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Communicating transportation carbon dioxide emissions information: Does gender impact behavioral response?

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ABSTRACT

General concern and knowledge on climate change have been increasingly studied over the past decades. Gender differences have been found for general environmental concern and knowledge, but mixed findings exist with respect to climate change. In transportation, research has examined potential relations between environmental attitudes and transportation behavior, with mixed findings as well. Recently, the use of carbon dioxide (CO_2) emissions information to influence choice has been tested with women being found more willing to pay to reduce their personal impacts, suggesting that women are either more willing to change or that their response to information on climate change is stronger. However, those studies used CO_2 mass and studies that examined understanding of CO_2 information as a mass have found that people struggle to understand it. If concern and knowledge about climate change differ amongst individuals, then, according to theories such as the Transtheoretical Model, the type of information used to motivate choices is likely important. Using a unique data set (n = 236) it is possible to take a first look at how gender might affect concern, knowledge, and action in terms of transportation and climate change. Further, it is also possible to examine behavioral responses to transportation climate change information. Finally, an empirical analysis is conducted of the effect of *how* the information is presented might differ by gender. Thus, this work aims to investigate whether gender differences might contribute to the explanation of individual behavioral responses (from concern to action) in a transportation climate change context.

1. Introduction

Environmental concern, knowledge, and action, and the links between them, have been studied for several decades. Gender differences were reported in such studies; specifically, findings show that women generally have higher concern of environmental issues and conduct more environmental action, though less activism. For climate change though, general concern and knowledge on the subject have been increasingly studied over the past decade, but evidence of gender differences on attitudes towards and knowledge of climate change are mixed. Information on climate change such as CO_2 emissions are increasingly available, and some evidence suggests that it can have an impact on choices. However, questions have been

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raised about whether the most common means of presenting that information, as a mass, motivates those who are not already convinced of a the need to reduce emissions.

Theories such as the Knowledge-Deficit theory suggest that a lack of knowledge is related to lower concern and lower action on a problem. Some research has found that more informed individuals felt less concerned about climate change and less personally responsible (Kellstedt et al., 2008), with men being more likely to report being concerned. In other research related to support for reducing greenhouse gas emissions, the cognitive component (i.e. knowledge) was the most strongly associated support (O'Connor et al., 2002). In that study, gender was not an influence. However, in those studies, how people responded to information on a behavior was given, so how they might *respond* to greenhouse gas (GHG) emissions information is not known.

In the domain of transportation, studies have examined how environmental attitudes might affect daily travel, but have either found that the environment was not considered (Beirão and Cabral, 2008), or that higher education was the defining characteristic for those who did (Anable, 2005). As well, people may be more willing to reduce domestic energy consumption than to change their transportation habits (e.g. O'Connor et al., 2002; Whitmarsh, 2009). Thus, transportation is an area that likely requires greater effort to induce change.

Despite the considerable role that transportation plays in anthropogenic greenhouse gas emissions (in particular carbon dioxide (CO_2)) that contribute to climate change (Ryley and Chapman, 2012), research in transportation has only recently examined how knowledge (through information) of climate change impacts might affect an individual's transportation behavior in choice experiments (e.g. Achtnicht, 2012; Gaker et al., 2011, 2010; Daziano and Achtnicht, 2014). In those studies, the information was found to have an impact on choice and women were generally found to be more willing to pay to reduce personal emissions. However, that research did not take into account knowledge or concern about climate change and used CO_2 emissions presented as a mass, which may not be useful to most people.

Useful can be interpreted as providing the individual with information that they can apply to their choices, or as a means to reduce society's overall impacts. Presumably, improving the first could help with the latter. Previous studies on the use of CO_2 emissions presented as a mass have found that people struggle to understand the information (Chatterton et al., 2009; Coulter et al., 2007). In those studies, gender influenced results related to *how* the information was presented. Thus, the question of whether changing how the CO_2 emissions information is presented might effect motivation to make choices that result in lower emissions.

