THE COGNITIVE APPREHENSIONS REGARDING DRINKING WATER AMONG
EDUCATED AMERICANS AND ARABS LIVING IN MIDDLETOWN

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ABSTRACT

DISSEPTION

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This qualitative study described and compared the cognitive apprehensions regarding drinking water quality (DW) in Muncie, Indiana, USA. The comparison was between two different, culturally elite groups using constructive-grounded theory. Eighteen semi-structured interviews were conducted with both Arab (n=9) and American (n=9) participants. Five essential themes emerged from the interview data: the sensory properties of drinking water, pollutants, health concerns, information sources, and experience.

The data from this study is grounded to the epistemologies regarding drinking water. The epistemologies differ between the Arab and American groups due to social factors, such as ethnicity, culture, and past experiences. The study showed that the two groups in the study perceived knowledge regarding drinking water in different ways.
The study showed that the educated Arabs had different cognitive apprehensions regarding drinking water compared to educated Americans due to their previous experiences with drinking water quality in their home countries and their lack of interest in the local media. However, similar findings regarding beliefs about pollutants and diseases in drinking water were shared between the groups. The grounded study found that each group had different behaviors regarding drinking water, and it developed a theory that described how different epistemologies lead to different actions regarding drinking water among different ethnicities.

Some recommendations based on the study findings endorse that the government agencies should provide a readily accessible publication about the drinking water quality to the community. It is recommended that the government agencies promote the dissemination of water quality studies’ findings through mass media, social media, and other means of communications with the public. In addition, recommendations should also be provided to enhance the local environmental awareness of international students at universities.
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Dedication

I dedicate my dissertation to my father Mohamed Abd Eljawad and the soul of my Mother Salma Alejely
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In the past few decades, public awareness of drinking water has increased significantly. For example, concern about environmental pollution is one of the main reasons why people have changed their attitudes about tap water. Previous studies of public apprehension addressed different factors that related to bottled water consumption. The majority of these previous studies used quantitative methods, such as surveys, questionnaires, and phone interviews to estimate the factors related to public apprehension. One example was the 1974 survey by the Gallup Organization conducted in the United States, which revealed the need for targeting people’s attitudes and behaviors. The study surveyed 33 million participants about their satisfaction with water quality in the United States. The results showed that one in five people thought that local drinking water could affect their health. This percentage was higher among people with a higher education background (Gallup Organization, 1974).

Another study in 1975 pointed out that people’s knowledge and awareness regarding water quality had increased, and, as a consequence, public perceptions of drinking water had also changed over the years (Bruvold, Rosen, & Pangborn, 1975). Moreover, a survey was conducted in Florida between 2008 and 2009 to study public perceptions concerning groundwater and surface water resources. The researchers found that 39% of the respondents believed that the quality of surface water was either poor or fair, and about 55% thought that the water quality was good (Borisova, 2010).

Water Quality Assessment, WQA, (2001) found that 86% of the American population have concerns about tap water quality. Those people may substitute bottled water for tap water or
choose to attach devices to filter their tap water. This finding is consistent with the trend in annual production of bottled water, which has increased by 10% every year since the production of bottled water began (Bottled Water Web, 2000). Furthermore by 2000, the sales of bottled water had increased to $4 billion in the United States and $36 billion worldwide (Seattle Times, 2000; Suffet, 2001). Based on these facts, we can argue that higher production and sales of bottled water indicate that people have increased their demand for bottled water.

Most of the above studies investigated general satisfaction, such as taste satisfaction and risk satisfaction, yet no other studies have been conducted to investigate the cross-cultural apprehensions regarding drinking water. Social factors are very important to the study of public behavior regarding water, because the U.S. is becoming more culturally diverse.

This research studied educated people’s apprehensions and compared the attitudes regarding drinking water quality between Arabs and Americans. No specific study has focused on comparing perceptions of drinking water quality between two socially distinct groups in the area of Muncie, Indiana, also known as Middletown, or the typical American community (Geelhoed, 2003).

This study answered the general question, “What apprehensions do educated Americans and Arabs have regarding drinking water in Muncie Indiana? This study was designed using qualitative inquiry and procedures. Semi-structured interview questions were designed to stimulate discussion in interviews and provide more data and a deeper understanding of the perceptions of drinking water quality.

The research questions are related to the following sub-areas that were missing in the literature from other studies related to water quality: identifying types of apprehension, public health concerns, media influences, religious influences, and academic backgrounds.
The specific research questions for this study were:

- Do educated Arabs have different attitudes toward drinking water in Muncie, Indiana than Americans?
- What kinds of apprehensions do Arab and American groups have toward drinking water in Muncie, Indiana?
- Does the length of residence in Muncie affect the participants’ perceptions and behaviors toward drinking water?
- Does previous experience(s) with drinking water change participants’ perceptions and behaviors toward drinking water?
- What public health concerns does each group have about drinking water?
- Does the media, such as local newspapers, affect participants’ apprehensions toward drinking water?
- Does academic background affect participants’ perceptions and behaviors regarding drinking water?
- Do religious beliefs affect participants’ perceptions and behaviors regarding drinking water?

This study used a qualitative method and arrived at a series of claims after analyzing the data. The study tended to find interactions between different themes for different groups. A qualitative approach is not a method to test prior knowledge listed in the literature review, but rather a way to discover data and create processes within the research stages to end up with a theory. That is why this study did not examine any previous theory or test a hypothesis. This is consistent with Maxwell (1996), who argued: “in qualitative research, hypotheses or propositions are generally formulated after the researcher has begun the study; they are grounded in the data.
and are developed and tested in interaction with it, rather than being prior ideas that are simply tested against data” (p. 53).

Need for this Study

Studying public awareness and perceptions regarding water is critical as demand for water continues to increase with population growth and immigration in the United States. People can be affected by different factors regarding choices about drinking water, and different backgrounds and cultural reflections can also influence their attitudes. This study collected qualitative data from two different cultural groups, Arabs and Americans, living in a similar geographic area and sharing similar educational characteristics. The study was intended to contribute to the literature about perceptions and behaviors surrounding demand for drinking water. The results from the data will be compared with the literature to describe attitudinal differences regarding water quality between educated Arabs and Americans.

Definitions of Terms

_Apprehension:_ “Fearful or uneasy anticipation of the future; dread” (Thefreedictionary.com, n.d.).

_Stormwater:_ The run-off from precipitation that flows onto impervious land (paved streets, parking lots, and building rooftops) and cannot be absorbed so that the ground accumulates chemicals, oils, sand, and other pollutants that move into the river or other surface water (USEPA, 2012).

_Nutrient:_ Nutrients such as phosphorus and nitrogen are important for helping animals and plants grow. High amounts of these nutrients can have negative impacts on water bodies, such as causing eutrophication and eventually hypoxia (Angie Brown, 2006).
Chemical agents: Different chemicals can pollute drinking water, such as chlorine, lead, or mercury; and excessive levels can lead to negative health effects for the consumers (USEPA, 2013).

Microbial agents: Bacteria, viruses, fungi, and algae can contaminate drinking water (USEPA, 2013).

Emic: Refers to a body of knowledge arising from within a culture, based upon habits, traditions, beliefs, and sources of information expressed in the local culture's own terms (Pike, 1954).

Etic: Refers to knowledge derived through application of the scientific method that is expressed in the universally relevant terms of scientific discourse (Sturtevant, 1964, p. 102).

Overview of the Dissertation

Chapter Two provides the literature review about public perceptions and related factors such as the media as a source of information. The Star Press is the local newspaper in Muncie, Indiana that has published on different topics regarding drinking water quality. Also, the literature review discusses previous studies about bottled water as an alternative drinking water source, and the conceptual framework of the method.

Chapter Three is a description of the methodology used in this study; the chapter includes information about grounded theory, sampling and analysis procedures. Chapter Four presents the participant profiles and the findings from both groups. The fifth chapter is a discussion of the overall results and analyzes the qualitative data using the constructive grounded theory method. The recommendations were intended for government agencies and academic institutions. Chapter 5 includes suggestions for future research.
Chapter Two: Literature Review

“We don’t live in a world of reality, we live in a world of perceptions”
Gerald J. Simmons (n.d.)

There are many studies regarding public perceptions of tap water. Water Quality Assessment, WQA, (2001) found that 86% of the American population have concerns about tap water quality. Those people may substitute bottled water for tap water or choose to attach devices to filter their tap water. This finding is consistent with the trend in annual production of bottled water, which has increased by 10% every year since the production of bottled water began (Bottled Water Web, 2000).

Regulations and water standards for water treatment seem very controlled. A study showed that only 5% of the 55,000 water treatment systems in the United States exceeded Maximum Contaminant Level (MCL) limits (Environmental Protection Agency [EPA], 2001). The study declared that the MCLs are not the reason for poor water quality.

The number of people using alternative sources of drinking water in the United States is increasing every day. A study by Mackey et al. (2003) found that more than 80% of people on the West Coast, Southern Coast, and Southeast Coast consume tap water alternatives, for example bottled water. This percentage increased from 1993 to 2003. However, Mackey et al. (2003) concluded that only 20% of people in the Midwest area, including Indiana, consumed alternatives.

Variables that may affect the study of perceptions of water quality include age and number of children in the household. The results of the study above found that people younger than 29 are less satisfied with tap water. They think tap water is not safe, is unhealthy; or the quality is not good in general. Although age was an important factor, in contrast, educational
level and gender had no significant effect on these perceptions (Mackey et al., 2003).

**Muncie, Indiana, i.e., “Middletown,” as a Typical American City**

Geelhoed (2003) described Muncie as a small city that attracts social scientists and journalists, and he based this on his recounting of Robert Lynd and Helen Merrell Lynd’s 1937 and 1929 descriptions of Muncie in their books, *Middletown: A Study in Contemporary Culture* and *Middletown in Transition*. The authors of the books observed factors of American life, for example, religious practice in a modern urban city. The authors named Muncie “Middletown” because of the population size and other factors such as a diversity of businesses. They also divided the people living in Muncie into two classes: business class and working class. Business class as defined by the authors as including businessmen, lawyers, physicians, educators, clergymen and others; whereas the working class is described as Muncie’s laborers. The Lynds made Muncie famous as a typical city to conduct social and cultural research. The above information about Muncie compelled the researcher in the present study to study the social factors related to awareness of environmental issues in this typical city. The culture of American people is one of the most important factors for understanding American apprehensions regarding environmental issues such as drinking water quality.

**Water Articles in The Star Press, Muncie’s Local Newspaper**

*The Star Press* is the most popular newspaper in Muncie, Indiana. Locally, drinking water quality has been an issue for a long time, and *The Star Press* has published articles on many different pollutants. It has brought to light pollutants that affect the local drinking and recreational water quality. By reviewing *The Star Press* for water quality articles from the last 10 years, we can identify many different types of possible pollutants in the Muncie area.
First: Stormwater issues. The Star Press featured several articles related to stormwater between 2006 and 2009. The newspaper identified the problem of stormwater in the area from both an economic and an environmental perspective. The following background discussion addresses articles from both perspectives.

Presenting the environmental perspective helps draw the attention of local residents to the environmental risks of stormwater. For example, an article from June 2007 about the new Director of the Bureau of Water Quality said, “Conrad's primary goal will be to continue to carry out the Bureau's main duties ‘as a testing and enforcement agency.’ New challenges will continue to arise, such as the reduction of pollution in stormwater” (Slabaugh, 2007b). An additional article from July 9, 2006 entitled “Grow a filter to help clean the White River” and showed how dangerous stormwater can be. The author described the stormwater as brown because of sediment washed from fields and building sites, fecal matter from failed septic systems, and even oil, along with soil and chemicals from local lawns. After describing the White River’s color, the author mentioned the benefits of a rain garden and how it can help decrease the flow of stormwater into the White River (Dungan, 2006).

Another reason to pay attention to the cost of the potential harm from stormwater is to look at the economic impact. On August 23, 2006, the article “Homeowners will pay to clean stormwater,” brought awareness of the cost of stormwater management by discussing the future fees to be paid by homeowners and businesses. The journalist began the article by presenting the cost of pollutants from stormwater, stating, “The $2.50-a-month charge will pay for the removal of dog feces, cigarette butts and other pollutants from stormwater” (Darrell, 2009). Another example of the economic cost of pollutants in stormwater was found in an article published on May 1, 2009. The title emphasized the effects of heavy rain and pollution with the headline
“April Showers Bring Pollution” (Darrell, 2009). The author of the article described the cost incurred when garbage and other harmful chemicals run off the pavement and roads when there is heavy rain.

*Second: Nutrient issues.* Another environmental topic in water quality that *The Star Press* showed concern about within the last ten years was nutrient pollution. This is represented in many articles such as Seth Slabaugh’s article from 2006, in which he gives a brief history of the issue. He argued that nutrient pollution has been a problem since 1913 in the Limberlost Creek watershed in Indiana due to hypoxia in the water body. This historical issue about nutrient pollution might raise residences’ apprehensions toward water quality, especially in the agricultural areas, such as Muncie, Indiana.

