

Northumbria Research Link

Citation: Sillence, Elizabeth, Hardy, Claire, Medeiros, Lydia and LeJeune, Jeffrey (2016) Examining trust factors in online food risk information: The case of unpasteurized or 'raw' milk. *Appetite*, 99. pp. 200-210. ISSN 0195-6663

Published by: Elsevier

URL: <http://dx.doi.org/doi:10.1016/j.appet.2016.01.010>
<<http://dx.doi.org/doi:10.1016/j.appet.2016.01.010>>

This version was downloaded from Northumbria Research Link:
<http://nrl.northumbria.ac.uk/25596/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)

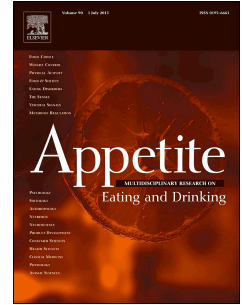
www.northumbria.ac.uk/nrl



Accepted Manuscript

Examining trust factors in online food risk information: The case of unpasteurized or 'raw' milk

Elizabeth Sillence, Dr, Claire Hardy, Lydia C. Medeiros, Jeffrey T. LeJeune



PII: S0195-6663(16)30009-5

DOI: [10.1016/j.appet.2016.01.010](https://doi.org/10.1016/j.appet.2016.01.010)

Reference: APPET 2826

To appear in: *Appetite*

Received Date: 2 March 2015

Revised Date: 14 November 2015

Accepted Date: 8 January 2016

Please cite this article as: Sillence E., Hardy C., Medeiros L.C & LeJeune J.T., Examining trust factors in online food risk information: The case of unpasteurized or 'raw' milk, *Appetite* (2016), doi: 10.1016/j.appet.2016.01.010.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

**Examining trust factors in online food risk information: The case of unpasteurized or
'raw' milk**

Elizabeth Sillence^a, Claire Hardy^{ab}, Lydia C Medeiros^c and Jeffrey T. LeJeune^c

^a Psychology and Communication Technology Laboratory, Department of Psychology, Faculty of Health and Life Sciences, Northumbria University, Newcastle upon Tyne, NE1 8ST, UK. elizabeth.sillence@northumbria.ac.uk

^b Present address: Department of Psychology - Health Psychology Section, Institute of Psychiatry, Psychology, and Neuroscience, King's College London (Guy's Campus) 5th Floor, Bermondsey Wing, Guy's Hospital, London SE1 9RT, UK. Claire.hardy@kcl.ac.uk

^c Food Animal Health Research Program, OARDC, The Ohio State University, Wooster, OH, 44691, USA. medeiros.1@osu.edu; lejeune.3@osu.edu

Corresponding author:

Dr Elizabeth Sillence, Psychology and Communication Technology Laboratory, Department of Psychology, Faculty of Health and Life Sciences, Northumbria University, Newcastle upon Tyne, NE1 8ST, UK. elizabeth.sillence@northumbria.ac.uk

1 **Examining trust factors in online food risk information: The case of unpasteurized or**
2 **'raw' milk**

3
4 **Abstract**

5 The internet has become an increasingly important way of communicating with consumers
6 about food risk information. However, relatively little is known about how consumers
7 evaluate and come to trust the information they encounter online. Using the example of
8 unpasteurized or raw milk this paper presents two studies exploring the trust factors
9 associated with online information about the risks and benefits of raw milk consumption. In
10 the first study, eye-tracking data was collected from 33 pasteurised milk consumers whilst
11 they viewed six different milk related websites. A descriptive analysis of the eye-tracking
12 data was conducted to explore viewing patterns. Reports revealed the importance of images
13 as a way of capturing initial attention and foregrounding other features and highlighted the
14 significance of introductory text within a homepage. In the second, qualitative study, 41
15 consumers, some of whom drank raw milk, viewed a selection of milk related websites before
16 participating in either a group discussion or interview. Seventeen of the participants also took
17 part in a follow up telephone interview 2 weeks later. The qualitative data supports the
18 importance of good design whilst noting that balance, authorship agenda, the nature of
19 evidence and personal relevance were also key factors affecting consumers trust judgements.
20 The results of both studies provide support for a staged approach to online trust in which
21 consumers engage in a more rapid, heuristic assessment of a site before moving on to a more
22 in-depth evaluation of the information available. Findings are discussed in relation to the
23 development of trustworthy online food safety resources.

24
25 **Keywords:** unpasteurized milk; trust; internet; food safety; online information; eye tracking.

26

27 **Introduction**

28 Consumers need to have access to reliable, trustworthy information in order to make
29 informed decisions around food and food safety (Coulson, 2002). Family, friends and peers,
30 food producers, government bodies, consumers' associations, scientists, medical doctors,
31 dieticians and retailers are frequently used sources of information on food risks (Hu, Qi &
32 Hua, 2007; Kornelis, De Jonge, Frewer, & Dagevos, 2007). These sources, however, are
33 sometimes contradictory and vary in the extent to which they are trusted generally (Thiede,
34 2005), with food safety (Liu, Pieniak & Verbeke, 2014), and in relation certain food types
35 (Jay-Russell, 2010). Furthermore, the credibility of the source can fluctuate in response to
36 specific events, as was the case for the UK government following the BSE crisis (Smith,
37 Young & Gibson, 1999).

38

39 The way in which people are accessing food safety information is changing and over the last
40 few years the internet has become an increasingly important way of communicating with
41 consumers about food risk information in the UK and the USA (Redmond & Griffith, 2006;
42 Jacob, Mathiasen & Powell, 2010). In China, television and the internet are the most
43 frequently used channels for food risk hazard information (Liu et al, 2014) and in the West
44 we are also seeing the emergence of social media as a potential way of communicating
45 information about food risk and benefit especially during times of food crisis (Kuttschreuter,
46 Rutsaert, Hilverda, Regan, Barnett & Verbeke, 2014). The internet allows more direct
47 communication between organisations and consumers but also gives voice to groups and
48 individuals that might otherwise be unheard. As farmers, merchants, advocacy groups and
49 individual consumers themselves are now presenting food safety information on the internet,
50 the space becomes more crowded and more confusing for consumers choosing which sources

51 to trust. Information overload and low levels of trust in the internet are frequently cited by
52 consumers within this context (Rutsaert et al, 2014).

53

54 How do consumers regard the internet as a channel of information about food risks and
55 benefits and how do they decide whether to trust the information they find online? We
56 already know that ordinary consumers are more likely to adopt a wider range of trust criteria
57 than experts when assessing health information online in general. Whilst health experts
58 suggest evaluation should be based on certain quality criteria such as completeness, authority
59 of providers, currency of information and readability (Eysenbach, Powell, Kuss & Sa, 2002;
60 Gilardi & Filbini, 2005), literature on consumer trust in online information highlights a range
61 of trust indicators including aesthetics of the site (Cyr, Head & Larios, 2010; Riegelsberger,
62 Sasse & McCarthy, 2005; Harris, Sillence & Briggs, 2009), perceived competence or
63 benevolence of the site (Bhattacharjee, 2002; McKnight & Chervany, 2001), and the sense
64 in which the website is tailored to the user's specific needs (Briggs, Burford, De Angeli &
65 Lynch, 2002).

66

67 In attempting to reconcile these differences in the literature, a key approach has been to
68 propose several distinct stages in the development of consumer trust and engagement online.
69 This so-called 'staged model approach' (Briggs et al, 2002), initially developed within an e-
70 commerce setting, has been tested in several medical health information studies (Sillence,
71 Briggs, Harris & Fishwick, 2007) and proved useful in explaining how consumers engage
72 with and trust websites over time. The approach recognises that users are initially influenced
73 by the design of the website and its structure. For example, the use of images can influence
74 consumer trust in the site (Steinbrueck, Schaumberg, Duda & Krueger 2002). This initial
75 assessment of visual appeal is something that can occur very rapidly with researchers

76 showing an exposure of just 50 milliseconds is enough for users to determine a positive or
77 negative first impression (Lingaard, Fernandes, Dudek & Brown, 2006). Once an initial trust
78 impression has formed on the basis of this first heuristic or 'rule of thumb' stage, users move
79 to a more systematic evaluation of the website's content and considers, inter alia, authorship,
80 currency and personal relevance (Sillence et al, 2007). This strategy is consistent with dual
81 process models, such as those developed in the persuasion literature (e.g. Chaiken, 1980),
82 recognising the role of user motivation and opportunity in selecting an appropriate strategy
83 for processing online information.

84

85 Alongside trust, the role of threat or risk perception is pivotal. Research exploring the staged
86 model of trust has recognised the role of risk perception on individual responses to health
87 information online (Sillence et al, 2007). Researchers noted attitude towards risk, as well as
88 individual understanding of risk information, affects people's trust in different health
89 information sources (Harris, Sillence & Briggs, 2011). At a general level, risk perception is
90 likely to be affected by a mixture of culture, individual differences and beliefs (Bontempo,
91 Bottom & Weber, 1997). People are not neutral processors of health-risk information
92 preferring information that is congenial and comforting rather than threatening and
93 unwelcome (Good & Abraham, 2007). People also have strong initial preferences and
94 expectations for the sorts of information they are seeking (Joinson & Banyard, 2002) and
95 these may influence which sites they trust.

