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Different Strokes for Different Folks: Gender and Emotions in an Environmental Game

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Abstract

Females are often expected to behave more environmentally-friendly than males, to be more sensitive to nuances in wording/framing, to be more emotionally expressive, and to be more likely to act on these emotions. Do they actually behave according to these expectations? Previous research found mixed evidence on gender effects. The purpose of our study is to examine whether there are gender differences in reaction to framing, expressing of emotions and acting in response to emotions in the environmental context and to determine whether these differences (if present) follow the "stereotypical" expectations. To investigate this, we conducted a framed laboratory experiment in the water quality context. Our findings show that there is a gender effect and it is highly context-dependent with respect to environmental decisions and with respect to the likelihood of expression of positive and negative emotions. Furthermore, we find that females sharing behavior is not sensitive to empathy vs. self-interest framing, while males sharing behavior is. Our results indicate that the payoff-relevant factors are, generally, more important than gender. We conclude that males and females are responding to different stimuli ("different strokes for different folks"), thus empirically testing behavior in a specific context is paramount when trying to predict responses by gender and designing environmental policies.

Keywords: gender differences, environmental behavior, economic experiment, water quality, emotions, framing

1. Introduction

This study attempts to investigate whether there are gender differences in the reaction to framing, expressing of emotions, and acting in response to emotions in the environmental context and to determine whether these differences (if present) follow the "stereotypical" expectations. Understanding the differences, or lack thereof, will allow decision makers to formulate more effective environmental policies.

Increased attention to gender differences in economic behavior has led to a number of studies investigating gender effects in economic experiments involving other-regarding preferences. Evidence from these studies is, however, mixed. For instance, in dictator game experiments, Eckel and Grossman (1998) and Kamas, Preston, and Baum (2008) find that women donate more than men, while Bolton and Katon (1995) report no gender differences. In a modified dictator game, Andreoni and Vesterlund (2001) find that men behave more altruistically when it is cheap to do so. In their public good experiments, Brown-Kruse and Hummels (1993) and Anderson, DiTraglia, and Gerlach (2011) find gender differences with men contributing more than women; Seguino, Stevens, and Lutz (1996), on the other hand, report that women contributed more than men, while Frey and Meier (2004) find no significant differences. In a solidarity game, Selten and Ockenfels (1998) report that giving nothing is much more common for men. Brown and Taylor (2000) find gender differences in a hypothetical valuation treatment but not in a real valuation treatment in their public good experiment. In prisoner's dilemma games, Ortmann and Tichy (1999) report that women cooperate more in the first round. In subsequent rounds, however, the difference becomes smaller and non-significant. In their experiment of individual contributions to group projects, H. Czap N. Czap, and Bonakdarian (2010) find that women contribute significantly more than men. In terms of sharing behavior, females are often more empathetic than males if they are in a position of a victim. However, in a position of a polluter both genders are equally empathetic (N. Czap,

H. Czap, Burbach, & Lynne, 2014).

Evidence from the environmental economics literature on gender differences in pro-environmental attitudes and behavior is also mixed. Surveys on gender differences show that women have higher levels of environmental concern (Mohai, 1992; Mohai, 1997; Xiao & Dunlap, 2007), they are more concerned about species preservation (Czech, Devers, & Krausman, 2001) and have stronger ecocentrism (concern for nature and living organisms; Zelezny, Chua, & Aldrich, 2000). As a result, they feel more responsible for improving the environment, and thus are more likely to contribute to the environment (Israel, 2007). Based on interviews of people regarding their attitudes and behavior towards wildlife, Kellert and Berry (1987) established that females value wild animals as objects of affection and are concerned with the exploitation of wildlife, while males value animals for practical and recreational reasons. Davidson and Freudenburg (1996) report that, although gender differences in general environmental concern are modest, women exhibit much higher levels of concern in their attitudes towards specific forms of environmental risk. Caiazza and Barrett (2003) claim that women are concerned more than men about environmental risks at the local level. However, in a survey of rural residents, Luzar and Cosse (1998) find no significant difference between men and women in their willingness to pay for rural water quality. N. Czap and H. Czap (2010) report that women not only exhibit higher stated environmental concern than men, but also higher levels of revealed environmental concern (i.e., demonstrate more environmentally-friendly behavior). Furthermore, the differences in conservation behavior depend on the type of (dis)incentives provided for its violation. Specifically, females are more sensitive to soft nudging via empathy than males are. However, neither gender responds well to monetary fines (N. Czap et al., 2014).

The papers discussed above are studying gender differences in economic and environmental decisions under the assumption that there are either psychological, or neurological, or socialization differences between females and males. Other researchers point out that a lack of gender differences or inconsistencies in the results might be explained by the differences in the type of experiments, the experimental design, the context, the framing, or motivational factors (Eckel & Grossmann, 2008; Croson & Gneezy, 2009; Fujimoto & Park, 2010). These inconsistencies suggest that further research is needed in identifying gender differences and their impact on economic and environmental decisions.