As outlined above, there is evidence that men and women might have different levels of concern about climate change and might respond differently when presented with climate change relevant information such as CO_2 emissions. Work has suggested that if concern is taken into account, gender does not have an effect (O'Connor et al., 2002), but that research did not present the individuals with CO_2 emissions related to the possible behavior changes. Thus, the objectives of this research are to examine: (1) *how gender might relate to concern, knowledge, and action in terms of transportation and climate change*; (2) *behavioral responses to transportation climate change information*; (3) *whether how the information is presented might influence behavioral responses*. Put another way, this work aims to investigate whether gender differences might contribute to the explanation of individual behavioral responses (from concern to action) in a transportation climate change context. The results will be useful for any program that aims to use information to aid in reducing individual climate change impacts, in particular those that apply segmentation.

2. Background

2.1. Theoretical considerations

Knowledge and concern do not translate directly into action. This is often referred to as the attitude-action gap (e.g. Anable et al., 2006), where individuals may know and be concerned about a problem, but not take action. Anable et al. (2006) discuss how there are two opposing views on this. One suggests that if people had the relevant information they would behave appropriately (according to knowledge deficit theory), while the other suggests that information is necessary but not sufficient. Their review found that the latter is emerging as the consensus.

There are many different behavioral models that relate to how information might influence behavior (Avineri and Waygood, 2010; Chorus et al., 2006; Waygood et al., 2012). In this work a dynamic model is used as we focus on the process of change from having no concern about a problem behavior to a behavior that addresses that problem.

2.1.1. Transtheoretical model: stages of change

According to the Transtheoretical Model (TTM; Prochaska et al., 2008) people pass through different stages on the path to behavioral change and different information will be relevant at each stage (Waygood et al., 2012). These stages (Fig. 1) begin with not being concerned about the problem (*pre-contemplation*), then possibly moving to a point where an individual considers the pros and cons of changing behavior (*contemplation*). Individuals may remain for a long time, or even permanently at this stage where they are concerned about the problem, but are not sufficiently concerned that they truly consider changing. They may think about how they might change, but do not take steps to decide what action they will do.

Following that stage, the individual has now decided to do something and must find what possible behavior changes are relevant and decide which ones they might try (*preparation*). In the *action* stage, the individual has decided on a change in

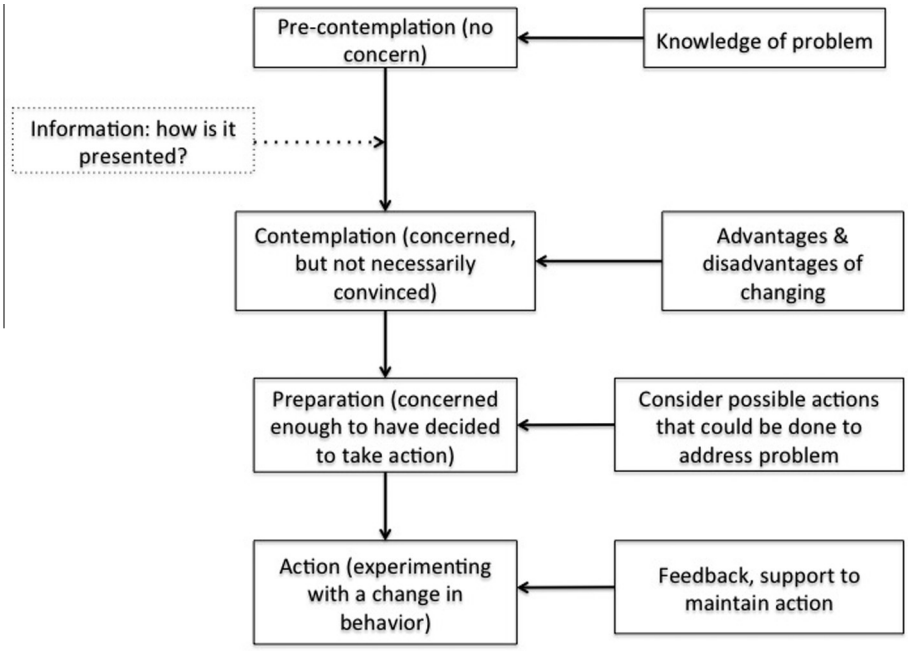

Fig. 1. Simplified schematic of the Transtheoretical Model (TTM; later stages omitted). The dotted lines indicate the additional information that is provided in this study.

behavior and is testing it out. This testing may last for many months until they have found something that works for them. Following that they may work to maintain this new behavior (*maintenance*), and finally, if they are successful, they will reach a point where they conduct the behavior without allocating much cognitive effort to it, like a habit (*termination*).