96

97 **The case of raw or unpasteurized milk**

98 For the purposes of this project, we focused on information about the risks and benefits of
99 raw milk consumption. Milk remains for many people an important part of their diet. The
100 majority of consumed milk is pasteurized to remove the threat of bacterial infection through

101 pathogens such as *Listeria* and *Escherichia coli* O157 (American Academy of Paediatrics,
102 2014). Despite pasteurization, milk borne disease outbreaks still occur (LeJeune & Rajala-
103 Schultz, 2009) and this may in part relate to increased interest in raw or unpasteurized milk
104 products as part of a return to more locally sourced, traditional foodstuffs (Claeys et al,
105 2013). Advocates promote the nutritional, taste and health benefits despite little empirical
106 evidence to support such claims (American Academy of Paediatrics, 2014). People choosing
107 to consume raw milk, particularly those living in rural locations, often cite their own positive,
108 illness free experiences and see raw milk consumption as part of maintaining a rural identity
109 (Enticott, 2003). Pasteurised milk consumers present a more varied consumer group
110 comprising both those staunchly opposed to drinking raw milk on the grounds of its
111 perceived risks alongside those drinking pasteurised milk out of convenience with little if any
112 awareness of raw milk products or the raw milk debate. Once again, individual differences in
113 response to risk information and food safety orientation are likely to be important here as
114 consumers encounter food risk communication online. We can assume the way in which
115 individuals reflect upon their own set of circumstances in relation to what they read will
116 influence their perceptions of this information and the extent to which they find it
117 trustworthy.

118
119 Food safety experts, clinicians and nutrition experts are in a position to provide reliable
120 information about risks and the health claims associated with raw milk. Whilst these
121 professionals undoubtedly face challenges in terms of trying to change risk perceptions and
122 consumption habits of raw milk consumers, in particular, there is still value to be gained from
123 understanding which sources of online information are seen as most trustworthy, which
124 features are preferred and which types of messages are least likely to be derogated. Web sites
125 and social media are becoming important resources for communicating information about

126 both safety and health benefit claims associated with raw milk (Jay-Russell, 2010). Whilst we
127 know people's information needs increase during a food crisis or scare (Frewer, Raats &
128 Shepherd, 1994) the ongoing and evolving food safety issues surrounding raw milk pose a
129 different kind of challenge for both communicators and consumers producing and accessing
130 trusted online information. The online setting provides a somewhat unique repository for
131 information about the risks and benefits of raw milk. We know that visual design is important
132 in establishing a preliminary sense of trust in the site. Understanding what people notice and
133 respond to immediately will provide an agenda for examining the structure and content of
134 websites in further detail. In addition to the visual elements the web environment affords
135 opportunities for trust markers above and beyond those offered by more traditional print
136 media. Here we can take the time to gauge the effect of video, interactive elements and
137 tailored information from a range of different sources on the trust perceptions of milk
138 consumers, which may in turn affect their beliefs and behaviours regarding its consumption.

139

140 *The current studies*

141 This paper explores consumers' perceptions of trust and risk in relation to online information
142 about milk and raw milk products. We used a multi-study, multi-method approach to explore
143 this topic. Study 1 aimed to identify features of the websites' design and structure that capture
144 participants' initial attention as we know that rapid judgments are made about websites
145 regarding their perceived trustworthiness based on their appearance and design.. Study 2
146 examines these features in more detail to understand the value participants place on these
147 elements and the role they play in the development of trust and perception of risk in the
148 websites when more in-depth processing of the information is taking place i.e. to understand
149 what that captured attention means in terms of more evaluative trust judgements. Follow-up
150 data is also collected (study 2) to explore the lasting impact of website features on consumers

151 and whether consumption beliefs or behaviours have changed. Together, the studies provide
 152 an overview of trusted sources of milk food safety information as well as highlighting areas
 153 of mistrust. It is a timely piece of research given the growing concern of raw milk
 154 consumption, and presents the first application of a staged model of trust in a food risk
 155 communication area.

156

157 **Study 1**

158 *Participants and recruitment:*

159 Upon ethical approval for the research from the University Ethics Committee, 33 adult
 160 pasteurised milk consumers (see table 1) based in the UK were recruited via newsletter,
 161 posters, emails and word of mouth. In an attempt to sample individual differences across
 162 consumers, Berg's (2004) food safety orientation typology was used to measure participants'
 163 potential variations towards food safety information. Berg proposed 4 consumer types: 1)
 164 non-reflexive trust (the naïve consumer); 2) reflexive trust (the sensible consumer); 3)
 165 reflexive distrust (the sceptical consumer); and 4) repressed distrust (the denying consumer).
 166 Twenty-four participants could be categorised using this typology (see table 1). All
 167 participants were compensated £20 for their time in this study.

168

169 *Table 1: Sample characteristics for study 1 (N=33)*

| | N |
|---------------------------|--|
| Milk consumer type | Pasteurized milk consumers = 33 |
| Gender | Male = 13 Female = 20 |
| Age | M=30.12 (range=18-60) |

| | | |
|-----------------------------|--|---------|
| Berg consumer type* | Sensible = 17 Skeptical = 5 Naïve = 1 Denying = 1 Unclassified = 9 | |
| Internet use | Years | M=12.49 |
| | Days per week | M=6.39 |
| | Hours per week | M=19.10 |
| Internet proficiency | Beginner | 2 |
| | Intermediate | 9 |
| | Advanced | 22 |

170 *The Berg (2004) typology is operationalised by placing those who answer 'Very' and 'Rather large degree' in
 171 the categories reflexive and trusting. Those who answer average are not classified into these clear 4 categories
 172

173 *Design and procedure:*

174 Eye-tracking data were collected to provide objective data on user attention and engagement
 175 allowing exploration of the features that capture participants' initial attention. An eye tracker
 176 (Tobii x1 Light) fixed to a laptop with a 17-inch display was used to record the eye
 177 movements as participants viewed six pre-determined websites (3 largely pro-pasteurization
 178 and 3 pro-raw milk - see Table 2). The pre-determined websites were selected on the basis of
 179 factors previous research suggests may influence online trust (e.g. design, source, visual
 180 imagery, social presence (Briggs et al, 2002). The choice of sites was also influenced by an
 181 earlier pilot study examining participants free search results on the topic and were chosen to
 182 cover a range of opinions on the topic. Whilst the design of each homepage differed, there
 183 were several common features, for example, images, videos, introductory text, website name,

184 and navigation areas (i.e. the menu or tabs). These homepage features are labelled as Areas of
185 Interest (AOI) for the purposes of eye tracking analysis.

186

187 Participants attended a one-hour testing session at a UK university. After giving their
188 informed consent, participants spent 5 minutes looking at each website whilst having their
189 eye movements tracked using the eye tracker. After viewing each website, participants
190 completed a logbook where they could indicate, by means of circling either a negative,
191 neutral, or positive face icon, their first impression of the site's homepage. They were also
192 asked to write some qualitative comments to support this impression. Next, participants were
193 asked to rate the extent to which they trusted the site. Trust was measured using a shortened
194 3-item version of Harris et al (2011) measure of online trust: "I trusted the site"; "I felt I
195 could trust the information on the site"; and "I felt I could trust the person putting information
196 on the site", on a five point scale from strongly disagree (1) to strongly agree (5). The scale
197 showed very high internal reliability with a Cronbach's alpha of .951.

198

199 *Table 2: Milk websites selected for the present research studies*

| Website name | Website address |
|---|---|
| Pro-pastuerisation milk websites | |
| Real Raw Milk Facts ^{1,2} | http://www.realrawmilkfacts.com/ |
| Food Safety.Gov ² | http://www.foodsafety.gov/blog/raw_milk.html |
| Centre For Disease Control (CDC) ^{1,2} | http://www.cdc.gov/foodsafety/rawmilk/raw-milk-index.html |
| Dairy Farming Today ^{1,2} | http://www.dairyfarmingtoday.org/Pages/Home.aspx |
| Pro-unpastuerized milk websites | |
| Raw Milk Facts ^{1,2} | http://www.raw-milk-facts.com/ |

| | |
|-------------------------------------|---|
| Hook & Son ^{1,2} | http://www.hookandson.co.uk/index.html |
| Campaign For Real Milk ² | http://www.campaignforrealmilk.co.uk/id7.html |
| Raw Milk Institute ^{1,2} | http://rawmilk institute.net/ |

200 ¹ Used in study 1; ² Used in study 2.

201

202 *Analysis:*

203 In accordance with the eye tracking analysis software different design features of interest on
204 each website homepage were marked as AOIs. Mean scores and ranges were calculated for
205 each AOI in terms of: a) time to first fixation, to give a sense of the features that capture
206 initial attention; b) total fixation duration, to give a sense of engagement with a feature; and
207 c) percentage of participants fixating on each AOI to give a sense of the consistency of
208 attention amongst participants. The eye-tracking software uses fixation filters to group gaze
209 data into meaningful fixations on a particular area. A number of different algorithms for
210 fixation definition have been proposed by researchers and practitioners (see for example,
211 Nyström & Holmqvist, 2010) and in the present study fixation was assessed using the default
212 Tobii fixation filter. Provided the equipment is set up according to the manual then eye
213 tracking is accurate to within 0.5 degrees. Overall, average trust scores for each website were
214 calculated, and frequency counts of negative, neutral and positive first impressions.
215 Qualitative comments to support these impressions were thematically coded.

