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ABSTRACT

Publicly accessible food safety inspection reports are a standard procedure to inform consumers on restaurants' food safety levels in many countries. This study examined how different formats of food safety inspection report are associated with consumer perceptions related to food safety, as well as other perceptions about the restaurant. The study was conducted in Denmark and Finland with similar inspection grade systems but differences in the distribution of awarded grades. We conducted a population-based survey experiment with a between-subjects design on nationally representative samples of the 18–70 years old Danish (n = 978) and Finnish (n = 907) populations. Respondents received one of six food safety inspection reports with different combinations of inspection grade with a smiley and/or text. According to the results, both Danish and Finnish consumers' food safety perceptions of the same grade were more positive when the report included a smiley, and more negative when the report included a text. Finnish respondents perceived a good food safety inspection grade more positively than Danish respondents but there were no country differences when the grade was poor. In addition, food safety inspection results elicited perceptions that were not related to food safety in both countries. The results suggest that if the grade is poor, the inclusion of text is effective in eliciting perceptions of increased food safety risk. If the grade is good, a standalone smiley may be most effective in eliciting positive perceptions of a high food safety level. Moreover, these results indicate the importance of carefully evaluating how to develop public accessible inspection grades to ensure they are correctly interpreted by consumers in different countries.

1. Introduction

Publication of inspector grade reports at food establishments has become a common means to illustrate the actual food hygiene and safety level of the establishments to consumers. Such reports may improve food safety if consumers use them as a cue to shift demand towards restaurants with higher hygiene standards (Aik et al., 2018; Choi et al., 2013; Henson et al., 2006; Knight et al., 2007; Vainio et al., 2020), especially if they are a result of unannounced inspections (Kaskela et al., 2021). In addition, reports available to the public have been found to improve compliance and restaurant hygiene (Kaskela et al., 2019; Wong et al., 2015) and to have a positive effect on food safety, as shown by a letter grading food safety scheme that was associated with a decline in *Salmonella* infections in New York City (Firestone & Hedberg, 2018).

A successful food safety inspection report can convey information about the actual level of food safety to the consumer (Dundes & Rajapaksa, 2001) and is based on consumer's knowledge of risks as well as their concerns, needs and preferences (Charlebois & Summan, 2015; Cope et al., 2010; Frewer, 2004). One challenge in effective risk communication is that consumer behaviour is primarily driven by perceptions and not by what scientists regard as facts (Hansen et al., 2003; Renn, 2006). Moreover, consumers may have illusory opinions on their own understanding of what is described in inspection reports (Leisner et al., 2014). Thus, consumers have been found to some degree confuse

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food safety issues with the topics such as food quality and level of service at a food establishment (Vainio et al., 2020). For example, in a study conducted in the US, respondents perceived quick-service restaurants to be less safe than casual dining or fine dining restaurants (Park & Almanza, 2015). From the consumer point of view, food safety is often considered as part of the wider and multidimensional concept of food quality, and these concepts may be used interchangeably (Röhr et al., 2005). Consumers may also use quality indicators as proxy parameters of disease risk (Curtis et al., 2004), and therefore the perceived quality of a restaurant could be used as a cue for indicating the level of food safety risk.

Food safety inspection results are displayed to consumers in various ways in different countries and regions. For example, numeric grading is used in the UK (Food Standards Agency, 2017), star grading in Australia (New South Wales Food Authority, 2021), letter grading in New York City, US (McKelvey et al., 2015) and face symbols in Denmark (DVFA, 2019), Finland (Finnish Food Authority, 2018), Norway (Norwegian Food Safety Authority, 2017), France (Ministère de l'agriculture et de l'alimentation, 2017) and China (Bai et al., 2019). A core issue is whether a report preferably should communicate risk in a verbal format, a numeric grading format or face symbols or combinations thereof. The format of food safety inspection report influences the persuasiveness of the inspection result as well as consumer response (Choi et al., 2013). Verbal formats may affect consumer behaviour to a larger degree whereas numeric or letter grade formats may be easier to comprehend (Dundes & Rajapaksa, 2001; Kim et al., 2017). The smiley format, defined as visual representation of an idea, feeling, or status, used alongside or instead of words (Evans, 2015; Luangrath et al., 2017), seems to be particularly effective in catching consumers' attention (Pankaj & Rietveld, 2021). Smiley formats have initially been used in advertisements and product packaging to convey (in particular) positive moods (Stark & Crawford, 2015). The heterogeneity of the disclosure schemes together with the differences in ways grades are awarded create difficulties when comparing consumer perceptions of disclosed reports between countries.

The perceptual information available for the consumers can vary between countries not only depending on whether the grade is readily available (e.g., displayed on the entrance to an establishment) or not (e.g., hidden behind a QR code), but also in the degree of information the report provides. Although researchers such as Nisbett (2004) have argued for general cultural differences in perception and cognitive style, individual differences are probably more subtle and based in part on established perceptual categories (Dall et al., 2021; Xie & Zhang, 2017; Zimmer & Fischer, 2020), and in part how various perceptual categories are used (Brogaard & Sørensen, in press). Moreover, studies of visual search behaviour have demonstrated that individuals have difficulties to detect targets that are very rare (e.g., Wolfe et al., 2013). Similarly, one may think that targets that are less informative may also capture attention to a lesser degree. So, an obvious question that is rarely addressed would be to study whether the frequency of awarding different grades in a country affects general consumer perception about food safety.

