Article

How Perceptions of Trust, Risk, Tap Water Quality, and Salience Characterize Drinking Water Choices

Madeline A. Grupper [1,*] , Madeline E. Schreiber [2] and Michael G. Sorice [1]

1   Department of Forest Resources & Environmental Conservation, Virginia Tech, Blacksburg, VA 24061, USA; msorice@vt.edu
2   Department of Geosciences, Virginia Tech, Blacksburg, VA 24061, USA; mschreib@vt.edu
*   Correspondence: maddyag@vt.edu

Abstract: Provision of safe drinking water by water utilities is challenged by disturbances to water quality that have become increasingly frequent due to global changes and anthropogenic impacts. Many water utilities are turning to adaptable and flexible strategies to allow for resilient management of drinking water supplies. The success of resilience-based management depends on, and is enabled by, positive relationships with the public. To understand how relationships between managers and communities spill over to in-home drinking water behavior, we examined the role of trust, risk perceptions, salience of drinking water, and water quality evaluations in the choice of in-home drinking water sources for a population in Roanoke Virginia. Using survey data, our study characterized patterns of in-home drinking water behavior and explored related perceptions to determine if residents' perceptions of their water and the municipal water utility could be intuited from this behavior. We characterized drinking water behavior using a hierarchical cluster analysis and highlighted the importance of studying a range of drinking water patterns. Through analyses of variance, we found that people who drink more tap water have higher trust in their water managers, evaluate water quality more favorably, have lower risk perceptions, and pay less attention to changes in their tap water. Utility managers may gauge information about aspects of their relationships with communities by examining drinking water behavior, which can be used to inform their future interactions with the public, with the goal of increasing resilience and adaptability to external water supply threats.

Keywords: drinking water; behavior; trust; risk; tap water; salience

1. Introduction

Challenges to the safety of public drinking water are increasing as external drivers, including climate and land-use change, adversely impact the stability of drinking water sources [1–3]. Increasingly frequent disturbances, such as algae blooms, hypoxic conditions, or rising metal concentrations, jeopardize water quality in the lakes and reservoirs sourced for public drinking water, requiring drinking water managers to respond with new technologies and strategies [4,5]. One strategy with the potential to help utilities respond to changing environmental conditions is resilience-based management, a style that focuses on adaption and flexibility amidst change [6–8].

Disturbances to raw water sources not only present challenges to treating those water sources but can also threaten the social capital that resilient systems rely on. Concern about the quality of lakes and reservoirs and household drinking water has risen in recent years among Americans [9,10]. As these concerns rise, there is potential for them to spill over to impact the relationship between communities and the water utility managers, who supply their drinking water [11].

The ability of water utility managers to maintain resilient systems and quickly adapt to water quality issues often depends on their relationship with the community they serve [12].

Managers with high levels of community trust have the flexibility to adapt and respond more quickly [12,13]. Trust can encourage citizen cooperation with managers through support for management plans, increased speed and effectiveness of the enaction of those plans, and reduced backlash to management shifts [14–17].

One behavioral indicator of community trust is the acceptance of tap water as a drinking source [18,19], although trust is not the only factor linked to water drinking behavior. Risk perceptions and personal experience with water quality (i.e., taste, smell, and appearance) are also related to the decision to drink tap water, utilize additional filters to treat it, or avoid it altogether e.g., [20,21]. For instance, residents in West Virginia who perceived higher risk associated with their tap water were more likely to drink bottled water compared to tap water, but not home-filtered water compared to tap [22]. Additionally, changes in taste, smell, and appearance of tap water are related to an individual's decision to drink from both bottled and home-filtered sources. Less favorable evaluations of tap water are commonly linked to the decision to drink from alternative water source choices [18]. Taste, in particular, has been linked to decisions to drink from bottled water sources as opposed to tap [23,24].

In areas where issues with water quality are slight or infrequent, the strength of associations and ease with which a person brings to mind water quality issues becomes a relevant factor. This issue of salience is related to the degree to which an individual may drink directly from the tap [25,26]. For instance, Grupper [27] found that residents' trust in a water utility to deliver safe drinking water varies based on two indicators of salience: (1) their familiarity with the water utility providing the water, and (2) the amount of attention they pay to variations in their water quality. Finally, other factors, including industry efforts to market sink and appliance filters as well as bottled water as "pure" sources of water, also contribute to the preference of bottled water and home-filtered water over tap water [28,29].

We focused this study on the roles of risk, trust, and salience in the choice of drinking tap water. Our goal was to explore in-home drinking water behavior in a community in southwest Virginia as a way to understand public trust in water utilities to provide safe and clean drinking water.

1.1. Conceptual Framework

Our study's conceptual framework integrates conceptualizations of risk from Saylor (2011) [21] and Debbler et al. (2018) [30], the salience framework of Stewart (2009) [31], and the concept of trust based on Mayer et al. (1995) [32] (Figure 1).
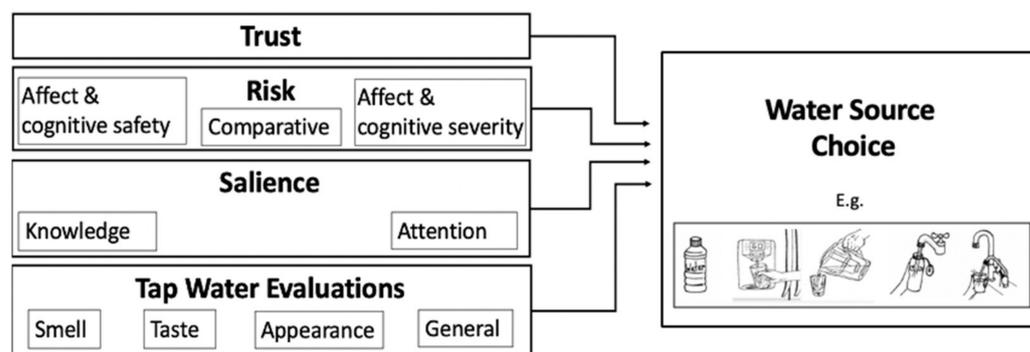

Figure 1. The water source, or sources, that individuals choose to drink from is a function of their trust in the utility to deliver safe drinking water to them, salience of their home water quality, risk judgments of water safety (alone and relative to bottled water), emotional concern, severity of consequence should their water become unsafe, and quality judgments of their tap water.

1.1.1. Trust

The intention to drink tap water directly, as opposed to drinking from bottled or personally filtered sources, has been tied to an individual's trust in their utility to deliver

safe drinking water to them. Trust is a psychological state when one actor, the trustor, accepts vulnerability based on the expectation that another entity, the trustee, will perform a certain action or behavior [32]. In a review of literature and surveys that examined individuals' decision to drink tap or bottled water, Doria (2006) found that when trust in tap water providers or bottled water companies is eroded, they are less likely to drink from those sources [18]. Saylor (2011) found that university students who trusted their local water utility to deliver safe drinking water were more likely to drink from tap water sources, while those who lacked trust in their government and university were more likely to drink bottled water [21]. These results were supported in a survey of residents in West Virginia that found residents' decisions to drink from tap water sources were related to higher levels of trust in the water utility [33].

1.1.2. Risk Perceptions

Alongside trust, risk perceptions have also been established as a driving factor in the acceptance of tap water [17,18]. Risk is conceptualized as a function of the perceived likelihood of an unwanted event occurring and the severity of consequence should that unwanted event occur [34]. Risk perceptions are a frequent object of study in natural resource management, where institutions are charged with protecting the public from hazards such as poor water quality [35]. Saylor (2011) found that barriers to drinking tap water include both low trust and perceived health risks associated with the tap [21]. Similarly, Hu et al.'s (2011) national survey found that people who have safety concerns with their tap water are more likely to reject it as a drinking source [36]. This was also true when household filtered water was included as a drinking choice [37]. Triplett et al. (2019) found that the more residents believe their tap water is unsafe, contaminated, or likely to cause sickness, the more they consume bottled water compared to tap and household filtered water [37].