216

217 **Results**

218 *Eye tracking*

219 Recent eye-tracking studies have examined design properties of websites in relation to trust
220 outcomes and speed of task completion (Cyr et al 2010; Roth, Tuch, Mekler, Bargas-Avila &
221 Opwis, 2013). Utilizing time spent on different AOIs to provide clues as to the attentional

222 properties of the website, table 3 presents eye tracking data for the six websites viewed in this
223 study. Although the websites contain many similar features, their actual design and layout
224 varies greatly, making absolute comparisons impossible. Despite this, the results reveal a
225 number of interesting findings with respect to the way in which the websites captured and
226 held participants' attention.

227 *Table 3: Eye tracking data for the Areas of Interest (AOIs) for the different websites (N=33)*

| Area of Interest | Dairy farming today | CDC | Hook and Son | Raw milk institute | Real raw milk facts | Raw milk facts |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|
| Introductory text | | | | | | |
| Mean time to first fixation in secs (range) | 19.48 (3.07-54.21) | 7.12 (1.43-32.27) | 7.05 (0.33-28.04) | 60.09 (15.5-180.58) | 13.38 (0-36.27) | 4.88 (0.04-27.38) |
| Mean total fixation duration in secs (range) | 14.66 (4.18-72.41) | 18.37 (0.63-36.77) | 12.82 (0.27-61.56) | 10.75 (2.14-33.91) | 20.32 (0.82-46.37) | 31.23 (1.96-80.17) |
| Percentage fixated | 100% | 100% | 100% | 100% | 100% | 97% |
| Image (static (S) or rolling (R)) | | | | | | |
| | R | S | R | S | S | S |
| Mean time to first fixation in secs (range) | 6.55 (0-37.98) | 76.00 (33.38-129.9) | 6.61 (0.61-25.2) | 6.34 (0-72.96) | 4.35 (0-17.55) | 8.18 (0-116.47) |
| Mean total fixation duration in secs (range) | 14.20 (2.15-53.45) | 0.92 (0.23-3.2) | 10.63 (0.4-97.19) | 0.57 (0.17-1.25) | 0.74 (0.07-2.77) | 2.38 (0.22-6.04) |
| Percentage fixated | 100% | 36% | 92% | 45% | 71% | 100% |
| Navigation features (left (L) or top (T)) | | | | | | |
| | L | L | L | T | T | L |
| Mean time to first fixation in secs (range) | 11.04 (0-42.88) | 17.20 (0.36-49.73) | 19.54 (0-63.61) | 65.19 (7.81-167.58) | 29.38 (1.27-239.64) | 21.63 (0.3-133.10) |
| Mean total fixation duration in secs (range) | 4.13 (0.3-9.17) | 5.1 (0.09-13.44) | 5.71 (0.35-18.25) | 3.34 (0.23-14.44) | 1.81 (0.18-8.53) | 6.20 (0.63-31.17) |
| Percentage fixated | 100% | 89% | 96% | 84% | 86% | 91% |
| Name | | | | | | |
| Mean time to first fixation in secs (range) | 11.43 (0.32-116.31) | 8.58 (0-109.68) | 40.22 (0.74-267.48) | 38.42 (1.03-192.88) | 6.4 (0-43.79) | 6.14 (0-56.51) |
| Mean total fixation duration in secs (range) | 1.46 (0.23-4.21) | 1.18 (0.18-4.15) | 1.16 (0.19-3.57) | 2.93 (0.27-13.19) | 1.1 (0.21-3.09) | 1.2 (0.22-3.55) |
| Percentage fixated | 88% | 79% | 72% | 97% | 82% | 62% |
| Video (have to click to play) (duration) | | | | | | |
| | | | | 5minutes 58 s | 12 minutes 13 s | |
| Mean time to first fixation in secs (range) | | | | 16.91 (0-0.58.88) | 20.28 (0-50.17) | |
| Mean total fixation duration in secs (range) | | | | 43.7 (0.5-213.34) | 3.24 (0.14-16) | |
| Percentage fixated | | | | 100% | 96% | |
| Real life stories | | | | | | |
| Mean time to first fixation in secs (range) | | 23.51 (1.4-114.78) | | | 9.67 (0.05-74.86) | |
| Mean total fixation duration in secs (range) | | 3.89 (0.25-15.07) | | | 6.27 (0.72-13.12) | |
| Percentage fixated | | 86% | | | 96% | |

228 Percentage fixation data indicates the importance of introductory text in the sense that almost
229 all participants engaged with the written text even if it is not the main feature of the
230 homepage (either in physical size terms or in informational content). It also reveals that
231 images are viewed more if placed above the fold (the portions of a webpage that are visible
232 without scrolling down the screen) rather than below. Time to first fixation data tells us
233 something about the features of the website that first capture the participants' attention. Table
234 3 indicates the importance of images in this respect. In four websites the image was the first
235 feature to be viewed, whereas the website name was second in half the websites. Participants
236 were quicker to fixate on 'real life stories' in the *Real Raw Milk Facts* site, possibly because
237 of a thumbnail photograph of the individual 'sharing' their story.

238

239 The total duration fixation data shows that although images were often the first feature
240 attended to by participants, in the case of static images, they rarely sustained attention.
241 Navigation features showed considerable variation in terms of fixation duration, reflecting the
242 range of information contained within some menus and tabs. Four websites with left-side
243 navigation tabs received more attention than those with navigation tabs across the page top.

244

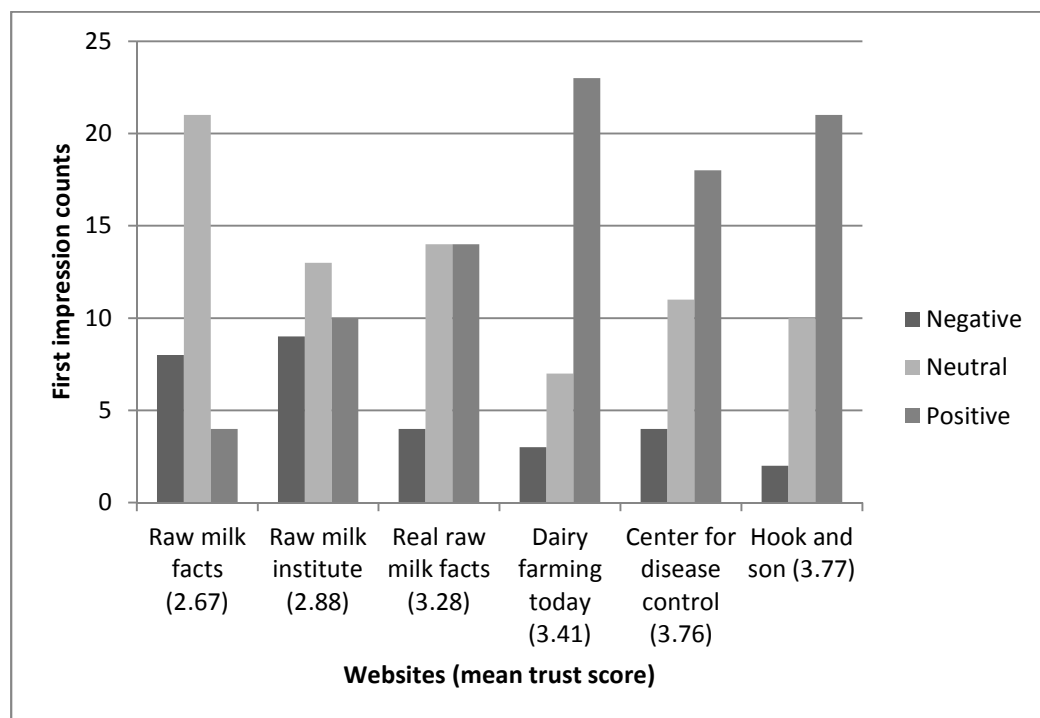
245 ***First impressions and trust:***

246 Figure 1 shows two websites received low trust scores: *Raw Milk Facts* and *Raw Milk*
247 *Institute*. These sites also had the highest negative impressions count, twice as many negative
248 first impressions as 'trusted' sites. Both sites were pro-raw milk. Negative first impressions
249 were supported by qualitative comments concerning the "busy" or "cluttered layout", the
250 "amateur feel" of the site or presence of adverts. Similarly, positive first impressions included
251 participants referring to ease of access to information, professional look and feel, and

252 appropriate use of photos and illustrations. Websites with these positive first impressions also
 253 received higher trust scores (e.g. *Hook and Son*).