Denmark and Finland are examples of two Nordic countries that are socio-culturally similar and have relatively similar public food safety disclosure systems. In both countries, a food safety inspection report targeted at consumers includes a smiley, as well as text. The Danish Smiley Scheme was introduced in 2001 (DVFA, 2019), and the Finnish Oiva scheme in 2013 (Finnish Food Authority, 2018). In both schemes, information about the compliance with food safety regulations is communicated using four different types of smiley faces (Table 1). The widest smile indicates full compliance with food safety regulations, followed by smiling face, straight smiley face, and finally unhappy smiley face. In Finland, these categories indicate "excellent", "good", "to be corrected" and "poor" (Finnish Food Authority, 2019) whereas in Denmark these categories indicate "no remarks", "enjoining order", "injunction or prohibitary order" and "administrative penalties, reported to the police, or approval withdrawn" (DVFA, 2019). In addition, the food safety inspection reports also provide verbal information about the level of compliance with food safety regulations if the result was below the highest grade. Despite relatively similar public food safety disclosure systems there are also significant differences between Denmark and Finland in the way inspection grades are awarded to food establishments in practice. In Denmark most retail establishments are provided with the highest grade whereas retail inspection reports in Finland show a much higher level of non-compliances (Table 1). Such differences may affect consumer expectancy of grades (Pankaj & Rietveld, 2021), and consequently, the consumer assessment of food safety. How the differences in the distribution of inspection grades affect consumer perception have not yet been studied.

Table 1
Distribution of food safety inspection grades in Finnish and Danish retail establishments in 2020 (Finnish Food Authority, 2021; FVFA, 2021).

Grade	Smiley	Distribution %	Description
Finland			
A		48.4	Excellent: Operations are in line with the requirements.
B		38.5	Good: There are small issues with the operations which do not impair food safety or mislead consumers.
C		12.6	To be corrected: There are issues with the operations which impair food safety or mislead consumers. These issues must be rectified within a set time period.
D		0.5	Poor: There are issues with the operations which jeopardise food safety or considerably mislead consumers, or the operator has failed to comply with orders that have been issued. These issues must be rectified with immediate effect.
Denmark			
1		81.8	No remarks
2		13.7	Remark
3		0.7	Injunction or prohibitary order
4		3.9	Administrative penalties, reported to the police, or approval withdrawn.

In this study we focused on two research questions. First, we wanted to explore how the food safety inspection grade is associated with consumers' perceptions of food safety, as well as other perceptions that are not related to food safety. Second, we wanted to investigate how the two different ways to communicate food safety inspection grade: smiley format and text format are associated with consumers' perceptions related and unrelated to food safety. We investigated these two research questions by analysing a quantitative survey conducted in Finland and Denmark. There is evidence that consumer perceptions raised by food safety inspection reports are multifaceted. While many of these perceptions are associated with food safety risk, consumers also interpret food safety inspection reports as indicators of the restaurant and food quality (Röhr et al., 2005; Vainio et al., 2020). However, there are no studies that simultaneously assess both types of consumer perceptions, and how they may potentially vary across different types of food safety report formats cross-culturally. The obtained results can be used to improve implementation or modification of public accessible inspection

grades to ensure their correct interpretation by consumers.

2. Materials and methods

2.1. Data collection

The data were collected in April–May 2021 using an online questionnaire, directed to the members of several different consumer panels by a commercial marketing research company (Aistila Oy, Finland). The samples are representative of 17–70 years old Internet users living in Finland and Denmark in terms of age, gender, and region.

Firstly, the questionnaires were designed in English and then translated into Finnish and Danish by the researchers. Secondly, the questionnaires were pre-tested in Finland and Denmark among a small sample of respondents, and finally, the questionnaires were programmed into the Compusense Cloud software for a client testing before actual data collection. The objective was to gather the samples of 900 respondents per each country and 150 respondents of each experimental group (see Table 3).

The total number of completed respondents was 1,141 in Finland and 1,457 in Denmark. Of the responses 20% (n = 234) from Finland and 30% (n = 479) from Denmark were excluded from the dataset due to poor quality. Poor response quality was determined based on response time and response patterns. Two questionnaire batteries were analysed on response behaviour to reveal "straight liners" (standard deviation between the statements = 0). The final sample included 907 respondents in Finland and 978 respondents in Denmark (total N = 1,885). Six different types of food safety inspection reports were distributed to random sets of respondents (n = 153–169 and 150–152, respectively).

In data collection we followed the APA ethical norms and GDPR. The participation was totally voluntary, and the participants were informed of the aims of the study. Before the data collection they signed informed consent. In Denmark and Finland no ethical evaluation was needed in this kind of data collection (Danish National Committee on Health Research Ethics, 2018; Finnish National Board on Research Integrity, 2019). The anonymity of each participant was guaranteed.

2.2. Characteristics of respondents

The study explored two samples of the 18–70 years old Danish and Finnish respondents. The samples were rather representative of the national populations in terms of gender and age distribution (Table 2).

Table 2
Characteristics of the respondents.