Risk has been conceptualized in drinking water studies most frequently as a cognitive indicator in surveys, asking how safe people believe their water is to drink [38,39]. Debbler et al. (2018) added to this by including a measure of affect-based risk [30]. While cognitive risk measures assess probability beliefs, affect risk measures assess worry, concern, or other emotional components associated with the occurrence of unwanted events. By examining both cognitive and affect measures, researchers can get a more complete picture of risk perceptions. Additionally, Saylor (2011) found that when people's perceived risk of bottled water is lower than their perceived risk of tap, they are less likely to accept tap water, introducing the concept of comparative risk to the water risk framework [21]. We conceptualize risk as a function of cognitive and affective perceptions of water safety and impressions of severity should one's drinking water be compromised. We included comparative risk of bottled and tap water as an additional measure of overall risk.

1.1.3. Salience

Both risk and trust perceptions are moderated by salience, or the degree to which drinking water topics are readily brought to mind or have strong associations for an individual [25,26]. For instance, residents with low salience about drinking water quality issues had a relatively high baseline trust in the water utility [27]. In that case, trust was positively related to familiarity with one's utility and negatively related to higher attention to changes in water quality. Anadu and Harding (2000) also found that, in cases where a water safety violation, such as coliform contamination or filtration issues, had occurred, increased awareness of that problem over longer durations was related to increased risk perceptions [40]. Because salience plays an important role in risk and trust evaluations, we expected that it may also be a significant contextual factor for an individual's behavior. For this study, we adapted aspects of Stewart's (2009) weather forecasting salience framework, which includes indicators such as event noticeability, event frequency, and an individual's knowledge, to form our drinking water salience conceptualization [31].

1.1.4. Tap Water Quality Evaluations

The taste, smell, and appearance of drinking water, referred to as organoleptic characteristics, are commonly cited factors for choosing filters or bottled water. Doria (2009) identified these organoleptic factors as the primary determinants of an individual's judgment of the quality of their tap water, showing a relationship between organoleptic factors and individuals' risk perceptions, trust, and decision to drink tap water [39]. Huerta-Saenz et al. (2011) demonstrated that organoleptic ratings drive preferences for bottled water consumption over tap water [41]. Triplett et al. (2019) also found that organoleptic perceptions are important in distinguishing between tap and household filtered water drinkers, even when respondents have similar risk perceptions about the safety, contamination, and health risks of unfiltered tap water [37]. Although organoleptic evaluations are clearly important in impacting drinking water behaviors, it remains unclear whether or when they are a reflection of objective preference, familiarity with a water source, or, in part, an artifact of other traits and perceptions [18,41,42].

1.2. Hypotheses

Overall, the majority of the literature on drinking water choices focuses on the specific public preference for bottled water over tap, or vice versa. Since bottled water has a substantially higher carbon cost to produce and dispose of [43–45], and a higher economic cost for consumers [46], it is natural that this dichotomy of tap or bottled water has been the focus of previous studies. However, focusing on the dichotomy does not acknowledge the complex patterns of use that characterize how people consume water in their homes. While some studies have included home-filtered water [22,41], and some assessed the difference between exclusive and preferred tap or bottled water use e.g., [47], water use is still often determined by asking about primary water source choice, rather than assessing patterns in use frequency.

To better understand this complexity and the patterns that characterize how people consume water in their homes, we examined the frequency and patterns of use of four water source choices in a population in Roanoke, Virginia, USA. We looked at the factors of risk, salience, trust, and water quality evaluations to get a more comprehensive view of which factors are related to patterns of water consumption in the home. We hypothesized that:

H1: Those with higher trust in their water utility to provide safe drinking water to them will be more likely to drink tap water.

H2: Those with greater risk perceptions associated with their tap water will be less likely to drink tap water.

H3: Salience is related to in-home drinking water patterns. Specifically:

H3a: Those who are more knowledgeable about their tap water quality will be more likely to drink tap water.

H3b: Those who notice changes to water quality more frequently will be less likely to drink from tap water sources.

H4: Those with more positive organoleptic water quality evaluations will be more likely to drink from tap water sources.

Previous research has highlighted the importance of these factors to water source choice; however, to the best of our knowledge, this is the first study to relate all four to patterns of in-home water drinking behavior. We explored these factors' contributions to explaining patterns of drinking water sources in one's home with the ultimate goal of better evaluating potential indicators of community trust.

2. Materials and Methods

2.1. Study Area

The greater Roanoke area in western Virginia contains the city of Roanoke and the neighboring Roanoke and Botetourt counties. The urban and suburban area is home to roughly 227,000 people, the majority of whom are white (78%), lower-middle-class (median

income from \$41,483 in Roanoke City to \$64,733 in Botetourt County) citizens [48,49]. Approximately 50% of households in the area are customers of the local water utility. Since its formation in 2004, the water utility that provides public water for the greater Roanoke area has had a record of safe and timely drinking water delivery that meets both the utilities' and government's standards.

Because our study focused on the decision to drink municipal tap water in the context of threats to surface water sources, we limited our population to customers of the local water utility whose water was sourced from surface water reservoirs. We formed our sampling frame using publicly available addresses, cross-listing our data with the utility to exclude residents who sourced their home water from wells. After randomly selecting a sample of 800 residents from this list and removing eight due to invalid addresses, a sample of 792 residents remained. This sample required a 40% response rate ($n = 385$) to attain 95% confidence intervals and $\pm 5\%$ sampling error [50].

2.2. Distribution

We used a four-stage drop-off pick-up method adapted from Trentelman et al. (2016) to distribute the questionnaire [51]. Compared to other distribution methods, drop-off pick-up methods have an increased emphasis on social exchange and personal rapport created from in-person interactions, allowing one to garner a higher response rate than mail or phone survey methods [50–52]. We expected that the lack of water quality issues in the Roanoke area would result in low salience of the topic among residents and reduce interest in survey participation. We adopted the drop-off pick-up method to offset this effect and heighten the survey response. Both the questionnaire and distribution methods were approved for use by Virginia Tech's Institutional Review Board.

We sent introduction letters to each resident between September and November 2019, informing them of our study and intended visit. One week after the letters were sent, our research team visited residents' homes to provide them with information about the study and invite them to participate. We mailed introductions to groups of about 100 houses per week to allow us time to visit all residents' homes no more than two weeks after they received the letter. To maximize the likelihood that residents would be home from work, we scheduled visits between 4 p.m. and 8 p.m. on weekdays and between 10 a.m. and 4 p.m. on weekends. To ensure uniform interactions, team members adhered to a script adapted from the guidelines that Dillman et al. (2014) and Trentelman et al. (2016) presented [50,51].

If they agreed to participate, residents were given a survey to complete at their convenience and a doorknob bag to deposit their survey and leave outside for us to pick up two days later. We made up to two follow-up visits, as needed to contact residents and pick up completed surveys, waiting two days between visits to allow ample time for them to complete the survey. If a resident was not home when researchers arrived at their door and a survey was not left outside for pick up, researchers would leave a note on the door saying, "Sorry we missed you, we will be back on [insert date]," and attempt that visit again two days later. The note established the research team's reliability because the participants had been told what date to expect the team's return. We made up to three attempts per visit to contact a resident. After a third failed visit, we left a packet by the resident's door with a note explaining our contact attempts, a cover letter, the survey, and a postage-paid envelope for the survey's return. If the third failed attempt was on an introductory visit, we also included a letter introducing the study and requesting participation.

