



A risk perception gap? Comparing expert, producer and consumer prioritization of food hazard controls



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ARTICLE INFO

Keywords:

Risk perception
Risk ranking
Experts
Consumers
Producers
Food hazards

ABSTRACT

Using a survey approach, the study examined how experts (i.e. food control representatives), producers (i.e. food industry representatives) and consumers prioritized control activities for 28 hazards related to food and other everyday items. The investigated hazards encompassed a wide range of safety issues, including health risks, consumer deception and poor food hygiene behaviour. The participants included 41 experts, 138 producers and 243 consumers from the German- and French-speaking parts of Switzerland. Based on detailed descriptions of the hazards, they were asked to rank these on a score sheet in terms of the perceived importance of monitoring by food control authorities. A between-group comparison of average rankings showed that consumers and experts differed significantly in relation to 17 of the 28 hazards. While the experts assigned higher priority to hazards related to everyday items such as nitrosamine in mascara and chromium VI in leather products, producers and consumers tended to prioritize products related to plant treatment and genetic modification of food and feeds. Producer and consumer rankings of the hazards were highly correlated ($r = .96$, $p < .001$). Rankings were also similar among participants from the two cultural regions (i.e. German and French-speaking parts of Switzerland).

1. Introduction

In 2013, beef-declared products in a number of European countries were found to contain up to 100% horse meat. Although horse meat is suitable for human consumption, the scandal raised questions about the safety of food production systems and the role of food control authorities in monitoring risks. In particular, does the extensive media coverage of the incident and intense public interest around Europe reflect a consumer desire for stricter monitoring and control of mislabelled food products and fraudulent production practices?

Another example: In a recent study, cocktails of up to five neonicotinoid pesticides were found in three-quarters of 198 honey samples from around the world (Woodcock et al., 2017). Almost half of those samples contained the minimum dose known to cause detrimental effects in pollinators. Experts consider these levels troubling, less for humans directly than for the health of bees.¹

The levels of neonicotinoids and horse meat found in the affected products were not detrimental to human health. However, public interest in these two food hazards differed considerably (Fig. 1). Clearly,

while mislabelled food products affect consumers directly, neonicotinoids exert an indirect effect by harming vertebrates. Both hazards are an issue for food control authorities, who constantly monitor a broad range of risks related to food and everyday items. Public debate about food scandals such as the horse meat incidence may force food control authorities to justify and upgrade their control systems. Given their limited resources, authorities must prioritize their activities; the question is whether their monitoring activities and priorities align with consumers' perceptions of hazard. Where there is a mismatch, consumers may lose trust in the authorities in question. Of course, most consumers probably never heard about neonicotinoids in honey, not least because it was covered less extensively in the mass media than the horse meat scandal. However, when consumers receive information about the hazards and their characteristics, how do they prioritize the control of these hazards? Moreover, food chain actors, such as farmers and persons working in food processing, are probably better informed about the risks related to food production and consumption, but it is unclear whether their risk perceptions concerning foods and everyday items are more in accordance with those of food control authorities or

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¹ https://www.newscientist.com/article/2149597-neonicotinoid-pesticides-found-in-honey-from-every-continent/?utm_term=Autofeed%26utm_campaign=Echobox%26utm_medium=Social%26cmpid=SOC%7cNSNS%7c2017-

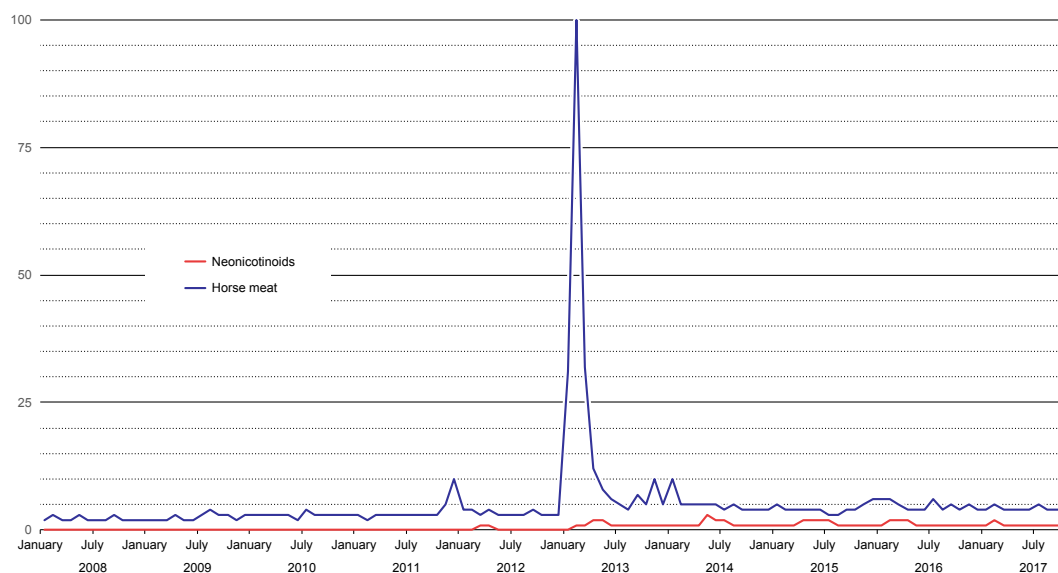


Fig. 1. Google search trends worldwide for the terms “horse meat” and “neonicotinoids” between 1.1.2008 and 31.10.2017 in all categories. The values indicate search interest relative to the highest point in the diagram. The value 100 indicates highest popularity of the term. The value 50 indicates that the value was half as popular. Data source: Google Trends (www.google.com/trends); access 13 November 2017.

