of the study was to develop and validate a scale to measure general consumer confidence in the safety of food. From the analysis, two distinct dimensions emerged that were labelled 'optimism' and 'pessimism'. The second aim of this study was to investigate to what extent general consumer confidence in the safety of food was related to consumer trust in institutions and organisations responsible for the management of food safety, taking into account three underlying dimensions of trust, namely competence, openness and care for public wellbeing. The results indicate that the degree to which trust was related to optimism and pessimism was dependent upon both the actor and the dimension of trust.

Keywords: *trust, confidence, food safety, optimism, pessimism*

Introduction

In response to a number of food safety scares over the past decades, food safety issues have become increasingly important. Besides the establishment of new regulatory bodies and intensified production process controls, there is an increased interest in consumer perceptions of the safety of food. Although previous research has focussed on consumer perceptions related to the safety of particular product categories and food-related-hazards (e.g., Miles & Frewer, 2001; Pennings et al., 2002; Verbeke, 2001), no measure has been developed to assess *general* consumer confidence in the safety of food. However, it is important to consider developments in general consumer confidence in the safety of food, as successive food scares as well as more general consumer concerns about contemporary food production practices might have long term consequences for consumer confidence in the safety of food in general, besides effects associated with particular product groups (Smith et al., 1999). This is also relevant from a public policy perspective, as regaining and maintaining consumer confidence in the safety of food has become an important issue for regulators, as well as for different

actors involved in food production and distribution. Therefore, the aim of the first study was to develop and validate a scale to measure general consumer confidence in the safety of food.

As a result of the increased complexity of the food production system, consumers have to rely on others in providing safe food. Therefore, consumer confidence in the safety of food might be dependent upon the degree to which consumers trust various actors with responsibility for the safety of food (Berg et al., 2005; Brunel & Pichon, 2004). The aim of the second study was, therefore, to investigate to *what extent* and *how* consumer confidence in the safety of food is related to consumer trust in institutions responsible for the management of food safety, as well as trust conferred in different actors in the food chain.

Study 1. Scale development and validation

Consumer confidence in the safety of food

Judgments of confidence are relevant for many areas of life (Siegrist et al., 2003). Confidence can be regarded as a taken-for-granted understanding of social reality necessary for carrying out daily life (see, for example, Berg et al., 2005), and is typically lost when a consumer's automatic expectations are disappointed (Kjærnes and Dulsrud, 1998, as cited in Hansen et al. 2003). For example, it has been suggested that consumer confidence in the safety of food has been negatively affected by the occurrence of food safety incidents (Verbeke & Viaene, 1999). In the context of food safety, confidence can be defined as the extent to which consumers perceive that food is generally safe and does not cause any harm to their health or to the environment.

Item generation and purification

Based on a review of the literature, a set of 26 items designed to measure general consumer confidence in the safety of food was constructed. Some items were developed and adapted from previous research on consumer perceptions of food safety (De Jonge et al., 2004; Henson & Northen, 2000; Miles et al., 2004; Sapp & Bird, 2003). In addition, based on several studies that have been conducted on emotions in relation to consumption in general (e.g., Richins, 1997), and consumption of food in particular (Laros & Steenkamp, 2004, 2005) various emotions were selected, taking into account their applicability in the context of food safety. The items were tested in a pilot study (n = 106), which indicated that the underlying structure of the data was represented by two dimensions, i.e. positive (optimism) and negative (pessimism) beliefs about the safety of food. Twelve items were retained for further analysis.

Assessing discriminant and convergent validity

In order to formally test the dimensional structure of the scale and to identify a final set of items with acceptable discriminant and convergent validity, confirmatory factor analysis was conducted on a large sample (n = 458) that was representative for the Dutch population with respect to gender and age. Confirmatory factor analysis in LISREL 8.50 was used to assess the validity of the measure of general consumer confidence in the safety of food. Maximum

Likelihood was used for estimation, and assessment of model fit was based on the Satorra-Bentler (S.-B.) scaled χ^2 statistic, the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Non-Normed Fit Index (NNFI).

