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Seeking information about food-related risks: The contribution of social media



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ABSTRACT

In the current information landscape, there are numerous channels for consumers to find information on issues pertaining to food safety. The rise in popularity of social media makes communicators question the extent to which resources should be allocated to these channels in order to reach new segments or audiences which are hard to reach through more traditional dissemination channels. A segmentation approach was used to identify groups of consumers based on their inclination to use different channels to seek information about food-related risks, including traditional media, online media and social media. In the wake of the 2011 *Escherichia coli* contamination crisis, the study focused on a bacterial contamination of fresh vegetables. Results were obtained through an online survey among 1264 participants from eight European countries in September 2012. Four segments were identified: 'a high cross-channel inclination' (24%), 'an established channel inclination' (31%), 'a moderate cross-channel inclination' (26%) and 'a low cross-channel inclination' (19%). Results show that social media can act as a complementary information channel for a particular segment, but that it is not a substitute for traditional or online media. Individuals who showed an inclination to use social media in conjunction with other channels considered it more important to be well informed, were more motivated to find additional information, were more sensitive to risks in general and perceived the likelihood of a food incident in the future to be larger. The 'high cross-channel inclination' segment contained relatively younger and more Southern European participants.

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Introduction

The 2011 *Escherichia coli* contamination of fenugreek seeds in Europe and the 2011 listeriosis outbreak in contaminated cantaloupes in the United States generated considerable public attention and concern regarding the potential consequences of a food contamination incident, with both cases resulting in many illnesses and deaths (Laksanalamai et al., 2012; Mellmann et al., 2011). Typically when a food safety incident occurs, there is often increased anxiety and information seeking activity among consumers (Kuttschreuter, 2006). To develop effective communication strategies, it is crucial to understand the processes through which consumers encounter and search for information from different sources, as well as through different channels.

Many studies have highlighted the importance of information sources in food risk communication (European Commission, 2010; Frewer, Howard, Hedderley, & Shepherd, 1996; Kornelis, de Jonge, Frewer, & Dagevos, 2007; van Kleef et al., 2006). Consumers' intention to use particular communication channels has garnered less attention in food risk literature (Clarke & McComas, 2012; Frewer et al., in press). This study aims to fill this gap by investigating consumers' intention to use current prevalent online and offline information channels. Special attention is given to the opportunities that arise with regards to the current societal popularity of several social media applications. The growth of social media offers communicators new channels for improving the communication of food risks but must be considered alongside the classical media channels that are traditionally used (Barnett et al., 2011; Rutsaert et al., 2014). In other words, to what extent are consumers who are familiar with social media applications inclined to use these as a channel to seek information about food risks, compared to other more traditional mass media and Internet channels?

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Channel use in a complex media landscape

When seeking information about food safety, the public has the opportunity to access information through many different channels. Traditional media such as television, radio and newspaper have been recognized as key sources and channels of food risk information that have a profound influence on consumer perception of food-related risk (Houghton et al., 2008). The media is one of the arenas where risk messages are constructed, disseminated and transformed and communicators use media channels to spread their message (Noar, 2006). Traditional media also have designated as a potential amplification station of risk (Petts, Horlick-Jones, & Murdock, 2001). As food risks are the focus of considerable public concern (Kuttuschreuter, 2006), they are likely to be a topic of much media reporting. While experts may believe the media to be an outlet which only serves to create public anxiety, consumers often view this commodity in a more positive light and see the media as a valuable channel of risk-related information about food (Krystallis et al., 2007; Van Kleef et al., 2006).

In recent decades, the landscape of communication channels has undergone a number of substantial changes with huge implications for organisations and institutions with a remit in food communication. The Internet has become a key channel for consumers to seek food risk information (Jacob, Mathiasen, & Powell, 2010; Redmond & Griffith, 2006; Tian & Robinson, 2008). Search engines have become the main starting point for accessing a vast amount of information online (Brossard & Scheufele, 2013; Kobayashi & Takeda, 2000). By entering a specific set of search terms in the search engine, users can find relevant information about a diversity of topics, including food safety issues. Another option to obtain food risk information is to directly access the website of a particular trusted organisation. Also news websites are increasingly playing a role as a key online information channel (De Waal, Schönbach, & Lauf, 2005).