	Denmark		Finland	
	Data sample	Population[a] [c]	Data sample	Population[b] [d]
Gender				
women	49.7	50	50.4	51
men	50.0	50	49.4	49
other/prefer not to say	0.3	n.a.	0.2	n.a.
Age groups				
17–29	15.3	25	16.6	23
30–39	15.0	18	20.5	19
40–49	17.9	19	19.6	18
50–59	22.4	20	21.2	19
60–70	29.3	18	22.1	21
Highest level of education				
basic	11.0	24	13.5	16
secondary	45.0	40	45.1	59
tertiary	43.5	35	40.6	25
other	0.5	1	0.9	n.a.

[a] Statistics Statistics Denmark (2020a).
[b] Statistics Statistics Finland (2020a).
[c] Statistics Statistics Denmark (2020b).
[d] Statistics Statistics Finland (2020b).

The respondents in both countries were slightly more highly educated than national populations. According to T-test, there were no statistically significant differences in the level of education and gender distribution between the Danish and Finnish respondents. Instead, Danish respondents (M = 48.4; SD = 15.48) were slightly older than the Finnish respondents (M = 45.6, SD = 14.43), $t(1883) = 4.14$, $p < 0.001$.

2.3. Methods

We explored the research questions using a population-based survey experiment approach with a between-subjects design (Mutz, 2011). The respondents were randomly assigned to one of six groups. In total six food safety inspection reports were designed with two different grades: three reports with a good grade and three reports with a poor grade (Supplementary material A). Each grade was presented with a standalone smiley, a standalone text, or both (Table 3). The good grade corresponded to the grade A ("excellent") in Finland and the grade 1 ("No remarks") in Denmark. The poor grade corresponded to the grade C ("to be corrected") in Finland and the grade 3 ("Injunction of prohibitary order") in Denmark (Table 1; Finnish Food Authority, 2021; FVFA, 2021). The smileys in the reports were grey.

The text in a report was designed to communicate the level of food safety risk to the consumer. In Denmark and Finland, the type of noncompliance is mentioned in the text description if noncompliance is detected. Since experimental design requires that all the factors are controlled, we had to focus on one kind of noncompliance. We chose cleanliness because it is a major factor in preventing foodborne illness (e.g., USDA (U.S. Department of Agriculture), 2016). Therefore, good grade was communicated with a text "Food safety risks were not elevated in the restaurant" and in poor grade was communicated with a text "Food safety risks were elevated in the restaurant. Noncompliances were detected in the cleanliness of the restaurant". The grade was not reported separately in the reports but through smiley and/or text. The grade was separated as its own attribute variable in further analyses.

After reading the report, the respondents were requested to indicate how high or low they perceived seven different food safety related issues at the restaurant (hygiene level, compliance with food legislation in restaurant operations, safety of the restaurant's food to the consumers, trust in operations of the restaurant, the level of freshness of food ingredients, risk for the presence of spoiled food ingredients, food poisoning risk). In addition, they were requested to indicate how high or low they perceived four different issues that were not related to food safety (palatability of food served at the restaurant, the level of the customer service, the level of culinary experience enjoyed by consumers, nutritional quality of food). These issues were chosen based on previous findings on consumer perceptions raised by food safety inspection reports (Vainio et al., 2020), and presented to the respondents in a random order. A 7-point response scale where the extremes were "very low" and "very high" was used.

Table 3
The experimental design used in the study and the number of respondents in each experimental group (DK = Denmark; FI = Finland).

Report number	Elements of report			Country	
	Grade (0 = poor, 1 = good)	Smiley (0 = not included, 1 = included)	Text description (0 = not included, 1 = included)	DK	FI
1	1	1	0	167	151
2	1	1	1	153	152
3	1	0	1	160	152
4	0	1	0	169	150
5	0	1	1	166	152
6	0	0	1	163	150

2.4. Analysis

An exploratory factor analysis (EFA; Maximum Likelihood, Oblimin rotation) was used for testing that the eleven perceptions could be grouped into two variables. As expected, EFA yielded two factors with Eigenvalue >1: *perceptions related to food safety* and *perceptions unrelated to food safety* (Supplementary material B). They together explained over 75% of variation in the responses. The mean scores of the items loading over 0.40 to each factor were used in further analyses. For calculating the mean scores, two items that loaded negatively into the first factor were reverse coded. Cronbach alphas of the items were high ($\alpha = 0.90$ and 0.93), indicating high reliability. The bivariate correlation between perceptions related to food safety and the perceptions unrelated to food safety was 0.64 ($p < 0.001$).

Respondents' perceptions raised by six different food safety inspection reports were compared using confidence intervals of the means (95%). Further, hierarchical multiple linear regression was used for testing associations between respondents' country, the three elements of the food safety inspection report (grade, smiley, text) and the two types of perceptions: those that were related and those that were unrelated to food safety. The three elements of the food safety inspection report (grade, smiley, text) were used as binary variables (Table 2) in the models. The combined effects were tested using interaction terms in the regression models. The steps in hierarchical multiple linear regression

