

# Conforming to or Defying Gender Stereotypes?

## Empathy vs. Financial Nudging in Environmental Context

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### Abstract

Environmental policy traditionally relies on financial incentives and direct regulation to achieve desirable outcomes in terms of conservation and pro-environmental behavior. Empirical research has shown that market based approaches are more cost-effective than direct regulation. However, experimental research has demonstrated that a combination of financial and non-financial incentives (specifically empathy nudging) is, on average, even more effective than a financial nudge, or empathy nudge, individually. The current study looks at environmental policy, specifically financial and empathy nudging, in the agricultural context. The increase of the number of farms headed by females raises the question whether previous findings of the effectiveness of these nudges are gender specific or gender neutral. We investigate this question using data from a framed laboratory experiment in the context of farmers' conservation behavior. Specifically, we compare the change in conservation efforts of females and males in response to financial incentives and empathy nudging applied separately and at the same time. Our findings show that both females and males are moderately affected by financial nudges, but only females are affected by empathy nudges separately. The combination of both nudges is economically and statistically significantly higher than each nudge individually, and substantially higher for females than for males. This implies that policy makers could increase the effectiveness of environmental policy by accounting for these gender specific differences in the policy design.

**Keywords:** gender differences, environmental behavior, economic experiment, empathy nudging, financial nudging, gender stereotypes

### 1. Introduction

From a traditional, and perhaps still mainstream, economic perspective, financial incentives are the most effective tool for encouraging economic agents to perform desired actions. In the environmental context this is reflected by the increased push away from command-and-control regulations to emissions charges and cap-and-trade schemes. While the empirical evidence suggests that these market based approaches are more cost effective than command-and-control regulation (e.g., Seskin et al., 1983; Spofford, 1984<sup>1</sup>; Krupnick, 1986), it remains unclear in how far nudging people to do the right thing can substitute for costly pecuniary incentive based schemes,

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<sup>1</sup> Spofford (1984) estimates that when it comes to particulate matter in the Lower Delaware Valley, the command-and-control approach was up to 22 times more expensive than the least cost method. Other studies have found smaller differences, typically in the range of 30% to 600%.

or, if not substitute, in how far empathy nudging can augment pecuniary incentive schemes and increase their effectiveness. Experimental studies by N. Czap et al. (2015) and H. Czap et al. (2016) have shown that in environmental context empathy nudging by itself was less effective than financial nudging. The combination of financial incentives and empathy nudging, however, had a statistically and economically highly significant and positive impact on pro-environmental choices, compared to each individual nudge. The fact that the combination works much better than the sum of the parts, is theoretically supported by the metaeconomic framework and dual-interest theory (Hayes and Lynne, 2004, 2013; Lynne, 2006; Lynne et al., in press; Sheeder and Lynne, 2011, and the closely related dual motive theory (Cory, 2006; Tomer, 2012) which assert that individuals are motivated not only by self-interest, but by a shared empathy-based other-interest. The current paper expands on this analysis by looking into gender specific differences in the empathy and financial nudges. Understanding these differences will help environmental policy-makers better tailor the design of policies to the target population and improve overall effectiveness.

It is plausible that gender differences in behavior and attitudes may be connected to gender differences in empathy. According to some studies, women are more empathetic than men (Goldenfeld et al., 2005; Baron-Cohen, 2009), which certainly conforms to gender stereotypes. However, studies that find women to be more empathetic than men are based on self-reported measures (Eisenberg & Lennon, 1983; Schieman & van Gundy, 2000; Toussaint & Webb, 2007). These gender differences disappear when empathy was measured either with physiological or non-verbal behavior (Eisenberg & Lennon, 1983). According to Ickes et al. (2000) gender differences in empathy are found in two cases; first, when subjects know they are being evaluated on empathy and, secondly, when “empathy-relevant gender role expectations and obligations are made salient” (p. 95).

If there are no differences in levels of empathy, the question is whether we nonetheless observe gender differences in other-regarding preferences, attitudes and behavior. Evidence from economic studies involving other-regarding preferences in males and females is mixed. Some find women to be more generous (e.g., Seguino, Stevens, & Lutz, 1996; Eckel & Grossman, 1998; Kamas, Preston, & Baum, 2008; N. Czap & H. Czap, 2010; H. Czap et al., 2010), others find men to be more generous (e.g., Brown-Kruse & Hummels, 1993; Anderson, DiTraglia, & Gerlach, 2011), and still others find no differences between men and women (e.g., Bolton & Katok, 1995; Frey & Meirer, 2004). These inconsistencies have been attributed to differences in experimental designs, contexts, and motivational factors (Eckel & Grossmann, 2008; Croson & Gneezy, 2009; Fujimoto & Park, 2010). Environmental (economic) studies are a little more skewed towards females being more environmentally concerned for general or specific issues (e.g., Mohai, 1992; Zelezny et al., 2000, Caiazza & Barrett 2003; Xiao & Dunlap, 2007), even though Luzar and Cosse (1998) did not find a significant difference in willingness to pay for rural water quality between the genders.

