



Communicating chemical risk in food to adolescents. A comparison of web and print media



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ABSTRACT

The study addressed the communication of chemical risks in food to adolescents with a view to evaluating the potential, the effectiveness and the limitations of web- and paper-based tools. The tools were developed through a participatory process based on the active involvement of the target group. The method used to convey the communication message was storytelling.

A sample of 327 students living in north-eastern Italy evaluated the tools through two questionnaires. An assessment was made of the tools' effectiveness in transmitting knowledge, changing perceptions of chemical risks and arousing students' interest. Results showed that perception of chemical risks and scientific knowledge increased significantly among participants following exposure to both communication tools, but the paper-based tool was the preferred medium.

The digital tool exhibited comparable effectiveness to the paper tool in terms of improving learning and changing risk perception, making it a valuable tool in the design of risk-prevention campaigns. However, the paper-based tool met higher approval, suggesting that further studies are needed in Italy to better understand young people's preferences in media usage and the correlations between approval, learning and changes in behaviours.

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1. Introduction

The availability of dynamic, effective tools is of crucial importance in communicating food risks to different targets. Use of the Internet is becoming increasingly widespread, especially among young people, who are a key target for food risk communication. Studies on adolescents have shown that this is the best age to promote healthy eating behaviours (Post-Skagegård et al., 2002). By increasing level of interactivity and active involvement of users, web-based applications create new learning contexts and facilitate new meaning negotiation processes (Petrucco, 2010). However, it cannot be taken for granted that web-based applications are more effective communication tools than other media, especially when their use has not been rigorously planned and evaluated (Bergsma & Carney, 2008; Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005;

Korp, 2006). The role played by both media and multimedia applications in the teaching process has been extensively investigated in the past (Clark, 1983). Several studies have emphasized the advantages of these tools (Turner-McGrievy, Kalyanaraman, & Campbell, 2012), but only few have compared the effectiveness of web-based tools with those traditionally used with students in the learning process (Koehler, Yadav, Phillips, & Cavazos-Kottke, 2005). These issues are being increasingly analysed at the international level, boosting the need to evaluate web-based interventions in order to better understand their real potential compared to other media (Marks et al., 2006; Ritterband & Tate, 2009; Webb, Joseph, Yardley, & Michie, 2010). Accordingly, to understand the real potential and impact of different forms of communication, both a suitable methodology and an adequate evaluation system are required to assess their effectiveness (Tiozzo et al., 2011).

Hence, the aim of this study was not only to analyse and evaluate the design of a communication campaign to raise young people's awareness of food safety issues and reduce food risks, but also to test the effectiveness of different communication tools. Studies conducted at EU level have shown that despite being rather indifferent to food risks in general (Verbeke, Frewer,

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Scholderer, & De Brabander, 2007), most consumers rated chemical risks first among their concerns, because they were unlikely to be prevented by individual behaviours (European Commission, 2010). In the light of the above and on the basis of current scientific knowledge of chemical risks in food, a communication message targeted at adolescents aged between 15 and 17 years was developed and conveyed using both a web-based and a paper-based tool. The strengths and weakness of the tools were evaluated with the goal of defining a suitable communication model for the target audience.

This paper reports the main findings on the tools' ability to: transmit specific knowledge about chemical risks in food, change perceptions of risks and arouse the target audience's interest.

2. Materials and methods

2.1. Procedure

The study consisted of three phases. During the first phase a group of students took active part in the preliminary development of the web- and paper-based communication material. In the second phase, the communication tools were presented to the target audience. The third and final phase was dedicated to evaluating the impact of these tools on the target population, through analyses and comparisons of any changes in knowledge and perception of food risks.

2.2. Participants

At present only a small number of strategies for communicating food safety risks are specifically targeted at younger people. Adults seem to be more concerned about food safety issues, while young consumers appear to be only interested in the hedonistic aspects of food (Mora & Menozzi, 2006). One explanation is that young people are not always well informed about food safety issues and are often prone to mishandling food at home (Byrd-Bredbenner, Maurer, Wheatley, Cottone, & Clancy, 2007).