We first visited homes closest to our base location west of Roanoke and progressed east. We started data collection in September 2019 but halted operations in November when daylight saving time restricted sunlit working hours. The COVID-19 pandemic prevented us from collecting data again in spring 2020. This reduced our sample from 792 to 611. The remaining 181 addresses were located to the northeast of Roanoke. Potential differences between neighborhoods sampled and unsampled may reduce the generalizability of our results to all residents in the greater Roanoke area. To examine the potential for this, we conducted a test of proportions to compare the respondents in our reduced sample with

the 2017 data on race from the U.S. Bureau of Census. Race is a demographic variable commonly associated with water quality issues [19,53], and our results indicated no differences see [27].

2.3. Measurement

The questionnaire assessed resident's patterns of drinking water source choice, trust in the water utility, their salience of water topics, perceived risk, evaluations of their tap water quality, and demographic factors. We pre-tested and refined the questionnaire (*n* = 60) before conducting the full survey.

2.3.1. Tap, Filtered, or Bottled Water

We assume in this study that people may prefer a particular source of drinking water, but their utilization of that source may vary in degree. Thus, preference for filtered water does not necessarily equate to an exclusive reliance on filtered water. To determine the degree to which residents utilize one or more water sources, we asked them to indicate how often in the past six months they drank bottled water, tap water, filtered water from an appliance, such as water filters in pitchers or refrigerators, or filtered water from a sink attachment in their home. We differentiated appliance filters from sink filters because appliance filters are often standard features built into modern refrigerators or are more affordable to purchase, as is the case with water filter pitchers, thus requiring low effort in comparison with sink filters to obtain. Because the focus of this study was on how water source choice could reflect trust in municipal utility, we focused on drinking behavior in the respondents' homes, ensuring that the respondents would associate tap water with the water their local utility provided. We measured responses on a five-point scale from 1 = *Never or almost never* to 5 = *All of the time or almost all of the time*. The residents responded to each of the four potential water source choices.

2.3.2. Trust

Two items gauged resident trust based on the conceptualization of trust as a willingness to accept vulnerability [27,54]. The residents first marked the extent to which they "trusted [their] local water utility to provide drinking water to [their] home that is safe to drink." We then asked their degree of comfort "with [their] local water utility controlling the quality of water delivered to [their] home." This second item measured vulnerability as a dimension of trust [32].

To ensure the trust variable would capture variability in the sample, we pre-tested the versions of the two indicators on Virginia residents using Amazon Turk (N = 111) [55]. We then conducted an in-person pilot study (*n* = 20) in our study area. Based on this pretesting we selected a 9-point scale for both trust items from 1 = *Do not trust at all/Not comfortable at all* to 9 = *Completely trust/Completely comfortable*.

2.3.3. Risk

We measured the residents' perceived risk of tap water using five indicators assessing cognitive safety, affective safety, cognitive severity, affective severity, and comparative risk. Cognitive safety assessed the residents' beliefs about the likelihood of tap water safety issues by asking the respondents to rate how safe they believed their water was from 1 = *Completely unsafe to drink* to 5 = *Completely safe to drink*. The affective safety item asked how concerned the residents were about their tap water safety (1 = *No concern* to 5 = *Extremely concerned*). To identify how severely the residents believed a public water disturbance could impact their lives, the respondents indicated how they would react cognitively (inconvenience and daily routine change) and affectively (worry and anger) and if they found themselves unable to access tap water in their homes. We measured these items on a 5-point Likert-type scale from 1 = *Not at all* to 5 = *A great deal*. Lastly, to measure comparative risk, we chose to focus on the risk of drinking bottled water compared to tap

water. The respondents ranked tap water on a 5-point Likert-type scale from 1 = *More safe* to 5 = *Less safe*.

2.3.4. Salience

Drawing from Stewart's (2009) salience framework, we measured attention by asking how often respondents noticed unacceptable changes in their tap water in terms of taste, smell, and appearance (1 = *Never* to 5 = *Extremely often*) and unacceptable changes in their tap water in general (1 = *Never* to 4 = *Often*) [31]. We measured knowledge of water topics by asking the residents the amount of information they could provide to a friend or family about their neighborhood water quality (1 = *No information* to 5 = *A great deal of information*).

2.3.5. Tap Water Quality Evaluations

Tap water quality evaluations were measured on a 5-point Likert-type scale of acceptability. Respondents rated how acceptable their water was overall and in specific terms of taste, smell, appearance, and safety (1 = *Not acceptable* to 5 = *Completely acceptable*).

2.4. Analysis

We conducted a hierarchical cluster analysis to partition the sample into mutually exclusive groups based on broad patterns of in-home drinking water consumption. We used Ward's minimum variance method, which groups items into clusters based on the similarities and differences between each data point [56]. To determine an optimum cluster solution to use in subsequent analysis, we used both the Calinski/Harabasz test and the Duda/Hart test to assist in identifying an optimal cluster solution [57].

We explored the internal consistency and dimensionality of multiple indicators using Cronbach's alpha and factor analysis. We conducted one-way analyses of variance (ANOVAs) to look for differences across in-home drinking water patterns based on trust, salience, risk, and water quality evaluation perceptions, in addition to a resident's drinking water behavior. We report comparisons of cluster mean differences (ANOVA contrast) and standardized mean differences (Cohen's d is a quantitative measure of the magnitude of the effect). A general guideline for interpreting effect size for Cohen's d is that a standardized difference <0.20 represents a small effect, a difference of 0.50 represents a medium effect, and a difference >0.80 represents a large effect.

3. Results

3.1. Response

Our household contact rate was 75%, communicating with 538 residents out of 611 attempts between September and November 2019. Of those 538 residents, 114 residents refused to participate, 7 were determined ineligible to participate, and 57 agreed to participate but failed to return a survey. We received 352 surveys for a 59% response rate [58].

3.2. Descriptive Statistics

Bottled water had the highest frequency of use among residents and drinking from a sink filter the lowest (Table 1). A substantial portion of residents chose to drink from a mixture of two or more sources rather than from one source alone, as indicated by the low to moderate means and medians for each water source.

Table 1. Descriptive statistics for water source choice item. Statistics for each water source include number of observations (*n*), mean, median, standard deviation (SD), minimum scale value (minimum) and maximum scale value (maximum).

Water Source	*n*	Mean	Median	SD	Minimum: 1 = *Never or Almost Never*	Maximum: 5 = *All the Time or Almost All the Time*
Bottled	339	2.84	3	1.55	1	5
Sink filter	312	1.38	1	1.03	1	5
Appliance filter	331	2.44	2	1.65	1	5
Tap	337	2.32	2	1.50	1	5

Most respondents (61%) reported that they *mostly* or *completely* trusted their utility to deliver safe drinking water to them (Table 2). The majority of residents believed the safety of their water was a low risk both cognitively and affectively and believed they would experience moderate to severe consequences if their access was compromised. The majority of residents considered bottled water equally as safe as tap water (45%). Drinking water was a low salience topic for the majority of respondents, with most (63%) reporting that they *never* noticed changes in their tap water and had *little* to *no* information about their neighborhood water quality (61%). Finally, the majority of residents (53%) had generally favorable impressions of their tap water quality, ranking their tap's smell, odor, taste, and general characteristics as *very* or *extremely* acceptable.

Table 2. Descriptive statistics for predictor variables. Statistics for each survey item include number of observations (*n*), mean, median, standard deviation (SD), minimum scale value (minimum) and maximum scale value (maximum).