In this research, the Transtheoretical Model is applied in two ways. The first is to measure the research participants' current level of change with respect to climate change (see Section 3.3). Generally, a goal is required such as "cessation of smoking". However, in this case, it was felt that a goal of "reach a sustainable level of emissions" was too complex (and not well defined in the literature at the time), thus a more general goal of having reduced emissions was used. It was not necessary that the individual had reduced their emissions through changes in their travel behavior, as the intention was more to capture whether (a) they were concerned, and (b) whether they were sufficiently motivated to have made some change in their life. The questions do not relate directly to transportation here.

The second is to measure the level of their reported motivation to reduce car use in response to information. The information relates to changing the individual's perception of a problem, and their response relates to whether it was significant enough to inspire the individual to take action. The choices range from changing nothing (pre-contemplation), consider a change in the future (i.e. contemplation), or make a change (preparation).

2.2. Gender-related potential differences in environmental concern, behavior, and response

In this section a review of relevant background literature is given along with the hypotheses (based on previous work and theory) to be tested.

2.2.1. Environmental concern

Environmental concern is generally defined as "*an individual's insight that humans endanger the natural environment combined with the willingness to protect nature*" (Franzen and Vogl, 2013). It is considered to be composed of two primary components: a cognitive one and a conative one (ibid). However, environmental sociology also takes into account an emotional reaction (affective component) (ibid) which has been found in previous research related to climate change (e.g. Waygood and Avineri, 2010, 2013). The cognitive component relates to knowledge, the conative one to action, and the affective one to emotional connections. Responses to environmental threats "*appear to be largely determined by interactions between people's cognitive and affective psychological mechanisms*" (Ogunbode and Arnold, 2012).

Women are generally found to have more concern than men for environmental problems (Stern et al., 1993) and this concern is stronger at a local level than a national one (Mohai, 1992). For climate change, women have been found to have slightly more concern than men in the USA (McCright, 2010), while in Europe men were found to have higher concern (Eurobarometer, 2009). Further, when new ecological values were accounted for, a study in the USA found that men were more concerned than women (Kellstedt et al., 2008). In the UK, men have been found to be more likely skeptics of climate

change (Clements, 2012). Thus it is not clear, from an international perspective, which gender, if either, would have more concern about climate change.

Unlike other environmental problems such as garbage, water pollution, or acid rain, people in western-developed countries have been found to believe that climate change is temporarily and geographically distant (Swim et al., 2009). In general, this reduces concern and action. However, altruistic tendencies might reduce this negative psychological impact. Women have been found to be more altruistic, which is argued to be due to social factors relating to their upbringing (Gilligan, 1982 in Stern et al., 1993; McCright, 2010). In environmental sociology research from the USA (e.g. Blocker and Eckberg, 1997), this relates to relevant aspects such as increased attention on impacts to others. According to Stern et al. (1993), "*women have stronger beliefs than men about consequences for self, others and the biosphere*." If women have greater altruistic tendencies and increased attention on impacts to others and the environment, then this should result in generally higher concern (Hypothesis 1 (*H1*)). However, a meta-analysis of altruism and gender found inconsistent findings (Eagly and Crowley, 1986). With respect to those findings, some research has found that women are more altruistic when the costs are higher, and men when the costs are lower (Andreoni and Vesterlund, 2001).

Summary: Whether men or women are more concerned about climate change might relate to the country of residence. However, climate change has characteristics that make it distinct from many other environmental concerns as it global and has a long temporal element which might require more altruistic behavior as the benefits may accrue to others and women are generally found to be more altruistic.