The present study involved young students aged 15–17 years. Since schools are considered to be an ideal setting for health promotion among adolescents (Contento, Manning, & Shanon, 1992), nine secondary schools (18 classes) from north-eastern Italy voluntarily joined the project. The communication campaign was presented to 393 students but only 327 of them actually filled in the evaluation questionnaires, with 66 declining to take part in the assessment phase.

Forty students, matched with the sample group for age, type of school attended, geographical area, actively contributed to defining the communication message and subsequent tool development. They were selected from two classes through a call for proposals and involved in the first phase only.

2.3. Digital storytelling and the participatory approach

The message was conveyed through *storytelling*. Several studies and experiences suggest that stories play a key role in processing, organizing, and recalling information (Kintsch & van Dijk, 1975; Mandler, 1984). This technique is widely used in educational and training settings, and has been successfully adopted in intervention strategies to prevent risk behaviours associated with certain diseases (CDC AIDS Community Demonstration Projects Research Group, 1999; Fishbein & Yzer, 2003).

Over the last few years, digital media have been used extensively to create narratives: this practice, known as *digital storytelling*, is now well established and relies on the Internet as its main communication channel. The active role of target group representatives in

planning and implementing educational interventions has proved to be a very important factor, especially when they become the actual authors of the media products (Tanner, Duhe, Evans, & Condrasky, 2008). This type of involvement appears to improve understanding of issues related to health and risk prevention in general, and to be more successful in positively changing attitudes and, most likely, eating behaviours (Banerjee & Greene, 2007).

By participating in the definition and development of the communication tools, the students in this study were able to create narratives the target audience could relate to, and to design communication tools that take account of expectations and preferences.

2.4. Communication message and tools

Discussion among the students and chemical experts led to identification of some of the risks to which adolescents are most exposed, since they are present in their favourite foods or associated with specific eating styles.

Scientific concepts were selected as the subject of the communication message, and each risk was associated with a healthy behaviour aimed at reducing it. This type of intervention study is designed not only to provide knowledge but also to reduce risks by communicating appropriate prevention strategies. The concepts contained in the message are listed in Table 1, alongside a description and recommendations on how to limit the risks.

The students identified a printed comic strip and a digital storytelling video to be circulated through the Internet as the most suitable tools to convey the informative message about the selected chemical risks. The same story was told using the two different media.

Students were actors in the digital story production, which was subsequently edited by experts on storytelling methodology from the University of Padua and uploaded to a password-protected online channel on Vimeo in order to monitor views.

The comic strip was created in collaboration with a comics artist. Characters were drawn from photos of the students playing the same roles as in the video. The comic strip was created in Euro-manga style to ensure it was in line with the target group's favourite products.

2.5. Administration and evaluation of the communication tools

The communication tools were presented to the students in different ways. Classes were randomly divided into three groups: the first group (6 classes, $n_1 = 138$ students) viewed only the comic strip under supervision in class; the second group (6 classes, $n_2 = 117$ students) watched the video online in class, while the members of the third group (6 classes, $n_3 = 138$ students) were provided with both tools and allowed to use them at leisure outside school.

Table 1
Concepts included in the communication message.

Risk	Description	Recommendation
Chronic poisoning	Exceeding the acceptable daily intake of chemicals	Frequently vary the content of the food eaten
Benzo(a)pyrene	Carcinogenic molecule associated with the consumption of burnt food	Never eat burnt meat
Histamine	Risks associated with improper food preservation methods	Preserve food correctly
Acrylamide	Risks associated with the consumption of fried food	Do not use the same oil several times to fry food
Pesticides	Risks associated with the presence of chemical residues in fruit and vegetables	Always wash fruit and vegetables

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