Item	*n*	Mean	Median	SD	Minimum	Maximum
Trust	345	6.34	7	1.97	1 = No trust	9 = Complete trust
Risk						
Cognitive safety	340	1.71	1	0.89	1 = Completely safe	4 = Completely unsafe
Affective safety	344	1.87	1	1.09	1 = Not concerned	5 = Extreme concern
Cognitive severity	339	3.25	5	1.40	1 = None	5 = A great deal
Affective severity	326	3.23	4	1.28	1 = None	5 = A great deal
Comparative	339	3.52	3	0.98	1 = Bottled muchless safe than tap	5 = Bottled muchsafer than tap
Salience						
Attention	348	1.68	1	0.74	1 = Never	4 = Often
Knowledge	343	2.35	2	0.98	1 = None	5 = A great deal
Tap water quality evaluations	348	3.70	4	0.93	1 = Not acceptable	5 = Extremely acceptable

3.3. In-Home Drinking Water Behavioral Choice Patterns

We selected a six-cluster solution for water source choice behavior groups, which was the solution with the best fit (Figure 2; Table S1).

We labeled the clusters based on the mean frequency patterns of bottled, sink filter, tap, and appliance filter water use (Figure 3). Almost two-thirds of the respondents (64%) drank primarily from a single water source. The largest cluster reflected people who drink bottled water exclusively (24% of the respondents; Figure 3A). The next largest cluster (22% of the sample) drank exclusively from an appliance filter (Figure 3B), followed by a cluster exclusively drinking tap water (18% of the participants; Figure 3C). Combined patterns included a cluster that equally drinks bottled and tap water (16%; Figure 3D), followed by mixes of all sources except for a sink filter (12% of the participants; Figure 3E) and a cluster that mixes sources but predominantly uses a sink filter (8%; Figure 3F).
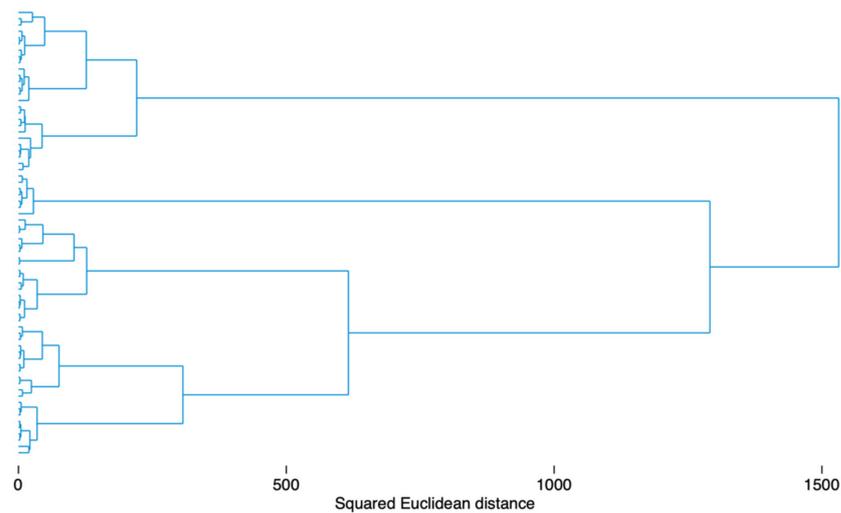
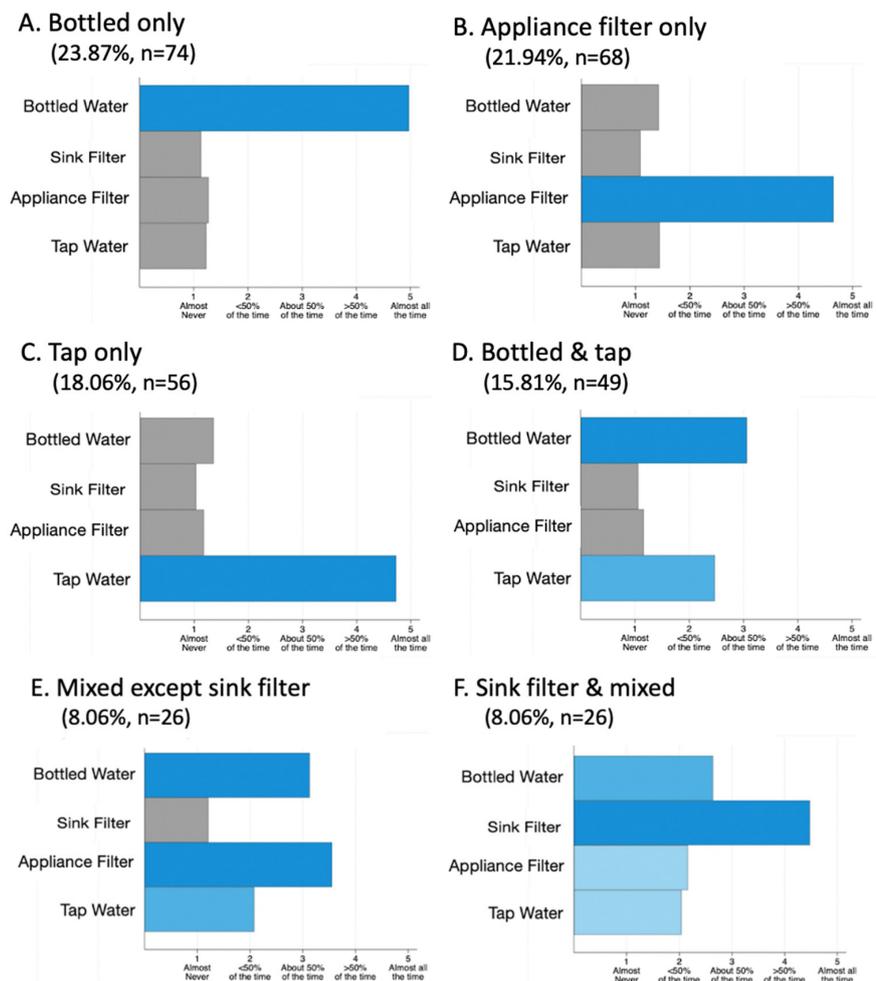**Figure 2.** Dendrogram for the hierarchical cluster analysis.

Figure 3. Means of the frequency of water source use for each cluster. Dark blue bars represent water source usage at or above *50% of the time*. Medium blue bars represent water usage between *<50% of the time* and *50% of the time*. Light blue bars represent water usage near *<50% of the time*. Grey bars represent water usage at or close to *almost never*.