Hypothesis 1 (H1): Women, as an aggregate, will report greater concern about climate change, as an environmental problem, than men.

An increase in the level of educational attainment is generally linked to greater environmental concern (if not environmental behavior) (Franzen and Vogl, 2013; Mayer, 2013). Internationally, this was found to be true (Franzen and Vogl, 2013). However, findings are not consistent. For climate change, Clements (2012) found lower education to be associated with greater skepticism in the UK; Kellstedt et al. (2008) found no relation between education and concern in the USA; and finally, McCright (2010) reviewed work that found education to be negatively associated with concern over climate change among the American public. Thus, the influence of education on concern is not clear.

Hypothesis 2 (H2): Higher education will be associated with less concern about climate change.

Having a child has different effects on environmental concern for women and men (Stern et al., 1993). For women it creates what is called a "motherhood" mentality where environmental concern increases ("Parenthood Status" hypothesis, Blocker and Eckberg, 1997), particularly so for threats to their children. For men, it increases a "marketplace mentality" where concerns about the economy increase with respect to the environment. These two mentalities result in mothers having an increased concern, as compared to non-mothers, and fathers having a reduced concern. However, some reviews have found inconsistent findings for this hypothesis (Blocker and Eckberg, 1997). Parenthood was not found to be significant in a previous study of climate change concern (McCright, 2010).

The temporarily distant others mentioned above (climate change concern) in this case might be interpreted as their own children, so having children might reduce the negative impact of temporal separation from the impacts. In that case, having children should increase concern, action, and response for both genders (with respect to the same gender without children). Thus, overall we would expect mothers to have increased concern, but it is not clear what the case would be fathers.

Hypothesis 3 (H3): Having children will increase concern about climate change.

A country's development stage and GDP are associated with higher levels of environmental concern about climate change. In a study of 33 countries Franzen and Vogl (2013) found that attitudes towards global environmental change differed greatly, with the more affluent countries having higher concern.[1] However, if education has an influence on concern as well, it may be that in those previous studies the results may have been related to the percentage of the population with higher education.

Hypothesis 4 (H4): Residents of developed countries will have higher concern for climate change.

2.2.2. Environmental knowledge

There are conflicting thoughts on the role of knowledge on concern. The theory of knowledge deficit suggests that having higher knowledge increases concern and this has been found to be true for actual (as opposed to reported) knowledge of climate change (Cornforth, 2011).[2] Research in the USA has found that men generally have higher knowledge of science, and higher confidence in their knowledge (the latter may be related to the former) (McCright, 2010). Due to those general findings, women are expected to have lower knowledge on climate change (as a group). However, recent findings (ibid) in the USA for climate change knowledge suggest that a difference may not exist.

Hypothesis 5 (H5): Women, as an aggregate, will demonstrate a lower level of knowledge on climate change as it relates to transportation than men.

[1] It should be noted that individual differences within a country will be larger than averages across countries.

[2] However, other findings suggest that there is an inverse relationship between knowledge and concern. The "Environmental Knowledge" hypothesis (Kellstedt et al., 2008) suggests that knowledge differences in science helps explain differences in environmental concern. Kellstedt et al. (2008) argue that higher knowledge may relate to a stronger science interest and belief that science will find a solution to climate change. Swim et al. (2009), who report findings from the American Psychology Association, argue that people with greater knowledge and wealth feel that they can avoid or escape the problems of climate change.

2.2.3. Environmental action

As mentioned above, concern and action are distinct, and as the adage goes, "actions speak louder than words" this section will discuss differences between individuals for environmental action.

Research has found that women generally do more local or private environmental behaviors such as recycling, while men are more likely to do more public behaviors such as activism (Hunter et al., 2004; Tindall et al., 2003). However, this may be related to "biographical availability" (Hunter et al., 2004), where women often retain greater responsibilities at home, limiting their available time to participate in such public behaviors.

Hypothesis 6 (H6): Women will demonstrate more environmental behavior than men.