254

255 *Figure 1: First impression counts and trust scores for the six websites*



256

257 *NB: Trust scores below 3 represent an 'untrustworthy' site

258

259 *Summary of study 1:*

260 Study 1 examined website features capturing users' initial attention as well as first
 261 impressions and trust scores for the websites. It explored potential trust indicators used by
 262 participants to make rapid judgements to continue engaging with or reject and leave a site.
 263 The findings reinforce the importance of images in capturing users' initial attention on a
 264 website's homepage. Images are also potentially useful in highlighting or foregrounding other
 265 content features on the webpage, for example the 'real life stories.' The introductory text
 266 remains a significant feature of the homepage, important in terms of setting out the message,
 267 direction, and tone of the website. We also found that sites with low overall trust scores also

268 received a higher number of negative first impression ratings (and vice versa), which
 269 strengthens the link between users' initial, rapid evaluation of a site and their trust
 270 evaluations as suggested in the staged model of trust. Now that these elements have been
 271 identified as important in capturing attention, study 2 will explore them in more depth, asking
 272 what value consumers place on different elements of food safety websites and exploring
 273 qualitatively how these elements feed into more in-depth evaluative trust judgements.

274

275 **Study 2**

276 *Participants and recruitment:*

277 After obtaining ethical approval for this research from both the relevant UK and USA
 278 University Ethics Committees, a new sample of 41 adult milk consumers took part in the
 279 study (see table 4). Twenty-four participants were resident in USA and 17 were resident in
 280 the UK. Participants varied in terms of employment, internet proficiency, milk consumption,
 281 and Berg's (2004) consumer types. All used the internet at least once a week. Overall, there
 282 were 11 raw milk consumers and 30 pasteurised milk consumers. Of the latter, 16 were
 283 considered low risk (i.e. healthy adults) and 14 were considered high risk (e.g. pregnant
 284 women or older adults). These risk groups were chosen to ensure data was collected from the
 285 spectrum of milk consumers. Specifically, those already consuming raw milk and those who
 286 might be expected to feel particularly vulnerable in relation to certain food safety issues.
 287 Participants were recruited through advertisements in local media, newsletters, posters, email
 288 and word of mouth. All participants were compensated for their time (£20 UK sample; \$40
 289 USA sample).

290

291 *Table 4: Summary of study 2 participants (N=41)*

| | UK sample | USA sample |
|--|-----------|------------|
| | | |

| | | | |
|-----------------------------|---|---------|---------------------------------|
| Milk consumer type | Pasteurized milk consumers = 15 | | Pasteurized milk consumers = 15 |
| | Raw milk consumers = 2 | | Raw milk consumers = 9 |
| Risk level | Low risk = 9 (healthy adults) | | Low risk = 18 (healthy adults) |
| | High risk = 8 (2 pregnant ladies, 6 older adults) | | High risk = 6 (older adults) |
| Gender | Male = 5 | | Male = 11 |
| | Female = 12 | | Female = 13 |
| Age | M=48 (range= 24-85 years) | | M= (49.9) (range= 22-80 years) |
| Berg consumer type | Sensible = 9 | | Sensible = 13 |
| | Skeptical = 1 | | Skeptical = 1 |
| | Naïve = 0 | | Naïve = 4 |
| | Denying = 4 | | Denying = 1 |
| | 3 unclassified* | | 5 unclassified* |
| Employment | Full-time = 8 | | Full time = 14 |
| | Part-time = 2 | | Part time = 1 |
| | Retired = 6 | | Retired = 5 |
| | Unemployed = 1 | | Student = 2 |
| | | | Homemaker = 1 |
| | | | Did not say = 1 |
| Internet use | Years | M=11.70 | M=15.91 |
| | Days per week | M=5.90 | M=6.04 |
| | Hours per week | M=14.70 | M=18.27 |
| Internet proficiency | Beginner | 4 | 2 |
| | Intermediate | 10 | 7 |
| | Advanced | 3 | 14 |

| | | | |
|--|-------------|---|---|
| | Did not say | 0 | 1 |
|--|-------------|---|---|

292

293 *Design and procedure:*

294 This study adopted an innovative research methodology successfully used within the e-health
295 context (see Sillence et al., 2007). Participants attended a three-hour discussion group (with
296 other people from the same milk consumer group, e.g. older adults) held in an internet café-
297 style setting within a university setting in either the UK or USA. It comprised of a room with
298 several computer terminals and a large desk in which to hold group discussion. For practical
299 purposes, the pregnant women took part in individual interviews as it proved too difficult for
300 these participants to be able to confirm their attendance at a group testing session. The study
301 was divided into three parts (see Table 5 for details). After providing written consent and a
302 background questionnaire, participants moved sequentially through each study part. Firstly, a
303 restricted range internet search (i.e. only specific websites could be viewed) including the 6
304 from study 1 and 2 additional sites to broaden the discussion. Websites were chosen in
305 consultation with colleagues to ensure a range of opinions and perspectives on the topic and
306 that they would be broadly applicable/of interest to both UK and USA participants. Four of
307 the websites took a generally pro-pastuerisation position and the remaining four were
308 generally pro-raw milk consumption (see Table 2 for websites). As in study 1, participants
309 were asked to spend a brief amount of time (approx. 5 minutes) looking at each website
310 (starting with the website home/landing page). They then completed a logbook entry for the
311 site. The logbooks were intended to be used as an aide memoire to enrich the detail of the
312 subsequent discussions. Participants worked at their own computer terminals and did not
313 interact with each other during this web browsing task. They could search the sites in any
314 order. The use of the restricted search task has been successfully employed in other studies

315 (Sillence, Hardy, Harris & Briggs, 2013) allowing a range of websites to be explored whilst
316 allowing the expression of individual preferences.

317

ACCEPTED MANUSCRIPT

318 *Table 5: Study 2 data collection procedure*

| | What | Duration (approx.) | Data collected |
|---------------|---|-------------------------------|-------------------------------|
| <i>Part 1</i> | Search within a restricted set of 8 websites: | 40 mins | Logbook |
| | Focus group | 30 mins | Audio recording of discussion |
| | Break | 5 mins | |
| <i>Part 2</i> | Selection of a single website: 1 of the 8 websites selected for further investigation | 20 mins | Logbook |
| | Focus group | 20 mins | Audio recording of discussion |
| | Break | 2 weeks | |
| <i>Part 3</i> | Follow up interviews | 20 mins | Audio recording of discussion |

319

320 After viewing all eight sites individually, participants engaged in a guided group discussion
321 (or individual interview for pregnant women) using themes developed from the literature
322 around the staged model of trust and piloted before commencing the current study. The
323 discussion themes followed : (a) first impressions; (b) trusted and mistrusted websites; and
324 (c) future website engagement. Participants were then asked to select one website to explore
325 again in more detail individually (Part 2) and discuss that site and their selection and
326 evaluation factors as a group (or within the individual interview). Two weeks later,
327 participants were contacted for a follow-up telephone interview (Part 3) to ascertain whether
328 individuals had: i) discussed the information with friends, family, or peers; ii) engaged in
329 further research of the topic; or iii) changed their attitudes and/or behaviour in relation to
330 milk consumption. Time restrictions meant that unfortunately the researcher was unable to
331 collect follow up data from the USA sample.

332

333 ***Analysis***

334 All discussions and interviews were recorded and transcribed verbatim. After inspecting the
335 transcripts from the individual interviews it was decided to combine with the group
336 transcripts for analysis as they did not differ substantially. Transcripts were scrutinized for
337 extracts describing trust and mistrust and coded by (author1) using a hybrid of inductive and
338 deductive thematic coding Data was coded initially under two anticipated (deductive) themes
339 - *first impressions* and *authorship* - drawn from the existing literature (e.g. Harris et al.2009;
340 Bhattacharjee, 2002), and under emergent (inductive) themes - *polarization and balance*,
341 *nature of evidence and reader's lens*. (Author2) read the transcripts and considered the codes.
342 Constant comparison was used during the analysis to ensure accurate interpretation and that
343 results represented all perspectives. Discrepancies between the coders were resolved through
344 discussion and mutual agreement.

345

346 **Results**

347 Participants discussed several factors associated with sites they had chosen to explore in more
348 depth. Perceived trust in the sites was an important feature of their selection and was apparent
349 in relation to the four main themes in the data: i) polarization and balance; ii) the nature of
350 evidence; iii) authorship agenda; and iv) reader's lens. It was notable most themes indicated
351 consensus across different demographic groups and countries. Contradictory views, where
352 observed, are noted below.

