Journal of Water & Health

IWA PUBLISHING

Journal of Water and Health Vol 21 No 6, 763 doi: 10.2166/wh.2023.323

Do health concerns stemming from personality trait influence the choice of drinking water at home? An analysis of the survey results conducted in the Tokyo area under the COVID-19 pandemic

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ABSTRACT

Many previous studies have already pointed out that health concerns influence people's choice of drinking water. The health concerns discussed in the preceding studies are those that are associated with the choice of a particular type of water. On the other hand, people also experience health concerns in their daily lives, unrelated to the choice of drinking water. These two need to be discussed separately, but preceding studies have failed to make a distinction. In this study, we refer to the former as 'health concerns attributable to water characteristics' and the latter as 'health concerns stemming from personality traits.' The purpose of this study is to explore the relationship, if any, between people's health concerns stemming from personality traits and their choice of drinking water. We use three types of health concerns that are stemming from personality traits (e.g. health maintenance, pesticide residues in food, and COVID-19 infection) to elucidate their influences on the choice of drinking water. Based on the results of the analysis, this study reveals that the influence of health concerns stemming from personality traits on the choice of drinking water differs depending on its typology.

Key words: choice of drinking water, COVID-19 infection, health concerns, health maintenance, pesticide residues in food

HIGHLIGHTS

- Concern about health maintenance urges the choice of untreated tap water.
- Concern about pesticide residues in food urges the choice of purified tap water.
- Concern about COVID-19 infection has no clear influences on the choice of drinking water.

INTRODUCTION

The recent COVID-19 pandemic has provided the Japanese people with an opportunity to create a new lifestyle. For example, people have adopted such new behaviors as refraining from going out, avoiding the three Cs (closed space, crowded places, and close-contact settings), disinfection and sanitization of personal belongings, eating in silence even in a group, and taking garbage home with them. As a result, it may be said that a lifestyle that incorporates these new behaviors is now becoming a norm among many people in Japan. The transformation of lifestyles under COVID-19 has led to the facilitation of remote work environments and the increased use of online shopping. Due to these changes, people today are steadily spending more time at home. This is because it is now dramatically easier than before to stay home and combine work and consumption.

Under these circumstances, it is likely that the opportunity for people in Japan to drink water at home has also increased. Under COVID-19, how do people drink water at home? Answering this question, i.e., identifying the factors affecting people's choice of drinking water at home, is of great importance in grasping the basics of contemporary consumer life. COVID-19 has further increased the importance of the issue of the choice of drinking water at home. Even when COVID-19 is over in the future, the importance of this issue will not diminish.

Preceding studies have shown that a variety of factors influence people's choice of drinking water. These factors can be divided into two: those related to water itself (water characteristics) and those that are not (mediating factors). It can be

said that factors related to water characteristics include sensory evaluation, health concerns, mineral and natural water, soft drinks, and the hardness of water. (Doria 2006, 2010). On the other hand, mediating factors include the influence of convenience factors, price, lifestyle, environmental concerns, social justice (activism), trust in government, business and media, demographics, and past experiences (Doria 2010; Brei & Böhm 2013; Van der Linden 2015). The main factors related to water characteristics are sensory evaluation and health concerns (MaGuire 1995; Anadu & Harding 2000; Doria 2006; Sayler *et al.* 2011; Espinosa-Garcia *et al.* 2015; Crampton & Ragusa 2016; Leveque & Burns 2017; Xu & Lin 2018). It has been noted that there is a cognitive link between these two main factors, i.e., negative sensory evaluations of a given drinking water also evoke health concerns (MaGuire 1995; Puget *et al.* 2010; Sayler *et al.* 2011; Crampton & Ragusa 2016). It has also been pointed out that health concerns evoke anxiety about drinking untreated tap water and prompt the choice of bottled water (Anadu & Harding 2000; Dupont *et al.* 2010; Hu *et al.* 2011). In addition, some studies have focused on cleanliness preference as a new factor (Wilk 2006; Sharma & Bhaduri 2013; Suzuki 2022). While cleanliness preference has traditionally been treated as an undifferentiated part of health concerns, its uniqueness as an independent factor has recently been pointed out.

