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Vicarious vs experiential information in the consumer's construal level on imported food safety risk perception

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Abstract

Consumers acquire information about the imported food safety risks through distal channels such as the Internet versus proximal channels such as direct experience, and these channels influence the consumer perception of safety. However, the empirical analysis of the sources of information (distal–proximal) channels is second to none. This article explores whether direct experience with imported food induces different levels of safety risks compared to distal information through social media. Based on the Construal Level Theory (CLT), the study examines consumer responses in a survey involving 500 respondents out of 1000 distributed in South Korea, using high-level construal (vicarious information) versus a low-level construal (direct experience) framework to assess food safety risk perception. We narrowed the imported food from China to South Korea to obtain a robust analysis. Our analysis shows that vicarious (distal) sources of information increase perceived food safety risks in the minds of the consumer, while direct experience (proximity) decreases food safety risks. In a supplementary analysis, those respondents who had visited China exhibited lower levels of food safety risk of the imported food. We infer that the lower-level construal (experience) mediates the effects of higher-level construal (indirect, social media) on the imported food safety risk. However, the correlation is nonlinear, explaining why some studies find proximity while others find distance in correlation with the food safety risk. In a contribution to the literature, this study answers a longstanding question regarding international business in food supplies, supports the CLT framework, and offers a policy recommendation for both Korea and China to enhance their information channels to counteract misinformation.

Keywords Food safety from China, Imports to South Korea, Construal level theory, Sino-Korean Business, Vicarious vs. experience learning, Information distance vs. proximity

1 Introduction

The import of agricultural food products, particularly staples like kimchi and aquatic items, plays a crucial role in South Korea's food supply chain, with China serving as one of the primary sources. Astonishingly, statistics reveal South Korea relies on China for a staggering 98% of its unprocessed and processed kimchi products (Canadian Government 2011). Kimchi, being a dietary staple, holds both nutritional and cultural significance for Korean consumers, and China stands as a major supplier of its primary raw ingredients (Lee 2014). Besides kimchi products, China remains a significant contributor to South Korea's aquatic product imports, leading to a trade deficit of $1.4 billion in 2009, with 31% of this deficit attributed to China. Notably, China had previously announced its intention to double agricultural trade with Japan and Korea, signalling the critical nature of this economic relationship.

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However, despite the pivotal role of Chinese imports in South Korea's food supply, there is a notable research gap in understanding how information channels, specifically distal (e.g., social media) versus proximal (e.g., direct experience) of the consumer influence the consumer perception of food safety risks. Media reports on food safety issues can adversely affect the demand and trade of food products, which ultimately depends on the institutions and organisations in the supply chain (Malik and Choi 2021). This article addresses this void by delving into the contrasting impacts of direct experience with imported food and distant information garnered from sources like social media (Hilverda et al. 2017). Grounded in the Construal Level Theory (CLT) and previous studies in this framework (Malik 2023a, 2024; Malik et al. 2023b), this study conducts a survey involving 500 respondents in South Korea, exploring high-level construal (vicarious information) versus low-level construal (direct experience) concerning food safety risks. The findings reveal that distal sources of information heighten perceived food safety risks, whereas proximity through direct experience diminishes such concerns. Interestingly, a supplementary analysis shows that respondents who have physically visited China exhibit lower levels of perceived food safety risk concerning imported goods. This suggests that low-level construal (experience) mediates the effects of high-level construal (indirect, social media) on imported food safety risk (Chalak and Abiad 2012; Hilverda et al. 2017; Malik 2023a, 2024; Malik et al. 2023b).

However, this correlation is nonlinear, shedding light on the competition results in previous studies exploring proximity and distance concerning food safety risks. In making a significant contribution to the literature, this study addresses a longstanding question in international food trade and substantiates the validity of the CLT framework. Furthermore, it offers practical policy recommendations for both Korea and China to strengthen their information channels, thereby combating misinformation in food safety.

We can answer this question effectively based on CLT (Trope and Liberman 2010), which can explain the consumer's food safety risk perception through the lenses of psychic distance of the sources of information, we can answer this question effectively. Studies on consumer behaviour have used CLT in a variety of settings. CLT affects food choices (Gardner et al. 2014), risk-taking behaviour (Kirshner 2021; Lermer et al. 2016), consumer satisfaction (Pizzi et al. 2015), media reports on food safety, health information (Simonovic and Taber 2023), and side effects of a product or the perception of it through institutional lenses (Anderson et al. 2011; Fukuda 2015; Malik 2023b; Malik et al. 2023a). The research gap in this context stems from the need to understand the impact of vicarious information flow on Korean consumers' food safety concerns. Additionally, there is a lack of clarity regarding whether high-level construal (distal sources of information) increases concerns related to imported food safety when compared to low-level construal (proximal sources, such as personal experience) (Malik 2023a, 2024; Malik et al. 2023b). Thus, the gap lies in exploring the specific influence of different types of information sources and construal levels on Korean consumers' perceptions of imported food safety.

> *Does the vicarious information flow affect the Korean consumer's food safety concerns, and does the high-level construal (distal sources of information) increase the imported food safety concerns compared to the low-level construal (proximal sources, i.e. experience)?*

The next section develops the CLT framework, followed by methodology, results and discussion. The study resolves a critical issue of food safety issues in the cross-border flow of products and services, contributes to CLT, and offers implications for policy and practice.

2 Construal level theory

Using psychological distance and perceived risk variation, we rely on CLT that is suitable to explain the perceived risk and uncertainty associated with the imported foods safety risks (Li et al. 2018; Malik and Choi 2021) assessed through different construal levels of the consumer as shown in the theory (Trope and Liberman 2010) and empirical evidence in practice (Malik 2023a, 2024; Malik et al. 2023b). In the food safety risk in Korean consumers' perceptions, the central issue is how and why Korean consumers perceive Chinese food as having safety risks. CLT provides a lens through which to understand this phenomenon of excessive worry about food safety concerns with the mechanisms of psychic distance related to information distance versus proximity as is described in vicarious learning in the literature (Choi et al. 2016). CLT is also suitable to explain this food safety phenomenon because it shows online search effects in response to psychic distances (Humphreys et al. 2021). Likewise, visual versus verbal communication brings the distance-proximity effects on perceptions and behaviour (Torrez et al. 2019), leading to consumer satisfaction (Humphreys et al. 2021; Pizzi et al. 2015; Sinha and Lu 2019).

In this instance, the psychological distance between Korean consumers and the source of information on their food imports from China exerts influence over their perception of food safety. CLT has been previously employed to elucidate diverse facets of consumer behaviour, encompassing food choices, risk-taking behaviour, and information security. These instances in the past

have established CLT as a highly pertinent framework for tackling this problem and addressing the research question of psychic distance from information sources and its implication on the consumer's perception and behaviour. By delving into the intricate interplay among psychological distance elements and consumer perceptions within the context of cross-country trade of food products, CLT provides insights that can inform policy decisions and pragmatic strategies to bolster food safety and foster consumer confidence in subtle ways.