In the last decennium the Internet has seen a new array of technical innovations that go collectively under the name of 'web 2.0'. Web 2.0 has provided a platform for the evolution of social media which is defined as "a group of Internet-based applications that build on the ideological and technological foundations of web 2.0, and that allow the creation and exchange of user generated content" (Kaplan & Haenlein, 2010, p.61). Consumer engagement on different social media platforms is growing exponentially. Applications like Facebook, YouTube and Twitter are extremely popular and used by millions of people every day. Tools such as YouTube make it easy for organisations to share videos, which can be used by viewers on websites, blogs or other social media applications. Social networking sites such as Facebook and micro-blogs such as Twitter have built-in search engines that allow one to seek information within their online community. Forums and blogs allow the individual to express personal views, share information and engage in citizen journalism (Tilley & Cokley, 2008). The high current societal popularity of social media raises the question as to how inclined consumers would be to seek food safety information through social media channels (Barnett et al., 2011; Brossard & Scheufele, 2013; Rutsaert, Regan et al., 2013).

Determinants of channel choices for seeking information about food risks

The determinants that motivate individuals to seek information have mostly been explored within the Risk Information Seeking and Processing (RISP) model, designed to account for predictors of information seeking and processing within the context of risk (Griffin, Dunwoody, & Neuwirth, 1999; Griffin, Neuwirth, Dunwoody, & Giese, 2004). Information provision to consumers should be properly managed and targeted to address particular

needs recognising that not all consumers are alike: "Individual characteristics such as uncertainty level, involvement, knowledge, or personality, as well as attitudes, lifestyles and socio-demographics account for differences in information needs and reactions to information" (Verbeke, 2005, p. 352). Kuttuschreuter (2006) defined three main determinants that could directly influence an individual's level of information seeking about food risks: risk perception, information need and affective response. Whether these determinants also result in different patterns of channel use has, to our knowledge, not been investigated.

One of the main determinants of information seeking according to the RISP framework is the information insufficiency of a consumer (Kahlor, Dunwoody, Griffin, Neuwirth, & Giese, 2003; Ter Huurne & Gutteling, 2008). This perceived information insufficiency can be defined as the gap between information that is held and information that is desired. This concept has been found to be more predictive of information seeking than the actual level of knowledge held by an individual (Griffin et al., 1999). The media complementarity framework, introduced by Dutta-Bergman (2004), proposes that interested consumers will access and use different media such that each complements the other. This framework suggests that the level of interest in a particular topic is one of the main drivers to determine media usage. The notion of complementarity is in contrast to the focus of displacement theory (McCombs, 1972) which predicts that a new media channel will replace a previously employed media channel (for example the Internet replacing the newspaper). With respect to our study, this would mean that individuals might be interested in using social media information channels alongside other channels rather than the use of one replacing another.

People's perceptions of risks and affective response to a risk can influence one's judgment of the amount of information needed to cope with the risk according to Griffin et al. (1999). Results from Kuttuschreuter (2006) showed that risk perception and affective response were indeed positively correlated to information need and information seeking. Kornelis et al. (2007) focused on the sources consumers consult and found evidence for five distinct groups: heavy institutional-source users, moderate institutional-source users, social source users, non-selective heavy users and low users. Their results also indicated that those consumers who relied more heavily on their social network as a source of information displayed the highest level of trait worry. These results thus suggest that higher risk perception and a stronger affective response might result in an increased preference for information seeking. As a corollary of this, a trait risk sensitivity might lead to a higher preference for social media friends, family and peers as a source of information – central to many social media applications.

It is also important to consider that socio-demographic characteristics such as age, gender and income can be significant for tailored information provision (Kornelis et al., 2007). Research has shown for example that older people and males have much lower trust in online health information channels than younger people and females (Hesse et al., 2005). The country in which consumers are residing may also be a key determinant of channel preferences as the traditional and social media landscape is not homogenous across Europe (de Almeida et al., 1997; European Commission, 2010).

Purpose of the study

The primary objective of this paper is to identify how consumers familiar with social media use it to seek information about food risks, vis-à-vis more traditional offline and online channels. Insights obtained from this study are relevant for the discussion on whether there is added value for communicators in investing resources in social media and whether this might allow communi-

cators to target consumers who are difficult to reach through more traditional channels. We aim to segment consumers based on their intended channel use when seeking additional information on food-related risks. The second objective is to gain a better understanding of the profiles of those consumers who are inclined to use social media as a channel to seek information about food risks; what is their motivational, perceptual and socio-demographic profile? This goal will be achieved by comparing attitudes in relation to information, perceived risks, general attitude and consumption of a particular type of food and the socio-demographics between the different segments.

In order to provide a context to situate our consideration of these questions, safety risks related to bacteria in fresh vegetables were taken as the topic of the study in the wake of the 2011 *E. coli* contamination crisis. The *E. coli* contamination of fenugreek seeds led to the death of 50 people, serious kidney failure of 850 others and severe economic losses that affected mainly the fresh vegetables' sector in many European countries. Several vegetables such as cucumbers, lettuce and tomatoes, were erroneously mentioned as carriers before fenugreek seeds were identified as the culprit. The uncertainty regarding the carrier food was associated with a large drop in sales of the suspected vegetables.