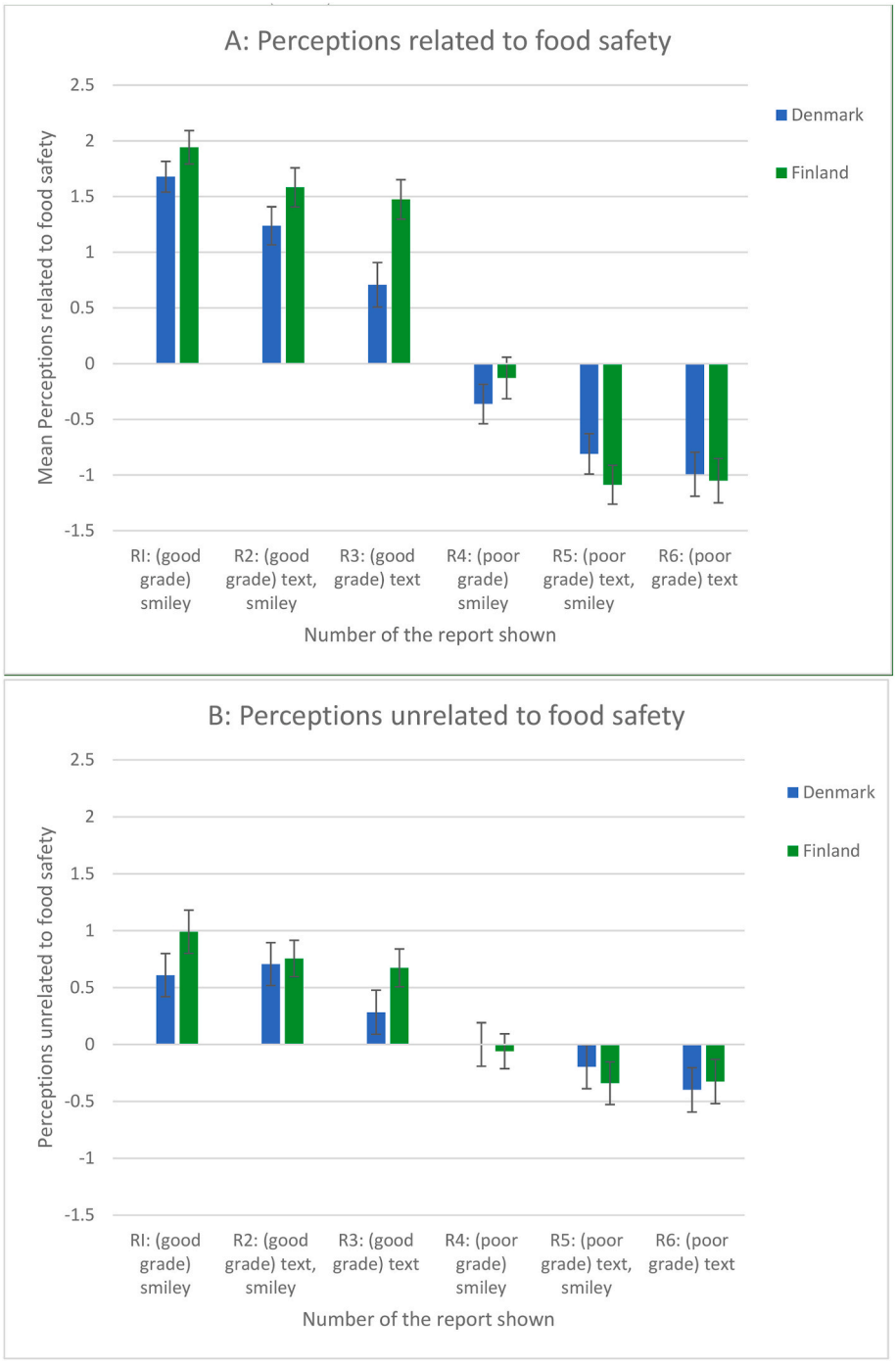

Fig. 1. Perceptions related (A) and unrelated (B) to food safety (−3 = very low, 3 = very high) raised by the six different food safety inspection reports (R1-R6) in Denmark and Finland. Means and confidence intervals (95%).

were as follows. The three elements of the food safety inspection report (grade, smiley, text) were entered in the first step. The country variable (Denmark vs. Finland) was added in the second step. Interaction terms were added to the model in the third step. Finally, statistically significant interaction terms were interpreted using visual representations and confidence intervals (95%). Because the Danish sample was slightly older than the Finnish sample, we also tested the regression models where the effect of age was controlled. Age was not statistically significant, and it did not affect other results.

3. Results

3.1. Perceptions raised by food safety inspection reports

Overall, all three reports with a good food safety inspection grade elicited positive perceptions about food safety and all three reports with a poor grade elicited negative perceptions about food safety even if the grades were not explicitly stated but communicated implicitly via smiley and/or text (Fig. 1A, Supplementary material C). Perceptions related to food safety raised by the reports were relatively similar in Denmark and Finland. The comparison of confidence intervals (95%) indicated only one difference: a good food safety inspection grade was perceived more positively in Finland than in Denmark when the grade was indicated with a standalone text.

Instead, there were more differences within countries between different types of reports. In Denmark, the perceptions of all three reports indicating a good grade differed from each other: the report with a standalone smiley was perceived most positively and the report with a standalone text was perceived least positively (Fig. 1A, Supplementary material C). In Finland, a good food safety inspection grade indicated with a standalone smiley was perceived more positively than the two other reports that included text (either alone or combined with a smiley).

In Denmark, a poor food safety inspection grade indicated with a standalone text was perceived more negatively than the two other reports including a smiley (either alone or combined with text) (Fig. 1A, Supplementary material C). Instead in Finland, a poor grade indicated with a standalone smiley was perceived less negatively than the other two reports that included text (either alone or combined with a smiley).