3.4. Comparing Groups

The six clusters—*bottled only, tap only, appliance filter only, bottled & tap, sink filter & mixed*, and *mixed except sink*—differed not only in their water source choice patterns but also in terms of trust, salience, risk, and tap water evaluation variables (see Figure 4 for a comparison of differences significant at a $p < 0.05$ level; Table S2 contains full ANOVA results; Table S3 contains full pairwise comparison results).
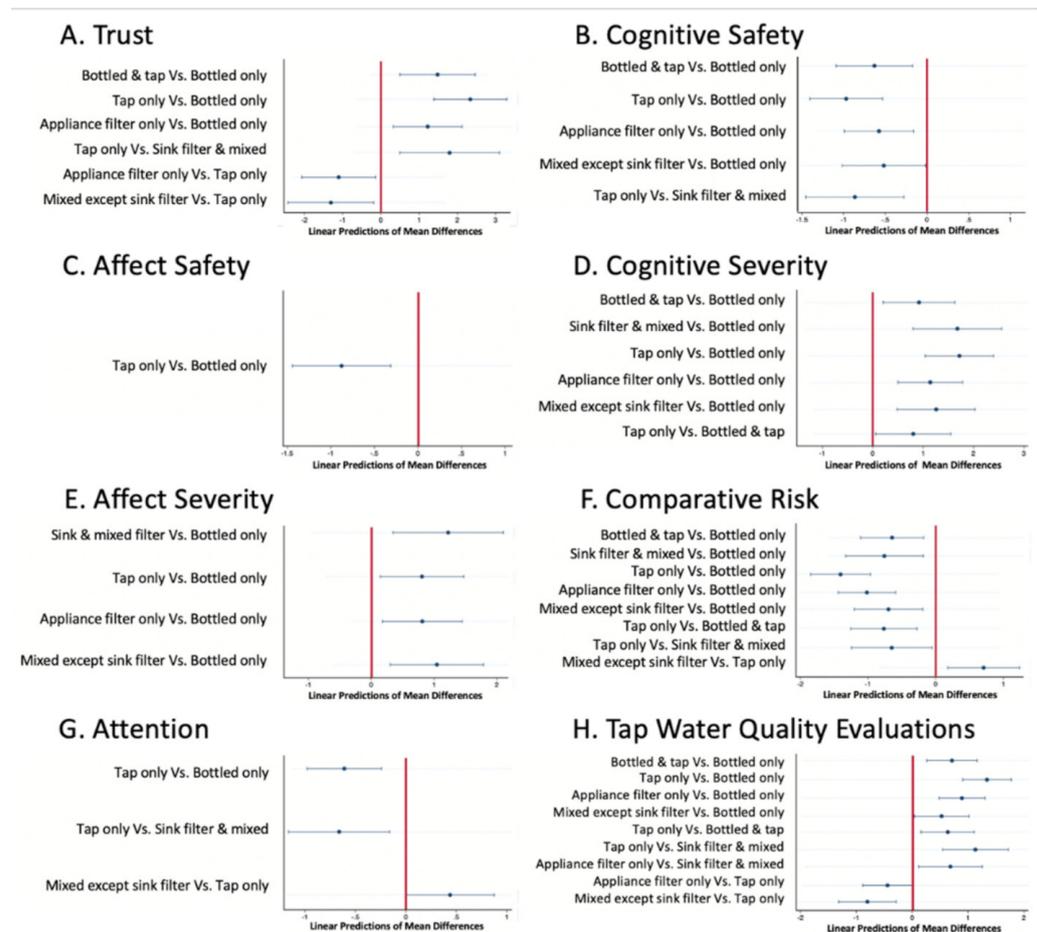

Figure 4. Post hoc pairwise comparisons of adjusted linear predictions of mean differences (first cluster–second cluster) between clusters for each predictor variable. Predictions were calculated using a Bonferroni test with 95% confidence intervals. Only significant differences at a $p < 0.05$ level are displayed.

Clusters were most similar in terms of affect risk perceptions (Figure 4C: affect safety and Figure 4E: affect severity) and salience variables (Figure 4G: attention and information known), evidenced by the lower number of mean differences between pairs in those variables. In contrast, comparative risk perceptions (Figure 4F) and organoleptic evaluations (Figure 4H) were most effective at distinguishing between groups.

3.4.1. H1: Those with Higher Trust in Their Water Utility to Provide Safe Drinking Water to Them Will Be More Likely to Drink Their Tap Water in Their Homes as Opposed to Drinking from Other Sources

The results of the pairwise comparisons mostly support our hypothesis that higher trust is related to the increased choice of tap water. Residents in the *tap only* cluster trusted their utility to deliver safe drinking water to them more than those in all other clusters except *bottled & tap* (Figure 4A; Table S3). Exclusive *tap water* drinkers' trust was much higher (mean (m) = 7.60) than that of exclusive *bottled water* drinkers (m = 5.26) (Cohen's d = 1.32)

or *sink filter & mixed* water source drinkers (m = 5.75; Cohen's d = 1.23), moderately higher than that of *mixed except for sink filter* drinkers (m = 6.25; Cohen's d = 0.91), and slightly higher than that of *appliance filter* drinkers (m = 6.45; Cohen's d = 0.70).

3.4.2. H2: Those with Greater Risk Perceptions Associated with Their Tap Water Will Be Less Likely to Drink Their Tap Water in Their Home as Opposed to Drinking from Other Sources

We found partial support for this hypothesis. Clusters with tap water central to their drinking water choices had lower risk perceptions than some other behavioral clusters, but not all of them. Residents who drank *tap water* exclusively believed more strongly that their tap water was safe to drink (m = 1.21) than exclusive *bottled water* drinkers (m = 2.18; Cohen's d = −1.19) or *sink filter & mixed* water drinkers (m = 2.08; Cohen's d = −1.31) did (Figure 4B; Table S3). Exclusive tap water drinkers were on average *not* concerned about the safety of their tap water (m = 1.43). While they were less concerned than *bottled only* drinkers (m = 2.30; Cohen's d = −0.79), they did not differ in concern level from other behavioral groups (Figure 4C).

Residents who drank *tap* water exclusively reported that they would be more worried or angry if they lost access to drinking water (m = 3.38) than exclusive *bottled* water drinkers (m = 2.58; Cohen's d = 0.66; Figure 4E). Residents who drank *tap* water exclusively were also much more likely to think that not having access to their home tap water would directly impact their lives (m = 3.94) than people who drank *bottled water only* (m = 2.22; Cohen's d = 1.40) and moderately more likely than those who drank both *bottled & tap* water (m = 3.13; Cohen's d = 0.66; Figure 4D).

The comparative risk variable, asking about the relative safety of tap water compared to bottled water, differentiated tap water drinkers from almost every other cluster (Figure 4F). Residents who drank *tap water* exclusively believed that tap water is no different from bottled water in terms of safety (m = 2.88). Those who drank *bottled water* exclusively believed much more strongly that bottled water is safer than tap (m = 4.28; Cohen's d = −1.78). Most other groups also believed that bottled water is safer than tap, including those who drank *bottled & tap* water (m = 3.64; Cohen's d = −0.92), *sink filter & mixed* water sources (m = 3.52; Cohen's d = −0.71), and from *mixed water sources excepting a sink filter* (m = 3.58; Cohen's d = −0.80). There was no difference between the *tap water only* cluster and the *appliance filter only* cluster in terms of their beliefs about bottled versus tap water safety.

Overall, cognitive and comparative risk perceptions (Figure 4F) differed more than affective risk perceptions (Figure 4C,E) between clusters, as demonstrated by the larger effect sizes between means. Exclusive *tap water* drinkers had lower risk perceptions than several non-tap water clusters, but it was not universal. Exclusive *bottled water* drinkers and exclusive *tap water* drinkers differed across all variables, unlike other pairs of clusters, and had stronger effect size differences than with other groups. Exclusive tap water and appliance filter clusters did not show different means across any of the risk indicators.

3.4.3. H3: Issue Salience Is Related to In-Home Drinking Water Choice. Specifically

H3a: Those who are more knowledgeable about their tap water quality will be more likely to drink tap water in their homes.

H3b: Those who notice changes to water quality more frequently will be less likely to drink from tap water sources in their homes.

The pairwise comparison results did not support our first salience hypothesis (H3a), as information known about water quality was similar across the six clusters (F (5, 298) = 1.85, p = 0.103). The results partially support the hypothesis that attention paid to tap water quality is related to lower use of tap water (H3b; Figure 4G). Exclusive *tap water* drinkers noticed changes in their tap water (m = 1.31) less frequently than exclusive *bottled water* drinkers (m = 1.92; Cohen's d = −0.95), *sink filter & mixed* water source drinkers (m = 1.98; Cohen's d = −1.05), and *mixed water source excepting sink filter* drinkers (m = 1.75;

Cohen's d = −0.75). The *appliance filter only* cluster and *bottled & tap* cluster did not differ from the *tap only* cluster.