CLT suggests that individuals mentally construe events or objects at varying levels of abstraction associated with different degrees of psychological distance (Malik 2023a, 2024; Malik et al. 2023b). The link between the construal level of information and the perceived risk of imported food affects purchasing behaviour, and it depends on information sources such as media coverage versus experience (Li et al. 2018). The main argument is that individuals perceive events or objects as either more abstract and distal (high-level construal) or more concrete and proximal (low-level construal) based on their psychological distance across sectors and contextual settings (Malik 2023a, 2024; Malik et al. 2023b). Psychological distance encompasses dimensions such as temporal (past versus future or duration), spatial (here vs. there), social (self-others), and hypothetical (probability) distance (Trope and Liberman 2010). According to psychic distance, construal levels and information evaluation, CLT suggests that whenever people encounter psychologically distant information, they tend to adopt a high-level construal, resulting in more generalised and decontextualised mental representations of reality. Conversely, psychologically proximal information leads to a low-level construal involving detailed and context-specific mental representations.

2.1 Food safety

According to the FAO (Food and Agricultural Organisation) of the United Nations, food safety "is a science-based discipline, process or action that prevents food from containing substances that could harm a person's health" (FAO 2022). Unsafe food can have adverse effects on the socio-economic well-being of the world. The World Health Organization (WHO) estimates that roughly 600 million people, approximately 1 in 10 worldwide, suffer from food related illnesses, resulting in 420,000 deaths and the loss of 33 million healthy life years. The economic impact is substantial, with low- and middle-income countries collectively losing about US$110 billion each year due to unsafe food, impacting both productivity and medical expenses. These far-reaching consequences of food related diseases extend to healthcare systems, national economies, and the spheres of tourism and trade. The issue of unsafe food extends beyond mere consumer health risks; it perturbs the intricate fabric of the entire food supply chain (Zhou et al. 2018) when dangerous elements such as toxins, unsanitary practices, detrimental additives, flawed processing techniques, and deceptive labelling enter the value chain.

The international food trade has further complicated the food supply chain and safety issues. In the era of globalisation, the significance of food safety has transcended national frontiers, which bears implications not solely for individual safety and health but also the stability and security of the entire nation and the world (WHO 2020). Especially susceptible are countries heavily reliant on food imports, which face vulnerabilities stemming from disruptions in the global food supply chain. The recent COVID-19 pandemic and the ensuing Ukrainian-Russian war have trickle-down effects on developing countries' populations. As food traverses international borders, it carries with it the potential for both safety and security ramifications. Above and beyond these physical complexities in the supply chain, psychological issues complicate the food safety issues: technically safe food can be perceived as unsafe, and unsafe food can be perceived as safe. Hence, the error of omission or commission occurs (Salleh 2023), raising the issue of construal levels in the psychological distance spectrum on imported food safety.

2.2 CLT and perceived food safety

CLT and perceived food safety are the specific context of general food safety issues. Food safety is a multifaceted concept influenced by technical factors that are required but omitted from the decision or the technical factors that are harmful and commissioned in the decision process. These chemical and biological elements make the technical aspect of food safety. Then, there are psychological factors, such as the perception of food safety associated with and explained by CLT. The theory posits that individuals' mental representations of events and objects vary in abstractness or concreteness, influencing their perceptions and behaviours. The literature review in Appendix 1 sheds light on how CLT applies to various aspects of consumer behaviour and decision-making in general and in the food-related response. For instance, studies illustrate that abstract (high-level) thinking might encourage individuals to focus on overarching aspects, such as health implications or long-term consequences when evaluating products or making choices related to food safety.

Conversely, concrete (low-level) thinking may lead to considerations of specific attributes or immediate concerns. Applying this to food safety, individuals with a high construal level might be more concerned about potential health risks associated with unsafe

food, while those with a low construal level might focus on visible characteristics like packaging or taste (Malik 2023a, 2024; Malik et al. 2023b). Appendix 1 below demonstrates the literature on CLT, consumer perceptions and food safety. The evidence (Anderson et al. 2011) shows that food safety perceptions of older adults may not reflect the accuracy of food safety based on technical merits, which explains how individuals perceive and engage with food safety information, which can be influenced by their psychological distance from potential foodborne risks. Castagna et al. (2021) addressed similar issues and established that the "beauty-is-good, ugly-is-risky" in the context of food aesthetics and construal level. It highlights that individuals may perceive food differently based on its aesthetic qualities, which can be connected to their construal level. Construal levels also influence the evaluation of organic versus nonorganic food safety risks. Chang et al. (2019) found the role of product type, perceived authenticity, and construal level in the evaluation of organic food. It suggests that consumers' construal level can influence their perception of organic food products, showing that not all organic foods are evaluated the same way.

The preceding studies established a link between psychosocial perception of food safety; the following several studies explore the internal mechanisms. Ergönül (2013) explains that consumer awareness and its sources shape the perception dynamics of food safety, suggesting that individuals process and evaluate food safety information differently under different conditions. Flynn et al. (2019) highlight the trends, challenges and global perspective on food safety at different construal levels. In more specific ways, Liu and Lee (2018) showed that consumers' perceptions of food safety in restaurants depend on visual and proximal issues such as cleanliness of the person and dress rather than technical merits in the kitchen of a restaurant. In support of these studies, the last study in this group presents a paradoxical challenge: an increase in foodborne diseases despite advancements in food safety practices (Motarjemi and Käferstein 1999).

Based on these studies and applied to the context of imported food risks, CLT suggests that how individuals process information about the risks depends on the psychological distance they perceive (Malik 2023a, 2024; Malik et al. 2023b). High-level construal, associated with greater psychological distance, could lead individuals to focus on the broader aspects of risk, such as general notions of risk or potential harm. On the other hand, low-level construal, corresponding to closer psychological distance, might prompt individuals to engage with specific details and context-related information about the risks. This theoretical underpinning leads us to the direct.

2.3 Vicarious-experiential information sources

CLT places vicarious sources of information on the high-level construal, distal location and abstract thinking, and it places experiential sources of information on the low-level construal, proximal location and concrete thinking. For instance, information sources that induce abstract minding are indirect information through a third person or the Internet, and direct information is one's own experience in doing something—seeing, purchasing, or consuming food. The indirect information is vicarious, and direct experience is first-hand information about food safety. Vicarious information, which is obtained through indirect means like media or hearsay, tends to be psychologically distant. Therefore, individuals may process this information at a higher construal level, concentrating on overarching risk perceptions without delving into specifics. Experiential information, acquired through personal encounters or direct experiences, tends to be psychologically closer. Hence, people might process such information at a lower construal level, focusing on nuanced risk details.