Food safety inspection grades also elicited perceptions that were unrelated to food safety. More specifically, the reports with a good food safety inspection grade elicited slightly more positive perceptions than those with a poor grade (Fig. 1B, Supplementary material C). However, this difference was smaller than in perceptions that were related to food safety. The comparison of confidence intervals (95%) suggested two differences between Denmark and Finland. More specifically, a good food safety inspection grade indicated with a standalone smiley or standalone text raised more positive perceptions unrelated to food safety in Finland than in Denmark. No differences between Denmark and Finland were identified in the perceptions of the reports with poor grades.

The perceptions unrelated to food safety raised by different types of reports with a same grade were relatively similar within countries. Confidence intervals revealed only one difference (Fig. 1B, Supplementary material C). In Denmark, a poor grade indicated with a standalone text was perceived more negatively than a poor grade indicated with a standalone smiley. In Finland, no differences between the reports with the same grade were found.

3.2. Multiple hierarchical regression analysis of perceptions related to food safety

The results of hierarchical multiple linear regression indicated that all three studied elements of food safety inspection report (grade, smiley format, and text format were used as binary variables, see Table 2) were associated with perceptions related to food safety in the first step (Table 4). More specifically, a good food safety inspection grade was associated with more positive perceptions related to food safety. The use of a smiley format independently increased positive perceptions related to food safety. Instead, the use of a text format in the report was associated with more negative perceptions related to food safety. The second step revealed that the Finnish respondents' perceptions of food safety raised by the studied reports were more positive than the Danish respondents.

Three interaction terms were found to be statistically significant ($p < 0.05$) in the third step multiple hierarchical regression. The first one was an interaction between country and food safety inspection grade. A visual interpretation of this interaction term and the comparison of confidence intervals (95%) indicated that Finnish respondents perceived the level of food safety more positively than the Danish respondents when the food safety inspection grade was good but there were no differences between the countries when the grade was poor (Fig. 2A). The second statistically significant interaction was found between the food safety inspection grade and the text format. Perceptions related to food safety were more negative when a text format was used, and this effect was more pronounced when the food safety inspection grade was poor (Fig. 2B). The third interaction term was found between the respondents' country and smiley format: the use of a smiley format increased positive perceptions related to food safety in Denmark more than in Finland (Fig. 2C).

3.3. Multiple hierarchical regression of perceptions unrelated to food safety

Then we analysed associations between respondents' perceptions that were unrelated to food safety, socio-demographic characteristics,

Table 4
The effect of food safety report elements and respondent country on perceptions related to food safety. Results of hierarchical multiple linear regression.

	Perceptions related to food safety								
	Step 1			Step 2			Step 3		
	B	S.E.	Beta	B	S.E.	Beta	B	S.E.	Beta
Constant	−0.51***	0.84		−0.82***	0.11		−0.81***	0.27	
Report: grade (0 = poor, 1 = good)	2.17***	0.05	0.67	2.17***	0.05	0.67	1.09***	0.22	0.34
Report: smiley format (0 = no, 1 = yes)	0.20**	0.07	0.06	0.20**	0.07	0.06	0.55*	0.21	0.16
Report: text format (0 = no, 1 = yes)	- 0.54***	0.07	−0.16	- 0.55***	0.06	−0.16	−0.37*	0.21	−0.11
Country (0 = DK, 1 = FI)				0.21***	0.05	0.07	0.33	0.17	0.10
Grade * smiley							0.25	0.13	0.07
Grade * text							0.29*	0.13	0.08
Country * grade							0.49***	0.10	0.25
Country * smiley							−0.32*	0.13	−0.16
Country * text							−0.22	0.13	−0.10
Adjusted R^2	0.49***			0.50***			0.51***		

***p < 0.001; **p < 0.01; *p < 0.05; B = unstandardized regression coefficient; Beta = standardized regression coefficient.