Materials and methods

Participants and design

A cross-national survey was carried out with a sample of approximately 200 consumers from 8 European countries: the Netherlands, Belgium, Ireland, United Kingdom, Italy, Germany, Spain and Portugal ($n = 1622$). The sample was stratified according to gender, age-group, country, and region within the country, in order to ensure representativeness for the online population with respect to these variables. Exclusion criteria were individuals aged below 18 and 75 or above. Data collection took place in September and October 2012. Participants in all countries were recruited by the same market research agency and invited to fill out an online questionnaire on the risks and benefits of fresh vegetables and red meat, that took approximately 30 min.

For this particular study, we were interested in the participants who were familiar with information seeking using all channels, including online and social media channels. Participants were asked about their likelihood of using a number of channels to find information on the risks of fresh vegetables (see Table 2 for an overview). A total of 358 participants (22.1%) indicated at least one channel as not applicable to them. These participants were

therefore excluded from the analysis. The sample characteristics of the resulting 1264 participants included in the study are presented in Table 1. Gender distribution was approximately equal across countries. Participants' mean age was 42.8 years. Almost half of the participants indicated that they were coping on their present income. In all countries, there was diversity in the educational level of the participants.

Segmentation variable

Perceived likelihood of channel use for information seeking: Participants were asked to indicate how likely they would be to use a number of communication channels to find additional information about vegetable risks (7-point Likert scale, ranging from 'very unlikely' to 'very likely'). Participants were presented with 11 online and offline information channels (Table 2). Special attention was given to social media that have emerged through the evolution of web 2.0 such as the use of micro blogs, forums, blogs, social networking sites and YouTube for additional information seeking about food-related risks.

An exploratory factor analysis that used the principal components extraction method with varimax rotation on these 11 items revealed three factors as follows: social media (5 items, Cronbach's $\alpha = 0.88$), traditional media (3 items, Cronbach's $\alpha = 0.88$) and online information (3 items, Cronbach's $\alpha = 0.72$). The factors explained more than 70% of the variance in the original data. The internal reliability coefficient or Cronbach's alpha for each dimension was satisfactory, and constructs were computed as the mean of the relevant items.

Segment profiling variables

The segment profiling variables were selected based on the determinants for information seeking proposed by Kuttuschreuter (2006) and informed by the RISP model (Griffin et al., 1999). To improve the quality of the responses and reduce the tendency to answer questions consistently, the questions on fresh vegetables were mixed with those on red meat. Similarly, the questions on risks were interspersed with those on the benefits. Question items were also randomised within constructs. All measures were extensively piloted in two of the participating countries (The Netherlands and Ireland) to ensure a high reliability in terms of internal consistency (Cronbach's alpha). Consumer attitudes in relation to information were evaluated with four constructs: information dependency, interest in food information, motivation to find additional information on the risks of fresh vegetables and self-efficacy

Table 1
Sample characteristics (% , $n = 1264$).

	All countries ($n = 1264$)	Belgium ($n = 155$)	Germany ($n = 149$)	Ireland ($n = 154$)	Italy ($n = 171$)	Netherlands ($n = 149$)	Portugal ($n = 166$)	Spain ($n = 158$)	UK ($n = 162$)
<i>Age (years)</i>									
<30	20.6	21.9	18.8	17.9	18.7	20.8	20.9	21.1	24.7
30–39	24.5	21.3	18.1	21.6	23.4	22.1	27.8	31.3	29.9
40–49	21.8	20.6	22.1	23.5	20.5	22.8	17.1	26.5	21.4
50–59	16.3	20.0	20.1	14.8	12.9	17.4	17.1	13.3	15.6
>60	16.8	16.1	20.8	22.2	24.6	16.8	17.1	7.8	8.4
Mean (SD)	42.8 (14.6)	43.0 (15.1)	45.3 (15.3)	44.8 (15.5)	45.2 (15.7)	42.7 (14.4)	43.0 (14.5)	39.4 (12.0)	30.2 (13.0)
<i>Gender</i>									
Male (%)	50.5	52.3	48.3	49.4	52.6	52.3	49.4	52.4	46.8
Female (%)	49.5	47.7	51.7	50.6	47.4	47.7	50.6	47.6	53.2
<i>Financial situation (self-reported)</i>									
Living very comfortably (%)	4.8	7.1	4.7	7.4	2.3	10.1	4.4	1.8	1.3
Living comfortably (%)	21.1	36.8	24.2	24.1	13.5	19.5	11.4	24.1	16.2
Coping on present income (%)	46.0	43.2	50.3	38.9	55.6	43.6	47.5	41.6	46.8
Finding it difficult (%)	20.3	10.3	17.4	23.5	20.5	18.8	26.6	22.3	22.1
Finding it very difficult (%)	7.8	2.6	3.4	6.2	8.2	8.1	10.1	10.2	13.6

Table 2Factor loadings from principal component analysis for inclination to use channels for information seeking about risks of fresh vegetables ($n = 1264$).