The aforementioned research analyzes differences in baseline values for males and females in terms of empathy as well as other-regarding preferences/behavior. This might be important for policy makers when it comes to personnel, or similar, decisions, but is perhaps less relevant when it comes to policy designs that intends to change behavior of economic agents. As exemplified by the “Nudge Unit”<sup>2</sup> in the UK, nudging has gained traction as a publicly accepted and supported approach of improving policy outcomes in, among others, the environmental, health, and financial context. Numerous papers have shown that nudges are effective in changing behavior (e.g., Clark et al., 2014; N. Czap et al., 2014, 2015; H. Czap et al., 2016; Fryer et al. 2008; Gneezy & Rustichini 2000a,b; Gneezy et al. 2011; HoWook et al., 2015; Jalava et al., 2015; Lanzini & Thøgersen, 2014;

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<sup>2</sup> Officially known as the “Behavioral Insights Team”. See <https://www.gov.uk/government/organisations/behavioural-insights-team> for more information.

Marteau et al., 2011; Strohacker et al., 2014), albeit not always in the expected direction, as exemplified by the research of Gneezy & Rustichini (2000a,b), Gneezy et al. (2011), and Sudarshan (2013) who demonstrate that financial incentives may lead to crowding out of intrinsic motivation or non-pecuniary nudges and, thus, lead to a decrease in the desired behavior rather than an increase.

As of yet, there is, however, very little research (that we are aware of) that deals with gender specific differences in the effectiveness of these nudges. Clark et al. (2014) show that an informational nudge significantly increases retirement contributions by young male employees and significantly decreases retirement contributions by older male employees. Females, in contrast, do not display any significant change in behavior. This gender difference in responsiveness to nudges is consistent with Fryer et al. (2008), who demonstrate that the introduction of financial incentives exacerbates gender differences by increasing male performance on a SAT-style math test, while leaving female performance unchanged. In contrast, N. Czap et al. (2014) find that females respond more to emotionally based punishment calling for empathy compared to males, while both females and males do not respond much to the monetary fines. Jalava et al. (2015) look at the test performance of students in response to various non-financial incentive schemes. Their results show that boys are only motivated to improve performance by rank-based incentives, whereas girls also react positively to symbolic rewards.

As evident from the above discussion, in addition to the scarce number of papers, there is also inconsistent evidence on gender differences, suggesting that any gender differences observed (or lack thereof) are probably highly context and nudge dependent (Khachatryan and N.Czap, 2016). This paper contributes to this literature by looking at evidence from a lab experiment on gender differences in the effectiveness of financial and empathy nudges in an environmental context. The next section presents the hypotheses of this study. The third section explains the experimental design and procedures. The fourth section discusses the results. And the last section concludes our study and provides environmental policy recommendations.

## 2. Study Hypotheses

Hypothesis 1 is looking at the effectiveness of a financial nudge in comparison to a empathy nudge for each gender separately. The focus here is to determine whether for the given experimental parameters the empathy nudge is more or less powerful than the financial nudge or the combination of nudges. As mentioned above, it was established in N. Czap et al. (2015) and H. Czap et al. (2016) that a financial nudge is more effective than an empathy nudge on average, and that the combination of both is significantly more powerful than each nudge individually. However, it remains to be shown whether this is consistent across genders.

***Hypothesis 1:*** *In environmental decisions, the relative effectiveness of empathy and financial nudging depends on gender.*

Specifically, based on traditional gender stereotypes we speculate that:

*Hypothesis 1a.* Males are motivated **more** by financial nudging than by empathy nudging.

*Hypothesis 1b.* Females are motivated **more** by empathy nudging than by financial nudging.

*Hypothesis 1c.* Females and males are motivated **more** by a combination of empathy and financial nudging than by each nudging used individually.

Hypothesis 2 directly compares differences in impact of financial and empathy nudging between genders. As discussed in the literature section, there have been various attempts at establishing

whether women are more empathetic than men, and in how far there are differences in actual altruistic behavior. Very few papers, however, have discussed in how far we can nudge different genders to behave in a particular way, arguably a much more relevant question from a policy making perspective, than establishing differences in baseline averages. This leads us to the following:

***Hypothesis 2: In environmental decisions nudging affects genders differently:***

As under Hypothesis 1, we speculate based on traditional gender stereotypes that:

*Hypothesis 2a. Empathy nudges have a stronger impact on behavior of females than males*

*Hypothesis 2b. Financial nudges have a stronger impact on behavior of males than females*

The study by N. Czap et al. (2015) showed that the combination of both incentives is highly effective in encouraging pro-environmental behavior. Because the expectation is that empathy nudges are more effective for females and financial nudges are more effective for males, the combination of both should lead to a reduction in the difference between males and females:

*Hypothesis 2c. Both genders are **equally** motivated by a combination of financial and empathy nudging.*

We further investigate in this paper differences in the degree of heterogeneity. For policy makers it is attractive to tailor policies along easily identifiable characteristics, such as gender. This becomes less attractive if within the sub-population identified based on such characteristic there is substantial variance in response to the policy tool of interest, in this case financial and empathy nudges. N. Czap et al. (2014) show that men display significantly less variance in terms of environmental choices. Ex-ante this leads us to expect that we will find a similar pattern when it comes to the impact of financial and empathy nudges:

***Hypothesis 3: Males will display lower variation in their response to financial and empathy nudges than females.***

### **3. Experimental Design and Procedures**

#### *3.1 Context of the Game and the Players*

We tested the hypotheses presented above using data from a framed laboratory experiment in the context of farmers' conservation behavior. The context of the experiment was given as a upstream-downstream water pollution scenario. Downstream water pollution is a negative externality resulting from the agricultural operations by upstream farmers, due to chemical runoff and soil erosion. The downstream water users incur the social cost of pollution, as they have to clean water more thoroughly than they would have to without pollution.