Many articles that followed the first one in 2006 reported the same issue. For instance, Angie Brown (2006) reported on the White River Watershed Project's activities to work with local residents to eliminate nutrient pollution. The writer explained nutrient pollution as nitrogen and phosphorus from fertilizers, and the effects of till draining from agricultural land. These efforts increase the concentration of nutrients, which can lead to eutrophication in water bodies. In 2004, *The Star Press* published an article that said the project also included a management plan for eliminating the excessive nutrients from tillage for the Killbuck-Mud, Buck, and Prairie Creek watersheds in Delaware County (Brown, 2006).

*Third: Chemical issues.* Moreover, many articles revealed chemical pollutants in the area that are due to many human activities. For example, one author spoke about the effort that Borg-Warner Company made to clean up chemical pollutants from groundwater in Muncie, Indiana. They found that the main contaminant was Trichloroethylene (TCE), and the author mentioned the negative cumulative health effects of TCE on humans, such as Leukemia (Slabaugh, 2009).
The Star Press is often the first to cover unusual environmental incidents, such as the news report that at one time nearly 2,000 tires in 2005 were burned in Muncie, Indiana. The journalist quoted Mr. LePoris, the Director of Delaware County Emergency Management Agency (EMA), who said that “a burned tire creates about two gallons of oil and contains metals that can contaminate water sources” (Werner, 2005, p. 3). In the same article, the Indiana Department of Environmental Management and Delaware County Emergency Management Agency (EMA) officials declared that there was no oil found in the duck pond where the stormwater eventually ended up (Werner, 2005).

In another report from The Star Press, Yencer discussed the petroleum pollutants spilled by Townsend Tree Service in the nearby area of Yorktown on July 21, 2006. The author mentioned the Indiana Department of Environmental Management’s (IDEM) request for assistance to clean up the oil spill. Moreover, the article showed the toxic effects of the oil on the plants nearby. However, the author declared that the groundwater was not affected and was safe to drink (Yencer, 2006).

An additional situation was reported in an article about Indiana’s decision to increase corn production to supply an increased number of ethanol refineries. The article quoted Otto Doering, a professor of Agricultural Economics at Purdue University, who said that this could lead to many negative effects on soil and water in the area, because corn needs pesticides and fertilizers, as well as a huge amount of irrigation water, which might cause water pollution by nutrients and soil erosion (Slabaugh, 2008a).

**Fourth: Microbial issues.** Microbial pollutants are another type of water pollution and are considered the most common. An article by Slabaugh on December 3, 2003 titled, “Plan targets E. coli” showed IDEM’s efforts to decrease the level of E. coli downstream from the
Memorial Drive Bridge. Slabaugh reported that this is an indication of human and animal waste, according to one IDEM consultant, who said that *E. coli* was found because of the combined sewer overflows (CSOs), livestock manure, inefficient septic systems, and stormwater that contained waste from pets, wildlife manure and pasture land.

Five years later, another article was published showing that Muncie had 19 combined sewer overflows (CSOs) along the White River and Buck Creek that contained many kinds of pollutants, such as domestic waste and raw municipal sewage, especially during the wet seasons. This flow also contained microbes such as bacteria, viruses, and others. The Muncie Sanitary District (MSD) in March 1999 offered $16 million to support a long-term plan to control CSO flow in the city (Slabaugh, 2008b). Local government agencies, such as the MSD have standards to improve surface water quality; whereas federal agencies regulate both bottled and municipal tap water.

**Federal Agencies**

Two different agencies in the U.S. regulate bottled and tap water. The Environmental Protection Agency (EPA) is responsible for regulating tap water, which includes regulations on source water protection, operation of drinking water systems, contaminant levels, and reporting requirements. In contrast, the Food and Drug Administration (FDA) regulates bottled water as a food product. FDA obtains regulations from the Federal Food, Drug, and Cosmetic Act (FFDCA). The FDA (2009) from time to time collects samples of bottled water and analyzes them and reviews the labeling (The Food and Drug Administration, 2009). Many studies have shown that bottled water quality is inconsistent.

Studies have done research on bottled water and found a lack of consistency in the quality of water. For instance, Lalumandier and Ayers investigated the level of fluoride and
bacterial content in five brands of bottled water and three plants that produced tap water in Cleveland, Ohio. The study showed that only 5% the bottled water in the study met the fluoride requirement. Meanwhile 100% of tap water met the state fluoride requirements. The study confirmed that bottled water samples can have levels of fluoride inconsistent with the recommended level of 1mg/l of fluoride, compared to tap water (Lalumandier & Ayers, 2009).

Consumption of Bottled Water

The exponential growth in the consumption of bottled water among U.S. consumers over time has been fueled partly by a growing dissatisfaction with the country’s tap water quality. Curry (1983) noted that, “although bottled water may now be considered a luxury, it may soon become a necessity” (p. 3). Also, in 1980 the USEPA estimated the dollar sales of home water treatment units at $112 million. Both phenomena, consumer preference for bottled water and the expanded use of water treatment equipment, were expected to increase in the next few decades. Since then, research has continued to examine the relationship between the use of alternative drinking water sources and people’s consumption practices.

Furthermore, numerous studies have shown that consumers prefer bottled water due to a more acceptable taste and odor. Bruvold et al. studied consumer perceptions of taste and odor and found that consumers judge the water quality negatively if the total dissolved solids (TDS) in drinking water increase. The study respondents considered the water to be unacceptable if it contained more than 500 mg/l of total dissolved solids, and this was the main reason that motivated them to find alternative solutions (Bruvold et al., 1977).

Many studies have shown other factors that have led to increased bottled water consumption. Such research has tended to focus only on dissatisfaction with typical sensory properties of tap water, such as odor and taste, at the expense of other factors, such as perceived
quality of water sources, trust in the tap water companies, and demographic variables. Doria (2006) concluded that an investigation of all factors related to tap water quality and consumer perceptions could provide crucial information toward understanding the reasons why consumers would want to use bottled water, an alternative that is more expensive, produces more landfill waste and is less comfortable to use at home. However, Doria (2006) stated that the study had limitations, such as variation in the research instrument, ignorance in the use of bottled water as an alternative drink, and the lack of longitudinal surveys to reveal change over time.

Mackey, Boulos and Crozes conducted a survey in 2005, which was distributed through water agencies in 22 states in the U.S. The main finding of the survey was that utility characteristics could also have an influence on the perceptions of both tap water quality and utility service. Customers of public water utilities tended to be more confident about the tap water quality that they received in their homes than those who were served by private water utility companies. Furthermore, customers of providers who used surface water as the drinking water source were often more satisfied with its water quality compared to those who bought it from providers using groundwater sources, due to health and safety concerns (Mackey, Boulos and Crozes 2005).

Previous research also suggested that Americans who used tap water in their homes exhibited a more positive perception of its quality than those who used bottled water (Canter, 1994). Most of those who chose to use bottled water at home cited safety concerns with tap water. However, no geographical trend in perception of tap water and its taste, quality, odor, health, and safety has thus far been observed in the U.S. (Mackey et al., 2005).
Health Effects of Polluted Water

Frankenberger (2010) noted a correlation between a healthy, clean environment and healthy watersheds in central Indiana. The author elaborated on the water resources of Boone County, including ground and surface water. The author also elaborated on water use in the region. Domestic water use (for drinking, washing, and watering gardens) comprised the largest share of water usage in the county. This water is derived from ground water and is liable to be contaminated by microbes such as Escherichia coli, pesticides, and other inorganic substances.

Moreover, another study by Christopher (2008) discussed the anticipated public health risk in the Great Lakes region. The author noted that approximately 40 million people who depend on the lake for drinking water were at risk for waterborne diseases. He attributed this to adverse weather conditions leading to high sewage discharge in Lake Michigan and recommended that the public health infrastructure be strengthened so as to minimize this risk. The same information applies to regions of Indiana. In general, Indiana is an agricultural land that uses a lot of chemical products such as fertilizers and pesticides to eliminate weeds or encourage plant growth. These chemicals harm the water bodies, which creates a concern about adverse health effects.

Chemicals in Indiana. Some studies related to water pollution mentioned Atrazine as the most common herbicide in the agricultural area. The study by Hugo in 2009 found that Atrazine and other herbicides were increasingly being detected in drinking water in Indiana. The article sought to assess whether Atrazine in drinking water is linked to increased prevalence of Preterm births and Small for Gestational Age births. Drinking water was sampled from 19 water systems in Indiana. Based on these systems, births from the same locality were selected. The study found that Atrazine in drinking water during pregnancy was associated with increased prevalence of
Small for Gestational Age births. Atrazine was also mentioned in the White River Watershed Project for Muncie and Delaware County. Researchers have noted that levels are highest in the Spring after it has been applied to farm fields (Hugo et al., 2009).

**Microbial agents in Indiana.** As the chemical compounds used for agricultural purposes contaminate the drinking water, there are many other contaminants that might be found if the water treatment is not sufficient. For example, Kaishan et al. (2012) found an increasing nuisance of cyanobacterial blooms in Indianapolis drinking water sources. Kaishan et al. (2012) sought to establish the most effective tool for detecting cyanobacteria in drinking water. Water was sampled from Geist, Morse, and Eagle Creek reservoir, and various sensing tools were applied. The research found that coupling of the genetic algorithm partial least squares with hyperspectral remote sensing was useful in monitoring cyanobacteria.

Another study by Wilczynski from 2012 reported an outbreak of gastrointestinal illness among firefighters in Indiana and Michigan. This infection was attributed to *Cryptosporidium*. The authors hypothesize that this infection was due to contaminated drinking water or exposure to calves. They conducted research to localize the source of infection. Contaminated drinking water was noted to be the transmission medium. They recommended proper measures for water treatment.

**Conceptual Framework**

The researcher was interested in studying the social aspects of environmental issues, such as perceptions of drinking water quality in a typical American city. Muncie as “Middletown, U.S.A.” allowed for a suitable laboratory to develop the research project. Many studies have mentioned people’s behavior related to drinking water and studied the factors that influence their perceptions. For example, Dorian in 2009 found from quantitative and qualitative studies
conducted in the UK and Portugal that people’s perceptions came from multiple factors and interactions and concluded that sensory properties of drinking water, chemical pollutants, and health concerns were related to people’s perceptions. This study was an initial reference that motivated the researcher to learn more about people’s perceptions in the US. In addition, the U.S. continues to diversify in terms of ethnic and cultural groups, which encouraged the researcher to investigate cultural differences by comparing multiple factors between two cultural groups. The investigator’s background as an Arab researcher lent additional credibility to the study, by acting as a bridge between English speaking and Arab subjects.

Muncie is a population of 70,000 and is one of many Midwestern communities that transformed in the twentieth century to maturity. This transition for Middletown (Muncie) with a majority of native-born citizens is very good for observing the difference with the Arab group in the area (Lassiter, 2004). Differences between White and African Americans have been studied in the past, but Arab citizens have not been studied extensively. It is very important to the study to compare the Arab and American ethnicities. The Arab population in the city is growing and the majority of them came to the city as students to study at Ball State University.

The researcher studied Arab and American perceptions of drinking water quality in Middletown (Muncie) and compared these two cultural groups by using constructive grounded theory. Grounded theory is a good method for creating a theory about public apprehensions and related phenomena. Grounded theory “seeks to inductively distill issues of importance for specific groups of people, creating meaning about those issues through analysis and the modeling of theory” (Mills et al., 2006, p. 8). The research sought to find themes that would emerge from the data and theory created from the driven model.
An Overview of Grounded Theory

Grounded theory is “a systematic qualitative research methodology in the social sciences emphasizing generation of theory from data in the process of conducting research” (Martin et al., 1986). The theory was developed by Glaser and Strauss in 1967 after they conducted research on death awareness in 1965. The study used a comparative approach without having a preconceived notion of what participants would discuss. The theory of the research was grounded in data; grounded theory gets its name from this meaning. There is an argument about the classic researchers of grounded theory that identifies who they are and what exactly they know about the main elements of grounded theory, which are: question constructing, theoretical sampling, transcribing interviews, coding (making themes), creating conceptual categories, comparing data, analyzing memos, and developing a theory (Ke & Wenglensky, 2010).

Constructive grounded theory. Kathy Charmaz was a Glaser and Strauss student. She described her method as “a set of principles and practices, not as prescriptions or packages” and emphasized “flexible guidelines, not methodological rules, recipes and requirements” (Charmaz, 2006, p. 11).

The qualitative data was collected in this study by using a semi-structured interview method. The data collected was not constructed as theory, but both the researcher and the participants worked together to construct a theory from the results. The study started with open coding and focus coding, informal memo writing and organized memo writing, theoretical sampling, and saturation of the sample to develop the theory (Charmaz, 2006).

Charmaz (2000) and Lincoln & Guba (1985) explained that the interaction between participants and the researcher gives flexibility to the data collection process to use the participant’s experiences very well. The research questions in this study described the cross-
cultural issues that are related to water quality. In order to collect data and generate a theory, the research questions were open-ended. Theoretical sampling gives the researcher ideas about major themes. It is a gradual process, whereby interviews provide additional information about possible themes. For more detail see the Methodology Chapter 3.

The research questions and the interactions between the data explained the social reflections through cross-cultural groups. Suddaby’s (2006, p. 636) perspective explained that understanding the designed relationships between social actors is the main point of grounded theory, rather than just gathering statements from the participants.

**Strengths of grounded theory.** Grounded theory is a good method for understanding and recognizing new phenomena. It is an effective approach for building new theories and understanding new phenomena. Grounded theory requires a certain system of data collection, sorting, and analysis. It can also predict future phenomena. In a nutshell, the researcher should be able to interpret the data from different perspectives (Ke & Wenglensky, 2010).

