"Troubled Waters" impact study: Student environmentalism in the Red Cedar River Basin

Christopher Fox
Undergraduate Student, Applied Social Science

Abstract

As a research initiative by the University of Wisconsin-Stout and the Tainter Menomin Lake Association, Minnesota's Bell Museum of Natural History's acclaimed documentary film *Troubled Waters: A Mississippi River Story* was distributed to many of the high schools and middle schools of the Red Cedar River Basin, located in West Central Wisconsin. Upon the film screenings at the various high schools and middle schools, post-screening surveys were distributed immediately afterward. The purpose of the surveys was to assess the film's impact on students, as well as how it may influence environmental consciousness and individual and/or cooperative action in addressing environmental problems, specifically regarding phosphorus and nitrate pollution. There were 486 surveys in the initial sample size, which yielded some significant findings. Upon watching the documentary, demographic variables of gender, residence, school, age, and occupation revealed the overarching dominance of individualism over collective action in terms of respondents' potential sustainability initiatives.
Keyword(s): Water Quality, Phosphorus Pollution, Red Cedar Basin, Individualism, Cooperation.

Introduction

The University of Minnesota's Bell Museum of Natural History's 2010 documentary film *Troubled Waters: A Mississippi River Story* illustrates the dangers of phosphorus and nitrate pollution in the Midwestern United States and describes citizen initiatives to generate more sustainable food production systems. The film is both thought-provoking and forward-thinking in telling

the story of scientists, farmers and citizens pursuing ambitious solutions to sustain food production while protecting health and the ecological sustainability of the Mississippi river. The film received three *Emmys* in 2011: Best Topical Documentary, Best Writer of Program (non-news), and Best Editor of Program (non-news). The Star Tribune of Minneapolis noted that *Troubled Waters*, "put a much-needed spotlight on Mississippi River pollution" (StarTribune, 2010). The film had a series of screenings at the University of Wisconsin-Stout in the fall of 2010 and had a dramatic effect on many students, faculty, and community members at large, including some farmers. As an initiative of the Tainter Menomin Lake Improvement Association, the film was distributed to the high schools and middle schools of the Red Cedar River Basin in Wisconsin along with surveys to assess the film's impact by measuring the how the subject's views may have changed as a result of the film, the likelihood they will participate in collective action, and their understanding the dangers of non-point source pollution.

The Tainter Menomin Lake Improvement Association's mission is to support the protection and improvement of Lake Menomin and Tainter Lake waters by providing educational information on water quality and environmental issues affecting these bodies of water and their corresponding watersheds (TMLIA, 2012). *Troubled Waters* focuses on how unsustainable agriculture practices along on the Mississippi River watershed have created detrimental effects aquatic to ecosystems. Dead zones have been created both upriver and downriver on the Red Cedar River as a result of the various fertilizers used to achieve record yields. The Red Cedar River Basin drains a 1,893 square-mile area in west-central Wisconsin, and includes parts of Barron, Chippewa, Dunn, Polk, Rusk, Sawyer, St. Croix and Washburn Counties. A larger portion of Lower Chippewa River Basin, the Red Cedar flows into the Chippewa River in southern Dunn County. Here, phosphorus runoff pollution is a human induced issue with many negative unintended social and environmental costs.

Phosphorus and nitrate pollution in water supplies are a global issue. Consequences of such pollution have negatively affected biodiversity, drinking water quality, animal populations, human

health, and have created unnatural dangerous algae blooms (EPA, 2012). In Menomonie, Wisconsin Lake Menomin and Tainter Lake are suffering from massive toxic blue-green algae blooms as a result of non-point source phosphorus and nitrate pollution (Simonson & LaLiberte, 2010). Point sources include those with a discrete identifiable location. Non-point pollution is difficult to prevent and regulate because it is typically from multiple diffused sources, such as farming and urban runoff. The technology and policy exists to mitigate phosphorus and nitrate pollution from industrial point sources. However, remaining pollution that goes unmeasured and unregulated is from non-point agricultural run-off and air deposition from vehicles (Mazmanian & Kraft, 2009, p.79). We need to take into consideration the social factors illustrated by this study in our attempts to mitigate such non-point pollution. Mitigating nitrate and phosphorus pollution is possible because it is a socially caused issue. In addition to collecting data, the film was screened with the intent to increase awareness and for mitigating the social and environmental impacts of phosphorus pollution.