This game was played by two players, an Upstream Farmer (UF) and a Downstream Water User (DWU). UF farms upstream and decides whether to use conservation tillage (CT) or intensive tillage (IT) on a part or an entire plot of their land. If the farmer implements CT, the levels of soil erosion and chemical runoff into the nearby rivers are lower, than if the farmer uses IT. DWU, therefore, benefits from CT usage upstream since they are getting cleaner water downstream and, thus, spend less on water cleanup. However, implementing CT is more costly for UF than implementing IT, as it increases uncertainties regarding the farm yields and the planting and harvest time.

### 3.2 Assigning Participants to the Roles

The downstream pollution situation represents a dictator game (Kahneman et al., 1986) in a context. Research shows that the division of the pie depends on several factors, including the feeling of entitlement to serve as a divider (see for example Cherry et al, 2002; Cherry & Shogren, 2008; Oxoby & Spraggon, 2008). Typically the feeling of entitlement is achieved by linking the divider's role to a superior performance on a trivia quiz. Given that our participants are making decisions in the agricultural context, we designed a farming quiz<sup>3</sup>. The quiz was comprised of 10 questions, related to agricultural practices, technologies and policies, which was testing the participants knowledge of basic farming issues. We had two major reasons for using a farming quiz instead of trivia questions. First, many farmers have been working on their lands for generations. As such, many farmers have a strong sense of their right to have complete private property rights on their land and, thus, the right to farm the way they see fit. In our experiment, having earned the position to be a farmer by performing better on a quiz might instill a similar feeling of entitlement in the participants. Second, the participants who performed better at the quiz were more likely to have a farming background and, thus, could more easily identify with the role of a farmer. After the completion of the game, we asked the UF players whether they agreed with the following statement: "Since my performance on the farming quiz was in the top 50% and my partner's was in the bottom 50%, it was fair that I was playing the role of a farmer who decided on the level of CT". Overall 74% of the players agreed to that statement.

Prior to the quiz, the participants were informed that based on their results in the test, their roles would be assigned and that those who performed better on the quiz would have more control over their take-home payoffs. Based on the quiz results, the participants were ranked by their performance. The top 50% were assigned the role of UF, while the rest took on the role of DWU.

### 3.3 Treatments and the Players' Payoffs

The game consisted of 20 rounds. Prior to Round 1, the participants were provided with the game instructions and asked to answer questions checking their understanding of instructions and the calculation of the payoffs. The game did not start until everyone correctly calculated the payoffs.

For the first 10 rounds all participants played the same game to establish a baseline of conservation behavior under the agricultural conservation policy that we called *Old Policy*. After 10 rounds the conservation policy has changed – we called this *New Policy*. For the second 10 rounds a variant of *New Policy* was implemented and the participants were assigned to one out of 4 treatments: no nudging; financial nudging; empathy nudging; and empathy & financial nudging. We used "partners matching", so the UF-DWU pair was playing together for 20 rounds.

#### 3.3.1 Old Policy

Each farmer was told that they had 500 acres of land. UF had to decide how many acres of land to put under conservation (CT). The payoff of UF consisted of two parts: payoff from farming and governmental subsidies. Payoff from farming was equal to  $1500 - 2 * CT$ . The amount of governmental subsidy depended on whether the farmer's conservation level exceeded the "conservation compliance" level of 250 acres. If CT was equal or greater than 250, then the subsidy was 300. If CT was lower than 250, then the subsidy was 200.

The payoff of DWU consisted of two parts: payoff from using water and a tax that was used to pay the farmers' subsidy. The payoff from using water was equal to  $500 + 2 * CT$ . The tax was equal to a third of the subsidy. If the UF's conservation level was equal to or exceeded the conservation

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<sup>3</sup> The quiz is available upon request.

compliance level, the tax was  $100(=300/3)$ . If the UF did not comply, the tax was  $66.67(200/3)$ . The relation between the subsidy received by UF and the tax paid by DWU was modelling the real world in the sense that the population pays taxes that are later used for subsidies, but the per farmer subsidy is greater than the per citizen tax.

The Nash equilibrium is for UF to choose  $CT=0$ , resulting in a total payoff of 1700 for UF and 433 for DWU. If UF chooses to adopt conservation on their entire plot of land ( $CT=500$ ), then the total payoff for UF is 800 and for DWU is 1400. If  $CT$  is equal to the compliance level of 250, then the total payoff for UF is 1300 and for DWU is 900.

### 3.3.2 New Policy

After round 10, the participants were told the agricultural conservation policy had changed and were provided with a new set of instructions and payoffs. The participants were randomly assigned to one of the 4 treatments described below.

In the *No nudging* treatment, the entire amount of the subsidy ( $=300$ ) was given to UF regardless of the conservation level they chose. In the *Financial nudging* treatment, the entire amount of the subsidy (300) was given to UF only if the conservation level was equal to or above the conservation compliance level. In the *Empathy nudging* treatment, the setup and payoffs for the players were the same as in the *No nudging* treatment. However, in this treatment DWU was invited to send UF a message, nudging for empathy (see the description in the next subsection). The message was passed to UF when she was about to decide on the  $CT$  level. The message carried no monetary consequences for UF. The *Financial&Empathy nudging* treatment was a combination of the *Financial nudging* and *Empathy nudging* treatments: DWU was sending a nudging message to UF and the subsidy received by UF was conditional on conservation compliance.