The purpose of this paper is to determine whether there are gender differences and whether they are following the expected pattern in: (1) costly pro-environmental choices, (2) sensitivity to framing, (3) willingness to provide a costly emotional feedback (both positive and negative), (Note 1) and (4) changes in behavior in response to such emotional feedback. The rest of the paper is structured in the following way. In the next section we discuss the theoretical background and develop testable hypotheses. In the third section we explain the experimental design. In the fourth section we present and discuss the results. In the last section we conclude our analysis and offer the implications for environmental policy.

2. Theoretical Background and Study Hypotheses

As noted above, there are numerous studies examining gender differences in environmental behavior. The majority of these studies claim that there is a significant difference between choices made by females and males. Caiazza and Barrett (2003) report that women are more likely than men to give money to (or volunteer for) environmental causes. According to Tindall, Davies, and Mauboulès (2003), women display more environmentally-friendly behavior on a daily basis. Menges and Traub (2009) and N. Czap and H. Czap (2010) find that females are contributing more to the environment than males. This leads to the first hypothesis of this study:

Hypothesis 1*: Females choose more environmentally-friendly actions than males.*

According to psychological research, women are more sensitive to social cues in determining their behavior compared to men (e.g., Gilligan, 1982). Women are also found to be more sensitive than men to the design and context of the experiment (Leon-Mejia & Miller, 2007; Perugini, Tan, & Zizzo, 2010; Miller & Ubeda, 2012; Rodriguez-Lara, 2014), to the decision-making context (Eckel & Grossman, 1996; Cox & Deck, 2006), and to framing effects (Druckman & McDermott, 2008; Fujimoto & Park, 2010). However, according to Batson et al. (1997), empathy manipulation was effective in both men and women. Croson and Gneezy (2009), in their review of economic experiments on gender differences in preferences, argue that the small differences in experimental design and implementation can have an influence on social cues, resulting in women being more other-regarding in some experiments and less other-regarding in others. Based on these studies, the next hypothesis is:

Hypothesis 2*: Females are more prone to framing effects in environmental context. Specifically, females are more sensitive to empathy/self-interest framing than males.*

The general public believes that women are more emotional (Graham & Ickes, 1997) and women confirm that they experience negative and positive emotions to a higher degree than men do (Alexander & Wood, 2000). Although this is disputed by Kring and Gordon (1998), who find that women do not report experiencing more emotions than men. The difference in perception of the general public and what the women actually feel could be explained by the difference in experiencing emotions and expressing them. Specifically, several researchers (Kring & Gordon, 1998; Gross & John, 1995; Brody & Hall, 2010) found that females are more emotionally expressive. Furthermore, women tend to rate themselves as more emotionally expressive (Simon & Nath, 2004) in terms of both positive and negative expressivity (Gross and John, 1998). This leads to the next hypothesis of this study:

Hypothesis 3*: Females are more likely to send costly emotional feedback (positive or negative) than males.*

If sending a negative emotional feedback can be considered as expressing sadness, then, according to some literature on self-reported measures of emotions (e.g., Fischer, 1993), females express sadness more. Alternatively, if negative emotion can be considered as expressing anger (or desire to punish) then males express it more (e.g., Fischer, 1993). Additionally, rewards and punishment can be thought of as the behavioral means to express positive and negative emotions (N. Czap, H. Czap, Khachaturyan, Burbach, & Lynne, 2013). Furthermore, as has been mentioned above, there has been reported sensitivity to social cues in the behavior of women (Croson & Gneezy, 2009; Miller & Ubeda, 2012). Gross and John (1998) find that "women show greater reactivity to emotional stimuli" (p. 177). Yuan et al. (2009) argue that females are more susceptible to negative emotions. Furthermore, N. Czap et al. (2014) find females to be more affected by potential social disapproval. This leads to the last hypothesis of this study:

Hypothesis 4*: Females react more to emotional feedback than males. Specifically, emotional feedback encourages females to undertake environmentally-friendly actions more than it encourages males.*

3. Experimental Design

3.1 Context of the Game and the Players

We tested the above hypotheses using data from a framed laboratory experiment in the context of downstream water pollution. Downstream water pollution is a negative externality. It occurs when the upstream water users are letting pollutants enter rivers, which subsequently negatively impacts the water quality of the downstream rivers and lakes. As a result, the downstream water users must undertake costly water clean-up operations. The cases of shared water resources are numerous in the world. Both men and women can be polluters (upstream farmers) and victims (downstream water users). However, there may be a difference in how they behave in each role. Our goal is to investigate these behavioral gender differences.