This research project is framed in the perspective of environmental sociology, which is the study of how social systems interact with ecological systems and function (Bell, 2012). It synthesizes theories such as ecological Marxism and world polity theory. There is a strong disconnect between resource consumption and its effects on the planet at large; the film depicts the causes of phosphorus pollution, which are ultimately social. A key component of this research looks at the pattern of individualism compared to group or community action for sustainability efforts. The emphasis of individualism has been a traditional dimension of modernity. Russian social theorist Mikhail Bakhtin argues "individualism deeply influences the way we regard the main medium by which we are connected to the environment, our bodies" (Bell, 2012, p. 158). A second area of interest is to determine if there is a relationship between demographic variables (like gender) and one's commitment to sustainability.

This research is also interested in the participant's perception of the causes and solutions of water pollution after watching the film and the level at which they found the film informative. The

survey cannot measure actual changes in behavior, but rather the likelihood they will want to participate in collective action, as a result of viewing the film. A consistent theme in the film is that policies must change and farmers need to be rewarded for more than just maximizing yields and profits. When there are no incentives to limit fertilizer use or other detrimental farming practices, such as through government regulation or other mechanisms, the environment will continuously degrade. According to this theory, many farmers are essentially forced into using synthetics due to the threat of unregulated competition with large-scale farms, regardless of whether they acknowledge such forces. A significant cause of conflict is the, "the lack of good interdisciplinary discussions among toxicologists, epidemiologists, environmental scientists, agronomists, clinicians, and policy makers, each of whom plays a different role in the assessment of health risks, and cost-benefits associated with nitrate exposure" (Van Grinsven, et al. 2006, p.2). These socio-economic problems align with the theory of Ecological Marxism, which views the exploitation of the environment as a result of assigning nature an economic value and helps explain the controversy regarding the agricultural use of phosphorus and nitrates (Mazmanian & Kraft, 2009, p. 32). Phosphorous pollution is a global issue in both urban and rural regions and, regulation is extremely costly eg. (Rutkoviene, 2005), et al (Cadenasso et al., 2008, p. 214), (Stickney, 2001, p. 218). However, these findings and theoretical frameworks must be coupled with other theories on society in order to understand the story told by the results of this research project, as will be offered below in this review of relevant environmental sociological literature.

Literature Review

This evaluates previous research on understanding the sociological costs pollution and the constraints to mitigating it. A consistent theme across environmental sociological literature reinforces the idea that mitigation becomes more accessible as groups collaborate to move social action and in turn, work to achieve environmental sustainability. Western culture is

continuously shifting to become more individualistic. This theme not only constrains mitigation of phosphorus pollution, but other environmental issues at large. In 2002, scholars Beck, Ulrich, and Beck-Gernsheim, concluded that in this era of market liberalization, personal growth or achievement is placed a higher value than civic engagement, which is suggested to be the only effective avenue to mitigate solutions (Beck, et al. 2002). This culture shift which emphasizes individualism has reproduced the tendency in environmental education to advocate for individualist actions, e.g. recycling, to be the solution (Robbottom, & Hart, 1995). This limits the drive and potential impact of civically minded environment educations and constructs a framing of the environment as asocial and apolitical. Robbottom and Hart argue, "Environmental issues are almost always political struggles, and collective action is usually more productive than individual efforts in the resolution of political struggles" (Robbottom, & Hart, 1995, p. 9). This individualist form of environmental education is inherently flawed, as the capitalist system benefits from individuals unconsciously making the wrong environmental choices. Thus, individualism is among the root cause of unsustainable social systems. Hales (2006) claims that "outdoor education", is also not effective because of the preexisting context of individualism framing the student's views of education (Hales, 2006). In addition, environmental denigration is often dismissed by rightist skepticism to serve a conservative market driven political agenda (Jacques, Dunlap, & Freeman, 2008). The pattern is particularly relevant in the rural farming regions of West-Central Wisconsin, where phosphorus pollution burdens the well-being of many. Along with the rise in individualism, Marsden (1999) points to the vast increase of the "Consumption Countryside, as the essence of a "thinning" rural identity. This phenomenon describes the process of people's diminished connection to the local water and environment, because goods and services are produced in regions farther away. This alters the people's relationships with both with their community members and the local environment. The rise in individualism, the prevalence of skeptics towards environmental denigration, and changes in identity all present constraints