Many studies have pointed to the influence of health concerns on the choice of drinking water. They commonly reveal the influence of health concerns about particular drinking water (often untreated tap water) on people's choice of drinking water. In this paper, we refer to this influence as 'health concerns attributable to water characteristics.' An abundance of precedent studies indicates that health concerns attributable to water characteristics are a factor in the choice of drinking water. On the other hand, people experience health concerns in their daily lives in general, not limited to a specific situation of choosing drinking water. This means that people may or may not feel health concerns as a personality trait, although the degree of concern may vary from person to person. We will call it 'health concerns stemming from personality traits.' To date, few studies have verified that health concerns stemming from personality traits is a factor in the choice of drinking water. This gap needs to be filled.

The purpose of this study is to clarify the relationship between health concerns stemming from personality traits and the choice of drinking water at home. In the preceding studies, the distinction between health concerns attributable to water characteristics and health concerns stemming from personality traits has been unclear. This seems to be one of the reasons why research on the factor of health concerns stemming from personality traits in the choice of drinking water has been in short supply. Since the distinction between the two as a concept has been unclear, the intricate relationship between the two has been, naturally, left unexplained. The results of our analysis suggest that, at least, there is a complex link between the two that should be elucidated in the future. In this analysis, three types of health concerns that are stemming from personality traits are employed: concerns about health maintenance, pesticide residues in food, and COVID-19 infection. Through the analysis of the results of a questionnaire survey conducted in the Tokyo metropolitan area under COVID-19, the influences of these three health concerns on the choice of drinking water at home are examined. The findings from this study have the significance of understanding a part of the current state of people's lifestyles, which may have changed significantly due to the COVID-19 pandemic.

MATERIALS AND METHODS

Survey data used

We conducted our original questionnaire survey in the Tokyo area under COVID-19. This survey was conducted with the aim of clarifying the current state of lifestyles in metropolitan areas in Japan. As the first step of the hypothesis-testing research, the Tokyo area was selected as a sample of the domestic metropolitan area. In future surveys, we plan to expand the survey area to other metropolitan areas in Japan.

A summary of our survey is as follows. The survey period was October 7–November 18, 2021. The survey targeted individuals, male and female, aged 20–69, of Japanese nationality, residing in the Tokyo area. The Tokyo area is defined as the cities, wards, towns, and villages within a 40-km radius of the Japan Railway (JR) Shinjuku Station. We chose to define the Tokyo area on the basis of the dwellers' commuting rate to 23 wards of Tokyo. Comparing thus-defined dwellers' commuting rates for every 5 km radius, more than half of municipalities in the areas beyond a 40 km radius show a commuting rate of below 10%. For the purpose of this survey, we decided to consider the area as having a certain urbanicity as the Tokyo metropolitan area. The sampling method was a stratified two-stage random sampling method using Basic Resident Registration. After stratification at the prefectural level, the number of points was allocated proportionally on the basis of the stratified population.

Subsequently, 'districts' were selected in the first stage and 'individuals' in the second stage. To conduct the survey, a questionnaire was sent to the target subjects by mail. The number of valid responses was 1,237 for a planned sample size of 3,300. The collection rate was 37.5%. The survey was outsourced to Nippon Research Center Ltd.

Variables

The main variables used in this study are health concerns and drinking water. Three variables for health concerns and another three for drinking water are employed. Below, the health concerns variables are explained first to be followed by the drinking water variables. The software SPSS Statistics is used for statistical analysis.