	Factor 1 social media	Factor 2 traditional media	Factor 3 online media
Use micro-blogs such as Twitter	0.876		
Read or write online blogs	0.859		
Read or take part in forums or chat groups online	0.804		
Use social networking sites such as Facebook, MySpace, LinkedIn, Google+	0.795		
Watch videos online e.g. on YouTube	0.710		
Listen to the radio		0.884	
Watch television		0.881	
Read the newspaper		0.838	
Read online articles on news websites			0.792
Use a search engine such as Google			0.742
Directly access website of a food communication agency			0.665
Variance explained (%)	30.76	25.83	13.86
Cronbach's α internal reliability	0.88	0.88	0.72

to find food information. The four constructs were measured using a 7-point Likert scale ranging from '1 = strongly disagree' to '7 = strongly agree'. *Information dependency* included four items: 'Being well informed is very important to me', 'It is very important to me to be up-to-date', 'I feel uncomfortable when I am uninformed' and 'I like to know as much as possible about topics that interest me' (Cronbach's $\alpha = 0.88$). *Interest in food information* was measured by four items: 'I am interested in stories in the mass media on current food issues', 'News reports on technological developments that may enhance food quality do interest me', 'News items on how I could maximize the benefits of the food products I eat interest me' and 'I am particularly interested in a news story if it is on how to minimize the risks of the food products I eat' (Cronbach's $\alpha = 0.90$). *Motivation to find additional information on the risks of fresh vegetables* consisted of three items: 'I want to learn more about the potential consequences of eating a fresh vegetable that carries residues of chemicals used in farming', 'I would like to know more about how to reduce the risks of eating fresh vegetables' and 'I would like to find out more about the risks of eating a fresh vegetable that carries a virus or bacteria' (Cronbach's $\alpha = 0.94$). *Self-efficacy to find food information* was measured by three items: 'If I want to find out something on risks of specific eating habits, I know how to find it', 'If I want to find out about the benefits of a particular food, I know where to look for it' and 'If I have a question about how to compose a healthy meal and cook it safely, I know who to address' (Cronbach's $\alpha = 0.91$).

Two constructs were included to measure perceived risks. *General risk sensitivity* was measured on a seven point Likert scale based on three items: 'If something bad happens to someone else, I think it is likely to happen to me', 'I regularly think about negative events that might happen to me in the future' and 'I am inclined to worry about something bad happening to me' (Cronbach's $\alpha = 0.84$). *Future facing risk perception* was measured with three items on a 7-point interval scale where the participants were asked how likely they think that five persons will die within the next five years as a result of: 'An incident involving improper treatment of fresh vegetables during production or transportation', 'Fresh vegetables that are carrying a virus or bacteria' and 'Fresh vegetables that are carrying a chemical such as pesticides or fertilizer' (Cronbach's $\alpha = 0.87$).

General attitude and consumption of fresh vegetables were also measured. These variables were included to check if the variance between the segments could be explained by the motivation to find additional information rather than by general attitude and consumption behaviour. *General attitude towards fresh vegetables* was measured using 7-point semantic differential scales. Participants were presented with the statement, "Please indicate which word best describes your feeling toward fresh vegetables". The bipolar adjectives were bad/good, unsatisfied/satisfied, unpleasant/pleasant, and negative/positive. This scale is a commonly used

scale for assessing general attitude (Pieniak, Verbeke, Olsen, Hansen, & Brunso, 2010; Stayman & Batra, 1991). The construct "general attitude towards fresh vegetables" is the average across the four items (Cronbach's $\alpha = 0.96$).

Consumption of fresh vegetables was a self-reported item and it was measured as total fresh vegetable consumption frequency per week. A 8-point frequency scale ranging from "never" to "seven times or more per week" was used. These variables were recoded into frequencies per week (e.g. "never" became 0; "once a week" became 1; and "seven times or more per week" became 7).

Socio-demographic variables: Gender, age and country of residence were recorded. Financial situation was assessed by asking participants to indicate how comfortable they were living on their present income (five response categories ranging from very comfortable to finding it very hard).