to societal engagement addressing collaborative solutions to mitigating pollution. What remains understudied are the conditions that limit the potential engagement of people in pursuing mitigation. This research study addresses the complexity of why societal engagement in problem solving may remain ineffective even if the acknowledgement of the problem increases; it also provides some insight into how societal engagement could become more effective.

Data

The research explores the conditions that may increase societal engagement. The survey used in this study encompassed two separate sections with a total of twelve quantitative questions. Demographic questions were included to provide information about age, gender, residence (village, city, or rural setting), occupation/occupation of parents (e.g. farmer, non-farmer), and county (e.g. Dunn, Barron). A five-level Likert item response option from "not committed" to "very committed" was used for the quantitative survey questions.

Table: 1 Survey questions that incorporated a 5 point Likert scale.

How committed would you say you are to environmental sustainability?
To what extent did watching Troubled Waters increase your understanding of the causes of water pollution?
As a result of watching Troubled Waters how likely is it that you will talk about water quality with friends, family or colleagues?
As a result of watching Troubled Waters how likely is it that you will change your personal behaviors related to water quality in your community?
As a result of watching Troubled Waters how likely is it that you will engage in group activities related to water quality in your community?

In addition to the twelve questions/variables on the original physical copies of the surveys, a variable was added that was not on the survey to account for the different schools/institutions from which data were collected.

In early 2012, the surveys were sent to schools in the Red Cedar Basin and were administered by science teachers at those particular schools who screened the film for their students as part of the course curriculum. The demographic questions were completed before subjects viewed *Troubled Waters*, and the remaining questions assess the film were completed after the screening. The completed surveys were then sent to the University of Wisconsin-

Stout Social Science Department though the mail and were coded and entered in SPSS as they arrived. 486 surveys from these institutions were collected and analyzed in SPSS. All participants signed consent forms in accordance to human subjects review by the Institutional Review Board at University of Wisconsin-Stout.

Quantitative Methods

After the 486 surveys were coded and entered in SPSS quantitative analyses were conducted through several frequencies models, cross-tabulations, and linear regression models. Again, this study looked to explore how environmental issues are framed as a series of individual efforts over group efforts. In addition, this study examined the relationship between demographic variables and the levels of environmental concern. The study was informed by the following research questions:

1. Is environmentalism more likely to be viewed as individual effort over a cooperative effort?
2. How do demographic characteristics of those who viewed the film impact their perceptions of environmental problems and generate attitudes about the likelihood that they would take action?

The first question emerged from the original design of the survey which included two questions to assess the potential for cooperation. These original questions were: "As a result of watching Troubled Waters how likely is it you will talk about water quality with friends, family or colleagues?" and "As a result of watching Troubled Waters how likely is it you will engage in group behaviors related to water quality in your area?". These questions (variables) were transformed and combined on SPSS to generate a numeric variable named "Cooperationscale". This process was then replicated to combine two questions to assess individualism in relation to environmental action, and was then coded "Individualismscale". These questions were "How committed would you say you are to environmental sustainability?" and "As a result of watching Troubled Waters how likely is it that you

will change your personal behaviors related to water quality in your community?". Two distinct regression models were conducted to test levels of Cooperation and Individualism. Utilizing scales to measure cooperation and individualism was an effective way to group like variables and analyze general themes in the subjects various responses.