This flexibility gives strength to constructive grounded theory. As Charmaz (2006) stated “the strength of grounded theory methods lies in their flexibility and that one must engage the method to make this flexibility real” (p. 178).

**Weaknesses of grounded theory.** The major weaknesses of this theory arise from the overwhelmingly massive amount of unorganized data, which entails creating a plan to deal with such large amounts of data. As a result, it is time consuming. Another weakness of grounded theory is that inductive and deductive reasoning are not differentiated. In addition, with this theory, it is difficult to recognize when the information available is sufficient and ready to analyze (Ke & Wenglensky, 2010). The process of interaction aims at understanding grounded theory and observing the correlation using symbols, words, interpretations, and language.
(Denzin, 1998). People’s experience and social behavior constitute the essences of grounded theory. It helps researchers in understanding and articulating some issues related to their unclear assumptions, which were not addressed well before in their studies (Hutchinson, 1993).

Figure 1. Summary of grounded theory method, by Lowe (1995), Pigeon & Henwood (1976), and Dey (1999).
The above figure describes the grounded theory process and the steps that the formulation of research goes through. First, it starts with the researcher pre-understanding the phenomenon. These ideas are based on the literature review, which is the main, beginning source for the research. Secondly, the researcher narrows down the phenomenon and focuses on investigating it. Having a topic is very important for directing the researcher in the right way, starting from data collection about the phenomenon. After collecting the data, the open coding process is used to categorize the information into themes. Writing memos during the interviews and defining relationships and properties of the data is essential in this method. This step helps formulate the researcher’s insight outside the (topic guide). To reach the saturation stage which is when no more new data can be gathered from the participants, transcriptions and coding of every interview are completed, and analysis occurs using an interactive process until it is determined that a saturation point (Glaser, 1978) has been reached whereby data collection ceases. Findings should be related to the literature review in order to formulate a theory at the end. The research, after these steps, can be published.
Chapter Three: Methodology

Research design

The sampling was purposive in this study, and eighteen participants were selected, who shared similar characteristics, such as place of residence, education, and ethnicity. The researcher focused on educated Arabs and Americans, people who have academic degrees higher than bachelor’s degrees, such as master’s, doctoral, and other professional degrees. It was easy for the researcher to find participants at a university, where the researcher studies and works. Three American participants were found from outside the campus through a friend’s referrals. The education, ethnicity, and place of residence of participants were the sampling criteria for the study.

The researcher conducted twenty interviews but lost two of them due to a technical problem with the audio recordings. The researcher spent extra time looking for two other participants and then set appointments and conducted the additional interviews. The research process resulted in 18 interviews to be used for analysis.
Geographic description

The study was conducted in the area of Delaware country that includes Muncie and Yorktown. Muncie is a small city that has a total area of 27.39 square miles (70.9 km²), and the total population is 118,769. The percentage of area in water in Muncie is 0.69% and in land is 99.31% (Wikipedia, 2013, para 3). As mentioned in previous chapters, Muncie has been well studied in the past as “Middletown,” i.e., a typical American town.

In addition to the Middletown heritage of having been studied over the 1900s, the researcher chose this specific area because it has the White River and the Prairie Creek Reservoir as a source of drinking water. The location is a very good place to find Arabs and Americans
because Muncie has a diverse university campus and has a decent sized Islamic Center. This allowed the researcher to find Arab participants easily.

**Research Participants’ Context**

The American participants were native speakers of English. There were a total of eighteen interviewees, who participated in this study: nine Arab and nine American participants.

As the researcher is a native speaker of Libyan Arabic, the interviews with Arab participants were in the Arabic language to obtain more detailed information from the participants. In addition, demographic variables were measured after the interview, including age, sex, marital and family status, educational background, place of birth, current residence, and income level.

**Data Collection**

Ball State University’s Institutional Review Board (IRB) approved this study for Human Subjects Clearance on March 27, 2012. On April 21, 2012, the researcher conducted a pilot study with six interviewees to test the questions with three Arab and three American participants. The pilot study helped the researcher to revise two questions, namely the questions about health concerns and the risks of drinking water. The researcher found that people got confused and repeated the same things to answer the questions. The researcher found that health concerns were more specific and therefore focused the question more narrowly. The researcher also adjusted the question order; for example, the first few questions were asked to identify the participants’ fears; and then if the researcher found that the participant had apprehensions, then the researcher tended to ask more questions about health concerns. It is not logical to ask what concerns a participant has regarding drinking water when the participant has no apprehension at all.
regarding tap water. On November 26, 2012, the interviews started with the protocol questions and then demographic information.

**Instrumentation**

*The semi-structured interview.* This study utilized a semi-structured interview protocol as defined by Denzin and Lincoln (2005). In this study, the researcher conducted semi-structured interviews, commonly used in qualitative research, based on open-ended questions, which give more detail about the topic being researched. Both the interviewee and the interviewer can ask and exchange information with flexibility and comfort. Semi-structured interviews provided the interviewer with a number of tools and prompts that could use to help the interviewee open up and expand on their ideas.

For instance, if the interviewee was unable to provide more information or felt hesitant to talk about certain issues, the interviewer could use certain types of prompts, such as the detail-oriented probe which, for example, included the use of “tell me more,” or “what else?” Another probe used in this kind of interview was a clarification probe, using, for example, “what do you mean by this,” and “could you explain this please?”

Based on the points mentioned above, the semi-structured interview provided the researcher the advantage of collecting and eliciting as much data as possible. In this case, the semi-structured questions enabled the researcher to go beyond the questions and obtain more relevant information about the topic, which included narratives and life experiences.

However, semi-structured interviews have a number of disadvantages. First, they tend to limit the size of the study as interviewing people is time consuming and expensive. Second, the interviews are also time consuming and the follow-up questions are unrestricted to any particular criteria, which creates inconsistency in the data (Patton, 1987).
**Interviewing educated participants.** The researcher conducted semi-structured interviews for two educated groups that share similar academic levels, areas of residence, and ethnicity. These two groups consisted of educated Arabs and Americans. The participants were well-informed and could therefore provide significant contributions to the study, because they have achieved a high educational level and high socioeconomic status.

Another advantage of interviewing educated people was that the educated could represent the organizations that they are a part of as well as the communities that they come from, such as those of the Arab participants. This provided the researcher with supportive, rich, and detailed information. In spite of the merits of this type of interview, there is a major disadvantage of interviewing educated groups, which is that they are always busy with their work or study, and it is hard to find time to conduct the interviews (Suter, 2012).

The question protocol started with “What apprehensions do you have about the drinking water in Muncie? What else?” And the second question was, “What about the sources of your drinking water worries you? What are your reasons for these worries?” For the complete interview protocol, please see the Appendix.

**Procedures.** The interviews took more than two months to complete with the extensive transcription and the coding. The participants were contacted either by e-mail or in person to set appointments. After contacting the participant and determining the place and the time, a consent form was read and signed by the participant and the researcher. The researcher started the interview with a small introduction to the study to prepare the participants for the questions. Every question had many probes to get more information, such as “Could you please explain? What are the reasons for that? What else?”
The audio recordings were taken and the files were saved in MP3 format on the researcher’s Mac computer. The researcher also opened a drop box account and transferred all the audio records into it to make sure that she had two places to save research data. The researcher took a pencil and notebook during the interview and kept the notes in her personal office at home.

**Theoretical Sampling**

After the summer 2012 Pilot Study, the researcher started interviewing people on November 26, 2012. The interview started with the American participants. The first three interviews with Americans helped the researcher create initial categories for the data. The researcher continued doing interviews and analyzing the data from Arab and American participants until the researcher reached the saturation limit and until the researcher did not gain any additional new information from the participants.

The two missing interviews were from American, not Arab, participants; that is why the researcher did not have difficulty in replacing them with different interviewees. The categories and initial themes were basically determined through the interview, and the researcher adjusted one question to fit with the themes after the first three interviews. According to Charmaz (2006), “[t]heoretical sampling involves starting with data, constructing tentative ideas about the data, and then examining these ideas through further empirical inquiry” (p. 102).

Theoretical sampling helps identify and describe the properties of the themes. The first theme was about knowing the participant’s apprehension. This theme explains whether the participants have apprehension or not, and then the question was designed to find out more about what kind of apprehension the participants had. This brought up the sub-theme for the initial categories, describing participants’ concerns about the types of contaminants in drinking water.
Using theoretical sampling was also helpful for reaching the saturation point in each category. For example, after interviews with eight participants from both groups, the participants did not add a new pollutant to the data, and the same thing occurred with other categories. The researcher confirmed saturation by adding one more interview to each group of eight. Theoretical sampling is the best way to distinguish between categories and also guide the data to create relationships between the categories, for example the relationship between the media and knowledge about specific pollutants.

**Transcribing and Coding**

The interviews were transcribed without using any electronic device. The Arabic interviews were transcribed in the Arabic language and translated into English. It took substantial more time for the researcher to transcribe all the interviews. The researcher did not change any information; only a few slang words in Arabic were substituted with the formal English words. The researcher saved the data in a secure place on her computer and in the drop box by user name and password.

The researcher used pseudonyms for the interviewees when writing the results to protect them. The Results Chapter shows only the substituted names and locations to keep the participants’ privacy.

**Writing Memos**

Glaser (1978) identified memos as “the *core stage* in the process of generating theory, the bedrock of theory generation” (p. 83). Writing memos helps the researcher create ideas and codes. Those ideas should develop freely and can be sorted and centered (Glaser, 1978, p. 83). The researcher starts writing memos by highlighting similar repeated words from the participants. The researcher in the present study chose different colors for different codes, such
as purple for taste, blue for color of water, red for chemicals, and so forth.

The researcher in the present study sorted similar answers about taste from each group in one document, such as what people said about taste related to their knowledge of the media, about their previous experience, and so forth. After the researcher finished sorting codes, the researcher looked again to the colored quotations and identified central themes; for example, the pollutant theme included chemical and microbial agents that people mentioned. The researcher continued sorting the themes under the related codes for each participant.

**Participants Check the Data**

According to Lincoln and Guba (1985), the participants can review the transcript to avoid misunderstanding and because it is a good way to protect trustworthiness in this type of research. All the transcripts were sent back to the participants. A few participants had comments, but the majority of interviewees were satisfied with the transcripts. The researcher faced some difficulties when she was translating the Arabic interviews to English text; the meaning of some words was slightly different. Another interviewee-check was when the researcher sent the Arabic and the English translations for the transcripts to the participants and the participants reviewed them, put comments in as track changes, and sent them back to the researcher to edit. Different wording and slight changes in meaning were adjusted after the participants gave their feedback.

**Keeping the Audio Recording and Notes**

After the researcher completed the transcription and was done with the audio recordings, all the files were collected and kept secure on an external flash drive. Also, all the notes from the interviews were kept in the researcher’s office at home. The data will be kept until the research is
done in case the researcher needs them. After completing the study the audio files on the external hard drive will be deleted and the notes shredded.

**Researcher Background**

The researcher’s background in environmental studies and as a native Arabic speaker gave her the ability to distinguish between different Arabic accents, and she is familiar with the common features of different Arab cultures. The research compared the two groups of Arabs and Americans so as to identify the emic basis of any ideas about local drinking water quality in Muncie, Indiana. The term "emic" comes from the linguistic term "phonemic," or the meaning carried by a spoken sound within a given language. In this research, emic refers to a body of knowledge arising from within a culture based on habits, traditions, beliefs, and sources of information expressed in the local culture's own terms (Pike, 1954). In contrast, the term "etic" has been derived from the linguistic term "phonetic," or the structure of a spoken sound within a given language. Etic relates to scientific knowledge, as explained previously.

**Data Analysis**

*Comparing languages.* The initial question was, "What are your apprehensions about the quality of the drinking water here in Muncie?" The interviewees responded to the question with either “I have apprehension” or the opposite. The next question asked was, “What else?” This second follow-up question was repeated until the interviewee had nothing else to add; some said, "That's all," or something similar.

The first question elicited two or more items of specific content, such as the participant’s fear if pollutants were found and what kinds of pollutants they thought would be found. For the Arabic-speaking sample, the opening question was

ما الذي يخيفك في جودة المياة؟

Or

ما الذي تتوجه منه خوف في مصادر المياة؟

The word “fear” in Arabic is represented as خوف and the word “apprehension” in
Arabic is represented as شكل. Also, the word حاجس could be used in Arabic to explain a troubled thought. The first word, خطوب in Arabic is very obvious and known in most Arabic dialects and is most similar to the English word “apprehension.” The Arabic-speaking participants were from different Arab countries, such as Libya, Palestine, Jordan, and Saudi Arabia.

**Open Coding**

Coding the data is very important in qualitative research. Coyne (1997) said that every group should be sorted by properties. The categories relate to each other if they share similar properties. This grouping is the best way to judge if the data is saturated or not (p. 629). After finishing the coding and data sorting for each theme, the researcher in the present study stopped writing memos and coding.

According to Boeije (2002), “It is only when new cases do not bring any new information to light that categories can be described as saturated. This means that these cases can easily be assigned to one of those already existent categories in the growing theory” (p. 393).

Four themes were identified from the data collected: apprehension regarding drinking water, pollutants and health effects, sources of information, such as media or word of mouth, and academic and religious backgrounds.