3.4.4. H4: Those with more Positive Organoleptic Water Quality Evaluations Will Be More Likely to Drink from Tap Water Sources in Their Home

Exclusive *tap water* drinkers had more favorable perceptions of their tap water quality (m = 4.35) than every other behavioral cluster (Figure 4H), supporting our fourth hypothesis. This difference was particularly pronounced with exclusive *bottled water* drinkers (m = 3.01; Cohen's d = 1.77) and *sink & mixed water source* drinkers (m = 3.28; Cohen's d = 1.48), and least pronounced with *appliance filter* drinkers, although still with a moderate effect difference (m = 3.91; Cohen's d = 0.62).

Overall, the ANOVA results (Figure 4 for selected comparison; Table S2 for full results) generally supported the hypotheses that tap water drinkers would have lower risk perceptions, higher trust, and higher water quality perceptions than other clusters. Exclusive tap water drinkers had the lowest number of differences with exclusive appliance water drinkers, suggesting a similarity between those clusters. Exclusive tap water drinkers showed the strongest differences when compared to exclusive bottled water drinkers and sink and mixed water source drinkers. This was evidenced by the high mean differences and effect sizes between those clusters compared to other pairs and the consistency with which those groups differed between variables.

4. Discussion

Our study examined patterns of in-home drinking water behavior and the degree to which it relates to perceptions of water and trust in water managers. We found that water behavior is best described by examining a range of drinking source choice patterns. Higher propensities to drink tap water were related to more positive perceptions of water quality and water utilities, including increased levels of trust in the water utility, more favorable evaluations of water quality, lower perceptions of risk, and lack of attention to salience to perceived changes in tap water.

4.1. Water Use Patterns: Characterizing Behavior

Our characterization of residents' water drinking behavior into clusters reliant on one water source exclusively and clusters who mix their water sources helped capture patterns of behavior more thoroughly than a dichotomy (e.g., tap water vs. bottled water) would have. Less than half of our sample (42%) drank either bottled or tap water exclusively, although many respondents did indicate that they employed an exclusive water source. Much of the previous literature examining drinking water source choice reduced water use to a comparison between bottled water use and tap water use e.g., [21,39]. Our results showed that exclusive tap water drinkers have the largest differences in perceptions with exclusive bottled water drinkers across variables (Figure 4). Despite these differences, we found that a more detailed picture could be painted by including mixed clusters, which accounted for over one-third (36%) of the respondents' behavior. Looking at patterns of behavior recognizes that people may rely on multiple sources of drinking water at home.

Distinguishing between filter types was also useful as differences in perceptions of risk, trust, salience, and water quality depended on the type of household filter individuals employed. While some previous research has added exclusive household filter water drinkers to their study scope e.g., [41], we are unaware of other studies that differentiate between household filter types. In one example of this characterization of filter types, Leveque and Burns (2017) found that individuals who report higher risk perceptions of tap water are equally likely to drink household filtered water compared to tap [22]. In contrast, we found the appliance filter cluster to be one of the most similar clusters to tap water, while the sink filter and mixed cluster had some of the strongest differences of all clusters, topped only by the bottled water cluster. It may be important to distinguish between the type of household filter individuals employ as it can indicate vastly different perceptions with regard to drinking water and water municipalities.

4.2. Perception Differences

4.2.1. Trust

Our results demonstrated that residents who primarily utilize tap water as their drinking source display higher levels of trust in their water utility than those who utilize mixed sources or bottled water only. Groups that relied partially on tap water, such as *bottled & tap* and *appliance filter*, had higher trust than the *bottled water* cluster. Yet those who drank tap water exclusively had higher trust levels than every cluster except for the *bottled & tap* cluster. Previous studies comparing tap water and bottled water groups have also found that tap water drinkers have higher trust levels [18,21,33]. Our results add to these previous findings by demonstrating how trust can increase with even partial reliance on tap water.

The difference in trust between those who drink bottled water exclusively and those who drink it half the time could be explained by examining why people are choosing to drink bottled water. Ward et al. (2009) found that, while those who drink bottled water have a range of beliefs about the health benefits of bottled water, these beliefs are not necessarily key drivers of bottled water purchases. In that case, convenience is the most motivating factor [59]. Similarly, Saylor et al. (2011) found that lack of convenience is a barrier to drinking tap water [21]. Consequently, a number of additional factors, including convenience and marketing effort, may impact drinking water choices. Future research could explore how these additional factors interact with trust, risk beliefs, and salience to explain drinking water behavior.

4.2.2. Risk

We found partial support for our hypothesis that tap water drinkers would have decreased risk perceptions, in terms of cognitive safety, affect safety, cognitive severity, affect severity, and comparative risk, compared to other clusters. Cognitive safety and severity were more useful at distinguishing between other clusters than affect safety and severity, and comparative risk most useful. Similar to previous studies, all risk items reliably and substantively differentiated between tap and bottled water e.g., [36,37].

Given the stronger risk perceptions of bottled water users, we were not surprised that comparative risk demonstrated strong differences between clusters but were surprised that those differences did not reflect patterns in the cognitive safety variable. The comparative risk variable introduced by Saylor (2011) asks respondents to contrast the cognitive safety of tap water relative to bottled water [21]. As a result, we expected perceptions to be similar across groups with these two variables. However, the strongest difference in comparative risk was found between tap water and bottled water groups, while the strongest difference in cognitive safety was between tap water and sink filter and mixed groups. Additionally, the comparative risk variable distinguished between tap water and all other clusters except for appliance filter drinkers, while cognitive safety only differentiated tap water from bottled water and sink filter and mixed groups. Future research might benefit from expanding avenues of relative risk to compare other water sources besides just bottled and tap or comparing water sources using other measures besides cognitive safety.

4.2.3. Salience

Out of the four variables we examined, salience contributed the least to understanding behavioral group differences. The respondents' salience perceptions did not support the hypothesis that increased knowledge about water quality would impact tap water usage and partially supported the hypothesis that increased attention to tap water changes would be related to decreased tap water usage. Grupper [27] surveyed respondents to determine the role that salience plays in trust formation and found that salience acts as an important contextual variable for trust determinants. While salience may not have a strong influence on drinking water behavior directly, it is indirectly relevant through the formation of trust, which is more proximately related to behavioral choice.

4.2.4. Water Quality Evaluations

Our findings supported the hypothesis that higher tap water quality evaluations in terms of taste, smell, and appearance would be associated with an individual's choice to drink from tap water sources instead of alternates. Of the perceptions we measured, water quality evaluations had as strong an effect as trust or comparative risk and was the only factor that differed between those who exclusively drank tap water and all other clusters. These results are similar to those of previous literature that cites organoleptic properties as a crucial determinant of tap water drinking [18,37,41]. While trust in water safety and risk perceptions both focus on water security, organoleptic evaluations relate to enjoyment of water. March et al. (2020) found that perception of taste is a stronger motivational factor in bottled water drinking than safety concerns [60]. Our results support the observation that these factors of enjoyment are strongly tied to each type of drinking water behavior.

5. Conclusions

Effective management of drinking water resources benefits when water utilities can adapt and be flexible amid changing environmental conditions. Such resilient management can be bolstered by positive relationships between water managers and the communities they serve [12]. In this study, we examined how community perceptions that can strengthen these relationships relate to drinking water behavior. We specifically examined the role of trust, risk perceptions, salience of drinking water, and water quality evaluations in their choice of in-home drinking water sources. We were particularly interested in the role of trust, a concept often studied in natural resource management because of its positive relationship with resilient management support, effective communication, and technology acceptance [13,14,16]. We allowed for the fact that people may vary in their in-home drinking water behaviors, enabling us to examine further differences that characterize behavioral patterns.

While other studies have demonstrated relationships between demographic variables such as income, educational level, and gender with water source consumption [41,61,62], it was not part of our research question. However, when we examine our data, we do not find a relationship between income, education level, or gender, and cluster membership.