Analyses

Statistical analyses were carried out with SPSS 20.0 (SPSS Inc., Chicago, IL, USA). First, factor analysis using principal components was performed to discover the basic structure underlying the intention to use channels for information seeking about food risks (findings already presented in Table 2). Second, two-step clustering (Wedel & Kamakura, 1998) based on likelihood measures was applied to identify consumer segments. Ward's hierarchical clustering method was used to identify distinctive homogenous segments based on the perceived likelihood of channel use for information seeking. After having identified the optimal number of segments on the basis of the proportionate increase in heterogeneity and inspection of the dendrogram, the clustering was fine-tuned by using the non-hierarchical K-means clustering method (Hair, Black, Babin, Anderson, & Tatham, 2006). Bivariate analyses including cross-tabulation with Chi²-statistics and one-way analysis of variance followed by Tukey's HSD tests were used to profile the segments.

Empirical results

Cluster analysis

Hierarchical clustering was performed with the three constructs resulting from the exploratory factor analysis as segmentation variables: traditional media, online media and social media. Examination of the agglomeration schedule and the proportionate increases in heterogeneity when moving from one solution to the next (respectively 50%, 24%, 26%, 15%, 12% etc.) suggested that a four-cluster solution would be optimal. This number of clusters was substantiated by the inspection of the dendrogram (Fig. 1). Next, a K-means cluster analysis using Ward's method was per-

formed with initial cluster centres resulting from the hierarchical procedure. The respective size and mean scores of the segments are reported in Table 3.

The participants in segment 1 were characterised by a high intention to use all available channels to seek additional information about the risks of fresh vegetables. For this reason, we labelled this segment as 'High cross-channel inclination'. (Henceforth referred to as the 'High' segment). Approximately 24% of the participants were classified in this segment.

Participants in segment 2 were labelled as 'Established media inclination' (or the 'Established' segment). Compared to participants of the 'High' segment who showed a tendency to seek additional information through all available channels, participants of this segment were particularly inclined to seek additional information about risks of fresh vegetables through the more established channels such as online and traditional media. Social media was not appealing as a potential channel to seek information to this segment. This was the largest segment accounting for 31% of the participants.

Segment 3 contained participants with a moderate tendency to use the presented channels to seek additional information. While these participants were less inclined to use traditional and online media compared to the total sample, they were more inclined to use social media as information channel. This segment contained 26% of the participants and is labelled as 'Moderate cross-channel inclination' and referred to as the 'Moderate' segment.

Segment 4 represents the smallest segment with approximately 19% of the participants. The 'Low cross-channel inclination' segment (or 'Low' segment) revealed a low inclination to seek additional information about vegetable risks, regardless of the information channel.

Profiling of the clusters

The four identified segments were compared on consumer attitudes in relation to information, perceived risks, general attitude toward and consumption of fresh vegetables (Table 4). Significant differences were found between the segments regarding attitudes in relation to information. The highest dependency on information, the highest interest in food information and the highest motivation to find additional information on the risks of fresh vegetables were evident in the 'High' segment. The second highest levels were found in the 'Established' segment and the lowest levels were present in both the 'Moderate' and 'Low' segment. These effects were large (eta squared = .24, .27 and .21, respectively). Self-efficacy to find food information followed a similar pattern, though the differences were less pronounced (eta squared = .10). In this case, the 'High' and 'Established' segment, and the 'Moderate' and 'Low' segment displayed equal levels of self-efficacy. Overall, the segments

Table 3

Mean scores of the segments on inclination to use channels for information seeking about risks of fresh vegetables.

	Total	Segment 1	Segment 2	Segment 3	Segment 4	p-Value	Eta ²
Number of participants	1264	300 24%	390 31%	328 26%	246 19%		
Information seeking on social media	3.27	5.16 ^d	2.37 ^b	3.94 ^c	1.50 ^a	<0.001	.755
Information seeking on traditional media	5.12	6.07 ^b	5.96 ^b	4.16 ^a	3.90 ^a	<0.001	.541
Information seeking on online media	5.23	6.22 ^d	5.91 ^c	4.58 ^b	3.82 ^a	<0.001	.551
Interpretation of segments		High cross-channel inclination	Established media inclination	Moderate cross-channel inclination	Low cross-channel inclination		

The a–d indicate represent the ascending order of the significantly different average scores on seven-point scales between the segments using independent sample one way analysis of variance followed by Tukey's HSD test ($p \leq .001$).

Eta² is the proportion of total variance that is explained by an independent variable and can be used as an effect size measure (Field, 2009).