The downstream water pollution problem was modeled in the form of a three-player game, including Upstream Farmer (UF), Downstream Water User (DWU), and Upstream Farmer/Downstream Water User (UF/DWU, dual-role player). UF operates upstream and decides what tillage technology to implement on his/her land. UF has two tillage options: conservation and intensive. Conservation tillage (CT) is not as invasive on the environment as intensive tillage (IT) because CT results in less soil erosion and less chemical runoff into the rivers. However, CT is more costly for the farmers to implement than IT. As a consequence of using CT, the water downstream is less polluted and needs less expensive cleaning before it can be used. As such, CT is more beneficial for DWU who gets their drinking water from downstream rivers and lakes. Finally, UF/DWU is a player performing activities of both UF and DWU (playing a dual role): they farm upstream and decide on the tillage technology, while, at the same time, draw drinking water from a downstream river or lake.

The experiment participants were presented with a simplified description of agricultural technologies. CT was presented as a relatively lower profit practice, but with a relatively mild environmental impact. IT was presented as a relatively higher profit practice, but with a relatively stronger negative environmental impact.

3.2 Treatments

The experiment consisted of three treatments: Empathy framing, Self-interest framing, and Neutral framing (or No framing). In Empathy treatment, the players were referred to as UF, DWU, and UF/DWU. All participants were presented with the description of the upstream-downstream situation. In addition, the farmers were told that *"The choice of tillage by farmers will greatly affect the water quality of the lake and the payoff for the Downstream Water User. A cleaner lake and higher payoff for DWU will be assured if the farmers choose to place* ***more*** *land under Conservation Tillage."* Then UFs and UF/DWUs were asked to make decisions regarding how much of their land (500 acres) to place under CT. The CT chosen by UF and UF/DWU was used to calculate the level of the lake cleanliness.

In the Self-interest treatment, the players were referred to as UF, DWU, and UF/DWU as well. Similarly to the previous treatment, all participants were presented with the description of the upstream-downstream situation. However, in this treatment, the farmers were told that *"The choice of tillage by farmers will greatly affect their own profit. The farmers get higher profit if they choose to place **more** land under Intensive Tillage."* Then UFs and UF/DWUs were asked to make decisions regarding how much of their land (500 acres) to place under IT. The IT chosen by UF and UF/DWU was used to calculate the level of the lake pollution.

In the Neutral treatment, the players were referred to as Player 1, Player 2, and Player 3. They were presented with a situation written in a neutral context-free language (without mentioning the upstream-downstream situation, CT, IT, cleanliness, or pollution of the lake). Players 1 and Player 2 had to allocate chips between Options A and Option B (with associated returns in line with the respective types of tillage).

3.3 Payoffs of the Players

3.3.1 Empathy Treatment

Farmers decide how much of 500 acres to place under CT. UF's payoff (π_{UF}) in tokens is defined as:

$$\pi_{UF} = 500 + 2 * (500 - CT_{UF}) \quad (1)$$

DWU's payoff (π_{DWU}) in tokens is defined as:

$$\pi_{DWU} = 500 + 10 * (\%\ Cleanliness\ of\ the\ Lake) \quad (2)$$

UF/DWU's payoff ($\pi_{UF/DWU}$) in tokens is defined as:

$$\pi_{UF/DWU} = 2 * \left(500 - CT_{UF/DWU}\right) + 10 * (\%\ Cleanliness\ of\ the\ Lake) \quad (3)$$

Note that each acre not placed under CT gives UF/DWU a payoff of two tokens, while each acre placed under CT gives UF/DWU a payoff of one token. Hence, similarly to UF, UF/DWU benefits more from not placing the land under CT. However, their opportunity costs of doing conservation are lower. The cleanliness of the lake depends on the proportion of land placed under CT by the two farmers (UF and UF/DWU). The cleanliness, therefore, is defined as:

$$\%\ Cleanliness\ of\ the\ Lake = \frac{CT_{UF}+CT_{UF/DWU}}{500+500} * 100\% \quad (4)$$

Therefore, if, for instance, both farmers decide to place all of their land (500 acres) under CT, then the lake cleanliness will be 100 percent.

The game represents a zero-sum game with three players sharing 3000 tokens, i.e., total social welfare is fixed. The structure of the payoffs is such that if the farmers choose $CT_{UF} = CT_{UF/DWU} = 250$ acres, which leads to $\%\ Cleanliness\ of\ the\ Lake = 50\%$, each player gets an equal payoff of 1000 tokens.

The Nash equilibrium in Empathy framing for both decision making players (UF and UF/DWU) is to choose a zero level of conservation tillage technology, since it gives them the highest payoff of 1500 and 1000, respectively.