Several frequencies were conducted to observe broad trends in the data; these were followed by a series of cross-tabulations, and the two linear regressions. The first regression had the dependent variable "Cooperationscale" and featured two models. The first model encompassed only the independent demographic variables "Residence", "Gender", "Age", "County", "Occupation of Parents", and "School". The second model featured all the previously listed independent demographic variables along with the three film variables: "Causes", "Solutions", and "Informative". The second regression used the "Individualismscale" as the dependent variable and utilized the same two models of independent variables as the first regression previously described.

Quantitative Results

The first statistical tests conducted were frequency percentages of variables that utilized the Likert scale response options (Table 1). With the "Commitment" variable, the majority of respondents (49%) selected the level three option (somewhat committed). Then the same test was run for the [personal] "Behaviors" variable. The results indicated that the majority of respondents (37.4%) also selected the level three option (somewhat committed). This same test was run for the "Group" variable and the majority of respondents (29.4%) selected the level 2 option (between not likely and somewhat). The final frequency percentage test was run for the "Talk" variable, and the majority of respondents (30.5%) selected the level three option (somewhat committed). These frequency results were significant and suggest that environmentally concerned behavior and action is favored as individual efforts over group efforts. In addition, these findings were reflected in the "Cooperationscale" and "Individualismscale" variables.

Figure 1 is the frequency percentage model for "Cooperationscale" and Figure 2 is the frequency percentage model for "Individualismscale".

Figure 1

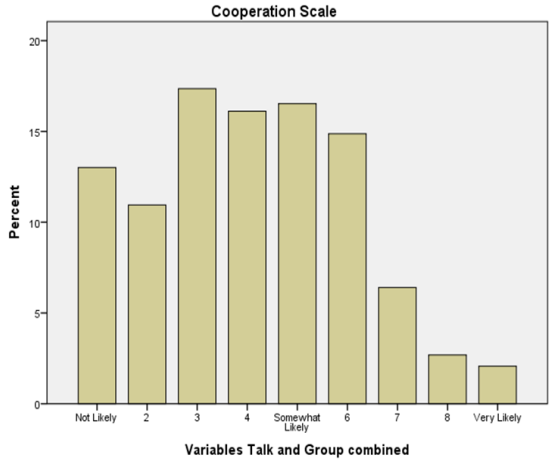
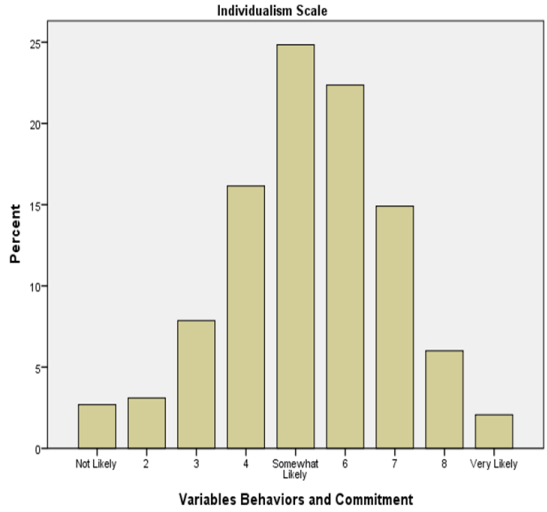


Figure 2



After the frequency percentages, several cross-tabulations were conducted comparing all of the demographic variables to both the "Cooperationscale" and "Individualismscale". Analyzing the "Gender" results with "Cooperationscale" as the dependent variable, the largest total percentage of male (20.6%, 49 subjects) fell on the fourth level. The largest total percentage of females (19.7%, 48 subjects) ranked higher than the males by one level and fell on the fifth level of the "Cooperationscale", thus suggesting the female participants are more likely to talk with others and engage in group activities related to water quality in their community compared to the male participants (Table 2). When "Gender" was run with the "Individualismscale" the majority of male subjects (25.2%, 60 participants) fell on the seventh level, higher than on the "Cooperationscale". The largest percentage of female subjects (24.3%) fell on the sixth level (59 participants). However, females still ranked higher than male participants overall; female variable had 48 respondents in both the seventh and eighth levels of "Individualismscale" (Table 3).