353

354 ***Theme 1. Polarization and balance***

355 This theme referred to the nature of the raw milk debate and the way in which different
356 websites approached the information. Although awareness of raw milk as a topic varied both
357 between and within the UK and the USA, the vast majority of participants were surprised by

358 the extreme positions held by proponents of the debate. People commented on the strength of
359 conviction expressed within the websites and the common disregard for opposing viewpoints.
360 One participant remarked that the way in which the websites favored one side or the other left
361 her feeling as though she could not fully trust any of the sites. Ignoring one half of the debate
362 left people with feelings of frustration. One woman explained:

363

364 *“I didn’t like that none of them actually looked at both sides it was either one side or*
365 *another. On each site I kept trying to say you know what about the other side because*
366 *there is another side to both of those and they don’t take that into account and I feel*
367 *like I’m treated stupid.” (P23, Pasteurized milk consumer, USA)*

368

369 There was also a sense among UK participants that the debate was somewhat polarized across
370 the two countries with the US taking a harder anti-raw milk stance. Despite the keenly felt
371 schism between the two sides of the debate, a few people felt one side did a better job
372 including the opposing points of view than the other. In some cases, this may have reflected
373 the participant’s strongly held viewpoint and their struggle to find positive comments about
374 websites not matching their own perspective. For others new to the topic, this appears to have
375 been a more ‘genuine’ observation. For example:

376

377 *“I prefer websites that have both sides of the argument and what I found was*
378 *generally was that those that are pro drinking raw milk had both sides of the facts*
379 *whereas those that were against drinking it only had their argument in that sense.”*
380 *(P7, Pasteurised milk consumer, UK)*

381

382 All participants explained how they would prefer a balanced approach to the provision of
383 information. Sites acknowledging both sides of the debate and attempting to win their

384 argument, rather than simply ignore information and comments at odds with their position,
385 were felt to be more trustworthy overall:

386

387 *“I don’t think it matters who produces the information as long as it’s a little more*
388 *balanced so maybe ok raw milk is only good for 10% of the population its good for*
389 *some people but for most people its not but that would be a little better than its not*
390 *good for anybody at all period” (P37, Raw milk consumer, USA)*

391

392 *“I found the Hook and Sons one quite trustworthy because it wasn’t pretending it had*
393 *all the answers and it was trying to honestly openly deal with the questions without*
394 *saying pick one. There were grey areas and I found that trustworthy” (P1,*
395 *Pasteurised milk consumer, UK)*

396

397 Although US participants seemed more familiar with the topic of raw milk, they still
398 expected a more balanced approach in information provision, especially from some well-
399 known sites (see ‘Authorship’). In many cases, participants commented on the fact that
400 narratives running through the debate seemed polarized also, with each site talking
401 exclusively from either a food safety *or* a nutrition and health perspective, rather than
402 presenting and discussing both sides of the debate.

403

404 ***Theme 2. The nature of evidence***

405 Evidence was important to all participants; they felt sites should contain sufficient
406 information to allow people to make their own decisions or at least be able to understand the
407 debate more clearly. Here participants discussed the nature of sufficient evidence, of
408 research, facts and objectivity. Trustworthy sites contained references and supporting

409 evidence, sometimes linked to original or original documents. Less trusted sites failed to
410 provide sufficient ‘evidence’ for their assertions:

411

412 *“Where are your facts and what kind of studies have been done to prove your point...
413 without any facts for me that doesn’t hold any weight.” (P36, Raw milk consumer,
414 USA)*

415

416 Evidence on websites was often numerical. Numbers were used to demonstrate risk levels
417 and document disease outbreaks. Participants expressed a preference for detailed information
418 regarding the risks and benefits of raw milk consumption and liked the idea of seeing the
419 evidence or statistics behind the headlines. However, the way sites presented different sets of
420 numerical information was not always straightforward or helpful. For some participants,
421 numerical presentation of risk information or the interpretation of data sets was at times
422 confusing and difficult to contextualise:

423

424 *“I like to see the detail I really appreciated one of the websites that had footnotes to
425 scientific studies instead of just saying studies have shown the magical phrase but I
426 also struggled with the fact that I looked at different websites and saw different
427 numbers and different facts and so well the numbers sound good but do they really
428 mean anything?” (P25, Pasteurised milk consumer, USA)*

429

430 *“They say that in Alaska that four people have the Campanile(?) bacteria whatever it
431 is since January 13th. Only 4, it does not sound like a lot.” (P11, Older adult, UK)*

432

433 Discussions also highlighted a number of confusions and misunderstandings around
434 terminology. Unfamiliar biological terms reduced participant confidence when talking about
435 the data, with some feeling unsure about the differences between types of milk, confusing
436 pasteurization with homogenisation or using terms interchangeably. Whilst some felt the fault
437 was theirs, others were convinced some websites purposely introduced confusing or
438 misleading terms to enhance their overall message, for example, by using the terms “raw”
439 and “organic” somewhat interchangeably.

440
441 Some of the websites also contained testimonial accounts of raw milk consumption. These
442 accounts typically documented negative outcomes and were often presented as short videos in
443 which people related their experiences of consuming raw milk. These stories were vivid,
444 powerful and easy to recall and almost all participants commented on them regardless of
445 preference:

446
447 *“See I like it when there are real life stories. I think I tend to like believe it more.” I*
448 *trusted it [the website] because it made me cry I had a lump in my throat.”(P5,*
449 *Pasteurized milk consumer, UK)*

450
451 A number of people were cautious of video material with one participant remarking it was an
452 easy medium through which to sensationalize a topic. The majority found them credible and
453 genuine on a case-by-case basis, but both USA and UK participants noted that such
454 experiential evidence did not really impact upon the debate in any meaningful manner:

455
456 *“I trusted what the people who have had those experiences argue. It really gives you*
457 *an insight to how serious it was for those people but it doesn’t give you an insight to*

458 *how common it is for that to happen and the likelihood of that compared with other*
459 *sources of E coli.” (P15, Pregnant milk consumer, UK)*

460

461 For raw milk consumers the small number of negative testimonials on the websites contrasted
462 with their own experiential evidence. One participant explained:

463

464 *“So you’ve got three videos on your website of people that drank raw milk and got*
465 *sick I’ve had thirty forty people in my driving group over the last five years who’ve*
466 *been drinking raw milk for five years and haven’t gotten so what’s the balance what’s*
467 *the weight of your three people against my forty?” (P34, Raw milk consumer, USA)*

468

469 ***Theme 3. Authorship agenda***

470 Participants paid attention to the authorship or ownership of each website and many
471 expressed certain expectations regarding the quality, tone, and balance of well-known sites.
472 They acknowledged all sites would have an agenda regarding raw milk. Some of these
473 agendas were predictable and accepted in terms of content and direction of information (i.e.
474 pro-raw milk or pro-pasteurized milk). For a site or organization that was familiar however,
475 participants were disappointed if it failed to live up to certain expectations regarding tone and
476 quality of writing. This was noticeable for government sites in particular:

477

478 *“I was really surprised at how... I thought the CDC site came across as being really*
479 *alarmist and really condescending I mean I think that was the one that opened up*
480 *with in quotes back to nature in a very sneering tone as if anyone who is concerned*
481 *about that sort of thing is obviously an idiot.” (P20, Pasteurised milk consumer, USA)*

482

483 Older participants appeared to exhibit a stronger sense of trust in their respective government
484 institutions and felt more confident of the government's agenda in relation to raw milk:

485

486 *"I think I would rather trust the government (site) and not go for it (consuming raw*
487 *milk)... I mean they should be impartial. What would they gain? They're looking after*
488 *the health of the country aren't they? I dunno."* (P8, Older milk consumer, UK)

489

490 With unfamiliar or less well-known sites, participants spent more time querying the
491 organizations' motivations and agenda with respect to raw milk. They scrutinized the name
492 and logo of the site and commented on unprofessional design features. Interestingly, a few
493 participants recognised that the visual appeal of a site may not always be a marker of its
494 trustworthiness but indicated that it was difficult to ignore. Overall, older participants made
495 fewer comments regarding the design of the websites. That said, the presence of adverts was
496 viewed with scepticism by some giving reason to question the motivation of the site and its
497 credibility. Establishing the authorship credentials for the websites was a key priority for
498 several participants when encountering unfamiliar sites. Knowing who owned the site also
499 helped people to gauge its agenda and thus evaluate whether the website was likely to have
500 consumer interests at heart, and, ultimately, whether or not it was trustworthy:

501

502 *"That was like real raw milk facts.com but I did go to 'who are the people behind the*
503 *website' and then you can like trust the people and look at the names and associations*
504 *and see where they are from and then I can just like read more."* (P24, Pasteurised
505 *milk consumer, USA).*

506

507 **Theme 4. Reader's lens**

508 The websites were of course all viewed through each participant's own world lens. To these
509 ends people brought with them different levels of knowledge, experience of the topic,
510 personal preferences and biases. This 'reader's lens' affected behavior as participants
511 searched and selected websites. For example, some chose not to engage with some video
512 testimonials because of their existing viewpoint regarding unpasteurized milk. When one
513 participant asked for her thoughts on the testimonial videos on the website she replied that
514 she hadn't clicked on any of them because they were pro raw milk and she did not like that.
515 Some participants acknowledged their own existing biases with regard to some of the
516 websites and admitted that this colored their perceptions of the information they contained.
517 For participants already holding strong views on the topic of raw milk they appeared highly
518 motivated to seek information that supported their viewpoint as one participant reflected:

519

520 *"I trust them because they are talking about things that I believe already. So it's kind*
521 *of reinforcing what I already think. And I think you tend to trust someone more if*
522 *they've got the same opinions as you."* (P16, Raw milk consumer)

523

524 The extent to which people trusted and engaged with the material reflected the personal
525 relevance the information had for them. Participants were more likely to engage with sites
526 that provided a good match for their circumstances. One USA participant used the interactive
527 features on one site to locate her home state in order to read relevant legislative issues. UK
528 participants, on the whole, noted the origin of the websites more keenly than the US sample
529 and demonstrated a preference for UK-based or UK-centric material:

530

531 *"I just thought I preferred the Hook and Son one rather than any of the others. It was*
532 *based in England as well so I thought 'this will be more about something that is*

533 *relevant'. Rather than a website that aimed at Americans.” (P16, Raw milk consumer,*
534 *UK)*

535

536 Participants in both countries reflected on information they read in relation to their own
537 circumstances. One participant remarked he felt unable to connect with peer accounts
538 targeted at parents, not being one himself. In other instances, participants weighed up what
539 they had discovered about the risks and benefits of raw milk consumption and compared that
540 to their current health status:

541

542 *“None of the purported health benefits are anything I say absolutely I am concerned*
543 *about you know like I’m lactose intolerant or I have allergies or whatever so none of*
544 *those benefits particularly speak to me so in the balance of things I’m like not going*
545 *to drink raw milk the risks are too high.” (P20, Pasteurised milk consumer, USA)*

546

547 Finally, some people expressed a desire to hear from a voice similar to theirs. One American
548 participant, for example, regularly consumed low pasteurized milk and felt her position was
549 not represented on the websites. Participants preferred sites that resonated with them at some
550 level. For the older group, the notion of raw milk altogether was viewed as being for someone
551 else, either someone younger, with more disposable income or someone with an interest in
552 organic, natural products. Accordingly, many of the older UK consumers felt unable to
553 identify with the online information, in part because of a perceived US bias, but also felt the
554 information was aimed at a younger, wealthier audience. Older participants also appeared
555 aware of particular health risks associated with their age.

556

557 *Follow-up interviews*

558 Since the testing session, most UK participants reported that the websites they had viewed
559 For those that had not consumed raw milk before, they noted that the topic was new for other
560 people as well and had not encountered anyone else who consumed raw milk during their
561 discussions. Two weeks after viewing the websites nearly all the participants recalled aspects
562 of the ‘real life stories’ they had read or seen on the websites, even if the details of the
563 particular illnesses had been forgotten:

564

565 *“The thing that sticks out most in my mind is the videos of the crying mothers and*
566 *their children an inch from death” (P16, Raw milk consumer, UK)*

567

568 Only two website names were recalled - *Raw Milk Facts* and the *Campaign For Real Milk* -
569 although other people described the sites that they remembered in some detail despite not
570 recalling the site name. Participants’ recollections were clustered around the vivid
571 testimonials, the so-called ‘scare stories’, and the sense of a highly polarised debate. Several
572 participants upon reflection felt that the American sites emphasized people and family
573 elements of milk production, whilst UK sites had emphasized animal welfare.

574

575 A small number of participants had either revisited some of the sites from the session (e.g.
576 *Dairy Farming Today*) in order to watch the videos, or had conducted their own new
577 searches. These searches were typically concerned with locating local milk producers. Whilst
578 the sessions raised awareness of the topic, there was a sense, certainly amongst the older
579 participants, that they were unlikely to try raw milk because of the food safety concerns. For
580 others, convenience and cost were seen as the main prohibitive factors. For the two raw milk
581 consumers, viewing the sites during the session provoked a lot of thought and discussion with
582 friends and colleagues. One participant explained that the websites had highlighted the
583 vulnerability of specific groups to the risks of raw milk consumption, although his own habits

584 remained unaffected. Overall, all participants reported that they had taken a keener interest in
585 their milk over the preceding two weeks and had read the labels on supermarket milk more
586 carefully. One participant had located a local farmers' market to visit, but apart from the raw
587 milk consumers, no-one had purchased raw milk during that period.

588

589 **Discussion**

590 The purpose of this study was to examine how consumers evaluate and then come to trust
591 food safety websites, using milk consumption and the raw milk debate as our case study. In
592 keeping with a more developmental or staged approach to trust we focussed on two different
593 forms of evaluation. Firstly, a rapid evaluation or screening of sites in which we observed the
594 website features that captured users' initial attention. Secondly, a more in depth evaluative
595 stage in which users, having already rejected certain sites, select trusted sites to engage with
596 further. Having identified in study 1 the features that captured users' initial attention, we were
597 then able in study 2 to explore the value participants placed on these different elements and to
598 understand the role of different features in the development of rapid and more in-depth
599 evaluative trust judgements. Here, we combine the features that feed into initial trust
600 judgements and the ways in which these features are subjected to further processing to
601 understand *how* they influence more considered assessments of trustworthiness.

602

603 Study 1 provided an indication of the design factors that capture consumers' initial attention
604 and contribute to first impressions of the website. Here the key finding is the importance of
605 images and photographs drawing consumers' attention through careful placement, above the
606 fold, on the homepage. Rolling images also captured initial attention with those websites
607 receiving more positive first impression counts than other sites. The relationship between
608 images and trust, although well studied, is far from straightforward (Steinbrueck et al., 2002;
609 Riegelsberger et al, 2005) with factors such as placement, quality, authenticity and relevance

610 all considered important. In our study, consumers expressed a preference for images that
611 were directly relevant to the content, documenting, for example, scenes from the dairy
612 producer's actual farm as opposed to stock images of people, places and animals. Image
613 placement was also important and used strategically to foreground other features. For
614 example, the real life story features received more attention when coupled with an image
615 rather than simply presented as plain text. Overall, positive impressions did appear to relate to
616 higher trust scores supporting the assertion of Lingaard et al. (2006) that web designers only
617 have a very short window of opportunity to present a good, trustworthy impression of their
618 website.

619

620 In study 2 participants were asked to search through a restricted set of sites before selecting a
621 single site to engage with further. During the first stage of this task we noted that participants
622 relied upon visual indicators of trust, making rapid evaluations often based on the visual look
623 and feel of the sites. Study 2 confirmed that the design elements of a website are important in
624 terms of making a quick decision about whether or not to engage further with the site
625 (Sillence et al, 2007). Ease of navigation, layout and professional tone of the site all affected
626 the extent to which consumers rejected the websites. In noting the importance of these
627 factors, participants acknowledged that design was important in their overall perceptions even
628 if they felt they ought to be concentrating on other more sophisticated markers of trust, such
629 as authorship, reputation or the presence of references. In keeping with research by Liao and
630 Fu (2014), we also noted older participant's credibility judgements were on the whole less
631 affected by the design features of the websites.

632

633 Participants then selected sites to engage with further and evaluate in more depth during this
634 more evaluative second stage. Four key themes were noted: i) balance and polarisation; ii) the

635 nature of evidence; iii) authorship agenda; and iv) reader's lens. Firstly, a key trust marker for
636 participants was presentation of a balanced argument. Many UK participants were relatively
637 unfamiliar with the raw milk debate, and as such, sought a broad and balanced set of online
638 resources to allow them to make sense of the issues for themselves. Although participants
639 were exposed to sites generally supportive of one position or another, the extent to which
640 they presented opposing viewpoints varied and this was something our consumers noted. All
641 participants found overtly biased information less trustworthy and preferred websites to
642 acknowledge alternative viewpoints before outlining a strong(er) case for their own position.
643 In this sense, websites had to actively win the argument rather than simply ignore or belittle
644 opposing viewpoints. Whilst food safety information typically focusses on either the
645 associated risks or benefits, usually the risks, consumers need access to both to make trade-
646 offs about food choices (Frewer et al., 1994).

647
648 In general, whilst consumers often express a preference for unbiased discussion about both
649 risks and benefits of food consumption (van Dijk, van Kleef, Owen & Frewer, 2010),
650 participants in our study holding strong positive initial attitudes towards raw milk
651 consumption preferred and trusted information that supported their initial position (Swann &
652 Read, 1981) and often derogated risk-based information. Experimental work by Van Dijk,
653 Fischer, De Jonge, Rowe and Frewer (2012) showed that communicating a balance of
654 positive and negative information about food safety differentially affected people with either
655 positive or negative initial attitudes. Consumers' positive attitudes became less positive after
656 viewing the information and negative attitudes marginally less negative. Together with the
657 results from our current studies, this highlights the importance of existing attitudes when
658 evaluating risk and benefit information and the influence of a less controlled, more

659 naturalistic environment in which participants are exposed to varying levels of ‘balance’
660 within food safety websites.
661
662 Participants found sites presenting information in a clear and accessible manner more
663 trustworthy. They wanted to understand the debate for themselves and consequently preferred
664 information easily digestible and meaningful. All consumers discussed the importance of
665 referenced, well-supported material, and in a debate centred on risk/benefit analysis it was
666 perhaps unsurprising that many participants referred to the presence of sufficient detail and
667 understandable numerical evidence. Interpreting these kinds of data was not without
668 difficulty for some and the nature of the topic itself meant some relied on ‘safety rules of
669 thumb’ (Green, Draper & Dowler, 2003) in relation to food preferences, using terms such as
670 “organic” to indicate preferences and distinguish between good and bad foods. Our
671 participants noted that websites on both sides of the debate made reference to science-based
672 evidence and terminology to enhance credibility. This meant consumers were faced with
673 unfamiliar microbiological or medical jargon on the pro-pasteurization sites, with raw milk
674 producer websites frequently referring to the technical processes employed to ensure
675 necessary levels of hygiene. The use of real life stories and video testimonials provided
676 participants with vivid accounts of the risk and benefits associated with raw milk
677 consumption. Regardless of preference, nearly all the participants found this material difficult
678 to ignore and for some the videos acted as key credibility indicators for the website. It is
679 worth noting that personal accounts of health and illness are becoming increasingly common
680 on a variety of websites and have been shown to affect knowledge and understanding of the
681 topic, social support and behavioural outcomes (Ziebland & Wyke, 2012). Both our studies
682 suggest these personal account elements captured consumers’ attention and for some
683 watching the ‘real life story’ videos in particular was a powerful and vivid experience. It may

684 be that watching this kind of material enhances the personal perception of risk or heightens
685 emotional responses on the part of parents for their children (Shaw, 2004), although this
686 depends on how personally relevant participants find the material. It could be useful for
687 website designers to consider the potential impact on behaviour of including such ‘real life
688 accounts’ on food safety sites over and above presentation of consequence-based statistics
689 (Morgan, Cole, Struttman & Piercy, 2002).