### 3.4 Empathy nudging messages

The empathy nudging messages were developed on the basis of the Interpersonal Reactivity Index (IRI) (Davis, 1980, 1983), which takes a multidimensional approach to empathy and includes four subscales (perspective-taking, fantasy scale, empathetic concern, and personal distress). We used two scales of IRI, perspective taking and fantasy. The perspective taking (PT) scale “assesses the tendency to spontaneously adopt the psychological point of view of others” (Davis, 1983, p.113). Fantasy scale (FS) “taps respondents’ tendencies to transpose themselves imaginatively into the feelings and actions of fictitious characters” (Davis, 1983, p.114). These two scales reflect the idea of empathy as feeling with the other person and imagining “oneself in the shoes” of another person, which is necessary for us to construct the messages nudging for empathy conservation (Lynne et al., in press).

PT and FS each contain 7 statements. Examples of PT statements are: “I sometimes try to understand my friends better by imagining how <sup>[SEP]</sup>things look from their perspective” and “Before criticizing somebody, I try to imagine how I would feel if I were in their place.” Examples of FS are: “I really get involved with the feelings of the characters in a novel” and “When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.” The first step in developing our empathy nudging messages was choosing the key phrases from each statement. Several statements included similar phrases such as “look at everybody's side” and “look at both sides of the question”. After eliminating similar phrases, we ended up with 6 distinct key phrases. On the second step we used the 6 key phrases to write a message that DWU can send to UF. We wrote 12 messages, each starting with “Before choosing the level of  $CT$  this year, please...”. The second part of the message was containing the key phrase and was written using either personal (e.g. “... see your decision from my point of view”) or general (e.g. “... see your

decision from the DWU's point of view") appeal (Table 1).

Table 1. List of empathy nudging messages

	<b>Personal appeal</b>	<b>General appeal</b>
	Before choosing the level of CT this year, please...	
1.	... see your decision from my point of view	... see your decision from the DWU's point of view
2.	... understand my situation better by imagining how your decision looks from my perspective	... understand the DWU's situation better by imagining how your decision looks from the DWU's perspective
3.	... look at both your and my side	... look at both your and the DWU's side
4.	... put yourself in my place	... put yourself in the DWU's place
5.	... try to put yourself in my shoes for a while	... try to put yourself in the DWU's shoes for a while
6.	... imagine how you would feel in my place	... imagine how you would feel in the DWU's place

### 3.5 Procedures

The experiment was conducted at the XXX University. The experimental subjects were recruited on campus via emails and flyers posted and distributed across campus. In total 400 students and members of the community participated in the experiment, with 100 in each of the treatments. About half of the participants were females. The experiment was computerized and administered using the experimental software z-Tree (Fischbacher, 2007). Each session lasted 90 minutes. The earnings in the game were in tokens. At the end of the experiment the tokens were converted into dollars at the rate of \$1 = 500 tokens. The money was paid privately in cash. The experiment was incentive-compatible with the average take-home earnings of \$43.6. This amount was much higher than the participants' opportunity cost, which is typically the minimum wage.

Participants were making decisions privately and anonymously. Their earnings were tracked only by a 5-digit random number. First, the participants took the farming quiz described above. Next, they read the instructions for Rounds 1-10 on their computer screens. They also received a printed summary of experimental instructions and a table showing possible payoffs for UF and DWU. The summary of instructions was read aloud to make it public information. Next, participants were given a quiz<sup>4</sup> to check their understanding of the instructions and ability to calculate payoffs. The game did not start until all participants correctly answered the questions and calculated the payoffs. At this point the participants were reminded about their performance on the farming quiz (top 50% or bottom 50%) and got assigned their role (UF and DWU respectively). After the first 10 rounds of the game were completed, the participants received a new set of instructions, corresponding to the appropriate treatment) for Rounds 11–20. As previously, they also received a summary with instructions and payoffs, which was again read aloud. UF and DWU group stayed unchanged till the end of the experiment. Both players knew that they were playing with the same partner. However, they did not know any other information about the partner, including the gender.