Table 2. Gender and Cooperation Cross tabulation
Likelihood Participants will discuss and Participate in Group Activities Concerning Water Quality Related to Water Quality

Gender	Not Likely	2	3	4	Somewhat Likely	6	7	8	Highly Likely	Total
Male	60.3%	55.8 %	58.3 %	37.7 %	45%	40.3 %	64.5 %	23.1 %	50%	49.4 %
Female	39.7%	44.2 %	41.7 %	62.3 %	55%	59.7 %	35.5 %	76.9 %	50%	50.6 %
N	63	52	84	77	80	72	31	13	10	482

Source: Troubled Waters Survey Data: 2012

In addition to "Gender", the cross-tabulations for the "School" independent variable had some interesting results when analyzed with both "Cooperationscale" and "Individualismscale" dependent variables. The overarching theme to "School" variables is that middle school participants ranked higher on both scales compared to high school participants. All of the schools, (11 schools), ranked significantly higher on the "Individualismscale" over the "Cooperationscale", which relates to the research question regarding to a higher commitment to sustainability in individual efforts over group effort. In addition to the "School" independent variable, the "Residence" independent demographic variable also had interesting results in the cross-tabulations. The "Residence" variable's response

options included "a village or town with less than 10,000 residents", "a city with more than 10,000 residents", and "a rural setting".

Table 3. Gender and Individualism Cross tabulation
Likelihood Participants will Change Their Behaviors Related to Water Quality and Commitment to Sustainability

Gender	Low	2	3	4	Mid	6	7	8	High	Total
Male	53.8%	66.7%	57.9%	21.3%	50%	55.6%	33.3%	34.5%	60%	49.5%
Female	46.2%	33.3%	42.1%	48.7%	50%	44.4%	66.7%	65.5%	40%	50.5%
N	13	15	38	78	118	108	72	29	10	481

Source: Troubled Waters Survey Data: 2012

Again, the pattern of individualism can be seen with these variables as well because each "Residence" category ranked higher on the "Individualismscale" over the "Cooperationscale" counterpart. For the "Cooperationscale", "a village or town with less than 10,000 residents" ranked highest on the ninth level (61.5%), which is significantly higher than "a city with more than 10,000 residence" or "a rural setting". This indicates that participants who live in a town with less than 10,000 residents are most likely to talk about water quality issues and participate in group activities related to water quality in their community, (Table 4).

After the completion of the frequency percentages and cross-tabulations two linear regression models were conducted. The dependent variable for the first regression was the "Cooperationscale" and the second regression dependent variable was the "Individualismscale". Below is the linear regression table for "Cooperationscale" as the dependent variable (Table 5).

Table 4. Residence and Cooperation Cross tabulation

Place of Residence	**Low**	**3**	**4**	**5**	**Mid Level**	**7**	**8**	**9**	**10**	**Total**
< 10,000 Residence	32	23	29	30	39	34	14	8	6	215
> 10,000 Residence	8	11	17	17	12	6	7	0	1	79
A Rural Setting	23	19	38	31	29	32	10	5	3	190
N	63	53	84	78	80	72	31	13	10	484

Source: Troubled Waters Survey Data: 2012

In the first block of data the R square value was .107 and can account for 10.7% of the variance in the dependent variable, significant at all alpha levels. In the second model the R squared value increased to .275 and accounts for 27.5% of the variance in the dependent variable, a significant increase at all alpha levels. The independent variable

"Gender" was significant at the .05 level in the first block; however when we added in the second block "Gender" was no longer significant. Also, the "School" variable was not significant in the first block but became significant at the .05 level in the second block. The variables (occupation of parents, age, understanding of causes, and understanding of solutions) were also statistically significant predictors of likelihood to talk with others and/or work with others to address environmental problems.