First, the fit of the measurement model with the two dimensions 'optimism' and 'pessimism' was assessed, using the 12 items that were selected in the pilot study (Model 1, Table 1). Model 1 fitted the data rather well. RMSEA was below 0.05, and CFI and NNFI were larger than 0.90. However, the variance accounted for of some items was (far) below the minimum level of 50%. Therefore, in the first step of modification three items were removed from the scale. The fit statistics of the two-dimensional model with nine items (model 2) are given in Table 1. The S.-B. scaled χ^2 decreased considerably, and fit indices improved (except for RMSEA, which remained zero). However, the correlations of two items with other items of the scale, departed in some cases from what might be expected on the basis of the item loadings, and were therefore removed from the scale. Model 3 shows a further improvement of the model's fit to the data in comparison with the second model (see Table 1), and this model was chosen as the final measurement scale of consumer confidence in the safety of food.

Table 1. Model fit statistics

	χ^2	S.-B. scaled χ^2	df	RMSEA	CFI	NNFI
Model 1	205.7	47.2	53	.00	.94	.93
Model 2	94.3	21.5	26	.00	.97	.95
Model 3	47.6	8.8	13	.00	.98	.96

In Table 2 the standardised factor loadings, the composite reliability and the average variance extracted of the final measure of consumer confidence in the safety of food are displayed. The psychometric properties of the scale in terms of discriminant and convergent validity (see Anderson & Gerbing, 1988; Fornell & Larcker, 1981) were satisfying.

Table 2. Standardised factor loadings, reliability and average variance extracted for the final measurement scale of consumer confidence in the safety of food

Optimism	
I am optimistic about the safety of food products	.70
I am confident that food products are safe	.70
I am satisfied with the safety of food products	.82
Generally food products are safe	.74
Reliability	*.83*
Average variance extracted	*.55*
Pessimism	
I personally worry about food safety	.87
I feel uncomfortable regarding the safety of food	.81
As a result of the occurrence of food safety incidents I am suspicious about certain food products	.68
Reliability	*.83*
Average variance extracted	*.62*

Discussion

In this study, we developed a scale for general consumer confidence in the safety of food. The results indicate that the concept of general consumer confidence in the safety of food consists of two distinct dimensions, namely 'optimism' and 'pessimism'. The two-dimensional structure of the scale was cross-validated for a separate sample (n = 520) by applying multigroup confirmatory factor analysis, using the approach as suggested by Steenkamp and Baumgartner (1998). Results show that the scale of consumer confidence in the safety of food is invariant for the two samples, indicating that the scale is robust for the Dutch population.

Study 2. The influence of trust in the government and actors in the food chain on consumer confidence in the safety of food

Whereas we conceptualise consumer confidence in the safety of food as the degree to which consumers perceive that food is generally safe, trust can be defined as relying on those with responsibility for managing public health and safety (Siegrist et al., 2000). Consumer trust in institutions responsible for the management of hazards, producers, and distributors may be an important driver of consumer confidence in the safety of food (Berg et al., 2005; Brunel & Pichon, 2004). However, general consumer confidence might be differentially enhanced depending on *which* entity is trusted (Hornig Priest et al., 2003) and whether an entity is trusted because it is regarded as *competent*, *honest*, or *caring for public welfare* (Frewer et al., 1996; Peters et al., 1997). In this study we investigated to what extent the two dimensions of general consumer confidence in the safety of food, i.e. optimism and pessimism, are related to trust in the government and actors in the food chain, taking into account three underlying dimensions of trust: competence, openness, and care for public wellbeing. In order to increase the power of the study, the data from the two samples were combined for the analyses.

Materials

The two dimensions of general confidence were measured with the seven items that formed the 'general consumer confidence in the safety of food' scale that was developed in Study 1. Measures of trust were developed and adapted from items that had appeared in the literature (see Frewer et al., 1996; Poortinga & Pidgeon, 2003). The competence, openness, and care dimension of trust were each measured by two items. In addition, trust was measured for four different actors, namely the government, farmers, retailers, and food manufacturers (from this point onward 'manufacturers'). All items were rated on 5-point Likert scales labelled 'disagree strongly' (1) to 'agree strongly' (5). The measures of trust, both across dimensions and across actors, showed good internal consistency and reliability (alpha > 0.80).