3.3.2 Self-interest Treatment

Farmers decide how much of 500 acres to place under IT. The payoffs in this treatment are mirroring the payoffs in Empathy framing. UF's payoff (π_{UF}) in tokens is defined as:

$$\pi_{UF} = 500 + 2 * (IT_{UF}) \quad (5)$$

UF's payoff (π_{DWU}) in tokens is defined as:

$$\pi_{DWU} = 500 + 10 * (100 - \%\ Pollution\ of\ the\ Lake) \quad (6)$$

UF/DWU's payoff ($\pi_{UF/DWU}$) in tokens is defined as:

$$\pi_{UF/DWU} = 2 * \left(IT_{UF/DWU}\right) + 10 * (100 - \%\ Pollution\ of\ the\ Lake) \quad (7)$$

Note, that each acre placed under IT gives UF/DWU a payoff of two tokens, while each acre not placed under IT gives UF/DWU a payoff of one token. The pollution of the lake depends on the proportion of land placed under IT by the two farmers (UF and UF/DWU). The lake pollution, therefore, is defined as:

$$\%\ Pollution\ of\ the\ Lake = \frac{IT_{UF}+IT_{UF/DWU}}{500+500} * 100\% \quad (8)$$

If the farmers choose $IT_{UF} = IT_{UF/DWU} = 250$ acres leading to $\%\ Pollution\ of\ the\ Lake = 50\%$, then each player gets an equal payoff of 1000 tokens.

To be consistent and allow for comparison of decisions of farmers across both treatments, the tillage decisions were converted into conservation tillage via $CT = 500 - IT$ and lake pollution was converted into lake cleanliness via:

$$\%\ Cleanliness\ of\ the\ Lake = 100\% - \%\ Pollution\ of\ the\ Lake \quad (9)$$

Since the payoff structure in Empathy and Self-interest framing treatments are the same, any differences that are observed in the experiment are due to the treatment effect.

The Nash equilibrium in the Self-interest framing for both decision-making players (UF and UF/DWU) is to place everything under intensive tillage technology, since it gives them the highest payoff of 1500 and 1000, respectively. Choosing any other amounts of CT (or IT) corresponds to altruistic giving in a dictator game. The economic theory predicts that a selfish dictator will keep the whole amount to themselves, without sharing with another player. Experimental evidence, however, shows that dictators do share and give, on average, a positive amount even to the anonymous respondents (e.g., Bolton & Katok, 1995; Eckel & Grossmann, 1998).

3.3.3 Neutral Treatment

In this scenario, the subjects were referred to as Player 1, Player 2, and Player 3. Player 1 and Player 2 have to choose how many chips to allocated to Option A and Option B. The profits were calculated the same way as in the framing treatments. The language used in this treatment was context-free.

3.4 Sending and Receiving Emotional Feedback

Participants were randomly assigned their roles in the game. Round 1 started with both UF and UF/DWU choosing how much of their land acreage to place under CT (in Empathy treatment) or IT (in Self-interest treatment) or Players 1 and Player 2 choosing how much of their chips to allocate to Option A (in Neutral treatment). Next, the cleanliness or pollution level of the lake was shown to UF (Player 3). This was done to reflect the real life situation, in which the downstream water users do not observe the choices made by upstream farmers (CT or IT), but only the outcomes of those choices (cleanliness or pollution of water). DWU/Player 3 had an option to provide a costly (costs =50 tokens) emotional feedback to the farmers/Player 1 and Player 2. Specifically, they could express their positive or negative emotions by sending a smiley/happy face ☺ or a frowney/unhappy face ☹ to both farmers (Figure 1). Prior to this step none one of the three players were informed that DWU/Player 3 will have an option to send an emotional feedback. This was done to prevent strategic behavior by UF and UF/DWU in eliciting or evading such feedback.

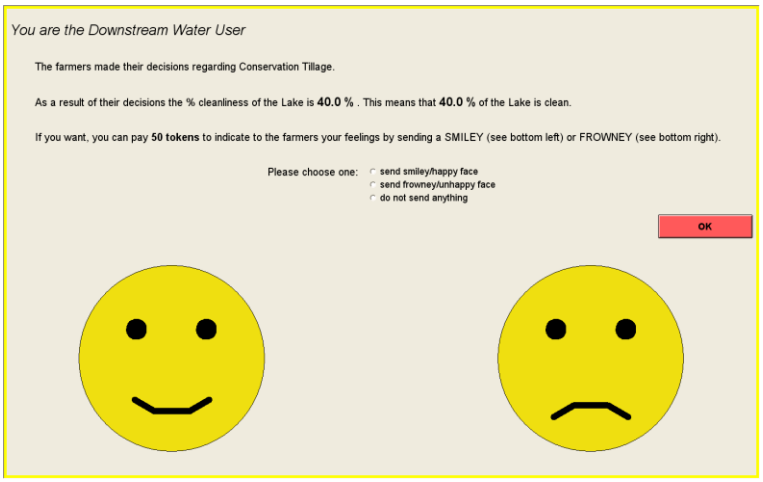

Figure 1. Empathy framing – an example of a decision screen seen by Downstream Water User

Note. This is Empathy framing. Thus, cleanliness of the lake is displayed. In Self-interest framing, the "% pollution of the lake" is displayed, while in Neutral framing, "% of chips in Option B" is displayed.