690

691 Participants assessed the source of the online information looking to identify the author’s
692 agenda or underlying motivation. ‘Social trust’ or trust in a source’s motivations is
693 particularly important when domain knowledge is low and people are asked to assess the
694 risks and benefits of a specific topic (Siegrist & Cvetkovich, 2000). To those ends, we saw
695 many consumers, in particular the older adults, relying on their perception of protection
696 motivation underpinning government sources of information. Participants were keen, at least
697 initially, to trust the clear markers of authority and authenticity on websites owned by
698 government bodies or those representing food producers. These findings, however, may also
699 reflect the absence of any recent crisis point in relation to raw milk, as during such times it is
700 not unusual to see a reduction in trust associated with government and food production
701 sources of information (Coveney, Mamerow, Taylor, Henderson, Myer & Ward, 2012). For
702 raw milk consumers in particular, the assessment of similarity between the sources’ values
703 intentions and goals and their own was important in relation to developing a sense of trust.
704 All participants noted the site’s credentials or evidence of competence and many were quick
705 to identify underlying interests or sponsors. In keeping with other research findings,
706 consumers remained wary of vested interest and commercial models of funding and it is
707 noticeable that sites containing adverts receive lower trust scores (Sillence et al., 2007).

708

709 Finally, a trusted site provides a good match for consumers in terms of personal and social
710 relevance. For all participants, risk and benefit information on websites was more readily
711 accepted and trusted if it resonated with them at some level. This meant for our UK sample,
712 UK sites were preferred to US sites but the tone or the way in which material was presented
713 also influenced the extent to which people trusted the material and engaged with it further.
714 Using stories of children, for example, to highlight the risks associated with raw milk created
715 a sense of connection with parents viewing the websites and made the information difficult to
716 ignore. Similar findings have been noted in a number of health domains emphasising the
717 importance of finding a good match between the consumer and the website ‘voice’ in terms
718 of age, gender or experience (Sillence et al., 2013). This reinforces the notion that food safety
719 messages should be relevant to the target audience (Jacob et al., 2010) bearing in mind that
720 more informed consumers usually exhibit less dramatic responses to food safety issues than
721 less informed consumers (Jin & Han, 2014).

722
723 For consumers in our study, we saw older participants more readily accepting of pro-
724 pasteurization websites’ message on the risks posed by raw milk despite a number
725 remembering drinking raw milk as children. Pregnant women were also aware of the dangers
726 of raw milk as part of their heightened awareness of food safety issues during pregnancy. For
727 a number of low risk pasteurised milk consumers, the information on the websites was
728 interesting and did not necessarily put people off the idea of trying raw milk if it were to
729 become more easily available. Perhaps unsurprisingly, the raw milk drinkers did not feel they
730 were likely to change their behaviour with regard to raw milk nor did those pasteurised milk
731 consumers with strongly held prior attitudes towards the risks of raw milk. For consumers
732 with a-priori beliefs, websites that took a less authoritarian, more balanced and tempered
733 approach were viewed more receptively or at least not dismissed immediately. Novel ways of

734 presenting information were also welcomed by those, typically raw milk consumers, who had
735 read a great deal about the topic already. This suggests information producers will need to
736 think more carefully about targeting their messages appropriately rather than trying to appeal
737 directly to all consumers, or at least recognise that information efforts must be appropriate for
738 specific populations as people with some topic knowledge will have different informational
739 requirements (Jay-Russell, 2010). Websites are well placed to offer this kind of tailored
740 information. Interactive features allow consumers to tailor information to their own situation
741 ensuring they access information in a way that is meaningful for them and making it less easy
742 to dismiss it as irrelevant. Being able to find information online that resonates with one's own
743 experience is a potentially helpful first step in getting a message noticed, even if actual
744 behaviour change may be harder to achieve.

745

746 Overall, the findings highlight two salient points. Firstly, it was interesting to note the way
747 this particular food risk was perceived by participants. Some pasteurised milk consumers
748 were already aware of the risks and were unlikely to consider drinking raw milk but for
749 others, we noted, that online information had generated discussion and sparked a potential
750 interest in this food product. In our previous work, we have seen people who have yet to
751 make up their mind on a potentially risky issue are heavily affected by variations in the
752 presentation of online material (Sillence, Briggs, Fishwick & Harris, 2004). Secondly, we see
753 how the online setting affects the nature of trust in this context. Design and visual appeal are
754 important ways of capturing users' attention and provide a very early indication of the
755 trustworthiness of the website. Subsequently, we noted the way in which familiar trust
756 indicators are reimagined through this medium so that visual indicators of personal and social
757 relevance become important. Interactive maps, for example, allow navigation to details

758 relevant to people's location and participants identify visually with photos, videos, and real
759 life stories of other groups, such as parents.

760

761 Although this study has provided some support for a staged approach to the development of
762 trust in online information, the limited timeline of data collection prevents us from saying
763 anything too definite about the development of longer-term trusting relationships with these
764 websites. A two-week follow up period may be insufficient to witness any significant
765 changes in either attitudes or behaviours. It would be interesting to note how the trust markers
766 noted here differ from those enacted during a genuine point of crisis in relation to raw milk.
767 Another limitation is the underrepresentation of raw milk drinkers and male participants in
768 the studies. Whilst females, as typically primary food preparers (Meysenburg, Albrecht,
769 Litchfield & Ritter-Gooder, 2014) may be more concerned with food safety issues, collecting
770 data from a wider range of people would be advantageous. Finally, it is worth considering the
771 generalizability of these findings across other consumer groups. Although no substantial
772 differences between consumer types in relation to Berg's typology, a larger sample size may
773 have revealed more subtle cultural effects that have been noted elsewhere (Berg, 2004).
774 Nevertheless, the trust factors found here are consistent with those found in our other studies
775 looking at a range of health topics.

776

777 **Conclusion**

778 This paper highlights several influential factors for consumer trust in food safety websites.
779 For food safety professionals, it is important to first acknowledge the relationship between
780 design and the development of initial trust when attempting to present information about the
781 risks and benefits of raw milk recognising that some credible websites may be rejected
782 simply on the basis of poor visual appeal. Messages perceived as more trustworthy are those
783 presenting a balance of risks and benefits, information via a range of clearly accessible, vivid

784 evidence formats, which express both the authorship credentials of the site and the personal
785 and social relevance of the material to the reader.

786

787 **Acknowledgements**

788 The authors would like to thank Pamela Schlegel and Kathryn Dodson for providing valuable
789 administrative assistance during this study. Funding from United States Department of
790 Agriculture (USDA), National Institute of Food and Agriculture (NIFA), grant number 2009-
791 51110-20162. The funders were not involved in the design, data collection, analysis or write
792 up of this study.

793

794 **References**

- 795 American Academy of Pediatrics (2014). Consumption of raw or unpasteurized milk and
796 milk products by pregnant women and children. *133*,175-179.
- 797 Berg, L. (2004). Trust in food in the age of mad cow disease: A comparative study of
798 consumers' evaluation of food safety in Belgium, Britain and Norway. *Appetite*, *42*,
799 21-32.
- 800 Bhattacharjee, A. (2002). Individual Trust in Online Firms: Scale development and Initial
801 Test. *Journal of Management Information Systems*, *19*, 211-241.
- 802 Bontempo, R. N., Bottom, W. P., & Weber, E. U. (1997). Cross-cultural differences in risk
803 perception: A model-based approach. *Risk Analysis*, *17*, 479-488.
- 804 Briggs, P., Burford, B., De Angeli, & Lynch, P. (2002). Trust in online advice. *Social Science*
805 *Computer Review*, *20*, 321-332.
- 806 Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source
807 versus message cues in persuasion. *Journal of Personality and Social Psychology*, *39*,
808 752-766.
- 809 Claeys, W L, Cardoen, S, Daube, G, De Block, J, Dewettinck , K, Dierick K, De Zutter L,
810 Huyghebaert A, Imberecht H, Thiangege, P, Vandenplash, Y and Hermanc L (2013).

