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The existence of optimistic bias about foodborne disease by food handlers and its association with training participation and food safety performance ☆

Diogo Thimoteo da Cunha [a], Anna Rafaela Cavalcante Braga [b], Estevão de Camargo Passos [c], Elke Stedefeldt [d,*], Veridiana Vera de Rosso [b]

[a] GeQual — Grupo de Estudo em Qualidade de Alimentos, Faculdade de Ciências Aplicadas, UNICAMP — Universidade Estadual de Campinas, Pedro Zacarias Street, 1300 Limeira, SP, Brazil
[b] GeQual — Grupo de Estudo em Qualidade de Alimentos, Departamento de Biociências, UNIFESP — Universidade Federal de São Paulo, Silva Jardim Street, 136, Vila Mathias, 11015-020 Santos city, SP, Brazil
[c] Instituto Adolfo Lutz, Silva Jardim Street, 90, Vila Mathias, 11015-020 Santos city, SP, Brazil
[d] GeQual — Grupo de Estudo em Qualidade de Alimentos, Centro de Desenvolvimento do Ensino Superior em Saúde, UNIFESP — Universidade Federal de São Paulo, Silva Jardim Street, 136, Vila Mathias, 11015-020 Santos city, SP, Brazil

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ABSTRACT

A positive outlook regarding future events, in which individuals find themselves less likely than others to experience negative events, is called optimistic bias (OB). The aims of this study were: 1. To ascertain the existence and measure the OB phenomenon in food handlers in relation to foodborne disease and 2. To examine the association of OB with food handlers' risk perceptions, knowledge, attitudes, self-reported practices, training participation, food safety performance of the establishments and microbiological analysis. This study examined different food businesses in Santos city, in Brazil, as follows: street food kiosks, beach kiosks, restaurants, hospitals, and school meal services. The food handlers indicated their own risk and their peers' risk of causing a foodborne disease. Responses were given on a 10 cm linear scale anchored with descriptors of intensity ranging from "none" to "very high". The difference between these risk perceptions characterized a score of tendency of an OB. A structured questionnaire was administered to evaluate knowledge, attitudes, self-reported practices and food safety performance. A total of 183 food handlers participated in the study. Microbiological analyses were conducted with ready-to-eat foods/preparations from selected sites. The food handlers perceived themselves as less likely than their peers to cause a foodborne disease ($p < 0.001$), demonstrating the tendency of an OB. Food handlers who had undergone some training presented lower scores for the perceived risk of themselves being responsible for a foodborne disease and higher knowledge than did untrained individuals. Hospitals, schools and restaurants performed better than street food group considering food safety performance. However, microorganisms were found in food samples from hospitals. This result may be motivated by OB and other subjective factors. Apparently, this positive outlook of food handlers is associated with training participation, lethality perception and correlating positively with age. No association was found between OB scores and knowledge, attitudes and self-reported practices. Since OB may lead individuals to adopt inappropriate or dangerous behavior, strategies for debiasing food handlers should be designed.

1. Introduction

The increase in consumption of food away from home is a reality of the current standard of living. There are some factors related to this increase as follow: increase in women working outside the home; sophistication and increased food industry with affordable and convenient meals, rise in household income and other social changes (Guthrie, Lin, & Frazao, 2002). In Brazil the consumption of food away from home rose from 22.2% in 2002–2003 to 27.9% in 2008–2009 (Claro, Levy, Bandoni, Baraldi, & Martins, 2014).

To ensure the food safety at these places Brazilian food safety law states that all food services must ensure that the meals produced are safe and adequate for consumption (Brazil — Health Ministry, 2004). However, it is believed that food service category may predict food safety compliance, because restaurants and mainly street food can be understood as a stereotype of risk according to common sense (Da Cunha, Stedefeldt, & De Rosso, 2014a).

Many strategies can be used to assess food safety. The most common methodological approaches are the microbiological assessment of food

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* Corresponding author.
E-mail address: Elke_nutri@hotmail.com (E. Stedefeldt).

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and the use of inspection scores, generally evaluated through a check-list. However, paradoxically a high amount of microorganisms can be found even in food services with good inspection scores and vice versa (De Oliveira et al., 2014; Kjeldgaard, Stormly, & Leisner, 2010; Tebbutt & Southwell, 1997). Additionally, studies report the inadequate handling of food is the main causal mechanism of FBD, and it is directly related to several foodborne outbreak cases (Howes, McEwan, Griffiths, & Harris, 1996; Todd, Greig, Bartleson, & Michaels, 2007). So, investigating subjective factors of food handling (e.g. food handlers' risk perceptions, motivation, knowledge and others) might be the key to understand this paradox.

Individuals do not make the same estimate of risk when comparing risks to them and people in general. In particular, individuals deny their own risks inferring that they themselves are at a lower risk than others (Sjoberg, 2000). Danger tends to be underestimated, especially when assessing personal risks, such as being exposed to hazards related to food, i.e., food poisoning (Weinstein, 1987), salmonellosis and bovine spongiform encephalopathy (Miles & Frewer, 2001), obesity (Weinstein & Klein, 1995), among others (Miles & Scaife, 2003). This positive outlook regarding future events in which individuals feel shielded against negative events is called optimistic bias (OB) or unrealistic optimism (Gouveia & Clarke, 2001; Weinstein, 1980, 1984, 1989).