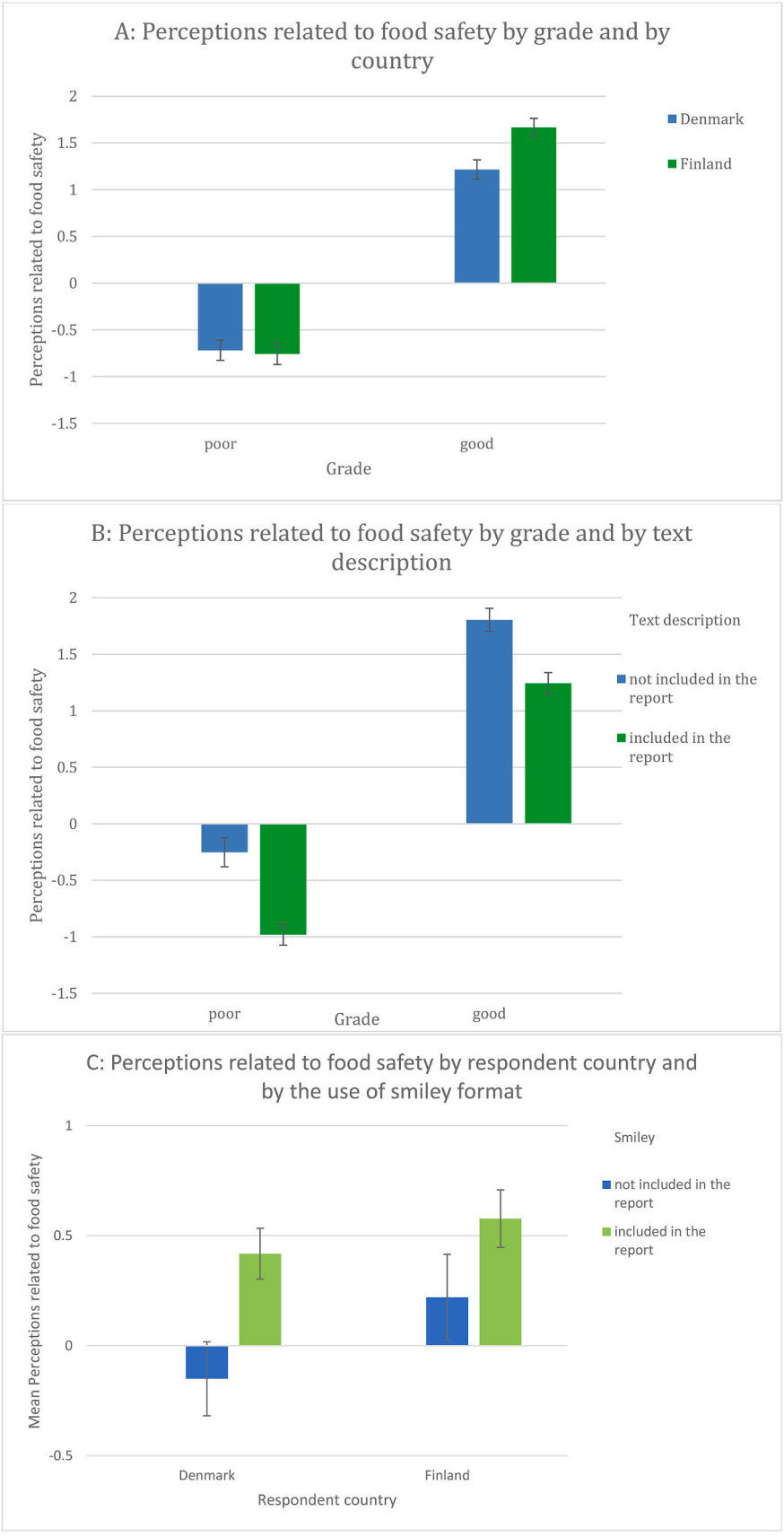

Fig. 2. Statistically significant interactions in perceptions related to food safety (−3 = very low, 3 = very high) between food safety inspection grade and country, and between grade and the inclusion of text ($p < 0.05$) in the whole data sample. Means and confidence intervals (95%).

and food safety report elements using hierarchical multiple linear regression (Table 5). In this analysis, the three elements of the food safety inspection report (grade, smiley format, and text format) were used as binary variables (Table 2). All three studied elements of food safety inspection report were associated with perceptions unrelated to food safety in the first step. Both a good food safety inspection grade and the use of a smiley format were independently associated with more positive perceptions that were unrelated to food safety. In addition, the use of text format in the report was associated with more negative perceptions unrelated to food safety.

The second step of hierarchical regression revealed that the Finnish respondents had more positive perceptions unrelated to food safety than the Danish respondents. In the third step, two interaction terms were statistically significant ($p < 0.05$). The first interaction was found between the country and the grade. Fig. 3A suggests that Finnish respondents had more positive perceptions unrelated to food safety than Danish respondents when the food safety inspection grade was good but no statistically significant difference between the countries was found when the grade was poor. The second interaction term was found between the respondents' country and smiley format. More specifically, the use of a smiley format in the report increased positive perceptions unrelated to food safety in Denmark but not in Finland (Fig. 3B).

4. Discussion

The results of the study suggest that a combination of smileys and text is a suitable format of communicating the level of food safety to Danish and Finnish consumers. More specifically, all tested report formats elicited positive perceptions about food safety at the restaurant when the text and the smiley were positive, and negative perceptions when the text and the smiley were negative. In other words, the respondents interpreted the food safety inspection results in the way as intended even if the inspection grades were not explicitly stated in the reports but communicated indirectly via different combinations of smiley and text.

Risk communication is effective when it minimizes misperceptions of risk (Wall & Chen, 2018). From this perspective, communicating the level of food safety risk as accurately as possible to the consumer is important. The results suggest that the way food safety inspection grade is communicated to consumers matters. More specifically, food safety perceptions of the same grade were more positive when it was communicated using a smiley format, and more negative when it was communicated using a text format. This phenomenon occurred both with good as well as poor food safety inspection grades and this overall trend was the same in both countries. If the purpose of a good grade is to indicate a low food safety risk and poor grade a high food safety risk, it may be beneficial to combine a negative smiley with text if the purpose is to elicit most negative food safety risk perceptions. When the purpose is to elicit positive food safety perceptions instead a standalone smiley symbol may be most effective. It would be of interest to further study the effect of the amount and content of text in food safety inspection reports in different countries as well as over time if food safety inspection grading systems change within a country.