If an emoticon was sent by DWU it appeared on the screens of both farmers accompanied by a message. In the case when a smiley emoticon was sent, the message was "*After seeing the % pollution of the lake the Downstream Water User sent to you and the other farmer: ☺*". In the case of a frowney emoticon, the message was "*After seeing the % cleanliness of the lake the Downstream Water User sent to you and the other farmer: ☹*". If DWU decided not to send anything, nothing appeared on the screen of farmers.

In Round 2, UF and UF/DWU chose how much of their land acreage to place under CT or IT (after receiving emoticons, in cases when they were sent). Cleanliness or pollution level of the lake was again presented to DWU; however, they were not able to provide any additional feedback. The payoffs of all players were shown to all of them after the game was over.

3.5 Procedures

The experiment was conducted in the Experimental and Behavioral Economics Laboratory at the University of Nebraska-Lincoln. The subjects were recruited on campus via flyers (posted and distributed across campus) and emails, inviting them to participate in the decision-making experiment in the context of water usage. There was no mentioning of gender either during the recruitment process or while running the experiment. Moreover, the subjects did not know the gender of the other participants in the group. In total 216 students and members of the public participated in the experiment: 84 subjects in Empathy, 84 in Self-interest, and 48 in Neutral framing. Overall, 45.4% of the participants were female (see Table 1 for details). All sessions were computerized and administered using the economics experimental software z-Tree (Fischbacher, 2007). Each session lasted 70-100 minutes.

Table 1. Percent of females by treatment and role

	UF	UF/DWU	DWU	*Average*
Empathy	64.3%	42.9%	35.7%	*47.6%*
Self-Interest	32.1%	53.6%	32.1%	*39.3%*
Neutral	43.8%	43.8%	68.8%	*52.1%*
Average	*47.2%*	*47.2%*	*41.7%*	*45.4%*

Upon arrival to the laboratory, participants were greeted and seated in the waiting area. Before starting the experiment, they read and signed the informed consent form. When the appropriate number of the participants for the session arrived, they were ushered to the experimental computer laboratory and randomly seated at the computers separated by privacy screens. To ensure anonymity and confidentiality, subjects were assigned a 5-digit random number, which they used to sign in on their individual computers.

Each subject received two handouts: (1) a payoffs table with some of the possible combinations of strategies and (2) formulas to calculate the payoffs. (Note 2) To ensure that the instructions are public knowledge, they were read to the subjects aloud and presented on the computer screens. After the instructions were read, the experimenter answered questions and the participants were given a quiz. (Note 3) The quiz checked their understanding of the instructions and ability to calculate the payoffs (or to use the payoff table). The game did not start until all the participants successfully completed the quiz. The tokens that the participants earned during the experiment were converted into dollars (at the rate of US $1=70 tokens). The participants were paid privately in cash. The average earnings were US $28.9. (Note 4)

4. Results and Discussion

4.1 Gender and Pro-environmental Behavior

In Hypothesis 1 we conjectured that females behave in a more environmentally-friendly manner. We found partial support for this hypothesis. In all but one case we observed economically significant, positive differences between the average conservation level chosen by female and male farmers (Figure 2). However, the difference was statistically significant at 1% in only one case: UF in Self-interest treatment (according to Wilcoxon rank sum test, p-value=0.0052).

Furthermore, we explored the heterogeneity of the behavior of both genders when it comes to zero conservation, equal sharing, and high levels of conservation (Figures 3a, 3b). Males were leading in the proportion of zero conservation: 45% of male UFs and 29% of male UF/DWUs chose not to conserve versus 21% of female UFs and 12% of female UF/DWUs. We classified CT of 250 acres as “equal sharing” because if both farmers choose it then all three players (UF, UF/DWU, and DWU) get an equal payoff. In the case of UF, twice as many females chose CT=250 than males, while in the case of UF/DWU the situation was reversed: males chose it more often. Finally, “high levels of conservation” refers to CT>250. Choosing this level of conservation suggests that the participants have either a very strong preference for pro-environmental and/or sharing behavior or a desire to compensate for the potentially lower conservation level by another player. Females led in high conservation: 26% of female UFs and 38% of female UF/DWUs implemented CT on more than 250 acres, while the numbers for males were 13% and 21%, respectively.