Table 5. Regression statistics for Residence, Gender, Age, County, Occupation of Parents, School, Understanding of Causes, Understanding of Solutions, and How informative was Troubled Waters

	1	2
1 Residence	(-.138)	(-.108)
2 Gender	.393*	0.196
3 Age	.928***	.703***
4 County	0.011	(-.045)
5 Occupation of Parents	(-.342)***	(-.333)***
6 School	0.070	.079*
7 Understanding of Causes		.310*
8 Understanding of Solutions		.648***
9 How informative was Troubled Waters		0.206
R^2	.107***	.275***
df	6	9
N	422	422

*p<.05; **p<.01; ***p<.001, two tailed tests

Source: Troubled Waters Survey Data: 2012

Above is the linear regression table for "Independentscale" as the dependent variable (Table 6). In the first block, the R square value was .083 and explains 8.3% of the variance in the dependent variable, significant at all alpha levels. When the three additional variables were included in the second model the R squared greatly increased to .321 and accounts for 32.1% of the variance in the dependent variable and the change was significant at all alpha levels. The "Gender" variable was significant at

the .01 level in the first model, but was no longer significant in the second model. The variables occupation of parents, age, understanding of causes, understanding of solutions, and positive perception of *Troubled Waters* information, were also statistically significant predictors of individual commitment and/or likelihood to engage in individual efforts to address environmental problems.

Table 6. Regression statistics for Residence, Gender, Age, County, Occupation of Parents, School, Understanding of Causes, Understanding of Solutions, and How informative was Troubled Waters

	1	2
1 Residence	(-.029)	0.001
2 Gender	.415**	0.210
3 Age	.601***	0.374**
4 County	(-.013)	(-.067)
5 Occupation of Parents	(-.290)***	(-.280)***
6 School	(-.013)	(-.007)
7 Understanding of Causes		.312***
8 Understanding of Solutions		.563***
9 How informative was Troubled Waters		0.299**
R^2	0.083***	.321***
df	6	9
N	422	422

*p<.05; **p<.01; ***p<.001, two tailed tests

Source: Troubled Waters Survey Data: 2012

Discussion

This research study analyzed the social attitudes for improving water quality among students in the Red Cedar Basin after viewing *Trouble Waters*. Three general results should be noted from this research, in accordance to subjects responses: 1) watching *Troubled Waters* encouraged students to take individual actions and/or consider becoming more personally committed to mitigating environmental problems, 2) while study can't measure actual behavior individualistic solutions were a more likely result of watching *Troubled Waters* than

cooperative solutions, and 3) gender, age, occupation of parents, and school were additional predictors of solutions viewers might engage in. Again, the surveys were administered directly after the screening film, which limited the study's ability to measure participant's behavior.

The pattern of individualism is an overarching theme in the results of this research (Figures 1 and 2; Table 5 and 6). This means that those who found the documentary informative would likely engage in personal behaviors and personal commitments to address environmental problems, and would not as likely engage in cooperative engagement. Perhaps this is because it much easier for individuals to commit to individualized personal changes rather than group engagement given the larger cultural commitment to individualism. This is explained well by world polity theory, which argues that norms have been established at global scale that emphasize modern conceptions of legitimate grievances and actions, one of which being individual rights and responsibilities (Meyer et al., 1997). Individualized attempts at improving water quality could include limiting fertilizer use, practicing proper pet waste disposal, and the proper use of safe detergents and soaps. However, much sociological research shows that collective thinking and acting is the only real way of driving meaningful changes in the ways we mitigate social and environmental problems, so that "virtual environmentalism" is established (Bell, 2012, p. 283). The idea behind virtual environmentalism is that people cannot simply make individually-oriented decisions that are collectively sustainable; society's laws and informal norms must create conditions by which our actions are collectively-oriented in order to sustainably use resources. The only way virtual environmentalism can be established is through collective thinking and acting and commitment to changing the laws and informal norms of society; with an individualistic mindset we tend to "ignore the consequences of our actions for those wider surroundings" and emphasize the self "in competitive and hierarchical ways" (Bell, 2012, p. 158).