As noted earlier, many preceding studies have pointed out that health concerns attributable to water characteristics is a major factor in one's choice of drinking water. However, virtually no research has examined how the health concerns stemming from personality traits influence the choice of drinking water. The present study examines the effects of three types of health concerns stemming from personality traits: concerns about health maintenance, pesticide residues in food, and COVID-19 infection. The choice of drinking water is a recurring activity in daily life. Therefore, it is important to examine the relationship between the choice of drinking water and health concerns that are frequently felt in daily life. The reason for selecting these three variables is to address the various types of health concerns that are often felt in daily life. Health maintenance is a health concern that continues vaguely in daily life, while pesticide residues in food are a source of health anxiety that is evoked every time one eats. COVID-19 infection is also a concern in daily life that one must be aware of at all times. Because of these characteristics, these three concerns are considered in this analysis to be representative of the health concerns that people frequently experience in their daily lives. By examining whether or not the various health concerns in daily life are related to the choice of drinking water, it is expected to obtain useful findings for future hypothesis-testing research. In this analysis, the three types of health concerns are used as a first step toward that end.

Concern about health maintenance, the first of the three, is a general and vague anxiety about one's health. It is used in our analysis as a variable to measure the characteristics of people who are constantly concerned about risks to their health in their daily lives.

Concern about pesticide residues in food is representative anxiety about the risk of health problems caused by oral intake of substances harmful to the human body. It is used in our analysis as a variable to measure the characteristics of people who are worried about health risks related to their diet.

Concern about the COVID-19 infection is one that, more or less, everyone feels amid the COVID-19 pandemic. However, it is assumed that the intensity of this anxiety varies from person to person. It is used in our analysis as a variable to measure the characteristics of people who are concerned about health risks from infectious diseases in general.

Table 1 shows the wording as well as the mean (M) and standard deviation (SD) values for each of the three questions on health concerns stemming from personality traits. All questions are formatted using a four-point Likert scale. The questions are intended to discriminate against those who have clearer health concerns than others. In this case, the four-point scale is more suitable than the two-point scale. This is because it is assumed that there is a certain range in how people feel about their health concerns. If you ask questions in a two-point scale, 'I feel anxious' and 'I don't feel anxious', it is highly likely that the 'I feel anxious' responses will include those who do not feel so much. In order to avoid such a result, the four-point scale is used. Each question shares a common lead, 'Please indicate how anxious you are about the following things in your day-to-day life.' The wordings of the choices are 'I feel anxious,' 'I feel a little anxious,' 'I don't feel anxious much,' and 'I don't feel anxious at all.' They are quantified on a four-point scale, with the option 'I feel anxious' scoring 4 points and the option 'I don't feel anxious at all' scoring 1 point. They are converted to binary variables in our analysis by dividing them into the 'I feel anxious' option and the other three options. A slight ceiling effect is observed for the 'health maintenance concern (HQ-1)' and 'COVID-19 infection concern (HQ-3)' questions. This may have reflected the peculiarity of the time the survey was conducted during the COVID-19 pandemic.

Table 1 | Wordings and statistics of health concerns ($N = 1,231$)

Questions	Wordings	*M*	SD
Health maintenance (HQ-1)	Concerned about losing my health	3.53	.67
Pesticide residues in food (HQ-2)	Concerned about pesticide residues in vegetables affecting my body	2.48	.88
COVID-19 infection (HQ-3)	Concerned about contracting COVID-19	3.33	.76

Table 2 shows the correlation matrix between the three health concerns questions. The correlation coefficient values are all less than .40, indicating weak correlations between all items. In light of these results, we have decided to consider each of these three items as a different type of health concern variable in our analysis.

Next, let us turn to the three variables related to how people drink water at home. In our questionnaire, we asked about three ways of drinking water. The questions asked were developed following Suzuki (2022). Table 3 shows their wordings, as well as mean (M) and standard deviation (SD) values. In addition, the correlation matrix between these three items is shown in Table 4. The values of the correlation coefficients between the three items indicate that there is a weak negative correlation between any pair of the three items. All questions were asked in a four-point Likert scale. The intent of the questions is to discriminate those who drink a particular type of drinking water frequently from others. Again, the four-point scale is appropriate. The reason for this is that, as with the health concerns question, it avoids including those who drink only a little in the 'drink' response. Each question shares a common lead, 'Please indicate how much of the following types of water you usually drink at home.' The wordings for the options are 'drink,' 'occasionally drink,' 'rarely drink,' and 'never drink'. They are quantified on a four-point scale, with the option 'drink' scoring 4 points and the option 'never drink' scoring 1 point. The 'drink' and the other three options are converted to binary variables for the analysis.