First, the interviews were transcribed; the researcher listened to the audio recordings again and typed in a Microsoft Word document. After that, the researcher highlighted the main themes in different colors and examined wording that was repeated many times. Then the researcher highlighted the text that related to the themes from each participant with one color. Following the first interview, the researcher coded the rest of the interviews similar to the first one, until the interviews were finished. The researcher created a new document for each
interviewee and sorted each theme by cutting the text and pasting the text under each theme and color-coding the sub-themes with different colors.

The coding used in this stage gave the researcher the ability to compare and contrast data between the participants and between the two groups. Comparing the data sets to each other helped the researcher find the base of her theory.

The researcher used an active voice in coding the data when restating what the interviewee said. Charmaz (2006) defined focused coding as “using the most significant and/or frequent earlier codes to sift through large amounts of data. Focused coding requires decisions about which initial codes make the most analytical sense to categorize your data incisively and completely” (p. 57). This stage of coding connected every piece of similar data to others to maintain the flexibility of examining sub-categories under each initial theme.

**Axial Coding**

Connecting categories to each other gives the researcher a view of the similarities and differences between themes. For example, the four themes were examined in both the Arab and American groups in this research, and the sub-themes were compared and contrasted. The connection between the themes, such as the effect of academic and religious backgrounds group perceptions was observed. For example, the sensory properties of tap water, such as color and taste, related to the period of stay in the USA. Each theme and sub-theme in this study was compared and contrasted for the two groups under study.

**Comparing the Data with Existing Literature**

Articles about water quality, such as in the *Star Press* were collected since 2009 and related to many points in this study, such as water quality in general, Muncie water quality issues, media use, and bottled water vs. tap water use. The sources mentioned in the literature
review were connected to these themes to examine the data; then the researcher wrote memos for every interview, and this helped her to construct the main aspects of this dissertation.

**Measurements**

_Credibility_. Credibility is the point where the data can speak for itself about the research, the point where data is believable. To reach that level in qualitative research, the researcher should organize the interview information well by sorting codes and giving good explanations. Credibility in quantitative research is achieved by instrument construction, but in qualitative research, the researcher is considered the instrument (Patton, 2001, p. 14).

According to Miles, Huberman, O'Flaherty and Whalley in 2004, qualitative analysis can obtain credibility through data reduction (breaking down the information to simple data coding). Charts, graphs, and even stories better illustrate research findings and give the data credibility (Suter, 2012, p. 345).

_Transferability_. Transferability means that your findings from interviews, focus groups, and shared conditions can be used in a wider setting. The results from specific contexts can be applied to general contexts and can be related to other field contexts. The data in this case is reliable and true. Other authors have explained this idea of transferability (Lincoln & Guba, 1985). Details and comparison, such as cross-case comparisons, can check the extent of transferability.

_Dependability_. In qualitative research, data is considered dependable when it is consistent. Healy and Perry (2000) assert that the quality of a study in each paradigm should be judged by its own paradigm's terms. The quality of the qualitative research paradigm is arbitrated by the same paradigm terms. The qualitative paradigm components, such as credibility,
neutrality or conformability, consistency or dependability, and applicability or transferability,
must be fulfilled for the research to be qualified (Lincoln & Guba, 1985).

**Conformability.** Conformability refers to neutrality. It refers to controlling bias. Another
researcher can reach the same result by peer review (Suter, 2012, p. 345).
Chapter Four: Presentation of the Data

Participants’ Profiles

Eighteen educated participants from Arab and American groups were interviewed for this qualitative study. A semi-structured and face-to-face interview format, audio recording, and pencil and paper notes were utilized throughout the interviews. The participants were highly educated residents of Muncie (Middletown) from different academic majors and different jobs. The interviews were directed by a series of questions. The researcher tended to use prompts to encourage the participants to speak or remember more information, to elaborate on their ideas for more rich information.

Profiles of the Arab participants. Ahmed is originally from Libya and has lived in Muncie for more than 10 years. He is in his late sixties and speaks fluent Arabic and English, but the researcher preferred to conduct the interview in Arabic to make the participant more comfortable. Dr. Ahmed’s major is Business, and he received his degree in the United States and has worked at many universities as a professor.

Manal from Saudi Arabia is working on her master’s degree in special education. She is Muslim, in her thirties, and married with two children. Manal has not lived in Muncie for a long time. She is a warm lady and speaks slowly, with details. She compares her experiences in Muncie with her experiences back home. Manal selected her home to do the interview.

Zakaria is a doctoral student in English. He has lived in Muncie less than five years and previously lived in California. Now he works as a graduate assistant at the university. He has worked in many places, such as Libya and Jordan. Zakaria is married, and he is 31 years old.

Rania is originally from Palestine and lived in Jordan. She is married to Zakaria, and they
worked together in Libya and the United States. She lived in Chicago when she was a child, and then moved to Jordan and obtained her master’s degree there. She came with her husband to live in Muncie. Rania and Zakaria chose their apartment for the interview.

Zainab is an EdD student from Saudi Arabia. She is a single Muslim, and her income is between $35,000 and $49,000 per year. She is also a teaching assistant. She was not a teacher back home. Zainab selected the library for her interview.

Salma is a master’s student in Urban Planning. She is from Morocco and speaks Arabic, English, and French. The researcher conducted an Arabic interview with her in the researcher’s home. Salma is married with no children. She has visited many different places in the United States and has stayed in Muncie for less than two years. She was working back home at an international company in Morocco.

Maya is 24 years old. She came to Ball State University in 2011. She will graduate next semester from the Department of English. She is from Palestine. She selected the researcher’s apartment for the interview. Previously, she worked with an international organization in Gaza. Her income in the United States does not exceed $24,000.

Fadi is 35 years old. Originally, he is from Saudi Arabia. He is an EdD student in special education. He has two children. Fadi’s income is between 35,000 and 49,000 per year. He selected the International Rinker Center to answer the interview questions.

Rafa is a physician from Libya working on a master’s degree in physiology. He is married and has one child. He came to Muncie in 2011 after living in Indianapolis since 2008. He selected the researcher’s home for the interview.

Profiles of the American participants. Mary has a master’s degree. She is married to an Arab specialist in waste management. Recently, she converted to Islam. She is pregnant and has
two school-age children. She was previously living in Wisconsin, and she just moved to Muncie last year. Her household income is not more than $74,000 per year. She preferred to have the interview at her office.

Patricia is a master’s student in the English department and works as a graduate assistant. She does not have any religious affiliation. Patricia is single and has lived in Muncie for less than five years. Her family lives in Indianapolis, Indiana. The interview was conducted in her workplace on the university campus.

David was born in 1960. He just moved to Muncie. He works in management. He has traveled and lived in many countries and states, such as Singapore, Michigan, and Oregon. His wife is a professional in water economy. The interview was conducted at his office. David does not have any religious affiliation.

Linda is an EdD student in the Education department. She is 35 years old and is married with a 2-year old daughter. Linda has no religious affiliation, and she has lived in Muncie for more than 10 years. Her household income is between $75,000 and $99,000. The interview was conducted in her office.

Jennifer is married and in her late sixties. She has a master’s degree. Her religion is Baha’i. Her husband is originally from Iran. She has lived in Muncie for more than 10 years. Jennifer does not have children. The interview was completed in her home in Muncie.

Peter is 40 years old. He came to Muncie in 2008 from Indianapolis. Peter lived in England for less than five years. He has a master’s degree. Peter is married and does not have children. He works as a Director at his office, where the interview was conducted.

Mark is an Orthodox Christian in his late thirties. Mark is married and has one daughter. He has lived in Muncie less than five years. The interview with Mark took place in his office.
Barbara has a master’s degree. She spent one school year in Germany. She is married and has two children. She was born in 1957 into a Protestant family. Her household income is between $75,000 and $99,000. Barbara and her husband Joseph selected their home for the interview. They have lived in Muncie, Indiana for more than 10 years.

Joseph has a doctoral degree in English Literature. He is married to Barbara and works as an assistant professor. He is 56 years old and was born and raised in Tennessee. His grandfather was a farmer, and his religious preference is Protestant.
Demographic Data

Table 1. Demographic data

<table>
<thead>
<tr>
<th>Demographic Data</th>
<th>Arab participants %</th>
<th>American participants%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Sex</td>
<td>44%</td>
<td>55%</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Married</td>
<td>Single</td>
</tr>
<tr>
<td></td>
<td>78%</td>
<td>22%</td>
</tr>
<tr>
<td>Number of children</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>56%</td>
<td>11%</td>
</tr>
<tr>
<td>Education</td>
<td>PhD</td>
<td>Master’s degree</td>
</tr>
<tr>
<td></td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>Household Income</td>
<td>$15,000-$24,000</td>
<td>$35,000-$49,000</td>
</tr>
<tr>
<td></td>
<td>33%</td>
<td>56%</td>
</tr>
<tr>
<td>Length of time in Muncie</td>
<td>&lt;5 years</td>
<td>&gt;10 years</td>
</tr>
<tr>
<td></td>
<td>89%</td>
<td>11%</td>
</tr>
</tbody>
</table>

The demographic data were collected after the interviews. In this chapter, I will next discuss and describe the variables that were collected, such as the age of the participants, sex,
religious background, household income, educational level, period of residency in Muncie, marital status, and number of children participants had.

The researcher included both male and female participants in order to discover any possible similarities or contradictory views between sexes. The interview had a question about how long participants have been in Muncie. Three It was surprising that none of the interviewees had been in Muncie between 5 and 10 years. Eight of the Arabs and five of the Americans were in Muncie for less than five years. Only one Arab participant had been in Muncie for more than 10 years. Four American participants had been in Muncie for more than 10 years.

The researcher conducted the interview with graduate students from different majors, and some of them were working as graduate assistants, teaching assistants, office coordinators, professors, and one medical graduate student. Six American participants were working on campus and were in the last year of their master’s degree. One doctoral student was working as a coordinator assistant. Six Arab participants were master’s students from different majors, and one had been a professor in the department for more than 10 years in the United States.

The Arab participants were all Muslim. Different religious backgrounds were listed for the American participants, including the following: two Muslim, two Protestant, one Orthodox, and four who have no religious preferences.

In summary, the Arab and American participants were similar regarding the length of time staying in Muncie. The American group in this study had higher household incomes than Arab participants.
Qualitative Data

The themes that emerged from the study were: sensory properties of drinking water, pollutants, health concerns, information sources and experience.

Table 2. Themes and sub-themes

<table>
<thead>
<tr>
<th>Central theme</th>
<th>Sub-Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Sensory Properties</td>
<td>Taste</td>
</tr>
<tr>
<td></td>
<td>Smell</td>
</tr>
<tr>
<td>B. Pollutants</td>
<td>Chemicals</td>
</tr>
<tr>
<td></td>
<td>Microbes</td>
</tr>
<tr>
<td>C. Health Concerns</td>
<td>Cancer</td>
</tr>
<tr>
<td></td>
<td>Bacterial diseases</td>
</tr>
<tr>
<td>D. (Personal) Background</td>
<td>Religious background</td>
</tr>
<tr>
<td></td>
<td>Academic background</td>
</tr>
<tr>
<td>E. Information Sources</td>
<td>Information from the Star Press</td>
</tr>
<tr>
<td></td>
<td>Newspaper</td>
</tr>
<tr>
<td></td>
<td>Information from other people</td>
</tr>
<tr>
<td>F. Experience</td>
<td>Length of residence in Muncie</td>
</tr>
<tr>
<td></td>
<td>Knowledge from home country</td>
</tr>
</tbody>
</table>
Theme A: Sensory Properties

Sub-theme A. (Taste, smell).

*American group responses.* Many different respondents from each group indicated that the taste was not acceptable and the water was not clear. The interviewees explained that with different words such as color, and turbidity; some respondents also noted that the chlorine in the water made the tap water smell and taste bad. For example, Patricia stated:

“I don't think I’ve thought about it a lot, but sometimes the water does taste a little strange. Sometimes there is almost a metallic taste. And there is a bit of a strange smell”. Did she explain the metal taste?

Mary also complained about the smell and taste of the water:

“We live in the county of Muncie, and the taste and the smell of the water is a turn-off.”

Those participants, who were not concerned about the drinking water also complained of the water taste, such as when Joseph said:

“I really don't have that much apprehension. The fact is I’m more concerned about the flavor than anything else. That’s my main concern. I generally think the water is safe.”
Arabic group’s responses. Most of the Arab interviewees stated that the water had a strong smell. Zakaria expressed that in the following statement:

"أنا أخشى أن تكون المياه ملوثة لأن لها طعم خفيف ورائحة ولاحظت في الأيام الأخيرة أن الطعم والرائحة عالية درجة أمري أسموها عن بعد قد تكون هذه الرائحة كلور أو شيء آخر لا أعرف بالضبط.

English translation

“I fear that the water may be contaminated, because it has a faint taste and smell. But recently, I have noticed that the smell and taste of tap water have increased significantly. I can distinguish the smell of chlorine in the water but I do not know what other smells it is concealing because of the overpowering smell of the chlorine”.

Zakaria meant that he did not notice the chlorine smell at first when he came to Muncie, and now he can tell that the smell is chlorine. Zakaria thought that maybe the federal agency increased the use of chlorine.