Analyzing demographic data revealed some interesting results. The variable, gender, tested significant in the cross-tabulations and regression models. In the cross-tabulations for both "Cooperationscale" and "Individualismscale", females were more likely than males to talk about water quality issues, participate in group activities related

to water quality, and engage in personal behaviors and commitment related to water quality after viewing *Troubled Waters*. In the United States, males are more represented in policy-making than their female counterparts. Perhaps if these females were equally represented in policy-making, there would be greater concern for environmental issues overall. These findings reflect sociological theory in regards to gender and the environment. There is a tendency in Western culture to consider women as being closer to nature than men. This can be attributed to the association of women with the biological function of giving birth, as well as other cultural necessities such as raising children, preparing food, and attending to the emotional needs of others compared to men, who are more likely to be associated with production, and the manipulation of natural landscapes (Bell, 2012, pp.162-166). In addition, this seem to reflect common gender stereotypes in the United States. However, the regression models add some complexity in how watching *Troubled Waters* reconciled the variation between genders. When controlling for respondent's answers regarding the environment after watching the video, the variation between genders was no longer statistically significant, demonstrated by the gender coefficients in model two (Tables 5 and 6). Essentially, when accounting for the effectiveness of the documentary females were not more pro-environment than males. Perhaps, in terms of practical application of these results, even if males remain the dominant policy-makers then by watching the documentary they could become more proactive in addressing environmental problems.

The "Residence" variable had some additional interesting findings in the cross-tabulations when "Cooperationscale" was the dependent variable. Individuals that resided in a city with more than 10,000 people were least likely to talk about water quality issues in their community and participate in group activities related to water quality in their community. Perhaps these results can be attributed to the lower levels of solidarity within cities, as suggested theoretically by Georg Simmel (1950) who argued that city dwellers tend to feel less connection with neighbors and fail to develop caring and personal relationships with one another compared to more rural residents (Simmel, 1950). Additionally, individuals may be less likely to internalize the denigration of existing environments as they are more surrounded by man-made environments.

Individuals that lived in rural areas were less likely than individuals that lived in a village or town with less than 10,000 residents to talk about water quality issues in their community and participate in group activities related to water quality in their community. Individuals that lived in a village or town with less than 10,000 residents (mid-sized option) ranked highest on the cooperation scale. Perhaps this is due to community solidarity that is higher with the increased population density of mid-sized towns compared to truly rural settings.

The "School" variable yielded some further noteworthy results. First, every school ranked significantly higher on the "Individualismscale" over the "Cooperationscale", which again speaks to the research question regarding a higher commitment to sustainability in individual efforts over group efforts. This could be attributed to environmental responsibility more often taught as an individual effort to children because it is easier to conceptualize. For example, recycling. Secondly, the middle school respondents ranked higher on both scales compared to their high school counterparts. This may speak to increases of environmental awareness taught in the educational system overtime. Another possibility is that younger students are in a time of identity development. They are developing their own individual and group identities, and thus they would be more open to information that does not contradict more established identities, as might be the case with high school students. In addition, the "School" variable tested significant in the linear regression with the "Cooperationscale" as the dependent variable in the second model when controlling for answers about understanding causes and solutions to problems upon viewing *Troubled Waters* and the perceived positive information provided by the documentary. This may be a reflection of the discussions that might have occurred in the classroom after viewing the film. Perhaps such discussions may be more prevalent in middle schools due to different pedagogical strategies compared to high schools, especially considering the "School" variable did not test significant in predicting the "Individualismscale" answers.

Finally, occupation of respondents (or, for most of the respondents, their parents) had a statistically significant effect on both dependent variables. Specifically, compared to everyone else farmers were less likely to engage in individual or cooperative actions to addressing

environmental problems. This is not surprising, considering the majority of the phosphorus pollution in the Red Cedar Basin comes from agricultural land (Simonson & LaLiberte, 2010), and farmers might feel attacked when environmental problems are addressed or feel expected to be the only people to make changes in behaviors if they are to accept responsibility for phosphorus and nitrate pollution.

Acclaimed author and anthropologist Margaret Mead (1964) once said, "Never doubt that a small group of thoughtful, committed, citizens can change the world. Indeed, it is the only thing that ever has." While this research revealed an overarching dominance of individualism over collective action in terms of respondents' potential sustainability initiatives, we know from previous literature that collaborative action and civic engagement are the only effective means to address environmental problems. Social change is not a fast process, but when committed groups work together, using the best social and biological knowledge available, they *can* change policies and mitigate pollution.

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