Based on the literature review in Appendix 1, although an imported food item might be safe on technical merits, it is perceived as unsafe. In other words, the consumer commits an error of omission. On the other hand, the imported food item might be unsafe on technical merits, but the consumer perceives it to be safe, committing an error of commission. Prior literature has contrasted direct versus indirect information processes and analytical versus imagery, respectively (Santeramo and Lamonaca 2021), it is inconsistent with CLT. The CLT argument suggests that the perceived risk of imported food is influenced by the construal level of vicarious versus experiential information (Santeramo and Lamonaca 2021). According to CLT, when individuals receive vicarious information about the risks of imported food, they might engage in high-level construal, resulting in a general perception of risk associated with the product. This could be due to the psychological distance created by the indirect source of information. On the other hand, when individuals encounter experiential information about the risks, such as personal experiences or direct sensory exposure, they might adopt a low-level construal, paying attention to specific aspects of the risks.

> *Hypothesis: Vicarious information increases the level of perceived risk of the consumer about imported food safety*

3 Methods

We used a survey instrument to garner South Korean consumers' responses to the food safety risk related to imported products from China, which is a country of origin in the empirical sense (Kuff et al. 2023). Data were gathered through multiple sources to increase the sample size. These sources include online, offline, emails, and groups. We received 500 responses out of 1,000 distributions in the first two years of the study. Prior studies have used similar methods and samples on food safety within China (Li et al. 2018). About 1/3 of the respondents had experienced living, buying and consuming Chinese-origin food. It is a non-random sampling method because we targeted relevant respondents, snowball processes, and mixed types of respondents (Lavrakas 2008). We used a series of questions in the survey method at this stage to accommodate sufficient information for the data analysis.

Research design comprises the food safety risk on one side of the equation and the construal level on the other side of the equation. For the food safety risk side, we used 16 items in the survey, comprising input factors, actors, locations, timing, and processes for a potentially integrated construct of food safety risk. These items elicited the consumer's attitude to Chinese imported food on the Likert scale (1-disagree; 5-agree). On the independent side of the equation, we provide four options to choose from the listed items in the instrument: personal experience (Spiteri Cornish 2020), relative/friend's experience, television, and internet/digital media. These sources of information were elicited in responses to the statement in the instrument: 3 Source of information. '*What is the main channel you use for obtaining food-related information*? After coding them on the distance scale (experience = proximal, and others distal), the responses were integrated into a single construct. These codes are elaborated in the following variables.

3.1 Variables

3.1.1 Dependent variable

The dependent variable is a factor of 16 items in the instrument used to assess the respondent's attitude to the imported food products from China. The respondents rated each question based on high food safety risk (5) and low food safety risk (1) on the scale. According to Cronbach Alpha, the average interitem covariance is 0.4169588, the number of items in the scale is 16, and the scale reliability coefficient is 0.9655. Within three groups (unintended components, antibodies, and logistics), the Cronbach Alpha values were 0.8731, 0.9142, and 0.9472, respectively. To normalise and standardise the integrated variable, we took the log of the factored variable and formatted the variable on a 10-scale. The table shows the components of the dependent variable.

3.1.2 Independent variables

The independent variable is the ranking of information sources, which varies from personal experience (proximal) to internet sources. These sources were assigned codes based on the respondent's selection. Personal experience was considered proximal and coded as 1, relative/friend's source was coded as 2, television was coded as 3, and internet/digital media was coded as 4. Personal experience is a reliable measure of proximity and low-level construal because it reinforces buying behaviour of the positive experience, while the regret from the negative experience constrains buyers in the future (Spiteri Cornish 2020). The variable was normalised using a logarithmic transformation and standardised on a 10-point scale to align with the dependent variable's 10-point scale. Table 1 introduces the parts and whole of the variable.

3.1.3 Control variables

Table 1 shows control variables in three groups: interaction with the Chinese environment through visits or relatives' presence there, purchasing frequency in a year, and the motivation for buying Chinese imported food.

4 Results

Graphical charts show two-way correlations, and tables show statistical results based on mixed methods. Figure 1 depicts a two-way linear correlation between information construal and perceived food safety risk. The correlation shows an upward slope, suggesting that an increase in the construal level associated with the information source on the X-axis increases the food safety risk (Chalak and Abiad 2012; Hilverda et al. 2017). Thus, vicarious information/learning induces food safety risk, and proximal information/learning mitigates food safety risk.

Figure 2 tests whether the two-way correlation is nonlinear. Except for the quadratic function, the variables are the same as in the previous model. The curvature of the two-way correlation confirms nonlinearity. Moreover, the correlation becomes negative after reaching an inflexion point at eight on the 10-scale. One reason is a possible third factor, and the other is the possible qualitative effects of the construal level of information scale on the X-axis.

Figure 3 assesses whether food safety preference (importance) correlates with the risk. In this linear correlation, the importance of food safety shows a positive correlation with the food safety risk. As safety importance to the respondent increases on the X-axis, the food safety risk increases, suggesting that the information-seeking behaviour increases for high preference consumers.

Table 1 Survey questions and responses

Qs	Mean	Std. Dev	Statement
q 1	3.75	.85	Metal
q 2	3.83	.9	Awareness
q 3	3.82	.82	Antibiotics
q 4	3.87	.8	Storage
q 5	3.85	.81	Regulation
q 6	3.95	.78	Traceability
q 7	3.89	.82	Water pollution
q 8	4.04	.76	Circulation
q 9	3.84	.79	Impurities
q 10	3.85	.84	Standards
q 11	3.93	.78	Origin tracking
q 12	3.98	.78	Government supervision
q 13	4.03	.79	Local variations
q 14	3.98	.76	Shoddy products
q 15	3.92	.82	Livestock deterioration
q 16	3.85	.83	Aquatic product quality decline
Information sources (CLT)			
Personal experience			10%
Friends & relatives			13%
Social media-TV			57%
Internet			17%
Other/none			3%
Controls			
Interaction			
Chinese national relatives			8%
Lived in China for over 6 months			16%
Visited China in 6 months			31%
Purchasing frequency (year)			
> 10 times			24%
6 to10 times			10%
1 to 5 times			46%
Never			20%
Reasons for Buying			
Cost-effectiveness			8%
Insufficient domestic supply			13%
Varieties			17%

Scale = 1 (low) to 5 (high)

Adopted from a previous study conducted in 2016 (Malik & Choi 2021)

Figure 4 tests the nonlinearity of the correlation between food safety importance and risk of imported food products. As expected, the importance of food safety importance has a nonlinear correlation with the food safety risk perception. The food safety risk declines before the food importance reaches 4 on the 10 scale. As the food safety importance reaches higher than four on the 10 scale, the food safety risk begins to increase. This curvature is opposite to the nonlinear curvature of the information construal, raising the question of interaction effects.

Figure 5 tests the interaction with nonlinear graphs of both predictors of risk: information source and safety importance. The two opposite curves interact at two places, making the interaction effects visible. One intersection occurs at 4 on a 10 scale, and the other interaction occurs at eight on a 10 scale.