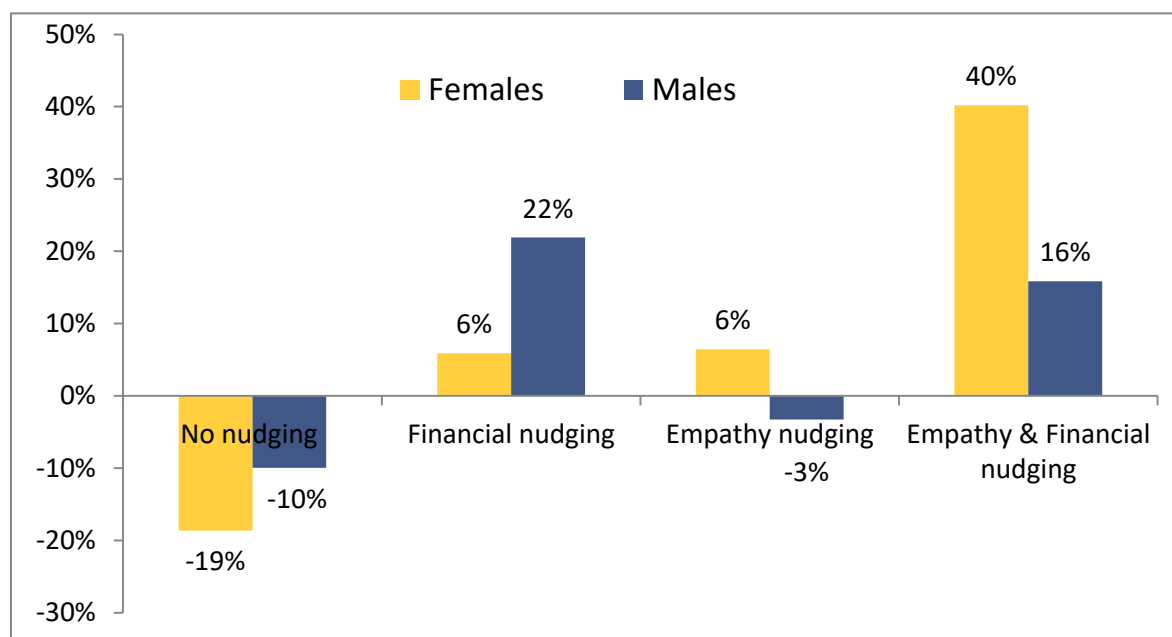
<sup>4</sup> The quiz is available upon request.

#### 4. Experimental Results

During the *Old Policy* part of the game UF females put 204 acres (out of 500) under conservation, compared to 198 acres by UF males. This is well above predictions based on the Nash equilibrium, which is to place zero acres under conservation. Since DWU was a passive party in this game, there were no strategic considerations for the UF to behave this way. Based on this results we can conclude that there is no gender difference in the initial decision regarding CT levels.

We begin by comparing the relative effectiveness of empathy and financial nudging by gender. We calculated the percentage change in each of the 4 treatments as compared to *Old Policy*. When the participants switched from *Old Policy* to *No-nudging*, the average CT went down by 19% for females and 10% for males (Fig. 1). This indicates that the removal of the conservation compliance as a condition of receiving the subsidy led to a, not unexpected, decrease in conservation. Financial nudging and empathy nudging were equally effective for females, increasing conservation by 6% as compared to conservation under *Old Policy*. However, for males we observe that only financial nudging was effective. When both nudges were combined, it produced a synergetic effect for females with the conservation increasing by 40%. For males, however, a combination of nudges was less effective in relative terms than financial nudging alone.

Figure 1. Percentage change in conservation in response to the policy change by gender



NOTE: The numbers show the percentage change from *Old Policy*.

To evaluate the significance of the treatment effects on the absolute changes in conservation levels, we estimated a regression model for each gender separately (Table 2).

We observed two similarities and two differences between the reactions of each gender on different nudging. The similarities are: (1) in the absence of nudging the conservation efforts by males as well as females decreased (the coefficients in front of the variable *Old policy* are below one) and (2)



financial nudging is effective for both genders as compared to no nudging (the coefficients in front of the variable *Financial nudging* are statistically significant and positive). The differences are: (1) for females empathy nudging is as effective as financial nudging (both coefficients are statistically significant and almost equal), while for males empathy nudging is not effective at all; (2) for females a combination of empathy and financial nudging is much more effective than each type of nudging alone, while for males the combination of nudges only marginally more effective than for females. Overall these results offered support for Hypothesis 1. We also found support for 1a and partial support for 1c, while 1b is not supported.

Table 2. Average treatment effect by gender

	<b>Females</b>	<b>Males</b>
Intercept	12.6 (23.8)	6.18 (17.1)
Treatment 2 - FINANCIAL NUDGING	48.9** (23.5)	45.6** (17.6)
Treatment 3 - EMPATHY NUDGING	49.8** (22.4)	13.0 (18.0)
Treatment 4 - EMPATHY & FINANCIAL NUDGING	102.1*** (22.3)	56.5*** (18.4)
Old Policy†	0.76*** (0.07)	0.87*** (0.06)
Number of observations	89	111
R-squared (adjusted)	0.59	0.70

NOTES: † - Average CT under *Old Policy*. Dependent variable: Average CT under *New Policy*. Standard errors are in parentheses. Significance: \*\* - 0.05; \*\*\* - 0.01.

Next, we compare the effectiveness of each of the nudges between the genders. We are testing for two effects: (1) whether males and females are responding differently to the change in policy and (2) whether females and males react differently to nudging. For each of the treatments we constructed a regression, which included a gender dummy (*Female*) and the interaction between the gender dummy with the past behavior (*Old Policy*). The regression results (Table 3) indicated that the strongest predictor of behavior is what the participants were doing before the policy changed as indicated by highly significant coefficient in front of *Old Policy*. We found no gender difference in the *No nudging* and *Financial nudging* treatments: the coefficients in front of *Female* and the interaction term are not statistically significant. In the *Empathy nudging* treatment we observed that females placed 65.2 acres of land more under conservation than the males did. The gender difference is both statistically and economically significant as the total amount of land available is 500 acres. The results also indicated the gender difference in the response to the policy change. After empathy nudging was introduced, males continue conservation at the same level as in the prior rounds: the coefficient in front of *Old Policy* is very close to one (0.98). For females, in

contrast, the dependence on the previous policy was lower by 0.22 (as indicated by the coefficient in front of *Female X Old Policy*). In the case of the combination of empathy and financial nudging we found that females placed 73.4 acres of land more under conservation than the males did. The gender difference is weakly statistically (at 10%) significant. However, it is economically significant as it represents close to 15% of all available land. In this treatment there was no gender difference in response to the policy change.