Working hypotheses

The present analysis was conducted as an exploratory study without setting a clear theoretical hypothesis. Therefore, there was no working hypothesis formed on the basis of the theoretical hypothesis, either. Nevertheless, based on the findings of the preceding studies, the following three propositions were derived. These three propositions were used as working hypotheses for this study, and their validity is tested.

Hypothesis 1 (H1): Concern about health maintenance has a significant negative correlation with untreated tap water.

Hypothesis 2 (H2): Concern about pesticide residues in food has a significant negative correlation with untreated tap water.

Hypothesis 3 (H3): Concern about the COVID-19 infection has a significant negative correlation with bottled water.

Table 2 | Correlation matrix of health concerns ($N = 1{,}231$)

	HQ-1	HQ-2	HQ-3
HQ-1	1.00	.29***	.38***
HQ-2		1.00	.31***
HQ-3			1.00

***$p < .001$.

Table 3 | Wordings and statistics of drinking water ($N = 1{,}201$)

Questions	Wordings	*M*	SD
Untreated tap water (WQ-1)	Untreated tap water	2.03	1.14
Purified tap water (WQ-2)	Tap water filtered through a water purifier	2.40	1.34
Bottled water (WQ-3)	Bottled water and other mineral water	3.06	1.05

Table 4 | Correlation matrix of drinking water ($N = 1{,}201$)

	WQ-1	WQ-2	WQ-3
WQ-1	1.00	−.22***	−.18***
WQ-2		1.00	−.12***
WQ-3			1.00

***$p < .001$.

The form of inference from which H1 above was derived is a projection from the findings of preceding studies. As noted earlier, a number of preceding studies have pointed out that health concerns about tap water discourage the choice of untreated tap water. Based on these, we infer that people who are more concerned about the maintenance of their health in their daily lives avoid drinking untreated tap water.

The form of inference from which H2 was derived is an analogy. Pesticide residues in food evoke health anxiety about ingesting food and drink orally. It is inferred that those who are more anxious about this avoid drinking untreated tap water, which is also taken orally.

On the other hand, H3 was derived by deduction. The risk of contracting COVID-19 increases as one contacts others more frequently. Of the three ways of drinking water, bottled water is the one that is most frequently relied on. Even when the product is purchased online, there is a risk of contacting others every time the product is delivered. Therefore, it is inferred that people with strong concerns about infection with COVID-19 avoid drinking bottled water.

RESULTS

A binomial logistic regression analysis was conducted with each of the three water choices as response variables. The resulting values of the partial regression coefficient (*B*), standard error (SE), odds ratio (OD), and significance level (*P*-value) are shown in Tables 5–7. The explanatory variables are three health concerns: concern about health maintenance (health maintenance dummy; ref. low anxiety group), concern about pesticide residues in food (pesticide residues dummy; ref. low anxiety group), and concern about the COVID-19 infection (COVID-19 dummy; ref. low anxiety group). The following six basic demographics were also employed in our analysis as control variables: gender (female dummy; ref. male), age (years), marital status (unmarried dummy; ref. married), with or without children (having children dummy; ref. no children), year of schooling (years), and equivalent household income (10,000 yen). The division of dummy and ref. for each dummy variable were also included as followed in Suzuki (2022). Samples containing missing data were excluded from the analysis.

Two models were set up for each response variable. Model 1 was a model in which only demographics are employed, while Model 2 was a model in which demographics and the three health concerns were entered. There was a little difference in sample size between the two models. The difference in sample sizes between the two models is due to the change in the number of samples containing missing data due to the increase in input variables. The respective sample sizes are shown in Tables 5–7. The chi-square tests were significant at the 5 or 1% level for all models (6 in total).