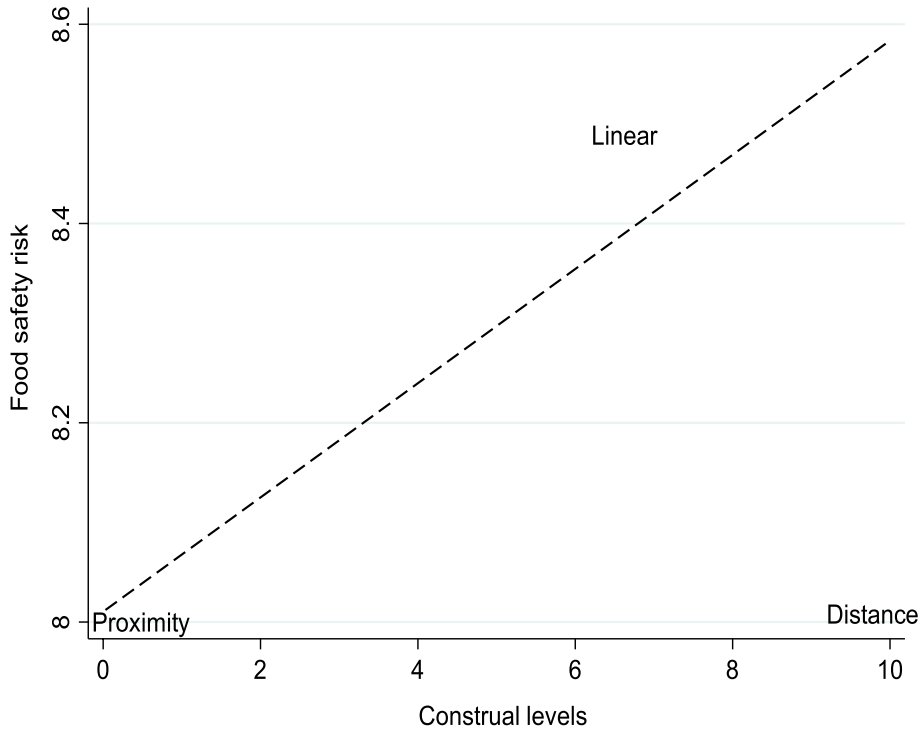

Fig. 1 Two-way linear correlation between information construal and food risk

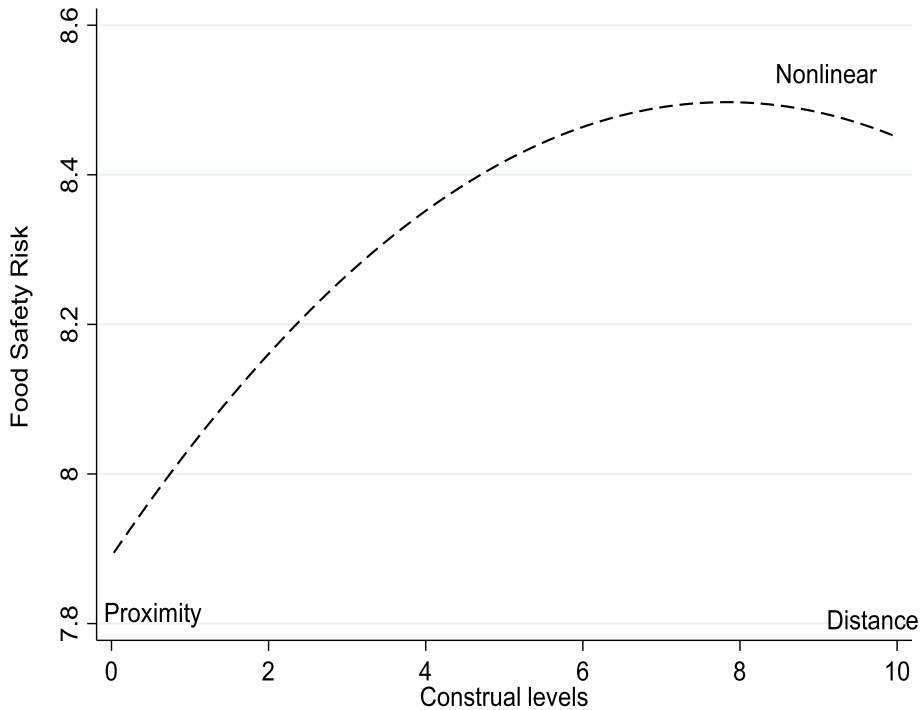

Fig. 2 Two-way nonlinear correlation between information construal and food risk

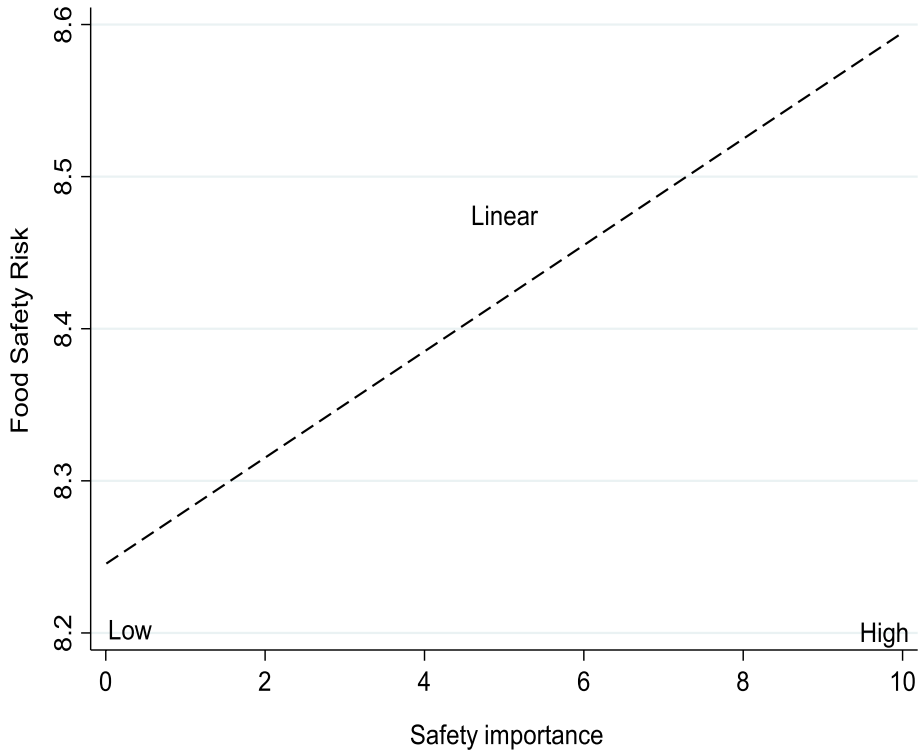

Fig. 3 Linear correlation between food safety importance and risk

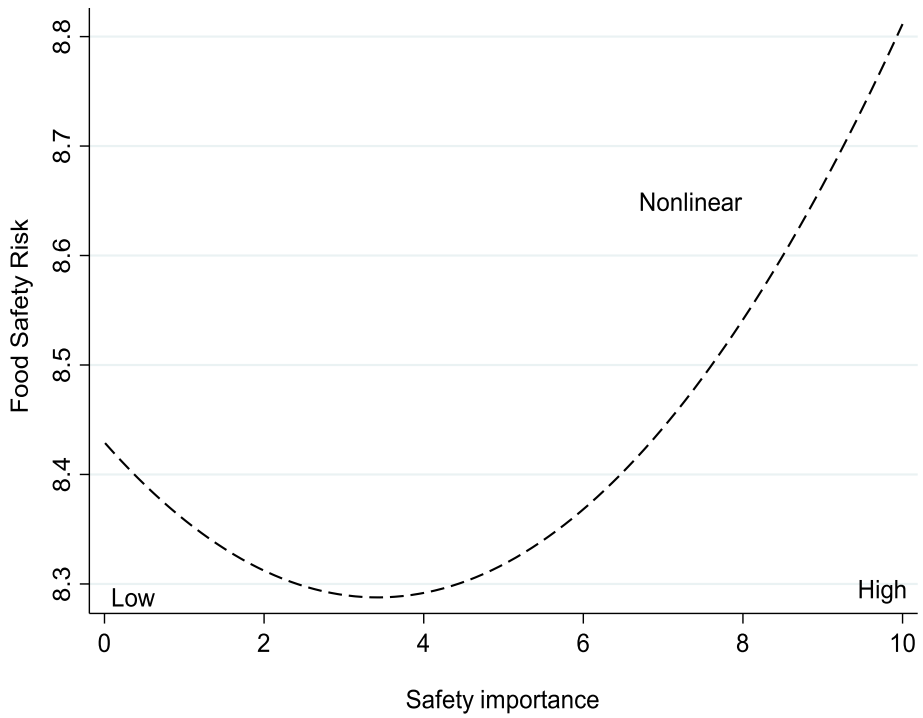

Fig. 4 Nonlinear correlation between food safety importance and risk

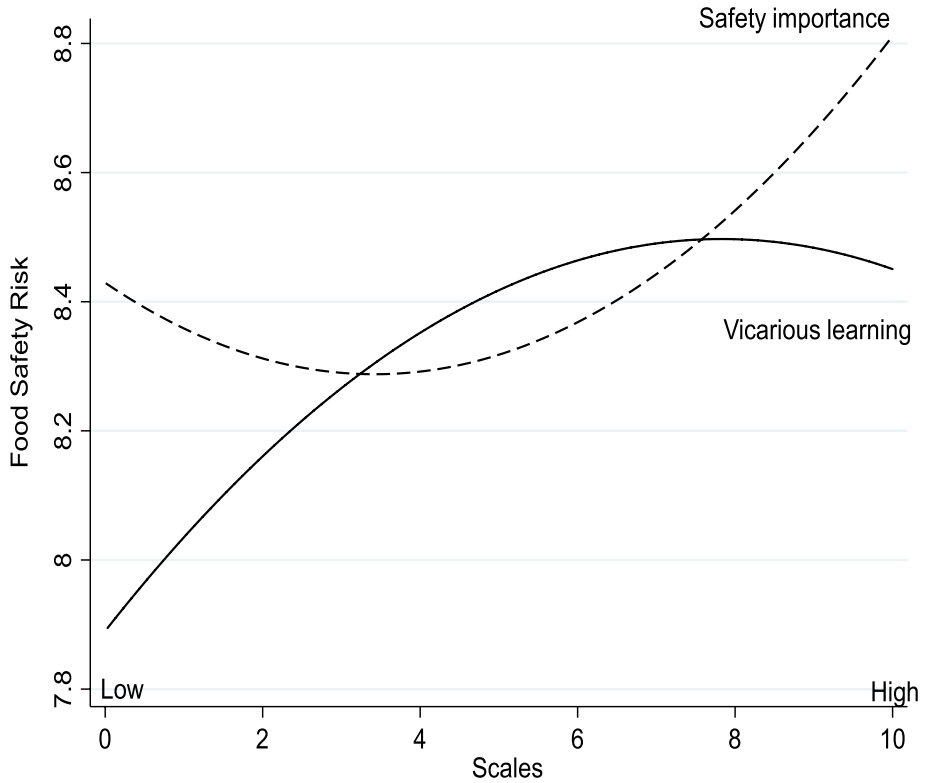

Fig. 5 Nonlinear interaction between safety importance and vicarious learning

4.1 Statistical results

Table 1 shows the contents of survey questions and responses. The upper section of the table shows 16 components of the dependent variable for the perceived level of imported food safety risk. For the shortage of space, we used main concepts instead of the full statement of each question. The next section in the table shows the construal levels of information sources. The remaining parts of the table reveal control variables.

Table 2 shows summary statistics on the average respondents perceive a relatively high level of risk associated with food safety, giving it a mean rating of 8.41 out of 10. This suggests a considerable concern within the surveyed population. However, these perceptions have notable variability, as indicated by a standard deviation of 1.56. This implies that while some respondents have a relatively low perception of risk (as low as 0.05), others have an extremely high perception (as high as 10). Regarding the information sources on the construal level, respondents tend to rely on vicarious sources, with an average rating of 7.05 out of 10. The spread of responses is even wider for this variable, with a standard deviation of 2.78, indicating

Table 2 Summary statistics