Manal said that strong smells come from the chlorination and she also thinks that the pipes and storage tanks are dirty and that is why the tap water has a smell, as stated in the following quote:

Manal thought that every house or houses has separate tanks like in Saudi Arabia, also she does not trust the net pipes in the homes.

"أول شيء جاء على بالي هو الكلور، والماء في غزة غير نظيفة ولكن الطعم يختلف غير الطعم وحتى إذا عملته بمياه الحنفية يصبح متعكر وغير صافي.

Translation of the first sentence only:

“The first thing that comes to mind about water is the evident chlorine in it. Water in the Gaza Strip is not clean but it tastes different from water here in the States."
Sub-theme B: Chemicals pollutants.

American group response. From the American group, for example, Mark mentioned agricultural runoff, which means fertilizers and pesticides. He stated:

“My concern for Muncie (with) the water system here would be the agricultural runoff that would possibly make their way into the Prairie Creek Reservoir. That is the water supply that is primarily used to provide water resources for the community of Muncie. My apprehension is that these contaminants are present, and having to rely on the water (Indiana American Water) company to sufficiently clean and treat the water for customer consumption."

Mark also explained that the chemicals can come from the landfills, as he stated:

“In the Midwest in general, you have large landfills, and those landfills are required to dig these very deep pits, and line them with plastic sheeting and weld the plastic sheeting together.”

Some participants mentioned chemicals that are used in the water treatment, Jennifer who has two apprehensions and said:

“It may not be, I don’t know, but I hope it is. The chemicals. They’re using too many chemicals to clean the water.”
Barbara summarized her answer too:

“(There are) two things that I tend to be concerned about. One is when the farmers are putting herbicides and fertilizers on their fields in the Spring. I have read that a lot of that gets into our water supply. The other concern is some of the chemicals that are actually added on purpose, such as the amount of chlorine and the amount of fluoride. I understand the need for the chlorine, to get rid of bacteria and it is very easy to get rid of that, once it’s in my house. But I can’t get rid of the fluoride, and I don’t believe the fluoride is good for us.” Her fear contradicts the idea that fluoride could help children's teeth (Koo H, 2008).

**Arabic group responses.** Manal said about the chemicals:

"أعتقد أن الكلور والأملاح أكثر ملوث لأن نسبتها زادت فسوف تتقلب إلى أثر سلبي في الجسم وعلى مدى بعيد قد يسبب السرطان."

English translation:

“I think Chlorine and the salts in water play a role in its contamination as . . . if it increased from its normal levels, it will have its toll on the body in the long-run and it might cause cancer.”

Rafah mentioned the groundwater and how it may be contaminated by chemicals from industrial wastes; and he stated also,

"أعتقد لو كانت هناك أي ملوثات ستكون الكيماوية وخاصة في المياه الجوفية من المخلفات الصناعية والمبيدات الحشرية المستخدمة في المزارع والتي تؤثر على جميع مصادر المياه."

English translation:

“I think if there is any sort of contamination it would be a chemical one. Underground water is exposed to industrial waste and pesticides that are used on crops, all which will affect water resources.”

In city water, the agricultural chemicals should be less of a concern; however Rafa's perception was that they could hurt him in the city.

**Sub-theme B: Microbes**

**American participants' responses.** Few participants from both groups stated that they thought that people could get sick because of bacteria or viruses. From the American group Patricia said:
“If it’s having a constant negative effect on my body . . . (it) could cause a stomach virus or worst-case scenario, it could cause some serious illness”.

Arabic participants' responses. Zakaria said regarding microbial pollutants:

الجراثيم أتوقع أكثر ملوث وهذا يأتي من كمية الكلور ... فلماذا كل هذا الكلور إن لم يكن هناك ميكروبات في الماء."

English translation:

“I think the water is infested with lots of germs and microbes and that might explain the large quantities of chlorine they use." need to put quotes after period

Theme C: Public Health Concern

Theme C represents the public health concerns of the participants, which includes six sub-categories: Cancer, poisoning, kidney diseases, gastrointestinal disease, infectious diseases and hormone disturbances. Some were stronger themes while others were mentioned less frequently.

Figure 4. Health concerns
Sub-theme C: Cancer.

*American group responses.* Most participants from both groups stated that cancer is the biggest health concern that drinking water might cause after a long period of time. Mary had a bad experience and said:

“Well, I have lived in areas in Pennsylvania, we called it cancer valley. That was the place I had talked about. We always had boil alerts, and we knew that that water was polluted” and added “I knew this one particular area had lots of instances of brain cancer, colon cancer, prostate cancer, many kinds of bladder/stomach cancers”.

Peter doesn’t have problem drinking water from the tap without a filter but he thinks that tap water may cause cancer. He stated:

“Like if there was cancer, I don't know. I would think the stomach, throat and digestive systems”

Linda also was concerned about the long-term effects and stated:

“I think we don’t really know. That’s maybe what makes people scared is that we don’t know. I think it would be more of a long-term effect. I think the fear that most people have would be cancer or birth defects or that kind of thing.”

Even David who does not have any apprehension regarding drinking water thinks that if the water has pollution, then the cancer will be the biggest concern. He said:

“Well, it would depend on the type of pollutant. I mean, if there are carcinogenic (substances) in the water, you’d certainly be concerned about the increased exposure to cancer, you know but I don’t know.”

*Arabic group responses.* From the Arabic group Raina thinks cancer can be caused from water. She said:

"مياه الحنفية أكيد تؤثر على الصحة وتسبب خلل في التوازن الكيميائي بالجسم وزيادة الزنك في الماء قد تسبب سرطانات وأورام مختلفة".

Her quote translates as:

“Tap water affects a person’s health if it was contaminated as it might affect the body’s natural chemical balance, i.e. zinc will cause cancerous diseases and tumors.”


Rania was not sure about the name of the chemicals, but she said zinc. The researcher thinks she meant Arsenic, because it has similar pronunciation in Arabic language.

**Sub- theme C: Bacterial diseases**

*American group responses.* Some American participants mentioned that viruses and bacteria could hurt the digestive system such as when Patricia said:

“It could cause a stomach virus or worst case scenario; it could cause some serious illness.”

Mark also mentioned a name of digestive disease that is caused by bacteria:

“My concern would be that if the water was not sufficiently treated, there would be gastrointestinal issues. Diarrhea or dysentery -- I would be particularly concerned for older people and children.”

Joseph is from the American group and was laughing and stated:

“We do have clean water. We don’t get dysentery. Or, cholera or whatever. And I think that’s what happens in third world countries, not in this country. And I hope I’m right”.

Some groups fear chlorine while others fear microbes. It is ironic in a way because chlorine takes care of the microbes.

*Arabic group responses.* Only Zainab and Zakaria were concerned about infectious diseases and said:

"أكثر تخوفى هو المرض وأي شئ ملوث يؤثر بلا شك على كل المجتمع وخاصة إذا كان معدي."

English translation:

“My main fear is to get sick from contaminated water. I also fear that the contamination may spread on a large scale and affect the community.”

"تлик معوي واسهال وتفيي .. أعتقد أنها الأمراض المتعلقة بالجهاز الهضمي وكذلك الجلد. هذا ينشر الأمراض والأوينة و يؤثر على الأطفال وكبار السن خاصة."

55
English translation:

“Some diseases relate to the digestive system like indigestion, diarrhea, and vomiting. It can also affect one's skin. Children and the elderly are affected the most.”

Theme D: Personal Participants’ Backgrounds

Sub-theme D: Academic background

American group responses. Both the American and Arab groups stated that there was no influence from their academic background that affected their perceptions of and behaviors about the drinking water. On the other hand, all participants were highly educated which assumes an inherent level of knowledge or curiosity. Participants from different disciplines and different academic backgrounds thought that their background did not affect their apprehension. Rather, the Academic background enhances their ability to read and analyze. For example Patricia said:

“Well, let’s just say I don’t have a really strong background in biology or sciences in general, so I don’t know as far as readings, it doesn’t influence the materials I am reading. But I do like to read. I guess it will influence me in that if the materials are
available, I’ll read it. I’d like to learn what is going on. I would like to know what affects my community.”

The same opinion was expressed from Mark, when he said:

“My academic background is in Slavic studies and history, so it doesn’t affect my apprehension, but it might affect my ability to perform research and form an opinion. My background has led me to live in other countries that have a much cleaner watershed; countries that are not involved in large scale commercial enterprises, and have a very clean, pristine aquifer.”

Linda also said:

“I think the fact that I’ve had some of the courses that I’ve had brought my attention to at least questioning. I think that if I do hear something now, probably not so much when I was younger, but now I think that I like to find out a little bit more about where the information is coming from than I used to. So if there is an article that I’m reading that talks about some finding of a research study, I want to see who paid for the research study. And that’s something I would not have done before pursuing further education. I’m much more skeptical about the information. Probably not as skeptical as I should be, but probably more than before.”

Barbara was laughing and said:

“You get to know too much. Solomon in the bible said that much wisdom can bring much sorrow. You know too much. Because I’m always involved in science, medicine, when I’m reading and working, so I come across these things all the time”.

The Arabic group responses. Zakaria said:

"المستوى الأكاديمي هو أدبي وليس له علاقة بالناحيية العلمية ولكن تعلمت إني أركز على دقة المعلومة وبالنسبة لمياه الشرب فإني اعتمد على كلام الناس ولابو وجود علاقة بين الخلفية الدينية ومخاوفي اتجاه مياه الشرب.

English translation:

“My academic background is in the humanities. But I have always focused on the accuracy of the details. Regarding my knowledge about water, it came from people’s past experience [and my own, too]. I think there is not a relation between academic background? and drinking-water apprehension.”

But Manal thinks that there is a relationship between education level and awareness. She stated:

"الإنسان كلما تعلم زاد الوعي وبالتأكيد أن ديننا في كثير من المصادر يبحث على أن الماء الجاري ظهور وذالك الماء الراكد مثل البحيرة أعتقد فيها حشرات وملوثات."
English translation:

“The more educated you are, the more aware you become. In my religion states that running water is clean and pure and still water is not, because it is infested with insects and pollutant.”

Fadi also had a similar opinion and said:

“لا أعتقد أن المستوى العلمي له تأثير على مخاوفى وحتى أهلي لديهم نفس مخاوفى وهم أميين ولذلك لا يوجد أي ارتباط.”

English translation:

“I don’t think that one’s educational level plays a role in deciding to use tap or bottled water. My parents are both illiterate and they share the same concerns I have regarding drinking water.”

**Sub-theme D: Religious background.**

*American group responses.* All the American participants had the same response about how religious background can affect peoples’ attitudes toward drinking water. Different religious preferences were included, such as Protestants like Barbara and Joseph, Orthodox Christians like Mark, Muslims like Mary and Jennifer, and others who didn’t have any religious preferences.

For example, Mary, who recently converted to Islam, said:

“I have to go on faith basically. I have to trust that that it is true to what’s being tested. I can’t recall now if there was any statement, like if it was a federal agency that was testing this.”

The participants who have no religious backgrounds only said one word. For example, Patricia “Nothing”, and Mark stated “No.”

Jennifer was a Christian and now she is a Muslim with Bahaii. She said:

“No, I think I would have the same apprehension regardless of what religion I am, I think. I mean, that’s what I feel. , , , I was Christian and now I’m not Christian. I’m another religion, I’m a Baha’i and whether I was Christian or whether I am a Baha’i, I’m still concerned about whether we are getting a healthy source of water.”
Linda was raised in a religious environment but now she doesn’t have any religious preference; she said:

“Probably not, because I wasn’t raised with a religion. But I would say that . . . definitely my cultural … even more so my socioeconomic group of peers, my peer group, would have an impact versus if I was of a different culture or socioeconomic group because we tend to do and think like who we envision as our peers, especially with things like school. What school I attended has a major impact. The fact that I was able to attend school had a major impact. But I wouldn’t say, probably, (that) religion influenced my situation, no.”

Barbara also answered the research question about the relationship between her religious background and her apprehension when she said:

“No. Actually my religious background would give me more confidence because God will take care of my family and me. I can do my best, but God has to take care of the rest. There are all sorts of things that I don’t know.”

Arabic group responses. All of the Arabic participants were Muslim, and they thought that water was valuable because Islam and the Quran speaks about the water in general. Furthermore, the participants shared those reflections based on their religion. For example, Zainab mentioned:

"أنا عن نفسي لم أقرأ أو أسمع شيء عن مياه الشرب في منسي ولكن على أن أتحقق من المعلومات وبالنسبة للجانب الدينني أعرف أن مياه الحنفية طاهرة وكم هل هي نقاء من الميكروبات ولكن لا توجد علاقة بين الدين ومخاوفنا اتجاه مياه الشرب."  

English translation:

“I, personally, have not read or heard about the water in Muncie, but I have to be careful and verify from the source. My religion states the tap water is pure but the question remains are there microbes present in the water”

Ahmad stated in Muncie for more than ten years stated:

"لا يوجد تأثير ديني ولكن في اعتقادي أن الماء لايسبب سرطان وأن هناك أشياء أخرى قد تسببه."  