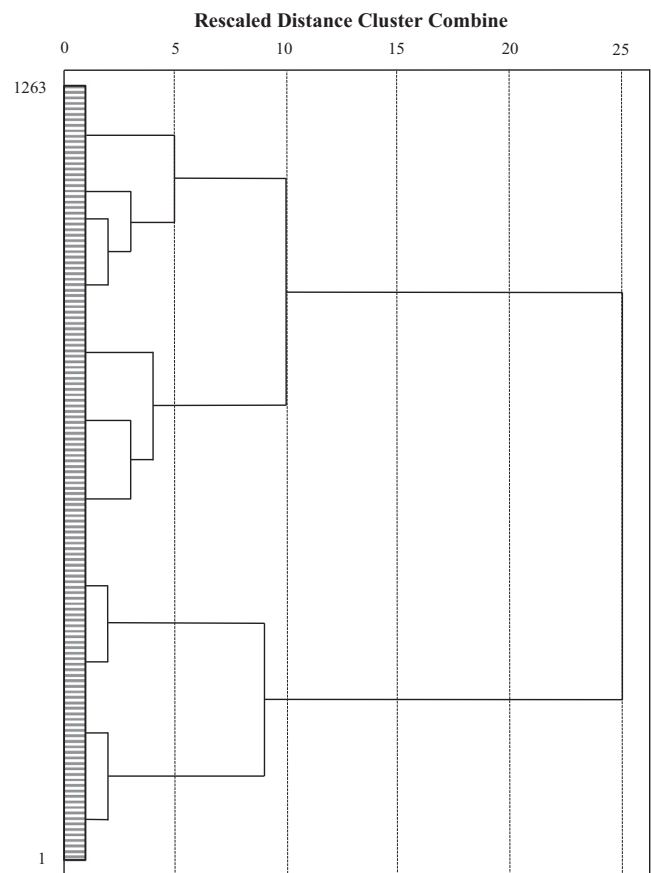


Fig. 1. Dendrogram using Ward linkage.

scored above the mean of the scales for information dependency, interest in food information, motivation to find additional information on the risks of fresh vegetables and self-efficacy to find food information.

With respect to general risk sensitivity, the 'High' segment scored highest and the 'Low' segment lowest (eta squared = .081). The differences between the segments in future facing risk perception, general attitudes toward fresh vegetables and consumption of fresh vegetables were small (eta squared $\leq .035$).

Socio-demographic profile of segments

Table 5 presents the socio-demographic characteristics of the segments. With regard to age, medium-sized differences were found between the segments (eta squared = .052). The average

Table 4Profile of the segments on dimensions of consumer attitudes in relation to information, perceived risks, general attitude toward and consumption of fresh vegetables ($n = 1264$).

	Total sample	Segments				p-Value	Eta ²
		High cross-channel inclination	Established media inclination	Moderate cross-channel inclination	Low cross-channel inclination		
Information dependency	5.34	5.99 ^c	5.68 ^b	4.82 ^a	4.69 ^a	<0.001	.243
Interest in food information	5.10	5.85 ^c	5.46 ^b	4.58 ^a	4.32 ^a	<0.001	.274
Motivation to find additional information on risks of fresh vegetables	5.12	5.82 ^c	5.47 ^b	4.64 ^a	4.36 ^a	<0.001	.211
Self-efficacy to find food information	5.31	5.66 ^b	5.58 ^b	4.84 ^a	5.10 ^a	<0.001	.099
General risk sensitivity	4.03	4.52 ^c	3.87 ^{a,b}	4.05 ^b	3.65 ^a	<0.001	.081
Future facing risk perception	4.01	4.35 ^b	3.92 ^a	3.92 ^a	3.84 ^a	<0.001	.021
General attitude toward fresh vegetables	6.01	6.06 ^a	6.18 ^a	5.84 ^a	5.92 ^a	0.002	.012
Consumption of fresh vegetables (times per week)	3.18	3.84 ^b	3.25 ^{a,b}	2.93 ^a	2.62 ^a	<0.001	.035

The a-c indicate represent the ascending order of the significantly different average scores on seven-point scales between the segments using independent sample one way analysis of variance followed by Tukey's HSD test ($p \leq 0.01$).

Eta² is the proportion of total variance that is explained by an independent variable and can be used as an effect size measure (Field, 2009).

age of the 'Established' and 'Low' segments was significantly higher than the average age of the 'High' and 'Moderate' segments. The latter segments were overrepresented in the youngest two age categories, and strongly underrepresented in the oldest age categories.

Furthermore, results indicated that the segments differed significantly with respect to the country in which participants resided. In the segment characterised by a high cross-channel inclination, Portugal and Spain were overrepresented. Italy was also overrepresented in this segment and additionally so in the 'Moderate' segment, also characterized by an above average inclination to use social media. In the 'Low cross-channel inclination' segment, the United Kingdom, The Netherlands and Belgium were overrepresented. In these countries as well as in Germany, the 'High cross-channel inclination' segment was noticeably underrepresented.

There were no significant differences found with respect to gender and the self-reported financial situation of the participants.