It has also been shown that risk perception can directly interfere with the conduct of the individual (Janz & Becker, 1984) and that OB reduces the precaution of the individual to reduce his perception of own risks (Horswill & McKenna, 1999; Weinstein, 1984, 1987), which leads him to adopt inappropriate or dangerous behavior. If the food handler believes that a foodborne disease (FBD) will never occur during his work, it may be more difficult to get him to adopt preventive measures, such as good handling practices.

Identifying OB in food handlers and its associated factors could assist the development of strategies for interventions for these professionals, ensuring effective risk communication that can change their practices at work. Currently, the use of strategies for training food handlers has been challenging because training based only on scientific communication may not promote changes in the behavior or practices of these professionals (Green et al., 2005; Park, Kwak, & Chang, 2012; Seaman & Eves, 2008). However, this type of strategy is still the most used, as reported in systematic reviews on the topic (Egan et al., 2007; Medeiros, Cavalli, Salay, & Proença, 2011). Increasing the knowledge of food handlers about food safety does not guarantee changes in practice (Rennie, 1994) and may even increase OB (Miles, Braxton, & Frewer, 1999). In contrast, other authors (Choudhury, Mahanta, Goswami, & Mazumder, 2011; McIntyre, Vallaster, Wilcott, Henderson, & Kosatsky, 2013) have reported that training can be transformative especially when it is conducted with different strategies and not just lectures.

Our study was designed to explore which characteristics of food handlers are associated with OB. Identifying these factors can be a first step toward establishing debiasing strategies, since knowledge is affected by training participation (Da Cunha, Stedefeldt, & De Rosso, 2014b) and practice is associated with food handler attitudes (an expression of favor toward food safety) (Ko, 2013). Therefore, the aims of this study were: 1. Ascertain the existence and measure the OB phenomenon in food handlers in relation to FBD, and 2. Examine the association of OB with food handlers' risk perceptions, knowledge, attitudes, self-reported practices, training participation and food safety performance.

2. Methods

2.1. Subjects and design

This study was cross-sectional and involved 183 food handlers from 119 food services of five type of food business in the city of Santos, in Brazil, as follows: 29 street food kiosks, 23 beach kiosks, 28 restaurants, two hospitals and 37 school meal services. These services were randomly selected across regions of the city, and only food handlers who had direct contact with food during its preparation were invited to participate in the survey. A pilot study was first performed with 50 food handlers, 10 from each business, to test comprehension of the questionnaires and to verify necessary parameters for sample calculation. The sample size was calculated using an estimate of the vector between the means of the OB variable obtained in the pilot study. One point was considered as the maximum error within a 95% of global confidence interval.

2.2. Perceived risk and optimistic bias assessment

OB was identified using the indirect method, in which individuals indicate their own risk separately from their peers' risk of causing an FBD (Da Cunha et al., 2014a).

The food handlers were asked, through a printed questionnaire already described in other study (Da Cunha et al., 2014a), the following questions:

- Question 1 — "What is the consumer's likelihood of presenting abdominal pain and/or vomiting (foodborne disease) after eating a meal or food in a restaurant (other than the one in which you are working)?"; to evaluate the risk perceived by food handlers about their peers being responsible to cause FBD.
- Question 2 — "What is the consumer's likelihood of presenting abdominal pain and/or vomiting (foodborne disease) after eating a meal or food prepared by you?"; to evaluate the risk perceived by food handlers being themselves responsible for causing an FDB.
- Question 3 — "To what degree do you believe that a foodborne disease can be severe or lethal to a person?"; to evaluate the perceived lethality about FBD by food handlers.
- Question 4 — "What is the consumer's likelihood of present abdominal pain and/or vomiting (foodborne disease) after eating a meal or food in another food service that is not a restaurant (like hospitals, beach kiosks, street food kiosk or school meal services)?";
- Question 5 — "What is the likelihood of your friends and family members present abdominal pain and/or vomiting (foodborne disease) after eating a meal or food prepared by you?"; and
- Question 6 — "What is the likelihood of your friends and family members present abdominal pain and/or vomiting (foodborne disease) after eating a meal or food prepared by a food handler other than you?"

The questions were adjusted for each food business. Responses were given on a 10 cm linear scale anchored with descriptors of intensity ranging from "none" (in the zero centimeter) to "very high" (in the 10 cm) where food handler assigned a mark with a pencil in this scale. This mark determined the risk perception score for each question. All questionnaires were administered in the workplace of food handlers in a quiet place, without the presence of managers or work colleagues, after/before their job activities or during a work pause.

To assess the food handlers' degree of OB about personal risk, the score assigned to the perceived risk of themselves being the cause of an FBD (question 2) was subtracted from the scores assigned to question 1, which was about their peers' risk of transmitting an FBD to the consumer. Other OB tendencies were evaluated as: OB about food business risk (question 4–question 1); OB about — friends and family members' risk (question 6–question 5); and positive results equal to or greater than one indicate the tendency of an OB, higher scores indicate greater magnitude of this tendency (Chock, 2011; Helweg-Larsen & Shepperd, 2001). In any case, the results were confirmed through statistical analysis.

2.3. Knowledge, attitudes and self-reported practices assessment

To evaluate knowledge, attitudes and self-reported practices (KAP), a structured printed questionnaire was administered to the food handlers. This questionnaire was fully described in a previous research (Da Cunha et al., 2014b).