Table 5 shows the results of the binomial logistic regression analysis using untreated tap water as the response variable. Among the control variables, only age had a significant positive correlation at the 5% level in both models. The equivalent household income had a significant negative correlation at the 5% level in Model 1. Among the three explanatory variables, only the health maintenance variable showed a significant positive correlation at the 5% level.

Table 5 | Binomial logistic regression analysis predicting untreated tap water

	Model 1 ($N = 1{,}084$)				Model 2 ($N = 1{,}081$)			
	B	**SE**	**OD**	***P*-value**	***B***	**SE**	**OD**	***P*-value**
Female dummy	−.276	.165	.759	.095	−.251	.169	.778	.137
Age	.017*	.007	1.017	.014	.018*	.007	1.018	.010
Unmarried dummy	−.046	.269	.955	.866	−.012	.270	.988	.965
Having children dummy	−.140	.237	.869	.555	−.131	.238	.877	.581
Years of schooling	.064	.047	1.066	.174	.059	.048	1.061	.218
Equivalent household income	−.001*	.000	.999	.044	−.001	.000	.999	.051
Health maintenance dummy					.417*	.184	1.517	.024
Pesticide residues dummy					−.340	.174	.712	.051
COVID-19 dummy					.078	.177	1.081	.658
Model χ^2	15.50*				24.15**			
Nagelkerke R^2	.023				.036			

*$p < .05$, **$p < .01$.

Table 6 | Binomial logistic regression analysis predicting purified tap water

	Model 1 ($N = 1,091$)				Model 2 ($N = 1,087$)			
	B	SE	OD	*P*-value	*B*	SE	OD	*P*-value
Female dummy	.266*	.132	1.305	.044	.188	.135	1.207	.162
Age	−.008	.005	.992	.163	−.010	.006	.990	.081
Unmarried dummy	−.421	.218	.656	.053	−.409	.219	.664	.062
Having children dummy	.162	.189	1.176	.390	.153	.190	1.165	.421
Years of schooling	.072	.038	1.075	.056	.082*	.038	1.086	.031
Equivalent household income	.000	.000	1.000	.662	.000	.000	1.000	.604
Health maintenance dummy					.095	.143	1.100	.506
Pesticide residues dummy					.328*	.137	1.389	.016
COVID-19 dummy					.018	.140	1.019	.896
Model χ^2	19.92**				27.24**			
Nagelkerke R^2	.025				.034			

*$p < .05$, **$p < .01$.

Table 7 | Binomial logistic regression analysis predicting bottled water

	Model 1 ($N = 1,090$)				Model 2 ($N = 1,087$)			
	B	SE	OD	*P*-value	*B*	SE	OD	*P*-value
Female dummy	.170	.127	1.185	.181	.146	.130	1.157	.260
Age	.001	.005	1.001	.859	.001	.005	1.001	.858
Unmarried dummy	−.092	.205	.912	.655	−.097	.206	.907	.636
Having children dummy	−.331	.182	.718	.069	−.336	.182	.714	.065
Years of schooling	−.095**	.036	.910	.009	−.085*	.037	.918	.020
Equivalent household income	.000*	.000	1.000	.136	.000	.000	1.000	.111
Health maintenance dummy					−.191	.138	.826	.164
Pesticide residues dummy					.133	.132	1.143	.314
COVID-19 dummy					.253	.136	1.288	.062
Model χ^2	14.97*				20.89*			
Nagelkerke R^2	.018				.025			

*$p < .05$, **$p < .01$

Table 6 presents the results of the binomial logistic regression analysis using purified tap water as the response variable. Among the control variables, only gender had a significant positive correlation at the 5% level in Model 1. In Model 2, only the year of schooling showed a significant positive correlation at the 5% level. Among the three explanatory variables, only the pesticide residues in food obtained a significant positive correlation at the 5% level.

Table 7 shows the results of the binomial logistic regression analysis using bottled water as the response variable. Among the control variables, only the years of schooling resulted in a significant negative correlation in both models (at the 1% level in Model 1 and the 5% level in Model 2). No significant correlation was obtained for any of the three explanatory variables.