Our results show that those who drink tap water often have more favorable tap water quality evaluations, have lower perceptions of its risk, pay more attention to tap water changes, and have higher trust in their water managers, especially compared to those who drink bottled water exclusively or from a sink filter. Managers may be able to use the link between high trust and tap water choice as an indicator of public trust. This can help them determine their need to promote this trust through efforts to increase communication between utilities and the public. As utilities shift to employing more resilience-based management strategies, it is increasingly important to understand the ties between the public perceptions that define community relationships with their utilities and the drinking water behavior those communities engage in.

Author Contributions: Conceptualization, M.A.G. and M.G.S.; methodology, M.A.G., M.G.S., and M.E.S.; validation, M.A.G. and M.G.S.; formal analysis, M.A.G. and M.G.S.; investigation, M.A.G.; resources, M.A.G., M.G.S., and M.E.S.; data curation, M.A.G. and M.G.S.; writing—original draft preparation, M.A.G.; writing—review and editing, M.A.G., M.G.S., and M.E.S.; visualization, M.A.G., and M.G.S.; supervision, M.A.G., and M.G.S., M.E.S.; project administration, M.A.G., M.G.S.; funding acquisition, M.G.S., and M.E.S. All authors have read and agreed to the published version of the manuscript.

References

1. Dunn, S.M.; Brown, I.; Sample, J.; Post, H. Relationships between Climate, Water Resources, Land Use and Diffuse Pollution and the Significance of Uncertainty in Climate Change. *J. Hydrol.* **2012**, *434–435*, 19–35. [CrossRef]
2. Garrote, L. Managing Water Resources to Adapt to Climate Change: Facing Uncertainty and Scarcity in a Changing Context. *Water Resour. Manag.* **2017**, *31*, 2951–2963. [CrossRef]
3. Pouget, L.; Escaler, I.; Guiu, R.; Mc Ennis, S.; Versini, P.A. Global Change adaptation in water resources management: The Water Change project. *Sci. Total Environ.* **2012**, *440*, 186–193. [CrossRef] [PubMed]
4. Ho, J.C.; Michalak, A.M. Challenges in tracking harmful algal blooms: A synthesis of evidence from Lake Erie Jeff. *J. Great Lakes Res.* **2015**, *41*, 317–325. [CrossRef]
5. Olsen, C.S.; Shindler, B.A. Trust, acceptance, and citizen agency interactions after large fires: Influences on planning processes. *Int. J. Wildland Fire* **2010**, *19*, 137–147. [CrossRef]
6. Carpenter, S.; Walker, B.; Anderies, J.M.; Abel, N. From Metaphor to Measurement: Resilience of What to What? *Ecosystem* **2001**, *4*, 765–781. [CrossRef]
7. Folke, C. Resilience (Republished). *Ecol. Soc.* **2016**, *21*, 44. [CrossRef]
8. Holling, C.S. Resilience and Stability of Ecological Systems. *Annu. Rev. Ecol. Syst.* **1973**, *4*, 1–23. [CrossRef]
9. Swanson, E. *AP-GfK Poll: About Half of Americans Confident in Tap Water*. 2016. Available online: https://apnews.com/article/eedf886daa334d7c871e531d804620a1 (accessed on 11 March 2021).
10. Water Quality Association. Summary & Highlights National Study of Consumers' Opinions & Perceptions Regarding Water Quality. 2019. Available online: https://wqa.org/Portals/0/Publications/ConsumerStudy2019_Public.pdf (accessed on 11 March 2021).
11. Slovic, P. Perceived risk, trust, and democracy. *Risk Anal.* **1993**, *13*, 675–682. [CrossRef]
12. Bondelind, M.; Markwat, N.; Toljander, J.; Simonsson, M.; Säve-Söderbergh, M.; Morrison, G.M. Building trust: The importance of democratic legitimacy in the formation of consumer attitudes toward drinking water. *Water Policy* **2019**, *21*, 1–18. [CrossRef]
13. Stern, M.J.; Baird, T.D. Trust ecology and the resilience of natural resource management institutions. *Ecol. Soc.* **2015**, *20*, 14. [CrossRef]
14. Davenport, M.A.; Leahy, J.E.; Dorothy, A.E.; Ae, H.A.; Jakes, P.J. Building Trust in Natural Resource Management Within Local Communities: A Case Study of the Midewin National Tallgrass Prairie. *Environ. Manag.* **2007**, *39*, 353–368. [CrossRef] [PubMed]
15. Lachapelle, P.R.; McCool, S.F. The Role of Trust in Community Wildland Fire Protection Planning. *Soc. Nat. Resour.* **2012**, *25*, 321–335. [CrossRef]
16. Song, A.M.; Temby, O.; Kim, D.; Saavedra Cisneros, A.; Hickey, G.M. Measuring, mapping and quantifying the effects of trust and informal communication on transboundary collaboration in the Great Lakes fisheries policy network. *Glob. Environ. Chang.* **2019**, *54*, 6–18. [CrossRef]
17. Ross, V.L.; Fielding, K.S.; Louis, W.R. Social trust, risk perceptions and public acceptance of recycled water: Testing a social-psychological model. *J. Environ. Manag.* **2014**, *137*, 61–68. [CrossRef]
18. Doria, M.d.F. Bottled water versus tap water: Understanding consumers' preferences. *J. Water Health* **2006**, *4*, 271–276. [CrossRef] [PubMed]
19. Doria, M.d.F. Factors influencing public perception of drinking water quality. *Water Policy* **2010**, *12*, 1–19. [CrossRef]
20. Jakus, P.M.; Shaw, W.D.; Nguyen, T.N.; Walker, M. Risk perceptions of arsenic in tap water and consumption of bottled water. *Water Resour. Res.* **2009**, *45*. [CrossRef]
21. Saylor, A.; Prokopy, L.S.; Amberg, S. What's Wrong with the Tap? Examining Perceptions of Tap Water and Bottled Water at Purdue University. *Environ. Manag.* **2011**, *48*, 588–601. [CrossRef]
22. Levêque, J.G.; Burns, R.C. A Structural Equation Modeling approach to water quality perceptions. *J. Environ. Manag.* **2017**, *197*, 440–447. [CrossRef] [PubMed]
23. De Doria, M.F.; Pidgeon, N.; Hunter, P. Perception of tap water risks and quality: A structural equation model approach. *Water Sci. Technol.* **2005**, *52*, 143–149. [CrossRef]
24. Levallois, P.; Grondin, J.; Gingras, S. Evaluation of consumer attitudes on taste and tap water alternatives in Quebec. *Water Sci. Technol.* **1999**, *40*, 135–139. [CrossRef]
25. Gray, S.; Shwom, R.; Jordan, R. Understanding factors that influence stakeholder trust of natural resource science and institutions. *Environ. Manag.* **2012**, *49*, 663–674. [CrossRef]

26. Higgins, E.T.; Kruglanski, A.W. Knowledge Applicability, Activation: Accessibility, and Salience. In *Social Psychology: Handbook of Basic Principles*; Higgins, T., Kruglanski, A.W., Eds.; The Guilford Press: New York, NY, USA, 1996; pp. 133–168.

27. Grupper, M.A. Exploring the Role of Trust in Drinking Water Systems in Western Virginia. Master's Thesis, Virginia Tech, VTechWorks, Blacksburg, VA, USA, 2020. Available online: http://hdl.handle.net/10919/99860 (accessed on 1 March 2021).