Variable	Mean	Std. Dev	Min	Max
Food safety risk	8.41	1.56	.05	10
Vicarious information	7.05	2.78	.03	10
Safety Importance	4.42	3.54	.03	10
Purchasing frequency	5.5	3.42	.04	10
Factor: importance/purchasing/	3.2	1.82	.07	10
Respondent's age	6.57	2.03	.049	10
Education level	1.96	.46	1	3
Students vs professionals	.04	.2	0	1
Family income	5.71	2.36	.01	10
Male vs Female	.39	.49	0	1
Problem: Korean vs Chinese side	.47	.5	0	1
Living reason	.16	.37	0	1
Cost reason	.08	.27	0	1
Variety reason	.47	.5	0	1
Insufficient supply reason	.13	.34	0	1

$N = 500$

Questions statements (Appendices)

Variables normalised (log) and standardised (10 scale)

Table 3 Inter-variable correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Safety risk	1												
Information construal	0.10*	1											
Safety Importance	-0.36*	-0.11*	1										
Purchasing frequency	-0.10*	-0.15*	0.28*	1									
Age	-0.08	0.16*	-0.15*	-0.26*	1								
Education level	0.04	0.03	-0.04	-0.08	0.03	1							
Student-Professional	0.05	-0.11*	0.08	0.10*	-0.41*	-0.13*	1						
Family income	-0.03	-0.01	-0.04	-0.11*	0.19*	0.11*	-0.15*	1					
Male–Female	0.04	0.02	-0.02	0.03	-0.05	0.08	0.03	0.12*	1				
Korean vs China problem	0.01	-0.06	0.02	0.07	-0.02	0.00	0.05	0.02	0.00	1			
Lived in China	-0.04	-0.26*	0.19*	0.37*	-0.37*	-0.07	0.14*	-0.06	0.00	0.13*	1		
Cost reason	-0.09*	0.00	0.11*	0.07	-0.03	-0.04	-0.03	0.06	0.02	0.01	-0.13*	1	
Food variety reason	-0.07	0.13*	-0.05	-0.04	0.27*	0.02	-0.08	0.02	0.04	-0.11*	-0.41*	-0.27*	1
Supply reasons	0.14*	0.09*	-0.06	0.04	-0.01	0.06	0.00	-0.02	-0.08	0.05	-0.17*	-0.11*	-0.36*

$N = 500$

* $p < 0.05$

that while some heavily rely on vicarious information (ratings as low as 0.03), others do so to a lesser extent (ratings as high as 10). This suggests a diverse range of information-seeking behaviours among the respondents.