DISCUSSIONS

Verification of hypotheses

We test the validity of the three working hypotheses presented above using the results of the binomial logistic regression analyses. In the present study, none of the working hypotheses are found to be consistent with the results of the analysis. These findings suggest that the association between the choice of drinking water and the health concerns stemming from personality

traits is intricate. The three working hypotheses are set merely as a tentative starting point for conducting exploratory analyses. Therefore, we should pay attention to the result that the validity of those propositions is not supported. It is precisely this result that implies that the structure of association between the health concern and water choice can be intricate. Further research is needed to elucidate the structure of this unelucidated association.

Concern about health maintenance shows a significant positive correlation with untreated tap water. Two interpretations of these causal relations are conceivable: one is that the stronger the health maintenance anxiety, the more people choose untreated tap water, trusting the safety standards of tap water in Japan (Tokyo). The other is that the behavior of repeatedly drinking untreated tap water on a daily basis itself is a contributing factor to the rise of anxiety about maintaining their health. It should be noted, however, that the latter interpretation points to a health concern caused by water characteristics. The direction of cause and effect is reversed between these two interpretations. Results of the present analysis alone are not sufficient to determine which interpretation is more appropriate. In any event, the results suggest that there is some interaction between health concerns stemming from personality traits and health concerns attributable to water characteristics.

It is shown that there is a significant positive correlation between concern about pesticide residues in food and purified tap water. In addition, although no significant result is obtained in our analysis this time, concern about pesticide residues in food is found to have a negative correlation with untreated tap water. In light of these findings, it is inferred that people with high anxiety about pesticide residues in food lower their health concerns by taking actions to remove potentially harmful substances from what is orally ingested. For this reason, the results of our analysis suggest that it should be an effective measure to address health concerns related to dietary habits to explain the safety standards of tap water and accurately disclose and disseminate its ingredients.

In our analysis, concern about the COVID-19 infection is not significantly correlated with any of the three choices of drinking water. The results suggest that concern about the COVID-19 infection may not be a factor in people's choice of drinking water. It has to be added, though, that it would be dangerous to make such an assertion based solely on the results of this exploratory study. Also, we must refrain from extending the results of this analysis lightly to concerns about infectious disease in general. Further detailed research is required to determine whether there is an association between health concerns about infectious diseases and the choice of drinking water.

Limitations of the study

The following three points should be noted regarding the findings from our analysis, i.e., it is an exploratory study, data are obtained from a survey conducted amid the COVID-19 pandemic, and the regional characteristics of the Tokyo metropolitan area should be taken into consideration.

First, as we have repeatedly stressed, the results of the present analysis are obtained under an exploratory study. Therefore, it is necessary to formulate theoretical hypotheses based on the findings obtained in this study. In this sense, the findings obtained through this study are not solid propositions, but rather ones that should serve as clues when embarking on hypothesis-testing research in the future.

Next, this study is based on the results of a survey conducted amid the COVID-19 pandemic. It is, therefore, quite conceivable that respondents were more sensitive than usual to the questions related to health concerns, given the special circumstances in which society as a whole was becoming more aware of the danger of infectious diseases. However, it is impossible to say from the findings of this study whether such people's attitudes are temporary during the COVID-19 pandemic, or whether they are sustainable and will become a norm even after the pandemic is over. The findings of this study only reveal one aspect of the current lifestyle through the issue of the choice of drinking water at home. We must await the accumulation of further studies.

Furthermore, the data used in this analysis were collected in the Tokyo metropolitan area. Future research should confirm whether similar results can be obtained in other regions, where conditions, such as water supply coverage and tap water safety standards, differ significantly from the Tokyo area. To that end, it would be beneficial to first conduct a comparative analysis with other metropolitan areas in Japan.