Interestingly, the combination of the positive smiley symbol and the text format stating that there are no food safety risks in the restaurant decreased the positive food safety perceptions. It is not clear why text format decreased positive perceptions or why smiley format increased them. One hypothesis could be that the consumers are startled by the text about food safety risks. Another explanation could be that the inclusion of a smiley increased positive perceptions because traditionally smileys have been used in advertisements and product packaging for conveying moods, in particular positive moods (Stark & Crawford, 2015). The mechanisms explaining the reaction should be investigated further to better understand and control the effects of text and smiley in communicating the level of food safety to consumers.

There were some differences between Danish and Finnish respondents' food safety perceptions. In general, Finnish respondents perceived good food safety inspection grades more positively from the food safety perspective than Danish respondents but there were no differences between the two countries when the grade was poor. Regarding the specific report formats that were explored in this study, Danish respondents reacted more negatively to a good food inspection grade communicated with a standalone text than Finnish respondents. Differences in report grades for Denmark and Finland as observed by Lundén et al. (2021) may add to explain such outcomes. Thus, best food safety inspection grade is more frequent among Danish inspector records than is the case for Finnish reports (DVFA, 2020). As negative grades are often associated with explanatory text, the latter is a more familiar sight for the Finnish consumers. As a result, they may to a lesser extent disapprove such records.

Interestingly, food safety inspection results also elicited perceptions that were not related to food safety. Similar findings have also been reported before (Vainio et al., 2020). A positive smiley and/or text elicited positive perceptions unrelated to food safety and a negative smiley and/or text elicited neutral or negative perceptions. These findings indicate that consumers may use information about food safety as cues for other qualities of a given enterprise (Park & Almanza, 2015; Röhr et al., 2005).

It would be of interest to study if consumers interpret information unrelated to food safety as indicating the level of food safety. It could be tested for instance by presenting rankings based on parameters unrelated to food safety to respondents and subsequently ask them on their perception of such rankings using terms based on food safety. The rankings used could include non-food safety related terms such as those included in this study (palatability of food, level of customer service, culinary experience, nutrition value) in addition to others such as price

Table 5
The effect of food safety report elements and respondent country on perceptions unrelated to food safety. Results of hierarchical multiple linear regression.

	Perceptions unrelated to food safety								
	Step 1			Step 2			Step 3		
	B	S.E.	Beta	B	S.E.	Beta	B	S.E.	Beta
Constant	−0.24**	0.09		−0.41***	0.12		−0.54	0.28	
Report: grade (0 = poor, 1 = good)	0.88***	0.05	0.35	0.88***	0.05	0.35	0.19	0.23	0.08
Report: smiley format (0 = no, 1 = yes)	0.18**	0.07	0.07	0.18*	0.07	0.07	0.51*	0.22	0.19
Report: text format (0 = no, 1 = yes)	- 0.15*	0.07	−0.06	- 0.15*	0.07	−0.06	0.07	0.22	0.03
Country (0 = DK, 1 = FI)				0.12*	0.05	0.05	0.28	0.17	0.11
Grade * smiley							0.16	0.13	0.06
Grade * text							0.17	0.13	0.07
Country * grade							0.32**	0.11	0.21
Country * smiley							- 0.28*	0.13	−0.18
Country * text							−0.21	0.13	−0.13
Adjusted R^2	0.13***			0.13***			0.14***		

***p > 0.001; **p > 0.01; *p > 0.05; B = unstandardized regression coefficient; Beta = standardized regression coefficient.