To summarize, we observed two similarities and one gender difference. The similarities are: (1) in the absence of nudging there is no statistically significant difference in the conservation levels of males and females. (2) financial nudging is statistically and economically effective in increasing conservation and does so by a similar degree, as evident by the similar coefficients in Table 2 and the statistically insignificant difference in Table 3. The key gender difference is that empathy nudging is substantially more effective for females than for males. With respect to the combination of the empathy and financial nudging, we found only weak evidence that it is more effective for females. Overall these results offer support for Hypothesis 2. We also found support for 2a, while 2b is not supported. Hypothesis 2c is only partially supported in the sense that the combination of nudges is effective in changing behavior for both genders, but it is significantly more powerful for females than for males.

Table 3. Effect of (no) nudging by gender

	<b>No nudging</b>	<b>Financial nudging</b>	<b>Empathy nudging</b>	<b>Empathy &amp; financial nudging</b>
Intercept	11.3 (30.6)	62.7 (20.4)	-3.05 (20.0)	68.0* (34.9)
Female (Yes=1, No=0)	13.5 (65.8)	-47.0 (37.9)	65.2** (29.7)	73.4* (43.8)
Old Policy†	0.85*** (0.12)	0.80*** (0.10)	0.98*** (0.08)	0.85*** (0.14)
Female X Old Policy	-0.14 (0.26)	0.18 (0.17)	-0.22* (0.12)	-0.24 (0.19)
Number of observations	50	50	50	50
R-squared (adjusted)	0.53	0.69	0.81	0.53

NOTES: † - Average CT under Old Policy. Dependent variable: Average CT under New Policy. Standard errors are in parentheses. Significance: \* - 0.1; \*\* - 0.05; \*\*\* - 0.01.

## 5. Conclusion and recommendations

This paper belongs to a very short list of papers that discuss gender differences in the effectiveness of nudges. The difference in the results among the few existing papers highlights the need for more research in various contexts and with varying nudges. The current paper looks at nudges in the

context of agricultural policy and the impact of financial vs. empathy nudges on conservation behavior. We found that for women financial nudging and empathy nudging are equally effective (defying gender stereotypes), but the combination of the two is by far more effective. For men, financial nudging was a lot more effective than empathy nudging (conforming to stereotypes) and the combination of the two is not much more effective than the financial nudge by itself. When it comes to the effectiveness of the nudges based on gender, it turned out that financial nudges did not result in significantly different outcomes between males and females (defying stereotypes) whereas empathy nudging did – females reacted significantly more to empathy nudges individually (conforming to stereotypes) as well as to the combination of the two nudges.

Empathy nudging is a potentially attractive tool for policy makers. While the studies by N. Czap et al. (2015) and H. Czap et al. (2016) show, in the same experimental context, that on average financial nudging is more effective than empathy nudging and the combination of nudges vastly more powerful than each nudge individually, the analysis in this paper demonstrates that this is gender dependent. Currently the agricultural industry is still dominated by male farm operators. As such the current paper implies that the best policy is still based on financial incentives only, or perhaps in conjunction with empathy nudging as such nudging is quite cheap. However, if current trends of increased female ownership and management of farm operations will continue, the recommended design might very well shift to one incorporating significantly more “soft” nudges, such as the empathy nudges used in the experiment. From a practitioner’s perspective these nudges could be provided through letters specifically addressed at farm operators to walk-in-the-shoes of others affected by farming practices and nature, through education meetings in which the extension officers provide verbal and non-verbal cues to be more empathetic to the wildlife, and through local efforts to build a sense of community and belonging to the ecosystem.

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## References

- Anderson, L. R., DiTraglia, F. J., & Gerlach, J. R. (2011). Measuring altruism in a public goods experiment: A comparison of US and Czech subjects. *Experimental Economics*, 14(3), 426-437. <http://dx.doi.org/10.1007/s10683-011-9274-8>
- Baron-Cohen, S. (2009). Autism: The empathizing–systemizing (E-S) theory. *Annals of the New York Academy of Sciences*, 1156(1), 68-80. <http://dx.doi.org/10.1111/j.1749-6632.2009.04467.x>
- Bolton, G. E., & Katok, E. (1995). An experimental test for gender differences in beneficent behavior. *Economics Letters*, 48(3), 287-292. [http://dx.doi.org/10.1016/0165-1765\(94\)00621-8](http://dx.doi.org/10.1016/0165-1765(94)00621-8)
- Brown-Kruse, J., & Hummels, D. (1993). Gender effects in laboratory public goods contribution: Do individuals put their money where their mouth is? *Journal of Economic Behavior & Organization*, 22(3), 255-267. [http://dx.doi.org/10.1016/0167-2681\(93\)90001-6](http://dx.doi.org/10.1016/0167-2681(93)90001-6)