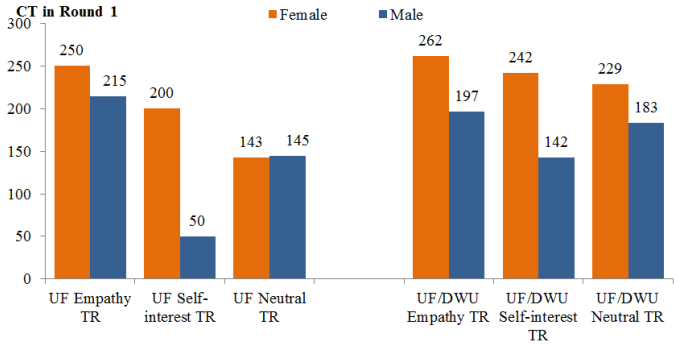

Figure 2. Conservation tillage chosen by farmers in Round 1 by gender

These results offer an intriguing observation about the heterogeneity of female and male behavior in the dual-role situation. By playing dual-role, UF/DWU can truly empathize and "walk-in-the-shoes-of-others" (N. Czap, H. Czap, Khachaturyan, Lynne, & Burbach, 2012; Lynne, N. Czap, H. Czap, & Burbach, 2016), in this case in the shoes of DWUs. However, males and females responded differently to this situation. One can speculate that male UF/DWUs chose conservation levels of 250 acres as if expecting that their group partner will do the same leading to a close-to-equal payoff for everyone. Such behavior can be summarized as "I do my part and I expect you [UF] will too". Female UF/DWUs, on the other hand, chose higher levels of conservation (CT>>250) as if not expecting that their group partner will conserve a lot and willing to compensate for it. Such behavior can be summarized as "I will pick up some of your [UF's] slack".

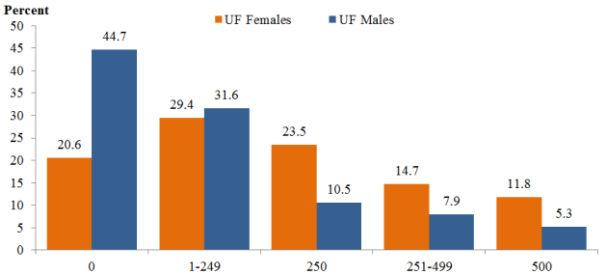

Figure 3a. Percentage of Upstream Farmers choosing a specific level of conservation tillage by gender

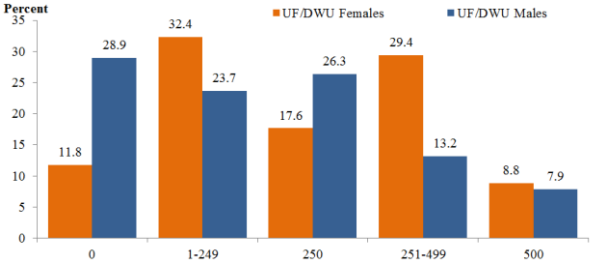

Figure 3b. Percentage of Upstream Farmers/Downstream Water Users choosing a specific level of conservation tillage by gender

4.2 Gender and Framing Effect

In Hypothesis 2 we conjectured that females are more susceptible to framing effects, specifically, to empathy/self-interest manipulation than males. We found no support for this hypothesis. Levels of CT chosen by female UFs in Empathy and Self-interest treatments (250 and 200 acres, respectively) are not statistically significantly different. The difference between female UFs in Empathy and Neutral treatment is statistically significant at 10% (according to the Mann-Whitney-Wilcoxon test). As it is evident from Figure 2, there is even less difference in the female UF/DWUs behavior (these differences are also not statistically significant).

Male UFs, however, were more sensitive to framing effects: the difference between the behaviors of male UFs in the Empathy and Self-interest treatment (215 vs. 50 acres, respectively) is statistically significant at 1%, and statistically significant at 10% (according to the Mann-Whitney-Wilcoxon test) between the Self-interest and Neutral treatment. The behavior of male UF/DWUs, on the other hand, does not statistically differ across the

treatments.

To summarize, neither female upstream farmers nor females playing the dual role are very sensitive to the difference in framing. Instead, they are choosing the conservation levels close to the one that Empathy framing tries to achieve in almost all treatments. In that sense sharing and empathetic behavior seems to be a norm for them. It is intriguing that some deviation from that norm happens only in the Neutral treatment (but not in the Self-interest treatment). The results are different for males. Male UFs, but not male UF/DWUs, are quite susceptible to the Self-interest, but not to the Empathy framing. Overall, the conservation levels that seem to be a norm for males are much higher than the Nash prediction, but not as high as the norm for females. At the same time, when they are nudged for self-interest, male UFs respond and demonstrate lower conservation efforts.

4.3 Gender and Provision of Emotional Feedback

In Hypothesis 3 we conjectured that females are more likely to send (costly) emotional feedback. We found that the likelihood to send emotional feedback depends on the context. At the end of Round 1, after UFs and UF/DWUs made a decision about conservation, lake cleanliness level was presented to DWUs and they were invited to provide emotional feedback to the farmers: either a smiley emoticon ☺ or a frowney emoticon ☹. Choosing to send such feedback was costly for DWU (their payoff was reduced by 50 tokens). Overall, DWUs expressed high willingness to provide costly feedback/express their emotions (see Figure 4 and the note below it for the graph explanation). As it is evident from Figure 4, males were more likely to send emotional feedback in both the Empathy and Self-interest treatments, while in the Neutral treatment females were more likely to do so. It is intriguing that females shied away from offering emotional feedback in the framed treatments. There are two possible explanations of such behavior: (1) the disbelief in the effectiveness of the feedback in the farmer-water user situation and (2) the acceptance of the right of the farmers to behave the way they did. By extension, in the Neutral treatment (free of the pre-conceived notions of how one should behave in such context) females felt the need to intervene and correct the behavior, while males were more accepting of the right of Player 1 to behave the way they pleased. Both genders were more eager to show their disapproval/negative emotions by sending a frowney than to show their positive emotions with a smiley.