English translation:

“I do not think religion affects the way I perceive water as a hazardous entity, but I do believe that there are other sources that cause cancer.”
However, Salma explained the symbolism of the running water in the Quran and how it is clean; and this relates to the use of the water when Muslims wash before praying. She went on to say:

"فَهَذَا نَبِيٌّ نَا وَلَا تَمَيَّزَ مِنْ مَاءِ الْبَحْرِ وَلَكَنْ هَذَا مَوْضُوعٌ يَتَعَلَّقُ بِالطَّهْرَةِ."

English translation:

“Our religion states that "still water" is hazardous for our health in comparison to running water. That is why I can perform Wudu with sea water, but it all goes down to how clean and pure the water is.”

Rania from Jordan emphasized that the Quran asks people to clarify information and this has motivated her to correctly understand her information about water before making a decision about it. This is explained in the following quote from her:

"وَإِذَا قَالَ النَّبِيُّ ﷺ ﴿وَتَبَيِّنْ ﷺ﴾ فِي قُولِ اللَّهِ ﷺ ﴿مَا جَاءَ ﷺ﴾ ﴿وَبَيِّنَ ﷺ﴾ فِي ﻣَا ﷺ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴾ ﴿وَتَبَيِّنَ ﷺ﴿

English translation:

“The experiences and situations I have gone through influenced me more than my academic background. I do not deny that academia helped develop a sense of analysis and of verifying truths and facts. Islam urges us to research as the Quran clearly states “validation” in order to be able to distinguish and find the evidence.”

Fadi mentioned the running water, namely how it is pure and clean; and she also talked about her father and grandfather, who were raised in a rural place in Saudi Arabia, where people and monkeys drink from one source. He stated:

"نَحْنُ كُسْلُمُينَ نَحْرُصُ عَلَى الْطَّهْرَةِ وَنَحْنُ نَعْرِفُ أَنَّ الْمَاءِ الْجَارِيِّ طَأْرَ وَقِيلُ هذِهِ الْحُضَارَاتِ كَانَ الْوَالِدُ يَقُولُ أَنَّ النَّاسَ مِنْ قِيلٍ خَمْسَةِ سَنَةَ كَانَ يُشْرَبُونَ مِنْ يَنْبُوعٍ وَاحِدٍ هُمِّ وَالْقَرْدَةُ حِيْثَ كَانَتْ مَنْطَقَتُهَا مَشْهُورَةً بِالقَرْدَةِ وَرَغَمُ ذَلِكَ أَبِيُّ الْآنِ لَا يَشْرِبُ مِنْ مِيَاهِ السَّعُودِةِ."

English translation:

"As a Muslim, I always am diligent about cleanliness and we know as a fact that running water is clean. My father used to tell me that people 50 years ago used to drink from a
well that they shared with the monkeys living there – our area in Saudi Arabia is popular for its monkeys but my father nowadays does not drink tap water in Saudi Arabia."

**Theme E: Information Source**

![Diagram showing media sources]

**Figure 6. Media sources**

*American participants' responses.* Americans mentioned different types of media they rely on such as, *The Muncie Star Press*, and governmental websites. For example, Mark stated:

> “Online governmental resources; I haven’t really done any research. If you notice, a bridge embankment in Muncie has signs posted warning people not to swim in the water. At the center of Muncie, there are signs warning people to stay away from the water during flooding. I haven’t heard any reports from local media concerning exposure. My knowledge has come from my own seeking out of information.”

Mary mentioned Internet websites.

> “I would suppose that I could go on the Internet and see because I know that in other places, other states that they are required to publish any contaminants in the water that they have found, like the level of contaminants, what they have found. And what is the safe level of contaminants for human consumption. But since we’ve moved here, I haven’t seen any, it’s funny, that’s interesting, I haven’t thought about it really, since we’re just buying our bottled water to drink. But it would be interesting to look that up”.

On the other hand, Patricia mentioned the local news and radio such as:
“The local news channel I would watch would be the station coming out of Indianapolis. . . . just like, you know the evening news. I also like to listen to NPR if I’m driving in my car”.

Linda explained that local news like The Star Press is a good information source to get information about Muncie. And she said:

“Usually, well for Muncie, it would be the Muncie Star Press. But now, I get information from . . . I now read the Indianapolis Star. I read that online. And also . . . the local news channel in Indianapolis, Channel 13, I read their news online.”

David likes to read the local News from the website, i.e., The Muncie Star Press has a good website:

“I mean, newspaper, Internet, but from Muncie most of it is a newspaper and even the Internet, I use the link to the Muncie news.”

Barbara, like David said she prefers reading the news from the website:

“Sometimes the newspaper, most of what I get . . . Like The Star Press, the Muncie Star Press. I read the Muncie Star Press online. Sometimes, . . . and also public radio.”

**Arabic group responses.** Most of the Arab group participants received information from Internet and through word of mouth, such as through friends. Manal answered the researcher’s question about media used to get information about Muncie drinking water:

"المصدر الذي أعتمدته عليه هو الأشخاص وكذلك قرأت أخبار من الصفحات الإلكترونية على شبكة الإنترنت ولا أذكر أي قرأت شيء حديث في مسائي ولكن اليورك تأوين حدث وأن قرأت والسبب في ذلك أعتقد لأن منسي صغيرة جداً. وأيضاً الراديو وخاصة إذا استضافوا خبراء للمياه سوف أثق أكثر من كلام الناس العامة."  

English translation:

“My main source was people’s past experiences and online. I do not recall reading something about the water in Muncie but I read about Yorkton’s water. I would also rely on what an environmental scientist would say.”

Zakaria was not aware about the drinking water when he first came to Muncie. He lived in California before he came to Muncie and he described to the researcher that the water in
California was good. Zakria stated that he heard from people that the drinking water is not safe.

Zakria stated:

"I used to drink tap water when I first came to Muncie but then stopped drinking it after I was at a friend’s house and the water there left yellow residue in the drinking glass. That incident made me reconsider drinking from the tap in addition to other stories I hear from the people that drinking water from the tap is unsafe. I also have noticed that the hot water is white."

Maya came to city of the Muncie from the Gaza strip, and she was also influenced by other people. She told the researcher her story:

"I haven’t read anything from official sources about the contamination of the water in Muncie but, as I mentioned earlier, the American woman, who I talked with was educated, I recall that she was a college professor, married, and had the experience that made what she said credible. I have also asked my colleagues at school and they have verified that."

Theme F: Experience Living in a Place

American group responses. Their experience related to the length of residence in Muncie.

For example, Mary responded to the researcher's question regarding her apprehension and fear related to water by saying:

“I know also sometimes like I’ve lived in areas, not here, but I’ve lived in areas where there have been issues with pollutants, so in that case the media would come out and say
oh we’re under a “boil your water alert” that kind of thing. But I’ve not seen that since I’ve been here.”

Patricia lives in Indianapolis with her parents and came to Muncie to study for a Master's degree. She seems to not have enough information about Muncie water, and responded to the researcher with the following:

“I know my apartment is connected to whatever system they have in the city. We’re not drinking well water. . . . But I guess I also don't know very much about the Muncie water system or sources. Maybe I know, I would say, zero to very very little about that. But if the information is available, I’d definitely check it out."

David was another participant who shared his experience about the drinking water in Muncie; he was so confident that the water is good and he doesn’t have any problem with drinking directly from the tap. David has lived in Muncie for less than five years.

David statement was:

“In Muncie Indiana, right now, I have no apprehension about the drinking water in Muncie. It is my understanding that it has a good aquifer and there are no contaminants. So I drink water out of the tap regularly.” David may not realize that the drinking water comes from both surface water and groundwater and is treated at the water plant.

Mark was born in an agricultural area and shared many shared a lot of information regarding his experience with that, but he stated that he has lived in Muncie for less than two years. He continued speaking about his experience with the agricultural land and the possible pollutants that might found. Mark’s experience with pollutants revealed his answer to the researcher's question:

“I think also a lot of the reasons I discussed such as growing up in an agricultural area, being around pesticides and livestock, and working with geosynthetic liners contributes to my personal experience with contaminants . . . This apprehension comes from my experience . . . It’s challenging to find a clean body of water to get fish from that I would feed to my family . . . Knowing that the water we drink comes from this aquifer also contributes to my apprehension.”
**Arab group responses.** The Arab group's responses had a common theme of relating their experiences to their home countries and drinking water there.

For example, Zakaria told the researcher about his experience back home and in California before he came to Muncie in 2011.

"منذ طفولتي في الأردن لاتشرب أبداً من مياه الحنفية مباشرة الا أن تكون مفترة جيداً بفلاتر قوية لأن الأنهار غير نظيفة هناك وعندما جئت لامريكا استقريت لمدة تسعة أشهر في كاليفورنيا و كنت أشرب مباشرة من مياه الحنفية لأن الطعام يختلف.

English translation:

“Since I was a kid during growing up in Jordan I have never drunk tap water. The water has either to be filtered or bottled; that is because the river water is unclean and contaminated. When I first came to the States and stayed in California for nine months, I used to drink tap water because it was clean and didn’t have any funky taste or smell.”

Manal came to Muncie directly from Saudi Arabia and has been in Muncie less than five years. She expressed to the researcher her concern by recalling her experience with drinking water tanks in Saudi Arabia and how people must take care when cleaning and sterilizing them. Her statement regarding this matter was:

"في منطقتنا في السعودية مصادر المياه حورية أو من محطات تحلية البحر والخزانات نعمها في البيبون ولكن في امريكا لانعلم كيف ينطفئ الخزانات فاننا دائما مشربو مياه الشرب ونادرا ما أحد امريكي يشتري من جهاز تصفية المياه في السوق.

English translation:

"The resources of water (in) my area in Saudi Arabia comes either from underground water or from the process of desalination. But here in the States, I am not familiar with the procedures they take to make the water drinkable. I normally buy bottled water and I have noticed that Americans do not buy water filters."

Zainab gave reasons that make her feel afraid to drink tap water. First, she said that she never drank tap water at all in Saudi Arabia and described her experiences with the home filters. She
spoke about how she was surprised by some advertisements regarding drinking water in California when she came to the State. She said:

"لا أشرب مياه الحنفية ابداً حتى في السعودية واستخدم المياة المعلبة وفي السعوديه مشترى الماء المعلب ولكن نستخدم فلاتر قوية ولكن أنا شخصياً لا أثق في الفلاتر والأحاف بعض الشوائب مثل الرمل والفلتر مكلف وغير مضمون ولذلك قررت أن أشرب مياة محلية واستخدمها أيضاً للشاي والطبخ مرة واحدة صادفت وقت هزيرة لصديقة أمريكية واردت تضييفي كوب من الماء فتفاجئت بأنها فحصت الحنفية مباشرة ووضعت بعضanela القهوة وقدمها للايام وحصلت أن شرب الماء من الحنفية وصراحة للاحاظ سي ولكن فكرة أن الماء يجري في أنابيب لا أقنع بها وعندما جئت للولايات المتحدة نزلت كاليفورنيا واضطرت أن أشرب من الحنفية متصلة براد في مكان عام وأذا به تحذير بيني أنه قد تعرض للسرطان وماشابه ذلك فختلت جداً."

English Translation:

"We do not ever drink tap water in Saudi Arabia. We always buy bottled water or we use water filters. I, personally, do not trust the filter because it might not be completely clean, e.g., like dirt residue, etc., and I have to mention that filters are also not cheap. That is why I choose to drink bottled water, which I also use in cooking and making tea. I once visited an American friend and when I asked for water she used tap water but it didn’t taste that bad when I had it. When I first came to the U.S., I had to stop in California and when I was out and about there I drank from a public water cooler, which had a warning that drinking from here might be cancerous."

Fadi answered the researcher's question about what reasons you have fears about the water, when he said:

"بالنسبة لمياه الحنفية في السعودية أو في منسني لا نستخدمها ابداً استخدم المياة التي تباع في الأسواق المغلقة أو المياه المعلبة ونستخدمنا أيضاً للشاي وأذا لم تتورم في حاله الشاي فالغلافين يطمنني في اعتقادي أن مياه الحنفية تحتوي على مواد كيميائية وغير صالحة للشرب قد تكون صالحة فقط للاستحمام والعسل فقط ونحن لا نستخدمها خشيه الامراض. وأنا الآن اسكن منسني لثلاثه سنوات ولا يوجد لدي أي مشاكل صحية أو مادية في توفير المياة المعلبه رغم اني سمعت أن الفلاتر المنزلية جيدة ولكن لا اثق."

English translation:

"I think that tap water contains chemicals, which make it not suitable for drinking, though taking a shower and the laundry with such water might be fine. I do not use tap water because I think it will make me sick. I have been living in Muncie three years and have not been sick nor did purchasing bottled water affect my budget. I would have used a water filter but I do not trust that they do a good job in filtering it."
Fadi explained experiences from his country with the nuclear war during Iraq war and how they lost the trust of water treatment back home; this caused psychological problem for Fadi regarding drinking water.

English translation:

“I always had apprehensions about water in Saudi Arabia because of the minerals and salts it contains because it goes through a desalination process. The Gulf War had its tolls on our concerns about water because of the nuclear weapons that have been used.”
Chapter Five: Discussion

This research was a qualitative study to analyze people’s apprehension regarding drinking water. The main purpose was to study and compare educated Arab and American perceptions and behaviors regarding drinking water. The chapter will discuss the results while making reference to the existing, relevant literature. The data gathered was used to answer the following research questions:

The specific research questions for this study were:

- Do educated Arabs have different attitudes toward drinking water in Muncie, Indiana than Americans?
- What kinds of apprehensions do Arab and American groups have toward drinking water in Muncie, Indiana?
- Does the length of residence in Muncie affect the participants’ perceptions and behaviors toward drinking water?
- Does previous experience(s) with drinking water change participants’ perceptions and behaviors toward drinking water?
- What public health concerns does each group have about drinking water?
- Does the media, such as local newspapers, affect participants’ apprehensions toward drinking water?
- Does academic background affect participants’ perceptions and behaviors regarding drinking water?
• Do religious beliefs affect participants’ perceptions and behaviors regarding drinking water?