- 811 Raw or heated cow milk consumption: Review of risks and benefits. *Food Control*,
812 31, 251-262.
- 813 Coulson, N. (2002). Source of food safety information: whom do adolescents trust? *Appetite*
814 38, 199-200.
- 815 Coveney, J, Mamerow, L, Taylor, A, Henderson, J, Myer, S, Ward, P. (2012). Comparative
816 Examination of Trust During Times of a Food Scandal in Europe and Australia.
817 *Food and Public Health* 2, 202-212.
- 818 Cyr D, Head M, Larios H. (2010). Color appeal in website design within and across cultures:
819 A multi-method evaluation. *International Journal Human Computer Interaction*,
820 68,1-21.
- 821 Enticott, G. (2003). Risking the rural: nature, morality and the consumption of unpasteurised
822 milk. *Journal of Rural Studies*, 19, 411-424.
- 823 Eysenbach, G. Powell, J., Kuss, O., and Sa, E-R. (2002). Empirical studies assessing the
824 quality of health information for consumers on the world wide web, a systematic
825 review. *Journal of the American Medical Association*, 287, 2691-2700.
- 826 Frewer, L.J., Raats, M.M. and Shepherd, R. (1994), ``Modelling the media: the transmission
827 of risk information in the British quality press'', *Journal of Mathematics Applied in*
828 *Business and Industry*, 5, 235-47.
- 829 Gilardi, L & Fubini, L (2005). Food safety: A guide to internet resources. *Toxicology*, 212,
830 54-59.
- 831 Good, A, & Abraham C. (2007). Measuring defensive responses to threatening messages: a
832 meta-analysis of measures. *Health Psychology Review*, 1, 208 - 29.
- 833 Green, J.M, Draper, A.K. & Dowler E.A. (2003). Short cuts to safety: Risk and rules of
834 thumb in accounts of food choice. *Health Risk and Society*, 5, 33-52.

- 835 Harris, P. R. Sillence, E. & Briggs, P. (2009). The effect of trust-related design cues on
836 responses to a Web-based message about the breast cancer risks from alcohol. *J Med*
837 *Internet Res*, <http://dx.doi:10.2196/jmir.1097>.
- 838 Harris, PR, Sillence, E., Briggs, P. (2011). Perceived Threat and Corroboration: Key Factors
839 That Improve a Predictive Model of Trust in Internet-based Health Information and
840 Advice. *J Med Internet Res*, *13*, e51: doi:10.2196/jmir.1821.
- 841 Hu, W. Z., Qi, Y., & Hua, S. F. (2007). An empirical study on food-safety information
842 needs of consumers in Zhejiang Province. *Journal of Human Agricultural University*
843 *Social Science*, *8*, 8e11.
- 844 Jacob, C. J., Mathiasen, L., & Powell, D. A. (2010). Designing effective messages for
845 microbial food safety hazards. *Food Control*, *21*, 1–6.
- 846 Jay-Russell, M. T. (2010) Raw (Unpasteurized) Milk: Are Health-Conscious Consumers
847 Making an Unhealthy Choice? *Clin Infect Dis*, *51*, 1418-1419.
- 848 Jin, HJ, Han DH. (2014). Interaction between message framing and consumers' prior
849 subjective knowledge regarding food safety issues. *Food Policy*, *44*, 95–102.
- 850 Joinson, AN, Banyard P. (2002). Psychological aspects of information seeking on the
851 Internet. *Aslib Proceedings*, *54*, 95-102.
- 852 Kornelis, M., De Jonge, J., Frewer, L., & Dagevos, H. (2007). Consumer selection of
853 food-safety information sources. *Risk Analysis*, *27*, 327e335.
- 854 Kuttischreuter M, Rutsaert P, Hilverda F, Regan A, Barnett J, Verbeke W. (2014). Seeking
855 information about food related risks: The contribution of social media. *Food Quality*
856 *and Preference*, *37*, 10-18.
- 857 LeJeune, J. & Rajala-Schultz. (2009). Unpasteurized milk: A continued public health threat.
858 *Clinical Infectious Diseases*, *48*, 93-100.

- 859 Liao, Q.V & Fu, W-T. (2014). Age differences in credibility judgements of online health
860 information. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 21(1).
- 861 Lingaard G, Fernandes G, Dudek C, Brown J. (2006). Attention web designers you have
862 50ms to make a good first impression! *Behavior and Information Technology* 25, 115-
863 126.
- 864 Liu R, Pieniak Z & Verbeke W. (2014). Food related hazards in China: Consumers'
865 perceptions of risk and trust in information sources. *Food Control*, 46, 291-8.
- 866 McKnight, D. H. and Chervany, N.L. Trust and Distrust Definitions: One Bite at a Time. In
867 R. Falcone, M. Singh and Y.-H. Tan (Eds.) (2001). *Trust in Cybersocieties Berlin*:
868 Springer-Verlag.
- 869 Meysenburg, R., Albrecht, J. A., Litchfield, R., & Ritter-Gooder, P. K. (2014). Food safety
870 knowledge, practices and beliefs of primary food preparers in families with young
871 children. A mixed methods study. *Appetite*, 73, 121-131.
- 872 Morgan, S. E., Cole, H. P., Struttman, T., & Piercy, L. (2002). Stories or statistics?
873 Farmers' attitudes toward messages in an agricultural safety campaign. *Journal*
874 *of Agricultural Safety and Health*, 8, 225–239.
- 875 Nyström M, & Holmqvist K. (2010). An adaptive algorithm for fixation, saccade, and
876 glissade detection in eye-tracking data. *Behavior Research Methods*, 42, 188–204.
- 877 Redmond, E. C., & Griffith, C. J. (2006). Assessment of consumer food safety
878 education provided by local authorities in the UK. *British Food Journal*, 108, 732–
879 752.
- 880 Riegelsberger, J., Sasse, M. A., & McCarthy, J. D. (2005). The mechanics of trust: A
881 framework for research and design. *International Journal of Human-Computer*
882 *Studies*, 62, 381-422.

- 883 Roth, S. P., Tuch, A.N., Mekler, E.D., Bargas-Avila, J.A., Opwis, K. (2013). Location
884 matters, especially for non-salient features- An eye-tracking study on the effects of
885 web object placement on different types of websites. *Int. J. Human-Computer Studies*,
886 *71*, 228-235.
- 887 Rutsaert P, Pieniak Z, Regan A, McConnon A, Kuttschreuter M, Lores M, Lozano N, Guzzon
888 A, Santare D, Verbeke W. (2014). Social media as a useful tool in food risk and
889 benefit communication? A strategic orientation approach. *Food Policy*, *46*, 84-93.
- 890 Shaw, A. (2004). Discourse of risk in lay accounts of microbiological safety and BSE:
891 A qualitative study. *Health, Risk and Society*, *6*, 151–171.
- 892 Siegrist, M., & Cvetkovich, G. (2000). Perception of hazards: The role of social trust and
893 knowledge. *Risk analysis*, *20*, 713-720.
- 894 Sillence, E., Briggs, P., Fishwick, L. & Harris, P. (2004b). What Parents Make of MMR and
895 the Internet. *He@lth Information on the Internet*, *39*, 5-6.
- 896 Sillence, E., Briggs, P. Harris, P. R, Fishwick, L. (2007). How do patients evaluate and make
897 use of online health information? *Social Science and Medicine*, *64*, 1853-1862.
- 898 Sillence, E., Hardy, C. Briggs, P & Harris, P.R. (2013). How do people with asthma use
899 Internet sites containing patient experiences? *Patient Education and Counseling*, *93*,
900 439-443.
- 901 Smith, Young, Gibson, (1999). How now, mad-cow? Consumer confidence and source
902 credibility during the 1996 BSE scare. *European Journal of Marketing*, *33*, 1107-
903 1122.
- 904 Steinbrueck, U., Schaumburg, H., Duda, S., and Krueger, T., A. (2002). Picture Says More
905 Than A Thousand Words - Photographs As Trust Builders In E-Commerce Websites.
906 *In Proceedings of CHI2002: Extended Abstracts*. Minneapolis, MN, US, April 20-25,
907 748-749.

- 908 Swann, W. B., Jr., & Read, S. J. (1981). Self-verification processes: How we sustain our self-
909 conceptions. *Journal of Experimental Social Psychology, 17*, 351–372.
- 910 Thiede M (2005). Information and access to health care: is there a role for trust? *Social*
911 *Science and Medicine, 61*, 1452-62.
- 912 van Dijk H, van Kleef E, Owen H, Frewer LJ. (2010). Consumer preferences regarding food-
913 related risk-benefit messages. *British Food Journal, 114*, 387-399.
- 914 van Dijk H, Fischer ARH, de Jonge J, Rowe G, Frewer LJ. (2012). The Impact of Balanced
915 Risk–Benefit Information and Initial Attitudes on Post-Information Attitudes. *The*
916 *Journal of Applied Social Psychology, 42*, 1958-83.
- 917 Ziebland S, Wyke S. (2012). Health and Illness in a Connected World: How Might Sharing
918 Experiences on the Internet Affect People's Health? *Millbank Quarterly, 90*, 219-49.