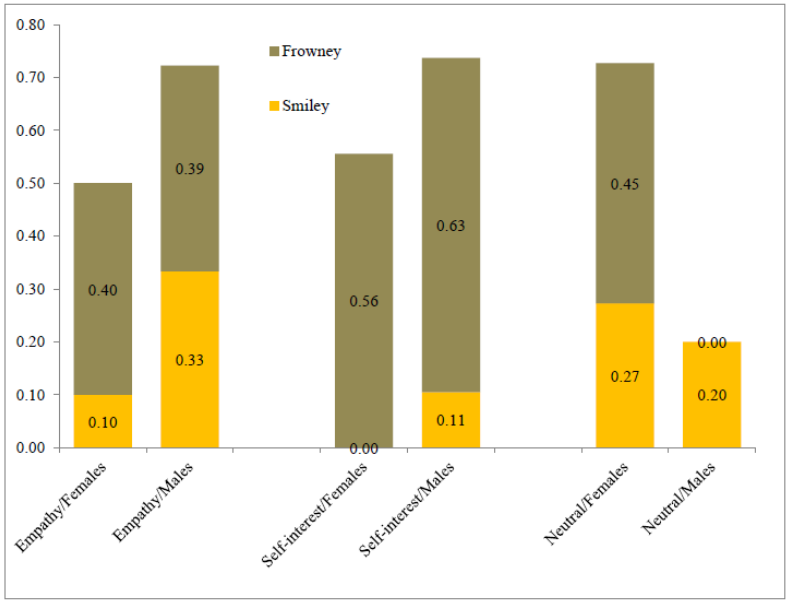

Figure 4. Proportion of Downstream Water Users sending emotional feedback by gender

Note. The height of each column represents the proportion of DWU players, sending emotional feedback, by gender. For example, the first column reveals that 10% of females in Empathy treatment sent a smiley and 40% of females sent a frowney, which implies that 50% of females (not shown) did not sent any feedback.

To further evaluate whether there are systematic gender differences in the proportions of emotional feedback across all treatments, several multinomial logit regressions were estimated (Table 2).

Based on the regression analysis, the emotion expression does not depend on gender. The gender dummy (in Models 1-3) and the interaction terms (in Models 4-5) are not statistically significant. Lake cleanliness is the only variable that is highly significant across all models. Moreover, including cleanliness in Model 2 as

compared to Model 1 increases the index for goodness of fit, Nakelkerke R-sq., from 0.014 to 0.46. These results indicate that expression of emotions is mainly triggered by the cleanliness of the lake and, as such, it depends on the payoff-relevant aspects of actions of others, rather than on other factors including gender. This, in turn, means that Hypothesis 3 is not supported by data.

Table 2. Gender in the context of sending emotional feedback (multinomial logit)

Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Intercept ☺	-0.44	-2.90**	-2.14*	-3.19***	-3.33***
☹	0.31	2.21***	1.19	2.33***	2.63***
Female ☺	-0.66	-0.81	-1.24		
☹	-0.15	0.36	0.82		
Cleanliness ☺		0.05**	0.06**	0.05**	0.08**
☹		-0.07***	-0.08***	-0.07***	-0.11***
Empathy frame ☺			-1.31		
☹			1.63*		
Self-interest frame ☺			-2.01		
☹			1.53*		
Cleanliness x Female ☺				-0.01	-0.02
☹				0.01	0.02
Cleanliness x Empathy frame ☺					-0.02
☹					0.04
Cleanliness x Self-interest frame ☺					-0.03
☹					0.04
Log-Likelihood	-74.0	-55.8	-51.4	-56	53.1
Nagelkerke R-squared	0.014	0.46	0.54	0.46	0.51

Note: Dependent variable is the type of emotional feedback (smiley, frowney, no feedback). Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

4.4 Gender and Response to Emotional Feedback

In Hypothesis 4 we conjectured that females react more to emotional feedback than males. In the context of this experiment, we tested whether females chose higher levels of conservation tillage than males after they received emotional feedback. We estimated two models for the change of conservation levels between Round 1 and Round 2, depending on the type of feedback received and gender (Table 3).