The data revealed that there was great agreement with the participants from both groups with regard to the taste of the drinking water, for example both groups mentioned taste concerns such as a metallic taste, or the taste of chlorine. Some of them also noticed that the water had a concerning smell or turbidity. Few American participants were satisfied with the taste and the smell when they drank directly from the tap water without a filter. The data collected also illustrated that the American people in this study relied on filters to make them more confident regarding the drinking water; whereas they did not buy bottled water to substitute for tap water as a source for their drinking water. One American female (whose husband was Arab) stated that she always buys the filtered water from the store because she does not trust the tap water in her home. All of the Arab participants were dissatisfied with the taste, color and smell of Muncie’s tap water. The Arab participants either used bottled water regularly. Drinking water apprehension can take different forms; and the first three questions in the interview identified different concerns arising from the two groups that related to different behaviors.

Maya for example said that the water tasted different as she compared it with the water familiar to her from Gaza. She stated that the water in Gaza is not clean but still the water tasted different to her; therefore. She has relied on bottled water since coming to Muncie. Zakaria from Jordon never drank from the tap in his country; but he can distinguish the smell and the taste of Chlorine in Muncie’s water. The researcher noticed that the Arab participants indicated their experiences with tap water in their home countries to provide a persuasive answer regarding their opinions of the drinking water in Muncie. Results showed that none of the Arab participants drank tap water in their birth country, because they had bad experiences back home with the tap
water; participants from different home countries, such as Morocco, Libya, Jordon, Saudi Arabia, and Palestine all shared similar fears of drinking water. The results in Chapter 4 include different Arabs’ quotes that stated their back home experience clearly.

The demographic data suggested also that there was no relationship between household income and participants’ apprehensions. The American participants had a higher income than the Arab participants, ranging from $75,000 to $99,000. The household income did not affect the result in regards to apprehension of drinking water, except that Arabs were more likely to purchase bottled water, whereas Americans were more likely to use tap water.

Americans and Arabs did differ by their explanations of their previous places of residence and whether or not that related to perceptions of water quality. American participants didn’t distinguish between the taste of Muncie water and the taste of water from other places. Most of the American participants were in Muncie for less than five years, which means that they had lived elsewhere, such as in other states. The researcher found that the American answers were related to chlorination, whereas some Arabs mentioned that they did not know exactly the reasons behind the smell and the taste they perceived.

Different studies showed that people in the Midwest area consumed alternative water sources. For example, Mackey et al. (2003) found that about 20 percent of Midwest states including Indiana consumed alternative water sources such as bottled water purchased at a store. That percentage is not that high and means that the majority of people rely on tap water in the Midwest.

Another study by Volk et al., (2002) studied the Muncie drinking water treatment and measured the Dissolved Organic Carbon (DOC) concentrations and Total Organic Carbon (TOC) analyzed for twenty-two months before and after treatment. The study found that there was a
relationship between the water quality of the source and the finished water after treatment, in that the water treated was affected by the river and weather conditions, such as high precipitation resulting in increased turbidity and color change. The study also found that about 42% is the average of organic matter removed after the treatment. The above study is consistent with the participants in this study indicating that they noticed that the taste and the smell were sometimes objectionable in Muncie.

**Sensory Properties of Drinking Water**

This study found that the foreign group “Arabs” has different interpretations of their fears than Americans. The Americans didn’t mention any past experiences with other countries, even though some, such as Mark and David lived outside of the state or country. David lived in Singapore, and Mark lived in UK. Americans mentioned some local problems that affected the taste and the smell in Muncie, such as pesticides, stormwater, and others.

People in general most commonly connect their apprehensions to the taste of the water. Mackey et al., 2003 argued that a person's attitude regarding tap water is based on their opinion with regard to its taste, from which they might base their health concerns.

The qualitative research between the two different groups is unique because it described the cognitive apprehensions from different distinct groups, who have lived in different places and have other different factors such as culture, religion, lifestyle and others that may come to bear on their apprehensions, perceptions and behaviors the result in different consumer decisions.

**Chemicals Concerns**

The interviewees provided discussion regarding the pollutants that related to water quality in Muncie. The Americans all discussed chemicals, for example Mark, Patricia, Jenifer and Peter mentioned agricultural runoff Barbara specified chlorine, fluoride, and pesticides in her answers;
also she highlighted Atrazine in the area. Atrazine has been noted in the White River Watershed studies (White River Watershed Project, n.d.).

The literature found by the researcher in her review of *The Star Press* news articles found mentions of stormwater, chemicals, and microbial issues in the last 10 years. American participants mentioned similar articles about the stormwater in Muncie, such as an article by Dungan (2006) about the runoff of stormwater into the White River. Linda, for example, mentioned the chemicals in stormwater and said, “…you could see the chemicals, like the rainbow from the [car] oil and you could see the trash floating down the road.”

Some participants focused their comments narrowly, such as when Josef only mentioned his concern regarding the chlorine. Patricia was the only American, who mentioned bacteria and viruses as microbial pollutants. Six Arab participants mentioned chemicals, such as chlorine. Ahmad has lived more than ten years in Muncie and he implied chemicals by describing the how runoff and the use of pesticides in the agricultural lands in Muncie affect the drinking water quality. Maya and Manal specified the chlorine as a main chemical that polluted the drinking water. Rafah explained that the chemicals might come from industrial waste and pesticides. Only Rania mentioned Zinc as a chemical pollutant in her answer. Three Arabs, Zakaria, Zainb and Rafa mentioned microbes and chemicals. Rafa also thought that microbe are found in Muncie’s water supply. In contrast, Salma was very sure there were no microbes in the water. As shown above, perceptions of pollutants varied.

The qualitative data from the participants connects to some studies related to water pollution, especially those mentioning Atrazine as a common fertilizer in agricultural areas where corn is a major crop. A study by Hugo (2009) found that Atrazine and other herbicides were increasingly being detected in drinking water in Indiana. The article sought to assess
whether Atrazine in drinking water was linked to increased prevalence of Preterm births and Small for Gestational Age births (GSA). Drinking water was sampled from nineteen water systems in Indiana. Based on these systems, births from the same locality were selected. The results found that Atrazine in drinking water during pregnancy was associated with increased prevalence of Small for Gestational Age births.

The American participant Barbara mentioned that birth defects were one of the health effects that related to the chemical contamination in the water. Her response relates to information available in the scientific literature.

Some of the Arab group mentioned that their fear was from microbial pollutants; whereas none from American group mentioned this topic. With relation to the literature, Wilczynski’s study from 2012 reported an outbreak of gastrointestinal illness among firefighter workers in Indiana and Michigan. This infection was attributed to Cryptosporidium. Contaminated drinking water was noted to be the source of transmission. This suggests that fear of microbes is not unrealistic.

Health Concerns

The present study also gathered information about the diseases that related to drinking water from both groups. The study showed that 11 out of 18 participants have mentioned cancer. The American Barbara, for example, stated:

“The risks of chemicals in the water, if they become … if the concentration becomes too high is, I think children and pregnant women are especially vulnerable to things like cancer, deformities, miscarriages.”

Barbara’s answers were similar to Mark, David, Mary and Linda’s, who all thought that cancer is the most common disease related to drinking water. Most of the American participants named many types of cancer, such as leukemia and cancer of the stomach, throat and digestive
systems. A review by Cantor (1996) showed that chlorination by products and nitrate are more chemicals that are relate to the risk of cancer. The qualitative study also noted that participants have reasonable apprehension regarding to the risk of cancer.

In contrast, Joseph was the only one in the American group that did not have a specific concern about cancer. He mentioned:

“…it’s just not my cup of tea. It’s not what I’m interested in so I don't read about it. I’m not that interested in science in most cases.”

The Arab participants also gave similar responses regarding the kind of health effects they believed they were predisposed to from using the drinking water. Rafa, Rania, and Zainab mentioned that leukemia and cancer of the digestive system are the most common types of cancer that are related to drinking water. Why? How do they know this? Zakaria and Ahmad did not mention cancer. Although Zakaria does not think that drinking water might cause cancer. He mentioned microbial disease:

"الجرائم أتوقع أكثر ملوث وهذا يأتي من كمية الكلور ... فلماذا كل هذا الكلور إن لم يكن هناك ميكروبات في الماء."

English translation:

“I think the water is infested with lots of germs and microbes and that might explain the large quantities of chlorine they use”.

Cancer was the only dominant disease clearly named by the participants. Other diseases, such as kidney disease, were mentioned by the Arab group only, and none of the Americans mentioned it. Barbara was the only one in the American group to mention hormone problems and diseases related to excess fluoride in the drinking water. A report in 2002 studied the fluoride in the bottled water and stated "tap water usually contains optimum fluoride levels while bottled water may contain less than optimal levels or no fluoride due to processing procedures."
It is an important debate in America. Gastrointestinal diseases were also mentioned by four American participants. Barbara, Mark, David and Mary. Results show variation on the theme of health and disease. Arabs and Americans agreed that cancer is the most common disease that relate to drinking water consumption, but Arab participants mentioned microbes more often.

The study showed that there are shared concerns regarding cancer and kidney disease among Arabs and Americans. However, diseases such as hormone problems and birth defects were mentioned by one American participant.

**Backgrounds of Participants**

The cultural background of the participants was explored in this qualitative research. Religious and academic backgrounds for the participants were very important for this study. The interview asked the participants these questions:

In what ways does your academic background increase or decrease your apprehension towards drinking water quality? Do you believe that your religious background affects your apprehension towards the drinking water in Muncie?

Eight out of nine of the participants from the American group responded that academic background did not affect their apprehensions regarding drinking water. Only Linda stated that she had a class in the Natural Resources Department about hazardous waste management, and this class gave her much information about stormwater and chemical pollutants. The Arab group also did not have any statements that declared the relationship between academics and their apprehension except Zakaria and Raina, who said that their academic background makes them able to analyze information.
This study includes participants from many different religious backgrounds besides the people who have no religious preference. The American group had participants from Protestant, and Orthodox Christianity, Islam, and no preference of religion, and none of them thought that their religious backgrounds affected their apprehension regarding drinking water. Most participants had a simple answer such as “no”, like Patricia. Mark said “But I wouldn’t say probably religion influenced my situation, no”.

Barbara said:

“No. Actually my religious background would give me more confidence because God will take care of me and my family. I can do my best, but God has to take care of the rest. There’s all sorts of things that I don’t know.”

However, all the Arab participants were Muslim, and Salma, Rania, Fadi, Ahmad and all of them mentioned that water is valuable in Islam and water is mentioned many times in the Quran, such as "We have made every living thing out of the water." (Sura 21 The Prophets, ayat 30). Rania said that her religious background enhanced her ability to validate, and she stated this by reciting ayat 6 from the Quran:

“If a rebellious evil person comes to you with news, verify it, lest you harm people in ignorance, and afterwards you become regretful of what you have done”. (Sura 49 Alhujuraat, ayat 6).”

Maya referred to praying in Islam and how Muslims wash beforehand, and that this water should be clean, but she said this does not mean that water should be free from pollutants because it is difficult to know that.

The researcher noted that Arab participants referred to the Quran and Muslim practices, such as washing and praying, in their answers. This highlighted the fact that the Arab participants give great attention to their religion. In addition, word Ma means water in all Arab countries and is mentioned sixty times in the Quran. There are other words for water also
mentioned in the Quran that describe water hydrology such as rivers, sea, fountains, spring, hail, clouds and winds (Abdel Haleem, 1989).

The study observed that Muslims give consideration to water because it is mentioned many times in the Quran. This was stated many times by the Arab participants. Further study needs to be done to investigate the direct information from the Quran and the Muslim beliefs that affect their apprehension toward drink water. The word *Ma* (water) describes water in general and does not describe drinking water.

Participants were asked about what type of media they got information about drinking water from and why they relied on the mentioned sources. Most of the American participants mentioned different types of media such as the local newspaper (*The Star Press*), Internet websites, TV, and local radio. However, the Arab group participants were not relying on the local news; rather, they mostly get their information from friends and Internet websites. The results showed that the Arab group already had opinions about drinking water before they came to Muncie, and they did not want to know specific information about water because they think using alternatives could save them time.

Data was collected from *The Star Press* newspaper in 2010 about Muncie’s drinking water quality. This data reflected a decade of reporting. Reported topics were related to chemicals, stormwater, and microbial pollutants in Muncie. The participants Patricia, Jennifer, Linda, David, and Barbara were relying on *The Star Press* for their local news. Only Ahmad from the Arab group, who had lived in Muncie more than ten years, listed *The Star Press* newspaper as one of the reliable media sources to get information on drinking water in Muncie. The researcher found that the American participants mentioned similar problems, such as
atrazine and birth defects, storm water, and fertilizers that had been mentioned in some of the newspaper’s articles.