- Caiazza, A., & Barrett, A. (2003). Engaging women in environmental activism: Recommendations for Rachel's network. *Institute for Women's Policy Research Publication #I913*.
- Clark, R. L., Maki, J. A., & Morrill, M. S. (2014). Can simple informational nudges increase employee participation in a 401 (k) plan? *Southern Economic Journal*, 80(3), 677-701.  
<https://doi.org/10.4284/0038-4038-2012.199>
- Cherry, T. L., Frykblom, P., & Shogren, J.F. (2002). Hardnose the dictator. *The American Economics Review*, 92(4): 1218-1221. <https://doi.org/10.1257/00028280260344740>
- Cherry, T. L., & Shogren, J. F. (2008). Self-interest, sympathy and the origin of endowments. *Economics Letters*, 101(1): 69-72. <https://doi.org/10.1016/j.econlet.2008.04.007>
- Cory Jr., G.A., 2006. A behavioral model of the dual motive approach to behavioral economics and social exchange. *J. Socio-Econ.* 35, 592–612. <http://dx.doi.org/10.1016/j.socec.2005.12.017>.
- Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature*, 47(2), 1-27. <http://dx.doi.org/10.1257/jel.47.2.448>
- Czap, N. V., & Czap, H. J. (2010). An experimental investigation of revealed environmental concern. *Ecological Economics*, 69(10), 2033-2041. <http://dx.doi.org/10.1016/j.ecolecon.2010.06.002>
- Czap, H. J., Czap, N. V., & Bonakdarian, E. (2010). Walk the talk? The effect of voting and excludability in public goods experiments. *Economics Research International*. 1-15.  
<http://dx.doi.org/10.1155/2010/768546>
- Czap, N. V., Czap, H. J., Burbach, M. E., & Lynne, G. D. (2014). Gender in environmental context: An effect of property rights, fines, and empathy nudging. *International Journal of Economics and Finance*, 6(4), 11-23. <http://dx.doi.org/10.5539/ijef.v6n7p11>
- Czap, N., Czap H., Burbach, M., & Lynne, G. (2015). Walk in my shoes: Nudging for empathy conservation. *Ecological Economics*, 118:147-158.  
<https://doi.org/10.1016/j.ecolecon.2015.07.010>
- Czap, H. J., Czap, N. V., Lynne, G. D., & Burbach, M. E. (2016). Farm Bill 2014: An Experimental Investigation of Conservation Compliance. *Journal of Sustainable Development*, 9(3): 23-38.  
<https://doi.org/10.5539/jsd.v9n3p23>
- Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology*, 10, 85.
- Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of personality and social psychology*, 44(1), 113.
- Eckel, C. C., & Grossman, P. J. (1998). Are women less selfish than men: Evidence from dictator experiments. *Economic Journal*, 108(448), 726-735. <http://dx.doi.org/10.1111/1468-0297.00311>
- Eckel, C. C., & Grossman, P. J. (2008). Differences in the economic decisions of men and women: Experimental evidence. In C. R. Plott, & V. L. Smith (Eds.) *Handbook of experimental economics results*, Volume 1 (pp. 509-519). Amsterdam, The Netherlands: North-Holland.
- Eisenberg, N., & Lennon, R. (1983). Sex differences in empathy and related capacities. *Psychological Bulletin*, 94(1), 100-131. <http://dx.doi.org/10.1037/0033-2909.94.1.100>
- Fischbacher, U. (2007). z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics*, 10(2), 171-178. <http://dx.doi.org/10.1007/s10683-006-9159-4>
- Frey, B. S., & Meier, S. (2004). Pro-social behavior in a natural setting. *Journal of Economic Behavior*