Table 3 shows inter-variable correlations, which are less than 50%, meeting the multicollinearity assumption. We further confirmed the multicollinearity issue by obtaining the variance inflation factor (VIF), which was lower than 5, and the acceptable conventional threshold is VIF 10.

Table 4 shows results from the mixed-effect method of linear functions. The coefficient of distal information is 0.04 ($p < 0.01$), suggesting that distal information increases the food safety risk perception. As the consumer moves from proximal to distal sources of information, there is an associated increase in the log of the food safety risk. In the random effects, the var (residual) represents the estimated variance of the residual errors in the model. In this case, it's approximately -0.234 ($p < 0.01$).

Table 5 shows results from mixed-effect method nonlinear functions. As expected and demonstrated in the graphical depiction section, the distance of the information source has a nonlinear correlation with the perception of imported food safety risk. The linear function is positive, and the quadratic function is negative, albeit insignificant ($p > 0.1$). The nonlinearity raises the chances of interactions with the induced reasons for purchasing. Appendix 2 below demonstrates four reasons and their effects on the frequency of purchasing among respondents, which alludes to additional analysis of interactions.

5 Discussion

The South Korean consumer faces a food security-safety dilemma concerning imported agricultural and aquatic products. On the one hand, imports alleviate the food security predicament within the consumer market by bridging the gap between excessive demand and limited domestic supply. On the other hand, concerns about food safety heighten consumer apprehension (Malik and Choi 2021), impeding imports and reinforcing the issue of food security. This article explored the sources of the consumer's perceptions regarding the food safety risks of imported products from China. Building upon the notion that the spectrum of consumer information sources varies in proximity and distance, along with their effects on safety perception, the CLT framework informs this study through the assumption of psychic distance literature (Trope and Liberman 2012). Based on a survey developed from the interview-based analysis, we developed a questionnaire with multiple statements related to food safety issues, with a special reference to imported food products from China.

To answer whether information source proximity-distance affects the consumer's perception of food safety imported from China, we tested distal information (vicarious) versus proximal (experiential) information of the consumer concerning food safety perception of the imported products. Our findings show that distal sources of information, such as the Internet, positively correlate with the consumer's perception of food safety risk. In contrast, the direct experience of the consumer (proximity) with the purchasing and using the imported

Table 4 Direct effect in consecutive models

Variables	(1)	(2)	(3)	(4)	(5)
Constant	10.779***	10.712***	10.803***	9.052***	8.751***
	(.812)	(.812)	(.826)	(.478)	(.485)
Male–Female	.086	.124	.128	.085	.077
	(.13)	(.13)	(.13)	(.074)	(.074)
Safety Importance	-.514***	-.497***	-.491***	-.061*	-.06*
	(.052)	(.052)	(.053)	(.033)	(.033)
Age	-.023**	-.021**	-.021**	-.005	-.005
	(.009)	(.009)	(.009)	(.005)	(.005)
Education	.095	.07	.065	-.033	-.033
	(.138)	(.138)	(.138)	(.079)	(.078)
Student	.229	.219	.213	.038	.067
	(.343)	(.34)	(.34)	(.195)	(.193)
Family income	-.073	-.065	-.07	-.044	-.035
	(.12)	(.119)	(.12)	(.068)	(.068)
Korea vs China problem	.06	.035	.037	.053	.059
	(.128)	(.127)	(.127)	(.072)	(.072)
Lived in China	-.06	-.113	-.046	.215	.246*
	(.189)	(.233)	(.259)	(.148)	(.148)
Cost		-.299	-.254	.079	.059
		(.278)	(.287)	(.164)	(.163)
Variety		-.17	-.132	.059	.033
		(.18)	(.191)	(.109)	(.109)
Insufficient supply		.383*	.427*	-.033	-.073
		(.232)	(.243)	(.14)	(.139)
Purchasing frequency			-.013	-.015	-.013
			(.022)	(.013)	(.012)
Agricultural risk				.27***	.26***
				(.073)	(.073)
Antibody risk				.517***	.525***
				(.081)	(.08)
Logistic risk				.668***	.666***
				(.072)	(.071)
Information construal					.038***
					(.013)
Var (Residual)	.347***	.338***	.337***	-.226***	-.234***
	(.031)	(.031)	(.031)	(.031)	(.031)

$N = 500$

Dependent variable = Imported Food safety risk; Standard errors are in parentheses

*** $p < .01$,

** $p < .05$,

* $p < .1$

Table 5 Nonlinear test of information construal

Variables	(1)	(2)	(3)	(4)
Constant	9.12***	8.686***	8.841***	8.585***
	(.601)	(.628)	(.618)	(.634)
Controls	*Entered*	*Entered*	*Entered*	*Entered*
	(.01)	(.01)	(.01)	(.01)
Information		.058**		.141*
		(.025)		(.082)
Information squared			.004*	-.008
			(.002)	(.008)
Var (Residual)	.411***	.406***	.408***	.405***
	(.031)	(.031)	(.031)	(.031)

$N = 500$

Dependent variable = Imported Food safety risk; Standard errors are in parentheses

*** $p < .01$,

** $p < .05$,

* $p < .1$

food products negatively correlates with the consumer's perception of the food safety issues. This finding is consistent with one section of the empirical studies that low-level construal and proximity with the food with a positive attitude towards food safety and high purchase frequency. Hence, our analysis supports some studies and counters others in analysing food safety measures (Motarjemi & Käferstein 1999).

In support of our findings, a study on American consumers shows that consumers purchase because of proximity with farmers, regardless of any risks associated with organic products (Yu et al. 2017). Likewise, proximity explains why clean fingernails, dress and gloves are more important to generate the perception of clean food rather than the actual contents and processes of the food chain or the kitchen preparation (Liu and Lee 2018). In the same way, visually appealing (aesthetic) food, which translates into low-level construal and proximity, is considered safe; unattractive food is considered riskier by consumers (Castagna et al. 2021). Lastly, with the same principle of distance versus proximity, unprocessed food (proximal) is perceived as safe and processed food (distal) is perceived as unsafe even though the reality is the opposite (Chang et al. 2019). These direct and analogous studies suggest that proximal information sources reduce food safety risk perceptions.