28. Ferrier, C. Bottled Water: Understanding a Social Phenomenon. *Ambio J. Hum. Environ.* **2001**, *30*, 118–119. [CrossRef]

29. Jaffee, D.; Newman, S.A. More Perfect Commodity: Bottled Water, Global Accumulation, and Local Contestation. *Rural Sociol.* **2012**, *78*, 1–28. [CrossRef]

30. Debbeler, L.J.; Gamp, M.; Blumenschein, M.; Keim, D.; Renner, B. Polarized but illusory beliefs about tap and bottled water: A product- and consumer-oriented survey and blind tasting experiment. *Sci. Total Environ.* **2018**, *643*, 1400–1410. [CrossRef]

31. Stewart, A.E. Minding the weather: The measurement of weather salience. *Bull. Am. Meteorol. Soc.* **2009**, *90*, 1833–1841. [CrossRef]

32. Mayer, R.C.; Davis, J.H.; Schoorman, F.D. An Integrative Model of Organizational Trust. *Acad. Manag. Rev.* **1995**, *20*, 709–734. [CrossRef]

33. McSpirit, S.; Reid, C. Residents' perceptions of tap water and decisions to purchase bottled water: A survey analysis from the Appalachian, Big Sandy coal mining region of West Virginia. *Soc. Nat. Resour.* **2011**, *24*, 511–520. [CrossRef]

34. Anthony Cox, L. What's wrong with risk matrices? *Risk Anal.* **2008**, *28*, 497–512. [CrossRef]

35. Poortinga, W.; Pidgeon, N.F. Trust in Risk Regulation: Cause or Consequence of the Acceptability of GM Food? *Risk Anal.* **2005**, *25*, 199–209. [CrossRef] [PubMed]

36. Hu, Z.; Morton, L.W.; Mahler, R.L. Bottled water: United States consumers and their perceptions of water quality. *Int. J. Environ. Res. Public Health* **2011**, *8*, 565–578. [CrossRef]

37. Triplett, R.; Chatterjee, C.; Johnson, C.K.; Ahmed, P. Perceptions of Quality and Household Water Usage: A Representative Study in Jacksonville, FL. *Int. Adv. Econ. Res.* **2019**, *25*, 195–208. [CrossRef]

38. Bratanova, B.; Morrison, G.; Fife-Schaw, C.; Chenoweth, J.; Mangold, M. Restoring drinking water acceptance following a waterborne disease outbreak: The role of trust, risk perception, and communication. *J. Appl. Soc. Psychol.* **2013**, *43*, 1761–1770. [CrossRef]

39. De Doria, M.F.; Pidgeon, N.; Hunter, P.R. Perceptions of drinking water quality and risk and its effect on behavior: A cross-national study. *Sci. Total Environ.* **2009**, *407*, 5455–5464. [CrossRef]

40. Anadu, E.C.; Harding, A.K. Risk perception and bottled water use. *J. Am. Water Work. Assoc.* **2000**, *92*, 82–92. [CrossRef]

41. Huerta-Saenz, L.; Irigoyen, M.; Benavides, J.; Mendoza, M. Tap or bottled water: Drinking preferences among urban minority children and adolescents. *J. Community Health* **2012**, *37*, 54–58. [CrossRef]

42. Harmon, D.; Gauvain, M.; Reisz, A.; Arthur, I.; Story, S.D. Preference for tap, bottled, and recycled water: Relations to PTC taste sensitivity and personality. *Appetite* **2018**, *121*, 119–128. [CrossRef] [PubMed]

43. Cole, M.; Lindeque, P.; Halsband, C.; Galloway, T.S. Microplastics as contaminants in the marine environment: A review. *Mar. Pollut. Bull.* **2011**, *62*, 2588–2597. [CrossRef] [PubMed]

44. U.S. Government Accountability Office. *Bottled Water: FDA Safety and Consumer Protections Are Often Less Stringent Than Comparable EPA Protections for Tap Water*; Report No. GAO-09-610; United States Government Accountability Office Testimony; 2009. Available online: https://www.gao.gov/assets/gao-09-610.pdf (accessed on 11 March 2021).

45. Gleick, P.H.; Cooley, H.S. Energy implications of bottled water. *Environ. Res. Lett.* **2009**, *4*, 1–6. [CrossRef]

46. Güngör-Demirci, G.; Lee, J.; Mirzaei, M.; Younos, T. How do people make a decision on bottled or tap water? Preference elicitation with nonparametric bootstrap simulations. *Water Environ. J.* **2016**, *30*, 243–252. [CrossRef]

47. Delpla, I.; Legay, C.; Proulx, F.; Rodriguez, M.J. Perception of tap water quality: Assessment of the factors modifying the links between satisfaction and water consumption behavior. *Sci. Total Environ.* **2020**, *722*, 137786. [CrossRef]

48. U.S. Census Bureau. ACS Questionnaire 2017. 2017. Available online: http://www.census.gov/acs (accessed on 13 July 2020).

49. U.S. Census Bureau. American Community Survey (ACS). 2017. Available online: https://www.census.gov/quickfacts/fact/table/roanokecountyvirginia,roanokecityvirginia,botetourtcountyvirginia/PST045219 (accessed on 11 March 2021).

50. Dillman, D.A.; Smyth, J.D.; Christian, L.M. *Internet, Phone, Mail, and Mixed Mode Surveys: The Tailored Design Method*, 4th ed.; John Wiley & Sons Inc.: Hoboken, NJ, USA, 2014.

51. Trentelman, C.K.; Irwin, J.; Petersen, K.A.; Ruiz, N.; Szalay, C.S. The Case for Personal Interaction: Drop-Off/Pick-Up Methodology for Survey Research. *J. Rural Soc. Sci.* **2016**, *31*, 68–104.

52. Steele, J.; Bourke, L.; Luloff, A.E.; Liao, P.-S.; Theodori, G.L.; Krannich, R.S. The Drop-Off/Pick-Up Method for Household Survey Research. *Community Dev. Soc. J.* **2001**, *32*, 238–250. [CrossRef]

53. Fragkou, M.C.; McEvoy, J. Trust matters: Why augmenting water supplies via desalination may not overcome perceptual water scarcity. *Desalination* **2016**, *397*, 1–8. [CrossRef]

54. Stern, M.J.; Coleman, K.J. The Multidimensionality of Trust: Applications in Collaborative Natural Resource Management. *Soc. Nat. Resour.* **2015**, *28*, 117–132. [CrossRef]

55. Chandler, J.; Shapiro, D. Conducting Clinical Research Using Crowdsourced Convenience Samples. *Annu. Rev. Clin. Psychol.* **2016**, *12*, 53–81. [CrossRef]

56. Ward, J.H. Hierarchical Grouping to Optimize an Objective Function. *J. Am. Stat. Assoc.* **1963**, *58*, 236–244. [CrossRef]

57. Everitt, B.S.; Landau, S.; Leese, M. *Cluster Analysis*, 4th ed.; Oxford University Press Inc.: London, UK, 2001.

58. AAPOR Response Rate Calculator. Available online: https://www.aapor.org/Education-Resources/For-Researchers/Poll-Survey-FAQ/Response-Rates-An-Overview.aspx (accessed on 14 October 2019).

59. Ward, L.A.; Cain, O.L.; Mullally, R.A.; Holliday, K.S.; Wernham, A.G.; Baillie, P.D.; Greenfield, S.M. Health beliefs about bottled water: A qualitative study. *BMC Public Health* **2009**, *9*, 196. [CrossRef]
60. March, H.; Garcia, X.; Domene, E.; Sauri, D. Tap water, bottled water or in-home water treatment systems: Insights on household perceptions and choices. *Water* **2020**, *12*, 1310. [CrossRef]
61. York, A.M.; Barnett, A.; Wutich, A.; Crona, B.I. Household bottled water consumption in Phoenix: A lifestyle choice. *Water Int.* **2011**, *36*, 708–718. [CrossRef]
62. Johnstone, N.; Serret, Y. Determinants of bottled and purified water consumption: Results based on an OECD survey. *Water Policy* **2012**, *14*, 668–679. [CrossRef]