of consumers. The objective of the present study is to evaluate stakeholders' (i.e. representatives from food control authorities, food industry representatives, consumers) risk perceptions towards a range of risks related to food and everyday items by means of a quantitative survey approach. It is important to identify critical points of mismatch between stakeholders' risk perceptions for food policy strategies and food control authorities' activities (Erdem et al., 2012; Verbeke et al., 2015).

1.1. Risk perception gap

Research suggests that lay persons (i.e. consumers) perceive hazards differently than experts (Savadori et al., 2004; Siegrist et al., 2007), for various reasons. The two groups clearly differ in their level of knowledge and how they evaluate hazards, but they may also differ in terms of their values and priorities. While the expert's assessment of risk is a stringent multi-step process that takes account of all the available evidence and ranges from hazard identification to risk characterization, the lay person is likely to be influenced by psychological factors such as emotional processes (affect) (Slovic et al., 2004); heuristics (mental shortcuts) (Kahneman et al., 1982); limited knowledge (Dickson-Spillmann et al., 2011) and cultural influences (Kahan et al., 2009). As a consequence, lay risk evaluations are sometimes irrational, and consumers may not worry most about risks that pose the most pressing threat (Ropeik, 2012).

Potential risks associated with food consumption are not the most important factors in consumer decision making about food (Green et al., 2003), and in Western countries, consumers tend to assume that food provided within their own society is safe (de Jonge et al., 2004). Nevertheless, trust in food control systems and market mechanisms influences consumers' perceptions of food safety (Berg et al., 2005). The Bovine Spongiform Encephalopathy (BSE) crisis in the 80s, the 2013 horsemeat scandal (Barnett et al., 2016) and the 2017 scandal related to fibronil in eggs sparked public debate about food safety and control, reflecting public concern and anxiety about uncontrolled risks in the food chain (Bánáti, 2011).

Psychometric studies reveal that a hazard's qualitative characteristics influence lay persons' risk perceptions. In the case of food, factors such as perceived 'severity', 'known risk' and 'number of people exposed' are hazard characteristics that influence public perceptions of risk (Fife-Schaw and Rowe, 1996; Siegrist et al., 2006; Sparks and

Shepherd, 1994). Issues such as involuntary exposure and lack of scientific exploration affect evaluations of hazard, as do consequences for future generations and threat of widespread disaster. For instance, bacterial contamination, listeria and salmonella were rated high on 'severity' but low on the 'unknown' dimension while packaging materials were rated high on the 'unknown' dimension but lower on the 'severity' dimension (Sparks and Shepherd, 1994). For lay people, qualitative characteristics seem important for risk perception while likelihood of adverse outcome is of less concern.

In addressing food hazards, government authorities must take account of perceived risks that lead to public concern, as misguided national risk management strategies can have detrimental economic and societal effects. People may choose to consume less of a given food product or seek alternatives (Morabia et al., 1999; Verbeke, 2001; Verbeke and Viaene, 1999), and a lack of confidence in national food control and safety may even lead to concerns about the use of public resources for risk management (Siegrist et al., 2018). In developing stakeholder-oriented communication strategies and to maintain stakeholder confidence in food safety, it is therefore essential to thoroughly understand how different stakeholder groups evaluate and prioritize food risks.

1.2. Approaches to studying perceived food risks

Previous studies have examined single food-related hazard scenarios such as the horsemeat incident (Barnett et al., 2016), organic versus conventional produce (Williams and Hammit, 2001), pesticides (Verbeke et al., 2015) and biotechnology/gene technology (Siegrist, 2000). Only a few studies have addressed a broader range of food hazards (Fife-Schaw and Rowe, 1996; Rosati and Saba, 2004; Siegrist et al., 2018; Siegrist et al., 2006; Sparks and Shepherd, 1994). In most studies examining lay people's perception of food hazards, only a few (Webster et al., 2010) provided participants with any information about the hazards in question, and sample sizes in these studies were small.

To the best of our knowledge, no study to date has adopted a risk ranking approach to a broader set of food hazards while providing detailed information about those hazards and utilizing a larger sample with sufficient power to explore possible between-group differences. The present project represents an attempt to bridge this research gap. To enable participants to make informed decisions, they received detailed information about the relevant hazards. Additionally, rather than

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