CONCLUSION

As mentioned earlier, in the preceding studies, the distinction between health concerns attributable to water characteristics and health concerns stemming from personality traits has been unclear. The results of our analysis suggest that, at least, there is a complex link between the two that should be elucidated in the future. Health concerns over drinking water are aroused by

the interaction between water characteristics and personality traits of people. Clarifying the structure of this interaction is an important research question. Our study also reveals that the influence of health concerns stemming from personality traits on the choice of drinking water differs depending on its typology. This also suggests that the effectiveness of measures for drinking water may differ according to the type of health concerns.

ACKNOWLEDGEMENT

The author wishes to acknowledge with gratitude that this research is supported by the Japan Society for the Promotion of Science's KAKENHI Grant Number JP19H01574.

DATA AVAILABILITY STATEMENT

Data cannot be made publicly available; readers should contact the corresponding author for details.

CONFLICT OF INTEREST

The authors declare there is no conflict.

REFERENCES

Anadu, E. C. & Harding, A. K. 2000 Risk perception and bottled water use. *Journal of American Water Works Association* **92**, 82–92.

Brei, V. & Böhm, S. 2013 '1L = 10L for Africa': corporate social responsibility and the transformation of bottled water into a 'Consumer activist' commodity. *Discourse & Society* **25** (1), 3–31.

Crampton, A. & Ragusa, A. 2016 Exploring perceptions and behaviors about drinking water in Australia and New Zealand: is it risky to drink water when and why? *Hydrology* **3** (1), 8.

Doria, M. F. 2006 Bottled water versus tap water: understanding consumers' preferences. *Journal of Water and Health* **4** (2), 271–276.

Doria, M. F. 2010 Factors influencing public perception of drinking water quality. *Water Policy* **10**, 1–19.

Dupont, D., Adamowicz, W. L. & Kruprick, A. 2010 Differences in water consumption choices in Canada: the role of socio-demographics, experiences, and perceptions of health risks. *Journal of Water and Health* **8** (4), 671–686.

Espinosa-Garcia, A., Diaz-Avalos, C., Gonzalez-Villarreal, F. J., Val-Segura, R., Malvaez-Orozco, V. & Mazari-Hiriart, M. 2015 Drinking water quality in a Mexico City University Community: perception and preferences. *Ecohealth* **12** (1), 88–97.

Hu, Z., Morton, L. W. & Mahler, R. L. 2011 Bottled water: United States consumers and their perceptions of water quality. *International Journal of Environmental Research and Public Health* **8**, 565–578.

Leveque, J. G. & Burns, R. C. 2017 Predicting water filter and bottled water use in Appalachia: a community-scale case study. *Journal of Water and Health* **15** (3), 451–461.

MaGuire, M. J. 1995 Off-flavor as the consumer's measure of drinking water safety. *Water Science and Technology* **31** (11), 1–8.

Puget, S., Beno, N., Chabanet, C., Guichard, E. & Thormas-Danguin, T. 2010 Tap water consumers differ from non-consumers in chlorine flavor acceptability but not sensitivity. *Water Research* **44**, 956–964.

Sayler, A., Prokopy, L. S. & Amberg, S. 2011 What's wrong with the tap? Examining perceptions of tap water and bottled water at Purdue University. *Environmental Management* **48**, 588–601.

Sharma, A. & Bhaduri, S. 2013 Consumption conundrum of bottled water in India: an STS perspective. *Bulletin of Science, Technology & Society* **33** (5–6), 172–181.

Suzuki, K. 2022 Cleanliness preference behind the choice of drinking water at home: an analysis of online survey results in the Tokyo area. *Journal of Water and Health* **20** (1), 185–192.

Van der Linden, S. 2015 Exploring beliefs about bottled water and intentions to reduce consumption: the dual-effect of social norm activation and persuasive information. *Environment and Behavior* **47** (5), 526–550.

Wilk, R. 2006 Bottled water: the pure commodity in the age of branding. *Journal of Consumer Culture* **6** (3), 303–325.

Xu, X. & Lin, C. A. 2018 Effects of cognitive, affective, and behavioral factors on college students' bottled water purchase intentions. *Communication Research Reports* **35** (3), 245–255.

First received 1 December 2022; accepted in revised form 9 May 2023. Available online 18 May 2023