- & *Organization*, 54(1), 65-88. <http://dx.doi.org/10.1016/j.jebo.2003.10.001>
- Fryer, R. G., Levitt, S. D., & List, J. A. (2008). Exploring the impact of financial incentives on stereotype threat: Evidence from a pilot study. *The American Economic Review*, 98(2), 370-375.
- Fujimoto, H., & Park, E-S. (2010). Framing effects and gender differences in voluntary public goods provision experiments. *Journal of Socio-Economics*, 39(4), 455-457. <http://dx.doi.org/10.1016/j.socec.2010.03.002>
- Gneezy, U., & Rustichini, A. (2000a). A fine is a price. *The Journal of Legal Studies*, 29, 1-17. <http://dx.doi.org/10.1086/468061>
- Gneezy, U., & Rustichini, A. (2000b). Pay enough or don't pay at all. *Quarterly Journal of Economics*, 791-810. <http://dx.doi.org/10.1162/003355300554917>
- Gneezy, U., Meier, S., & Rey-Biel, P. (2011). When and why incentives (don't) work to modify behavior. *The Journal of Economic Perspectives*, 25(4), 191-209. <https://doi.org/10.1257/jep.25.4.191>
- Goldenfeld, N., Baron-Cohen, S., & Wheelwright, S. (2005). Empathizing and systemizing in males, females and autism. *Clinical Neuropsychiatry*, 2(6), 338-346.
- Hayes, W.H., Lynne, G.D., 2004. Towards a centerpiece for ecological economics. *Ecological Economics*, 49, 287-301. <http://dx.doi.org/10.1016/j.ecolecon.2004.01.014>.
- Hayes, W.M., Lynne, G.D., 2013. The evolution of ego 'n' empathy: progress in forming the centerpiece for ecological economic theory. In: Richardson, R. (Ed.), *Building a Green Economy: Perspectives from Ecological Economics*. Michigan State University Press, East Lansing, MI, pp. 101-111.
- Ickes, W., Gesn, P. R., & Graham, T. (2000). Gender differences in empathic accuracy: Differential ability or differential motivation? *Personal Relationships*, 7(1), 95-109. <http://dx.doi.org/10.1111/j.1475-6811.2000.tb00006.x>
- Jalava, N., Joensen, J. S., & Pellas, E. (2015). Grades and rank: Impacts of non-financial incentives on test performance. *Journal of Economic Behavior & Organization*, 115, 161-196. <https://doi.org/10.1016/j.jebo.2014.12.004>
- Kahneman, D., Knetsch, J. L., & Thaler, R. H., 1986. Fairness and the assumptions of economics. *Journal of Business*. 59(4): S285-S300. <http://dx.doi.org/10.1086/296367>
- Kamas, L., Preston, A., & Baum, S. (2008). Altruism in individual and joint-giving decisions: What's gender got to do with it? *Feminist Economics*, 14(3), 23-50. <http://dx.doi.org/10.1080/13545700801986571>
- Khachatryan, M., Czap, N.V. 2016. Different strokes for different folks: Gender and emotions in an environmental game. *Sustainable Agriculture Research*, 5(4): 81-93.
- Krupnick, A. J. (1986). Costs of alternative policies for the control of NO<sub>2</sub> in the Baltimore region. *Journal of Environmental Economics and Management*, 13(2): 189-197. [https://doi.org/10.1016/0095-0696\(86\)90035-5](https://doi.org/10.1016/0095-0696(86)90035-5)
- Luzar, E. J., & Cosse, K. J. (1998). Willingness to pay or intention to pay: The attitude-behavior relationship in contingent valuation. *Journal of Socio-Economics*, 27(3), 427-444. [http://dx.doi.org/10.1016/s1053-5357\(99\)80097-3](http://dx.doi.org/10.1016/s1053-5357(99)80097-3)
- Lynne, G.D., 2006. Toward a dual motive metaeconomic theory. *J. Socio-Econ.* 35, 634-651. <http://dx.doi.org/10.1016/j.socec.2005.12.019>.

- Lynne, G.D., Czap, N.V., Czap H.J., Burbach, M.E., in press. A theoretical foundation for empathy conservation: Toward avoiding the tragedy of the commons. Accepted by *Review of Behavioral Economics*.
- Mohai, P. (1992). Men, women, and the environment: An examination of the gender gap in environmental concern and activism. *Society and Natural Resources*, 5(1), 1-19.  
<http://dx.doi.org/10.1080/08941929209380772>
- Oxoby, R. J., & Spraggon, J. (2008). Mine and yours: Property rights in dictator games. *Journal of Economic Behavior and Organization*, 65(3-4): 703-713.  
<https://doi.org/10.1016/j.jebo.2005.12.006>
- Schieman, S., & Van Gundy, K. (2000). The personal and social links between age and self-reported empathy. *Social Psychology Quarterly*, 63(2), 152-174. <http://dx.doi.org/10.2307/2695889>
- Seguino, S., Stevens, T., & Lutz, M. (1996). Gender and cooperative behavior: economic man rides alone. *Feminist Economics*, 2(1), 1-21. <http://dx.doi.org/10.1080/738552683>
- Seskin, E. P., Anderson, R. J., & Reid, R. O. (1983). An empirical analysis of economic strategies for controlling air pollution. *Journal of Environmental Economics and Management*, 10(2): 112-124.  
[https://doi.org/10.1016/0095-0696\(83\)90020-7](https://doi.org/10.1016/0095-0696(83)90020-7)
- Sheeder, R.J., Lynne, G.D., 2011. Empathy conditioned conservation: 'Walking-in-the shoes-of-others' as a conservation farmer. *Land Econ.* 87, 433-452.
- Spofford, W. O. Jr. (1984). Efficiency properties of alternative source control policies for meeting ambient air quality standards: An empirical application to the lower Delaware valley. *Resources for the Future, Inc., discussion paper D1189*.
- Sudarshan, A. (2014). Nudges in the marketplace: Using peer comparisons and incentives to reduce household electricity consumption. *Working Paper*, pp. 43
- Tomer, J.F., 2012. Brain physiology, egoistic and empathic motivation, and brain plasticity: toward a more human economics. *World Econ. Rev.* 1, 76-90.
- Toussaint, L., & Webb, J. R. (2005). Gender differences in the relationship between empathy and forgiveness. *The Journal of Social Psychology*, 145(6), 673-685.  
<http://dx.doi.org/10.3200/socp.145.6.673-686>
- Xiao, C., & Dunlap, R. E. (2007). Validating a comprehensive model of environmental concern cross-nationally: A U.S.-Canadian comparison. *Social Science Quarterly*, 88(2), 471-492.  
<http://dx.doi.org/10.1111/j.1540-6237.2007.00467.x>
- Zelezny, L. C., Chua, P-P., & Aldrich, C. (2000). Elaborating on gender differences in environmentalism. *Journal of Social Issues*, 56(3), 443-457. <http://dx.doi.org/10.1111/0022-4537.00177>