However, not all empirical literature is supportive of the proximity-distance and food safety perception argument. In one study concrete thinking increases the perceived risk of food safety (Lermer et al. 2016), implying that thinking distally about the food decreases food safety risk perception. Analogous to this view, another study showed that production, processing, transport and storage stages cause diseases unless hygienic rules are applied, suggesting that those distal stages make consumers and policymakers ignore the safety concerns (de Jonge et al. 2008; Malik 2023b; Malik et al. 2023a). These studies are consistent with the idea that abstract thinking

induces high values and concrete thinking induces lower values (Dhar and Kim 2007). For instance, psychological distance increases nonconscious trait thinking and trait inference compared to proximity (Rim et al. 2009). Nonconscious thinking reflects on the distance and high valuation in text analysis (Humphreys et al. 2021), and intangible (distal) versus tangible (proximal) attributes moderate the evaluation of the consumer. Likewise, the information distance proximity matters in consumer perception (Cobbs et al. 2020). Thus, empirical studies side with both sides of the argument on the proximity-distance proposition.

Despite these differences in empirical analysis, the core idea of the theory and our findings is clearer: CLT matters in explaining why food safety risk perception varies on the distal space or time in the process of information gathered by consumers because of their mental construction of the product (Trope and Liberman 2010), and this mental construction influences the mood, which leads to the variegated levels of perception and preferences for the food consumption (Gardner et al. 2014). CLT posits that distal sources of information make consumers think abstractly and focus on the forest rather than the tree; in contrast, proximal sources of information in the process make consumers think concretely and focus on the tree rather than the forest (Trope and Liberman 2010). For instance, the country of origin influences the consumer perception of food safety, depending on its perceived distance (Kuff et al. 2023). One source of the distance versus proximity is the country's image of its institutional development (de Jonge et al. 2008). The reality of the institutional development fades in the distance, and the image of the institutional distance perceived by the consumer makes the perception of food safety (Kuff et al. 2023). For instance, some studies and media outlets explain that institutional development is still shaped in China and other developing economies (Malik 2023b; Malik et al. 2023a; Yeh et al. 2010). Therefore, the experience of buying and using food products differs from the information acquired through distance-generating mediums.

The distal generating medium dominates in this era in which a significant portion of consumers now obtain information from the Internet, where social media is sometimes inundated with false, unsolicited, and sensationalised content. Such trends in the news can adversely affect food safety perception (Chalak and Abiad 2012; Hilverda et al. 2017). This is particularly exacerbated by the growing influence of social media influencers who generate copious amounts of information without proper accountability. In their pursuit of more "clicks" and "likes," these influencers often amplify such stories to capture the attention of consumers. Social media platforms operate outside of traditional institutional checks and cater to both direct and indirect audiences on a massive scale. In particular, scandalous industrial cases, such as Melamine in baby milk products in China, get magnified in the social media discourses (Malik and Choi 2021). The impact on the perception of Korean viewers is no different from the adverse effects experienced elsewhere due to the deteriorating quality of information emanating from unregulated online sources.

In the context of food safety, when individuals obtain information about food safety risks from distal sources like the Internet (Chalak and Abiad 2012; Hilverda et al. 2017), the information is often presented more abstractly compared to first-hand experience. These social media sources may highlight potential risks, provide statistics, or share stories with or without the immediate context of direct experience. This abstract presentation can make food safety risks appear more significant and alarming because they are removed from the individual's immediate, everyday life (Chalak and Abiad 2012; Hilverda et al. 2017). Conversely, when people gain information from proximal sources, such as their own direct experiences with food safety or information from trusted individuals or local authorities, the information is typically more concrete and grounded in real-life situations. This direct experience can reduce the perception of risk because it is directly linked to the individual's everyday life and environment. It provides a tangible reference point that may make food safety concerns seem less distant or abstract.

Several policy-oriented items can be useful for practice in addressing the South Korean consumer's food security dilemma and general implications that necessitate a multifaceted approach rooted in the study's findings. Firstly, policy should recognise that proximal information sources, tied to direct experiences with imported food products, negatively correlate with consumer perceptions of food safety risks. The policy should capitalise on this by promoting initiatives that foster trust in proximal sources and encourage direct consumer experiences with safe imported products. Secondly, policymakers need to acknowledge the correlation between distal information sources, notably the Internet, and consumer perceptions of food safety risks (Chalak and Abiad 2012; Hilverda et al. 2017). Combat this by implementing measures to ensure the accuracy and credibility of online information (Chalak and Abiad 2012; Hilverda et al. 2017), particularly regarding food safety. Thirdly, it can be useful to consider the influence of psychic distance, as described by the CLT framework, in shaping consumer perceptions of imported food product safety. Tailoring communication efforts to bridge the psychological distance and make food safety concerns more tangible is an option. Lastly, being mindful of the impact of a country's image on consumer perceptions directs to the concerns related to the institutional

development and regulatory systems of exporting countries, including trust in governing bodies (de Jonge et al. 2008; Malik 2023b; Malik et al. 2023a), especially those with perceived food safety challenges (Zhou et al. 2018). In addition, given the prevalence of misinformation on social media and online platforms, countries should invest in policies and initiatives that promote accurate and reliable information dissemination, urging social media platforms to implement measures to curb the spread of false or sensationalised content related to food safety (Chalak and Abiad 2012; Hilverda et al. 2017).

The article expands the literature in three ways. Firstly, it offers an extension on CLT, showing that vicarious learning (internet information flow) increases distance high-level construal and abstract thinking. It complements the idea that consumers evaluate the food at different levels of construal, varying from the ingredients to the composite whole. These distal sources of information increase the potential excessive worry about food safety through online channels (Chalak and Abiad 2012; Hilverda et al. 2017), which alludes to vicarious sources of information and learning. The vicarious learning about food safety enhances the food safety risk perceived by the consumer at a low construal level. Secondly, the correlation is curvilinear, suggesting that the distance proximity of sources might be binary rather than continuums. Furthermore, the continuum of distal versus proximity of the information source depends on the consumer's safety importance, which can reflect on how and how much information the consumer seeks to reduce food safety risk. Thirdly, the methodology developed in this study can be replicated elsewhere to expand this study and strengthen the theoretical underpinning.

Policymakers should embark on a multifaceted approach to address the multifaceted challenges in shaping consumer perceptions of food safety. Trust-building initiatives, targeted at proximal sources like local authorities and trusted individuals, must be promoted through awareness campaigns and educational programs. Simultaneously, online information verification measures are crucial, involving regulations, fact-checking, and collaboration with online platforms to ensure the accuracy of online food safety information. Tailored communication efforts, taking into account the concept of psychic distance, can bridge the gap between consumers and food safety concerns. Furthermore, policymakers should consider the impact of a country's image on consumer perceptions and work towards enhancing regulatory systems, especially for countries facing perceived food safety challenges. Encouraging replication of research methodologies, investing in consumer education, collaborating with social media platforms (Hilverda et al. 2017; Meraz 2009; Mou and Lin 2014), developing risk communication strategies, regulating influencers, and fostering interdisciplinary collaboration are essential elements of a holistic policy framework aimed at promoting accurate and responsible information dissemination in the realm of food safety.