Discussion and conclusion

The goal of this study was to assess how consumers familiar with social media position social media as a channel to seek additional information about food-related risks, alongside more traditional offline and online channels. As food plays a main role in everyday life, providing accurate and timely information about possible risks has been key to protecting consumers, avoiding social amplification and major economic losses in particular sectors of the food chain, and to re-establishing consumer confidence (EFSA, 2012). Nowadays, there is an increasing abundance of

Table 5Socio-demographic profile of the segments ($n = 1264$).

Socio-demographic profile	Total Sample	Segments				p-Value
		High cross-channel inclination	Established media inclination	Moderate cross-channel inclination	Low cross-channel inclination	
Age (years, average)	42.8	40.1 ^a	45.7 ^b	39.0 ^a	46.7 ^b	<0.001
Age (% category)						<0.001
<30	20.6	25.3	12.6	29.6	15.4	
30–39	24.5	28.7	22.1	28.7	17.9	
40–49	21.8	22.0	25.6	17.1	22.0	
50–59	16.3	11.3	20.8	11.3	22.0	
>60	16.8	12.7	19.0	13.4	22.8	
Gender (%)						0.753
Male	50.5	49.0	49.2	51.5	52.8	
Female	49.6	51.0	50.8	48.5	47.2	
Financial situation (%)						0.416
Living very comfortably	4.8	5.3	2.8	4.3	8.1	
Living comfortably	21.1	19.7	23.1	20.1	21.1	
Coping on present income	46.0	44.3	46.9	47.9	43.9	
Finding it difficult	20.3	22.0	19.7	20.4	18.7	
Finding it very difficult	7.8	8.7	7.4	7.3	8.1	
Country (%)						<0.001
Belgium	12.3	5.3	12.8	12.5	19.5	
Germany	11.8	6.3	13.1	13.1	14.6	
Ireland	12.2	14.7	12.3	11.3	10.2	
Italy	13.5	17.3	10.8	18.0	7.3	
Portugal	13.1	24.7	14.9	8.2	2.8	
Spain	12.5	19.3	12.1	12.2	5.3	
The Netherlands	11.8	3.7	11.0	14.0	19.9	
United Kingdom	12.8	8.7	13.1	10.7	20.3	

The a-c indicate represent the ascending order of the significantly different average scores on seven-point scales between the segments using independent sample one way analysis of variance followed by Tukey's HSD test.

channels available for the public to use when looking for food-related information. Therefore, communicators should be aware of where particular consumers are looking for information and why specific channels are used. The popularity of social media to connect with friends and family or as a source for entertainment has been generally acknowledged (Mintel, 2011), but are people also inclined to use social media as a channel to find additional information on food risks? Which roles do social media play alongside more common information channels such as traditional and online media? Answering these questions will help assess the extent to which communicators might usefully attend to social media as a potential information channel about food risks.

The results of this study clearly show that social media can act as a complementary channel for at least a section of consumers to seek information about food risks, but not as a substitute – even to those who are most inclined to seek out information through social media channels. Segmentation analysis indicated that those participants who were positively inclined towards using social media as a channel to seek additional information about food risks did so using it as part of a broader configuration of channel use. A high intention to use traditional and online media was also present. Social media might be used to confirm information that was found on other channels or vice versa. Given that social media provides individuals the opportunity to reflect personal opinions or experiences, it allows social media applications to be used as a source of social proof and monitor how peers deal with comparable situations (Bunce, Partridge, & Davis, 2012). It may prove worthwhile to pursue social media as an additional channel to confirm an official message also sent out through more traditional or online media. Previous work has indicated that conflicting information which is communicated across different channels can lead to lower perceived credibility of an official risk message (Dean & Shepherd, 2007). Any opportunity to increase awareness of consistent messages across multiple channels is valuable to ensure consumers feel confident in the risk information they receive.

A second segment of consumers displayed a lower but equally spread intention to use traditional, online and social media. The two remaining segments had a very low inclination to use social media for food and risk-related information. Based on the results of this segmentation study, social media would not seem useful to target consumers who are difficult to reach through more established channels in terms of information seeking about food-related risks (Barnett et al., 2011). If consumers indicated a low inclination to seek information on traditional or online media, this was also the case for social media. The results also showed that low and moderate information seekers portrayed a lower consumption of fresh vegetables. Therefore, one reason for a low inclination to seek additional information could be linked to a lower level of consumer involvement and consumption of the product category (Verbeke, 2005), i.e. fresh vegetables in the case of our study.

Our study identified a segment of consumers with a 'low cross-channel inclination'. A relevant question is whether this is the result of an idiosyncratic way of responding to questions, or whether there is indeed such a segment of consumers who are less interested in information on the risks of vegetables, who perceived less risks, who consume less fresh vegetables and who are the least inclined to seek information on the risks of fresh vegetables through various channels. Results by Visschers, Hartmann, Leins-Hess, Dohle, and Siegrist (2013) support the latter option. In their recent study into the segmentation of consumers based on nutrition information use, Visschers et al. (2013) identified four consumer groups which were labelled "official information users", "Internet users", "moderate users" and "uninterested". The uninterested segment (28%) was the least interested in using nutrition tables or other sources for nutrition information, showed the lowest usage of nutrition information sources and was the least health

conscious. These findings are very similar to our findings and support the existence of a segment with an overall "low" profile, for whom a lower inclination to seek additional information might be the result of a lower level of consumer involvement in general.