Data analysis

Respondents were included in the analysis when they had no missing observations on the items about general confidence in the safety of food and trust in the government and actors in the food chain, which resulted in a net sample of 850 respondents.

The extent to which trust in different actors on different dimensions is related to consumer confidence in the safety of food was assessed by means of two separate regression analyses: one with 'optimism' and one with 'pessimism' as the dependent variable. In both regression analyses, the twelve items that measure trust in a particular actor *i* (*i* = 1,…, 4) on a particular dimension *j* (*j* = 1,…, 3), for example, the extent to which the *government* is perceived to be *competent*, were included as predictors.

In a standard regression model, regression coefficients (b_{ij}) are estimated for each of the twelve trust items. These regression coefficients reflect the contribution of each of the trust items in explaining either 'optimism' or 'pessimism'. However, applying the standard regression model does not provide any insight in the extent to which the strength of the relationship between trust and confidence is dependent upon the particular actor, the particular dimension of trust, and/or specific combinations between actors and dimensions of trust. Therefore, in order to disentangle the effects of the different actors and the different dimensions of trust, the standard regression model was 'reparametrised'. The standard regression model was 'reparametrised' in such a way that the new regression coefficients can be interpreted as:

i) Overall average: the average of the b_{ij}s from the standard regression model
ii) Actor-specific effects: the deviation from the average of the three b_{ij}s that relate to a particular actor, i.e., one regression coefficient for each dimension of trust, compared to the overall average (see *i*),
iii) Dimension-specific effects: the deviation from the average of the four b_{ij}s that relate to a particular dimension, i.e., one regression coefficient for each actor, compared to the overall average (see *i*), and
iv) Effects for combinations between actors and dimensions: the deviation of the particular b_{ij} that relates to a specific combination of an actor and a dimension of trust, compared to the sum of the overall average (see *i*), the effect of the actor (see *ii*), and the effect of the dimension (see *iii*).

Through reparametrisation, the regression coefficients from the standard regression model are, by analogy with analysis of variance, decomposed into an overall average, two main effects (i.e., the actor and the dimension of trust), and an interaction effect. This enables us to separately estimate the main and interaction effects of both actors and dimensions of trust on consumer confidence in the safety of food. In order to establish whether the effect of overall trust (see i), the effects of the different actors (see ii), the effects of the dimensions of trust (see iii), and the effects of the combinations between the actors and the dimensions of trust (see iv) significantly contribute to predicting general consumer confidence in the safety of food, i.e. 'optimism' and 'pessimism', four nested models were estimated. In the first model it was established whether 'overall average trust' was related to 'optimism' and 'pessimism'. In other words, it was assessed whether there was a significant relationship between trust on the one hand and 'optimism' and 'pessimism' on the other, where for the trust measure no distinction was made between different actors and different dimensions of trust. In the second model, the effects for the different actors were added to the model, in order to assess whether specific actors build consumer confidence in the safety of food more strongly than others, irrespective of the specific dimensions on which this trust is based. In the third model the effects for different dimensions of trust were included to explore whether specific dimensions of trust

build consumer confidence more strongly than other dimensions, irrespective of the actor to which these dimensions are attributed. Finally, in the fourth model, we tested the full model, including all specific combinations of actors and trust dimensions. The specific combinations between actors and dimensions of trust were included in such a way that their associated regression coefficients reflected the extent to which the effect for a particular actor depended upon the dimension of trust, or in other words, whether there was an interaction effect between actors and dimensions with regard to the effect of trust on 'optimism' and 'pessimism'. By means of F-tests it was established whether the inclusion of differential effects for the different actors, the different dimensions of trust, and combinations between actors and dimensions resulted in a significant increase of the explained variance of 'optimism' and 'pessimism'.

Results

For both 'optimism' and 'pessimism', the inclusion of differential effects for the different actors, the different dimensions of trust, and combinations between actors and dimensions significantly improved the model, i.e., ΔR^2 was significant ($p<0.05$) for all three extensions of the model. This indicates that trust in particular actors is more strongly related to 'optimism' and 'pessimism' about the safety of food than trust in other actors. Similarly, the three dimensions of trust do not equally contribute to explaining 'optimism' and 'pessimism'. The significant interaction effects indicate that the effect of trust in a particular actor on consumer confidence in the safety of food is dependent upon the dimension of trust. The total amount of variance that is explained by the independent variables differs considerably for the 'optimism' (43%) and the 'pessimism' (16%) dimension.