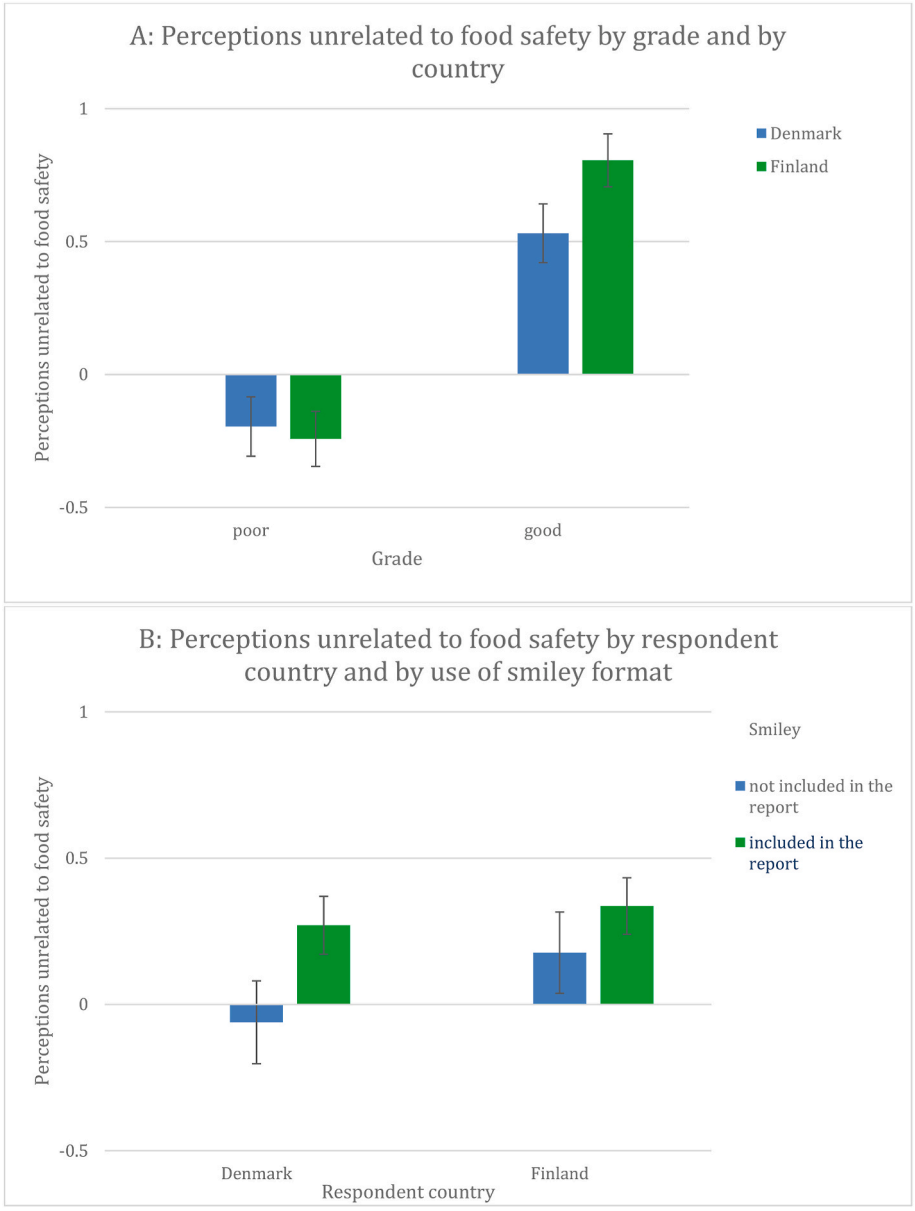

Fig. 3. Statistically significant interactions in perceptions unrelated to food safety (−3 = very low, 3 = very high) between food safety inspection grade and country, and between country and the smiley format ($p < 0.05$) in the whole data sample. Means and confidence intervals (95%).

and authenticity. Moreover, another important line of further study could be if restaurant quality rankings have a spill-over to perceptions related to food safety.

Food inspector records are now accessible to the public in several countries worldwide. It is evident that the grading systems differ between countries (e.g., Food Standards Agency, 2017; New South Wales Food Authority, 2021; Norwegian Food Safety Authority, 2017) but it is less clear what kind of differences there are between countries in the way good and poor grades are awarded. This study compared two countries with rather similar grading systems which however are distributed differently in practice. The obtained results suggest that the way grades are awarded influences consumer perceptions, but further studies are required to substantiate this finding. Research in that direction will provide important information regarding to what extent food inspectors' grades as well as the way of communication of such grades may affect how consumers perceive food safety at a restaurant.

The study involved a hypothetical experiment where the respondents had to indicate their perceptions based on the simplified food safety report and not any other information cues which are present in real-life situations. Previous research suggests that restaurant customers use a wide range of cues to assess food safety (Danelon & Salay, 2012; Fatimah et al., 2011; Gregory & Kim, 2004). Therefore, it is possible that the perceptions could have been different in a real-life setting where more information cues would have been present. Moreover, the experiment was based on a simplified food safety report where many parts included in actual reports used in Denmark and Finland were missing. Those other parts might have different impact on consumers' perceptions than just those investigated in this study. For example, we focused only on two grades instead of four. Moreover, we only analysed perceptions and not behaviour. Therefore, we cannot derive behavioural implications from our results. For example, the results cannot be used to indicate if the respondents would visit a restaurant with a certain food inspection grade or if they generally pay attention to food inspection grades. These simplifications were necessary because it allowed us to eliminate the influence of non-controlled variables, which are unavoidable in real-life contexts. The associations between consumer perceptions and behaviour

are important issues to be explored in future research. In addition, the data was collected during the COVID-19 pandemic. Therefore, it is possible that restrictions targeted to the restaurant operations in both countries may have affected consumers' perceptions.

In conclusion, despite the limitations, the results can be used for developing publicly accessible food safety communication to consumers that is meaningful across different countries and languages. Due to increased internationalization and travelling, there is increased need for developing food safety grading systems that are perceived similarly by people living in different countries. No such system exists now, and one barrier could be regional and socio-cultural differences in grading practices and consumer needs. For example, the current system that is used in Denmark and Finland could potentially be extended to countries with similar schemes. Currently, due to the decreasing attention spans there is increasing demand for simplifying food safety inspection reports. The findings of the current study suggests that a smiley could be used for communicating positive results, and a combination of smiley and text could be used for communicating negative food safety inspection results. However, the results also suggest that one size does not fit all and therefore the inspection report schemes need to find a balance between being understandable to a wide range of consumers irrespective of language barriers and conveying enough information about food safety.

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CRediT authorship contribution statement

Annukka Vainio: Conceptualization, Methodology, Formal analysis, Writing. **Sari Ollila:** Conceptualization, Methodology, Formal analysis, Writing. **Thomas Alrik Sørensen:** Conceptualization, Methodology, Writing. **Jenni Kaskela:** Conceptualization, Methodology. **Eerika Finell:** Conceptualization, Methodology, Formal analysis, Writing. **Jørgen J. Leisner:** Conceptualization, Methodology, Writing, Funding acquisition. **Janne Lundén:** Conceptualization, Methodology, Writing, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.foodcont.2022.109382.

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