The study has limitations. First, the study collected data from a sample of 500 respondents, which, while significant, may not be representative of the entire population. Second, the use of a non-random sampling method, such as convenience sampling or purposive sampling, introduces the potential for selection bias. Moreover, self-reported responses are susceptible to response bias, as participants may provide socially desirable or inaccurate information because of the conspicuous consumption of foreign brands as well as the suspicion of the governing bodies (Anderson et al. 2011; Fukuda 2015). Third, the demographic attributes of the respondents are limited to age, gender, education, and family income, but other demographic variables are not controlled here. Fourth, the research question focused specifically on food imports from China and did not consider food safety apprehension related to imports from other countries. Fifth, the limitation of cross-sectional design allows for associations to be observed but does not establish causality. For instance, one of the reviewer pointed out that they may exist 'endogeneity' issues in the data. Sixth, the limited data and cross-sectional nature of the study design can cause the issue of endogeneity. This research primarily focuses on a specific context, and its findings may not apply to other regions or countries with different cultures, economic, and regulatory contexts. Last, the data lacks an exploration of interaction variables, which could provide a more nuanced understanding of the relationships among the studied variables.

Appendix 1

Table 6 Literature review

Authors	Key Findings
(Henderson et al. 2006)	Distant time perspectives & negotiation outcome
(Fiedler 2007)	Construal level affects consumer decision-making
(Bilgin and Brenner 2008)	Temporal distance moderates subjective probabilities
(De Dreu et al. 2009)	Distance-proximity construal affects negotiation solutions
(Giacomantonio et al. 2010)	Psychological distance enhances integrative bargaining
(Aerts et al. 2017)	Language/valence influence subsequent risk perceptions

Authors	Key Findings
(Gamliel et al. 2017)	Construal level influences unethical behaviour
(Ding and Keh 2017)	Construal affects service evaluation of intangible-tangible
(Cobbs et al. 2020)	Construal level effects informativeness and timing
(Humphreys et al. 2021)	Construal in text analysis influence consumer's online search
(Hayes and Mowchan 2022)	Geographic distance's effect on decisions in accounting
(Duan et al. 2022)	Construal influences entrepreneurial opportunity evaluation
(Cloarec et al. 2022)	Happiness with the internet increases private information sharing
(Motarjemi and Käferstein 1999)	Technical merits of hazard partially predicts food safety
(Antle 2001)	Food safety regulation increase benefits and costs
(Knight et al. 2005)	GMO causes no negative perception of non-GM food imports
(Dhar and Kim 2007)	Concrete thinking affects the level of details in choice
(Williams and Bargh 2008)	Spatial distance cues influences evaluation
(Fujita 2008)	Concrete thinking influences individuals' self-control
(Rim et al. 2009)	Psychological distance increases nonconscious trait thinking
(Yeh et al. 2010)	Consumer's country image impacts preferences and choices
(Anderson et al. 2011)	Older adults misconceive food safety and handling/storage
(Ergönül 2013)	Consumer awareness/perception are crucial in food safety
(Onay et al. 2013)	Temporal distance creates imprecise probabilities and outcomes
(Fukuda 2015)	Global food safety supply chain demands global standards
(Lermer et al. 2016)	Thinking concretely increases the perceived likelihood of risks
(Yu et al. 2017)	Proximity with farmers increases purchasing of their food
(Liu and Lee 2018)	Clean fingernails, dress and gloves induce perception of food
(Flynn et al. 2019)	Distance of chemical/bacterial hazard are overlooked in food
(Chang et al. 2019)	Unprocessed food perceived with positive attitude/purchases
(Gallo et al. 2020)	Hazard occurs at production/processing/transport and storage
(Castagna et al. 2021)	Visually appealing food is perceived safe; unattractive unsafe
(Mert et al. 2022)	Pesticide residues found in foods imported to the UK
(Li et al. 2022)	Additives/prohibited veterinary drugs/non-edible/substance, & low-cost substitutes fraud in China
(Loebnitz et al. 2022)	High distance ads increase consumers' purchasing
(Li et al. 2018)	Media source and Food safety risk perception in China
(Spiteri Cornish 2020)	Regretting experience reduces buying and positive affect increases it
(Kalro et al. 2013)	Direct information is for analytical decision; indirect is for imagery decisions
(Ortega-Egea and García-de-Frutos 2021)	Country of origin influences food safety risk perception

Appendix 2

Table 7 Reasons for purchasing frequency

Variables	(1)	(2)	(3)	(4)	(5)
Constant	12.545***	10.128***	9.913***	9.109***	8.318***
	(2.052)	(2.017)	(2.011)	(1.98)	(1.887)
Food safety risk	-.065	-.062	-.049	-.006	-.049
	(.098)	(.095)	(.094)	(.093)	(.089)
Male–Female	.264	.271	.257	.164	.291
	(.291)	(.281)	(.28)	(.275)	(.262)
Safety Importance	.22***	.187***	.179***	.169***	.15***
	(.043)	(.042)	(.042)	(.041)	(.039)
Age	-.088***	-.05**	-.046**	-.056***	-.054***
	(.019)	(.02)	(.02)	(.019)	(.018)
Education level	-.417	-.32	-.285	-.258	-.346
	(.308)	(.298)	(.297)	(.291)	(.277)
Student-worker	-.597	-.438	-.363	-.427	-.47
	(.766)	(.739)	(.736)	(.722)	(.687)
Family income	-.409	-.413	-.448*	-.44*	-.435*
	(.268)	(.258)	(.258)	(.253)	(.241)
Korea vs China side	.431	.217	.197	.26	.139
	(.282)	(.275)	(.274)	(.269)	(.256)
Distal info	-.106**	-.044	-.043	-.048	-.075
	(.052)	(.051)	(.051)	(.05)	(.047)
Lived in China		2.555***	2.709***	3.507***	5.009***
		(.414)	(.419)	(.448)	(.473)
Cost			1.094**	1.98***	3.469***
			(.519)	(.546)	(.558)
Variety				1.421***	2.9***
				(.317)	(.364)
Insufficient supply					3.427***
					(.47)
Var (Residual)	1.148***	1.112***	1.108***	1.088***	1.038***
	(.031)	(.031)	(.031)	(.031)	(.031)

$N = 500$

Dependent variable = Purchasing frequency; Standard errors are in parentheses

*** $p < .01$,

** $p < .05$,

* $p < .1$

Supplementary Information

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Supplementary Material 1.

Authors' contributions

The author read and approved the final manuscript.

Declarations

Competing interests

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