The Risk Information Seeking and Processing model has been the dominant model in exploring the determinants of risk information seeking. In this study, we applied this Risk Information Seeking and Processing model to a food-related context and examined the motivations that encouraged people to use particular information channels to find food-related risk information. Our results showed that the motivation to find additional information was an important determinant of intended channel use as it encouraged a higher intention to use multiple channels. These results are fully in line with the media complementarity framework of Dutta-Bergman (2004) and as also reported by Tian and Robinson (2008). In their study on health information seeking, interpersonal channels, mass media channels and the Internet were used as complementary channels by interested consumers. Similarly, in a study by Voordouw et al. (2011), it was found that ICT methods could supplement allergy information provided by labels on food packages rather than replace it. These results suggest that all different media and channels of information might be utilized by interested consumers, including social media. Whereas the motivation to find additional information was higher for the 'High' segment than for the 'Established' segment, self-efficacy to find food-related information was equal. Participants belonging to the 'Established' channel were apparently convinced that the information they needed was sufficiently available through traditional and online media and were not motivated to start using social media in addition.

The results of Kornelis et al. (2007) indicated that trait emotional reactions to food risks lead to a higher use of information sources and especially sources within their own social network such as friends, acquaintances and family. The empirical results of our study are in line with these findings and showed that risk sensitivity and future facing risk perception were significantly higher in the 'High cross-channel inclination' segment than in the other segments. These results indicate that social media is more important as an information channel among consumers who display a higher level of perceived risk. This means that messages targeting users through social media should take into account higher risk perception levels and potentially higher levels of concern among consumers. These messages should therefore be easily interpretable and not prone to risk amplification (Loewenstein, Weber, Hsee, & Welch, 2001; Zhang, Pavur, York, & Amos, 2013).

The differences in mean age between the segments who see potential in social media and the ones that do not, are in line with characteristics of the early adopters of new technologies (Rogers, 1995) and the common (younger) profile of social media users (European Commission, 2012). Older people were less likely to be early adopters of new technologies such as social media and revealed preferences for more established media. Young Internet users in Europe are growing up with social media which makes these tools very familiar to them and they may thus, be more likely to see its value as an information channel. Besides age, there were also large country differences between the segments. Where the southern countries (Spain, Portugal and Italy) were overrepresented in the segments with an inclination to use social media to seek information, the more northern countries (United Kingdom, The Netherlands, Belgium and Germany) were overrepresented in the segments with a low inclination to seek additional information, regardless of the considered channel. These countries had a very low likelihood of using social media as an information channel.

The use of a self-reported measure of intended information seeking can be seen as limitation of this study. Where social media received generally lower scores as information channel, actual behaviour might point to different findings. When it comes to

information seeking channels, search engines play a main role in determining where users will go to find information, which was also confirmed by our results. Hochstotter and Lewandowski (2009) showed that social media websites such as Wikipedia, YouTube and Yahoo! Answers were very popular in search engine queries. Even if social media applications are not used to seek information directly, information from these channels may still be encountered (Rutsaert, Pieniak, Regan, McConnon, & Verbeke, 2013). These results indicate that more research is needed to gain insight into actual behaviour of consumers who use the internet to seek information about food-related risks.

The online nature of the survey might be considered a limitation of the study as well. In online studies, in particular the senior population is underrepresented compared to the offline adult population as a result of a lower use of the Internet in this age group. However, the focus of our study was on the contribution of social media channels to information seeking. We were therefore interested in consumers who were familiar with the social media phenomenon. As social media are a feature that is unique to the Internet, drawing a sample from the online population seemed an appropriate strategy. The drawn sample was representative of the online population with respect to gender, age and region of the country in which the participants lived. From this perspective, the older population was adequately represented. In order to understand the contribution of social media to information seeking, participants who indicated not to be familiar with social media were excluded from the analyses presented in this paper.

The Internet and especially the evolution of the web 2.0 technology has made dissemination and production of information faster and easier than ever before. Organisations are increasingly using social media to target specific audiences and present information that is relevant to them. However, the findings of this study suggest that this does not mean that these new channels will automatically replace more conventional channels for consumers to seek information about food risks. A large part of the participants were not at all familiar or revealed little intention to use social media applications. However, for the younger group of consumers social media could act as a complementary information channel.

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