In Table 3 the reparametrised regression coefficients are displayed for the full model. The positive coefficient of *overall trust* for the model with 'optimism' as the dependent variable (B = 0.13; p**a**0.01) indicates that a higher level of trust across actors and dimensions of trust is, on average, related to a higher level of optimism with respect to the safety of food. Similarly, we find that *overall trust* is, on average, negatively related to pessimism (B = -0.07; p**a**0.01). These results indicate that the more consumers confer trust in institutions and organisations, the more confident they are about the safety of food. The reparametrised regression coefficients for the different actors, the different dimensions, and the combinations between actors and dimensions, should be interpreted as *deviations* from the coefficient of overall trust. That is, significant coefficients indicate that the effect significantly differs from the coefficient of overall trust. Regarding the effects for the different actors on 'optimism' and 'pessimism', the results indicate that the strength of the relationship between trust and confidence in the safety of food depends on the particular actor, and that this relationship is strongest for manufacturers. This suggests that when trust in manufacturers is harmed, this might have relatively large consequences for consumer confidence in the safety of food. With respect to the effects of the different dimensions of trust, enhancing consumer perceptions that care is being taken of public welfare appears to be the most effective way to build consumer confidence in the safety of food. The interaction effects illustrate that the impact of trust in a particular actor on optimism and pessimism is dependent upon the dimension of trust. For example, for the government, openness is optimism-enhancing (and pessimism-reducing),

whereas for manufacturers openness does not contribute to enhancing optimism or reducing pessimism.

Discussion

Results of the second study indicate that consumer trust in the government and actors in the food chain is positively related to consumer confidence in the safety of food, but that the strength of this relationship depends upon both the actor and the dimension of trust. This has important implications for the development of communication strategies that are designed to regain or maintain consumer confidence in the safety of food. Another finding of this study is that trust in actors in the food chain has a stronger optimism-enhancing than a pessimism-reducing effect. This might indicate that while trust in different actors has a positive effect on optimism, trust does not withhold consumers from worrying about particular incidents or developments, which is reflected in the smaller pessimism-reducing effect of trust.

General discussion

In Study 1 we developed a reliable and valid measure of consumer confidence in the safety of food, which consists of two distinct dimensions, i.e. optimism and pessimism. In study 2, we found that the degree to which trust is related to consumer confidence in the safety of food is dependent upon both the actor and the dimension of trust. Trust in farmers and retailers appears to be less strongly related to consumer confidence in the safety of food, compared to trust in the government and trust in manufacturers, potentially because the latter are perceived to be primarily responsible for the safety of food (De Jonge et al., 2004). In addition, generally, emphasising concern for public welfare appears to be important for building consumer confidence in the safety of food, although for the government focussing on openness may even be more suitable. In conclusion, the results of this study imply that in examining consumer confidence in the safety of food it is important to distinguish between optimism and pessimism. In addition, when the role of trust is considered, different actors and dimensions of trust should be taken into account.

Table 3. Unstandardised parameter estimates for the complete model

	Optimism (*B*)		Pessimism (*B*)	
Constant	3.71	**	13.94	**
Overall trust	.13	**	-.07	**
Actor				
Government	-.04	*	.02	
Farmers	-.02		.00	
Retailers	-.03		.06	**
Food manufacturers	.09	**	-.08	**
Dimension of trust				
Competence	-.07	**	.10	**
Openness	-.06	*	-.03	
Care	.12	**	-.07	*
Interaction terms				
Government * Competence	-.11	*	.14	*
Government * Openness	.11	*	-.24	**
Government * Care	.00		.10	
Farmers * Competence	.11	*	.00	
Farmers * Openness	.02		.04	
Farmers * Care	-.13	*	-.03	
Retailers * Competence	-.01		-.04	
Retailers * Openness	.02		.02	
Retailers * Care	.00		.02	
Food manufacturers * Competence	.01		-.10	
Food manufacturers * Openness	-.14	*	.19	**
Food manufacturers * Care	.13	*	-.09	

* $p < 0.05$
** $p < 0.01$

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