Table 3**.** Gender and response on emotional feedback (tobit)

	Model 6		**Model 7**	
Dependent Variable –change in CT	by UF	by UF/DWU	by UF	by UF/DWU
Intercept	68.36	-31.8	29.38	-34.62
☺ (1=smiley dummy)	-39.13	-25.65	-11.52	-55.07
☹ (1=frowney dummy)	28.96	111.24**	73.33*	120.82**
Female (1=female dummy)	-67.5**	-5.64		
☺ * Female			-42.86	53.97
☹ * Female			-81.16*	-21.56
Log-Likelihood	*-434.3*	*-446.7*	*-435.2*	*-446.3*
Nagelkerke Rsq.	*0.14*	*0.17*	*0.12*	*0.17*

Note: Dependent variable is the difference between conservation tillage acreage from Round 2 as compared to Round 1. Significance levels: ** p < 0.05, * p < 0.10.

The results of the regressions demonstrate that positive emotional feedback is not effective in increasing the levels of conservation regardless of gender. Negative emotional feedback, however, turned out to be more effective: receiving a frowney encouraged the farmers, on average, to increase CT levels next round. Gender effect depended on the role that the participants played. Notably, and, in contrast to our expectations, female UFs were less affected by negative emotional feedback than male UFs. Specifically, female UFs increased CT by lower levels than the male UFs did. However, female and male UF/DWUs increased CT by the same level, on

average.

5. Conclusion

The discussion of gender differences and similarities is always a fashionable topic, both for the scientific community and for the public (Sanz de Acedo Lizarraga et al., 2007). Typically people expect females to behave more environmentally-friendly and be more emotionally expressive. The previous literature on these topics is inconclusive: with some researchers reporting the presence of gender effects and some finding the absence of such. In the current paper, we joined this investigation and added an exploration on whether there are gender differences in pro-environmental behavior and how individuals act upon emotions. We tested the gender effects using a framed laboratory experiment on water quality.

The first part of our exploration dealt with pro-environmental behavior and framing. In our experiment, we find limited evidence that females, on average, behave more environmentally-friendly than males. Instead, the gender effect is highly context-dependent. Specifically, females are more likely to choose high levels of conservation than males. Males are more likely than females to choose an outcome that will lead to close-to-equal distributions when their payoff depends on both their own choice and the actions of others (the role of UF/DWU). Females are more likely than males to choose an outcome that leads to close-to-equal distribution when they can unilaterally determine own payoff (the role of UF). Males are more sensitive than females to framing when playing one role. Both females and males are sensitive to the dual role manipulation. From our results we can also conclude that the payoff-relevant factors are, overall, more important than gender. However, the genders can respond differently to these factors.

The second part of our exploration dealt with the expression of emotions and reacting on emotions. Females are, typically, considered to be a more emotional gender. However, research does not support this stereotype. After reviewing empirical studies on gender differences in emotions, Fischer (1993) concludes that "the general idea that women are more emotional than men tells us more about Western sex stereotypes than about women's actual emotions" (p. 303). Fischer (1993) points out the differences between self-reported measures and direct measures of emotions. In this paper, we used an incentive-compatible experiment to directly measure emotional expression and acting on the expressed emotions of others. We found that the likelihood of expression of emotions (both positive and negative) using emoticons ☺ and ☹ does not depend on gender, but rather on the payoff-relevant factors. Furthermore, both genders were more likely to show their negative emotions than their positive emotions. In terms of acting in response to emotions, we found that the gender differences depend on the players' role. When the role allowed the participants to determine their own payoff unilaterally, in contrast to the expectations, females acted less on the emotional feedback than males. When the role implied that the payoff depended on both their own choice and the actions of others, the gender differences were not observed. These findings further underlined the complexity of the gender differences.

In the last decades experimental methods have gained recognition as a valuable tool for understanding human behavior. Understanding human behavior and its motivation helps the society to design more effective public policies. Many environmental problems are rooted in human behavior and, thus, can be managed by changing the relevant behavior in order to reduce its negative environmental impacts (Steg & Vlek, 2009). This paper contributes to the literature by experimentally investigating whether there are gender differences and whether these differences follow the expected patterns in environmental context. Our findings suggest that "different strokes for different folks": (1) the gender difference or the absence thereof depend on specific stimuli and the decisional context and (2) if the difference is present, it does not always correspond to typical expectations/stereotypes. Thus, we caution the policy makers and general public against predicting behavioral responses by gender without empirically testing the specific context.

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Notes

Note 1. Alternatively, this point can be thought of as willingness to costly express their emotions. It is believed that women experience and express emotions more than men; the emotion that men are believed to experience and express more is anger (Barrett, Feldman, Robin, Pietromonaco, & Eyssell, 1998). In this experiment we incorporate expression of emotions as punishment or reward, which are used to express social disapproval or approval, respectively, and increase fairness and cooperation in social dilemmas (N. Czap et al., 2013).

Note 2. The handouts are available upon request.

Note 3. The quiz is available upon request.

Note 4. The subjects reported their average hourly wages (thus, opportunity costs were) to be US $15. This average wage was quite high and after examining the data one outlier (or data entry error) of hourly wage was found to be US $1,320. After removing this outlier, the opportunity costs are down to US $8.95.