The last theme in this study was experience. Data collected from both groups indicated that past experience clearly meant more to the Arab group than the American group. The answers about taste all indicated that the Arabs had a similar experience with drinking water, such as the water not being safe, or they mentioned that they never drink tap water back home in their own countries. Fadi, for example, said that he does not trust the water in Saudi Arabia, and he referred to the Iraq war and how it has caused many problems with the ground aquifers due to toxic hazardous wastes. Similar agreement was found among Arab participants from different Arab countries where the participants were from in this study. Ahmad from the Arab group spent more than ten years in Muncie and said that he does not drink tap water when he visits Libya. He said that Libya has a new water project called the “artificial river” that comes from a ground aquifer in Sub-Saharan Libya. Ahmad still did not trust the source of the water in his country and drinks bottled water when he visits. Zainb and Manal from Saudi Arabia mentioned that the water tanks are different in Saudi Arabia because the people have special tanks for drinking water, and they clean and treat the water themselves, and the city water is only used for domestic purposes. Fadi mentioned how they treat the drinking tank separately in Saudi Arabia, and he added that his father changed his behavior about drinking water and mentioned that his father said that people were drinking with monkeys from the same source. Fadi himself was wondering how his father’s behavior changed and mentioned this.

The study showed that the Arab participants’ experience in their home countries causes them to give more attention to social factors such as religion and past experiences in their countries.
The results showed that the American group had less fear or serious apprehension regarding drinking water compared to the Arab group. The study showed that the Arab and American attitudes regarding drinking water could be affected by different factors such as media and previous experience. The Arab group had apprehensions regarding water that comes from their experience with drinking water in their home countries. This might change after a time of living away from home. The researcher perceived, from the qualitative data, that the Arab group members who lived in Muncie for less than five years still related to their experience back home regarding drinking water, but the longer they lived in Muncie the more used to the drinking water they became. They would also consider the local media more.

The study also illustrated that academic and religious backgrounds did not affect peoples’ attitudes regarding drinking water. The research found that the American group was more in tune to the local news than the Arab group. The reason that the Arab group did not want to know local information about water quality was because they already had a bad experience with water. In addition, the Arab group did not have a high enough income to buy bottled water, but they did so anyway, where almost the entire American group had higher household incomes. The majority indicated that it was too expensive for them to rely on bottled water or buy expensive filters.

The theory formed from the grounded data is described in the diagram below. *Arab Way of Knowing* illustrates the epistemology regarding this phenomenon. The themes describe the properties of the information and the process that leads to the theory. The Arab group’s way of knowing is different from that of the American group. Many factors determine their way of knowing, such as home country experience, religious background, and the sources of information, which is the mostly other people. The information about water they have is the second stage in this model, which describes the building of knowledge about drinking water
quality. The third step is that people build ideas about drinking water from the information they have, which affects perception. Perceptions were negative among the Arab group due to their past experience back in their own countries. The fourth stage in this model is the action that is developed from the preceding stages, which describes the group action toward drinking water. The Arab group was all using bottled drinking water, except for Ahmed.

*Arab Way of Knowing (Epistemology):*

- Background experience
- Religion
- Socialization
- Information about drinking water
- Perception: might cause disease
- Action: Use alternative sources

The model also describes the American group’s epistemology regarding drinking water as follows: The way of knowing for the Americans is different from that of the Arabs in this qualitative study. The American participants rely on media such as the local news in *The Star Press* and Internet websites, as mentioned by the participants in the study. The Americans’ personal experience, as evidenced by the participants’ statements about water, showed how they experience the taste. The study did not show any effect of socialization among the Americans. The second stage also describes the type of information the Americans have about drinking water. The third stage in the model describes the Americans’ perception about drinking water, which concluded that water is safe but the taste still is not acceptable. The fourth stage describes their action regarding to drinking water. All the American participants in the study, except David, were drinking filtered water to improve the taste.
Limitations of the Study

The majority of the sample was conducted with educated Arabs who came to Muncie to pursue master’s or doctoral degrees and who stayed in Muncie for less than five years. The study identified the correlation between periods of time in Muncie and apprehension. Only one participant had lived in the USA for more than thirty years and Muncie for more than ten years, and this participant had a different attitude toward the water. It would have been ideal if all the participants were Muncie residents for more than ten years, but because there were few Arab residents staying in Muncie, the researcher had difficulty finding Arab residents. In addition, the researcher had difficulty contacting these educated persons due to their busy schedules. It would have been beneficial if all the Arab participants were American citizens or green card holders from an Arab background to prove whether the drinking water apprehension was a perceived habit that came from cultural attitudes or not.

In the researcher’s opinion, the study should have had a quantitative part to estimate the bottled water usage between Arab and American groups, but this is a very time consuming and expensive process.
The study found that emic data controlled the Arab participants’ apprehension toward water quality in Muncie. Social perspectives such as religion, home country experience and socialization were the dominant factors in the Arab group. However, reliance on etic data was clearly observed in the qualitative data of the American group’s attitude toward drinking water. The way of knowing among the Americans regarding drinking water is dominated by media and personal experience. No effect of social perspective was observed. Social perspective, such as religion or experience of place was observed in this study among the Americans.

In this study, the emic data about drinking water is conveyed in people’s ways of knowing that are affected by social perspectives such as culture, religion and past experience, whereas the etic data about drinking water is conveyed in people’s ways of knowing without a social perspective.

**Recommendations**

The study suggests some recommendations from both the emic and etic perspective. The recommendations include the differences between the two ways of knowing. The following recommendations include general steps that might help the community considering these differences.

1. Dissemination of results and findings of social studies on water quality issues to raise public awareness of water treatment issues.
2. Water authorities should organize community presentations and introduce water quality topics to the audience and discuss their fear or satisfaction. The authorities can provide affordable water quality testers during this presentation as free samples to educate people about water quality.
3. Provide lectures or programs about the quality of local water on different media such as
public radio, TV channels, and the news.

4. Create a state website for water quality standards for the city and give the real results of the chemical, microbial and physical components in the water, with the normal ranges for each component.

5. Study people’s apprehension to provide better water management and consumer service.

6. In this study, the Arab participants were mostly graduate students. The universities should provide a session during their arrival orientations about the common habits in the state regarding drinking water. They should also provide peer-reviewed articles about drinking water for the new students, or at least give international students sources of information on the water quality. For example, identifying the state authority for drinking water and providing language assistance for foreign speakers by simplifying the materials for them.

7. Follow the interdisciplinary approach by building bridges between environmental studies and anthropology to study people’s perceptions and attitudes.

8. Provide the students who are staying in the campus residence halls or university apartments information about the tap water by sending monthly bulletins to their mailboxes to let them know about the source of drinking water. The people on campus spend most of their time on campus, so they should know about the quality of the water in the drinking fountains at least.

**Recommendation for Future Research**

The researcher recommends further research on public perception regarding people’s habits and previous experience. It would be great if future study would compare international groups regarding drinking water. One of the researcher’s groups just arrived in the state, and the
other group had been in the state more than ten years. Future studies should take time to examine attitudes with regard to different factors to provide more data about this matter. The research could be done with an American group who lived outside the state for more than five years and just arrived back home to observe whether they have changed their attitudes about the drinking water.

This study looked at many points regarding social perspectives such as religion and experience. Future research is needed to cover these points, for example, how Muslims perceive knowledge differently than adherents to other religions such as Christianity. Also, based on Ahmad’s experience in this study, the researcher suggests more study regarding how use of emic data transfers to use of etic data, depending on the length of time spent in a certain place.
Appendix

Protocol questions

I. Demographic Information
1. Sex: Male/ Female
   2. In what year were you born?  
   3. Race: American Arabian

4. What is your religious preference?
   Protestant
   Catholic
   Mormon
   Jewish
   Muslim
   No preference / No religious affiliation
   Prefer not to say
   Others

5. What is your marital status?
   Single
   Married
   Widowed
   Divorced
   Separated
   Never married

6. How many children do you have?
   No children  1  2  3  More than 3
7. What is your level of education?
- Master's degree
- Professional degree
- Doctoral degree (PhD, EdD)

8. What is your household income?
- Less than $15,000
- $15,000 to $24,000
- $35,000 to $49,000
- $50,000 to $74,999
- $75,000 to $99,999
- $100,000 to $149,999
- $150,000 or more

9. Where do you live?
- Rural
- Urban
- Suburban

10. How long have you been in Muncie, Indiana?
- Less than five years
- Between 5-10 years
- More than 10 years
II. Interview Protocol

- What apprehensions do you have about the drinking water in Muncie? What else?
- What about the sources of your drinking water worries you? What are your reasons for these worries?
- What factors do you think have contributed towards your apprehension regarding the safety of drinking water in Muncie? What else?
- From which forms of media do you get your information about Muncie’s drinking water quality? What else?
- What kind of pollutant do you think is polluting the drinking water most? What else?
- What are your reasons for thinking the pollutant is dangerous? What else?
- What kind of health effects do you believe you are predisposed to from using the drinking water? What else?
- In what ways does your academic background increase or decrease your apprehension towards drinking water quality?
- Do you believe that your religious background affects your apprehension towards the drinking water in Muncie? Please explain.
- What are the risks that you believe can arise from the intake of contaminated drinking water? What else?

The consent form

Study Title

The Cognitive Apprehensions Regarding Drinking Water Among Educated Americans and Arabs Living in Middletown

Study Purpose and Rationale

The proposed research involves a comparison of emic apprehensions of specific aspects of local drinking water quality in Muncie, Indiana, and the scientifically derived etic knowledge
of those same aspects. The study will compare two groups of people: native Arabic speakers and native U.S. English speakers. This research is important for identifying the sources of apprehension, if found, and for determining the validity of this apprehension. As both groups are highly educated, the study will attempt to analyze why they feel apprehension and identify which media they were affected by. In this research, “emic” refers to a body of knowledge arising from within a culture based upon its habits, traditions, beliefs, and sources of information that is expressed in the local culture's own terms (Pike, 1954). By contrast, the term "etic" has been derived from the linguistic term "phonetic," or the structure of a spoken sound within a given language. In this research, “etic” refers to knowledge derived through application of the scientific method that is expressed in the universally relevant terms of scientific discourse. "An emic analysis should ultimately indicate which etic characters are locally significant [and useful for a] reduction of the significant attributes of local [apprehensions regarding water quality] in culture-free terms" (Sturtevant, 1964, p. 102).

A designed interview protocol will be conducted to promote sharing of information during the interview. This study will utilize a semi-structured interview protocol as defined by Denzin and Lincoln (2005). The participants will be asked questions designed to encourage sharing and exploration of their experiences and thoughts about drinking water quality. Furthermore, this specific format for the interview protocol will allow the researcher to develop and further pursue related topics within the same base time. This will give the researcher the opportunity to explore beyond the detailed and strict interview protocol.

Data from the interviews will be analyzed for recurring themes. These themes will be used to formulate a conclusion and future recommendations.


**Inclusion/Exclusion Criteria**

Group participants will be professional people who have an advanced degree – either a master’s, Ph.D. or professional degree. Subjects will be no younger than twenty-four years of age and no older than seventy years old. Subjects will be local residents of Muncie, Indiana.

**Participation Procedures and Duration**

For this study, you will be asked to participate in a private interview. You will be asked several pre-constructed questions designed to prompt a discussion about drinking water quality.

**Audio or Video Tapes**

Audio recording devices will be used.
Data Confidentiality and Anonymity

All data will be maintained as confidential, and no names or personal information will be released in any type of publication or presentation.

Storage of Data

The researcher will start audio recording and writing notes by hand during the interview. The data will be entered into a software program and stored on the researcher’s password-protected computer until the project is complete. Only the researcher and her committee members will have access to the data. The tapes and the notes will be kept for two years, until the dissertation is completed.

Risks or Discomforts

There are no foreseeable risks associated with this study.

Who to Contact Should You Experience Any Negative Effects from Participating in this Study

If you experience any negative effects from participation in this study, please feel free to contact counseling service or contact Dr. Amy Gregg.

Benefits

Subjects will provide enough data to test whether or not there is apprehension about drinking water quality in Muncie, and if so, the research will testify the accuracy of participants’ information based on academic research.

Voluntary Participation

Your participation in this study is completely voluntary, and you are free to withdraw at any time for any reason without penalty or prejudice from the investigator. If you have any related questions, please feel free to ask before signing this form and at any time during the study.
Dear Sir/Madam:

Thank you for your consideration. I will give you a copy of this form to take with you. If you agree to participate in this interview, please answer the following questions and sign below:

I am over 24 years old and eligible to participate in this study [circle one]:

Yes No

I agree to be interviewed for this project [circle one]:

Yes No

__________________________________ _____________________________________
Participant's signature               Date            Investigator's signature              Date

___________________________________
Participant's name (printed)                          Investigator's name (printed)

___________________________________
Signature                                   Date

**IRB Contact Information**
For information on your rights as a research subject, feel free to contact the following office:
Office of Research Integrity
Ball State University
2000 West University Avenue
Room 100 - West Quad Building
Muncie, Indiana 47306
Phone: (765) 285-5070
E-mail: irb@BSU.edu

Dr. Amy Gregg contact information
Phone: 765-285-5781
West Quad
Office 118
Ball STATE UNIVERSITY
E-mail:algregg2@bsu.edu
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