In terms of car use, as it is a source of climate change emissions, women typically do not travel as far on average, and often have lower access to a car (e.g. Dobbs, 2005; Rosenbloom, 2006). This would, from an environmental perspective, mean that women's travel patterns are more environmentally friendly (if not environmentally benign in numerous developed countries). Segmentation analyses of various European populations have found mixed differences in driver behavior with respect to environmental concerns and attitudes (Anable, 2005; Beirão and Cabral, 2008; Hunecke et al., 2010). One paper used the term "aspiring environmentalists" to refer to people who wanted to reduce their car use due to environmental concerns (Anable, 2005). However, that group's defining socio-demographic characteristic was having higher education. Beirão and Cabral (2008) found that neither gender was inclined to consider the environment when making transportation decisions. For Anable (2005), the one group that was dominantly female, was the "reluctant riders" who were also most likely to be retired (and over age 65),[3] here supported by findings by Beirão and Cabral (2008) which found that men had more positive attitudes towards public transport. Thus, it would be expected that women use cars less than men.

Hypothesis 7 (H7):Women, as an aggregate, will not use cars as much as men.

2.2.4. Behavioral response to transportation climate change information

The last aspect of this research deals with how individuals might respond to transportation climate change information. Previous research on intentions to make changes to reduce climate change emissions found that with better information, people would be willing to make changes (O'Connor et al., 2002). In that research, gender did not have an impact. However, that research did have the component of providing information that might influence choices.

Research on habits suggests that people who have a mixed-use transportation profile are more likely to change behavior (Verplanken et al., 1997). In general, it would be expected that people who usually use other modes would be more likely to have higher behavioral response (BR) to change car use. Further, in relation to *H6* we expect women would be more likely to change travel behavior in response to climate change information.

Hypothesis 8 (H8): People who do not report using a car as their usual mode of travel, will be more likely to report being motivated to change travel behavior.

Women are generally found to be more risk adverse than men in a general, non-transportation context (e.g. meta-analysis (Byrnes et al., 1999); or 22,000 person study in Germany (Dohmen et al., 2005)). This suggests that for a problem such as climate change, which poses a risk to people, they might attempt to reduce such risks. Research on risk and climate change has found that women are more fearful of the risks of climate change (Bord et al., 1998; Kellstedt et al., 2008; O'Connor et al., 1999). For environmental concerns, findings have shown that when the information explicitly taps risk perceptions, women express more concern than men (McCright, 2010). We therefore expect that women should have a stronger reaction to information that more clearly communicates a risk.

Hypothesis 9 (H9): Women will have stronger responses than men to climate change information that is framed as a risk.

Differences have been found in concern about climate change between developed and other countries with findings generally suggesting that people from developed countries are more concerned (Franzen and Vogl, 2013). However, as mentioned, that may be related to differences in levels of education. As well, environmental concern is not necessarily related to environmental action, as Canada had the second highest level of concern (behind Switzerland) in Franzen and Vogl's (2013) study, but is one of the worst per-capita greenhouse gas emitters. One study suggested that although affluence and education were associated with greater concern, they were also associated with increased per-capita CO_2 emissions (Mayer, 2013). Further, psychological research suggests that people in wealthier nations feel that they are more resilient or could escape the problems of climate change (Clements, 2012). Finally, climate change impacts are predicted (Nath and Behera, 2011) to be more damaging to less developed countries (related to location, infrastructure deficiencies, and financial capacity to deal with impacts). Thus, despite having less concern about climate change in general, people from less developed countries may respond to climate change information more strongly as they may feel more vulnerable to the negative impacts. It is not clear what the impact of gender might be with respect to different countries' development levels.

Hypothesis 10 (H10): People of each gender in transition countries (despite potentially having lower concern), will have stronger responses to climate change information.

As discussed above, TTM argues that people need to first accept that there is a problem, and then convince themselves to try a new behavior. People who have already convinced themselves of the need to reduce their climate change impacts should be more likely to respond to climate change information related to their behavior (this would be also supported by the need to reduce the so-called 'cognitive dissonance' (Festinger, 1962) between two cognitions, in this case people's

[3] It should be noted that in the UK, elderly people can use public transport without charge.

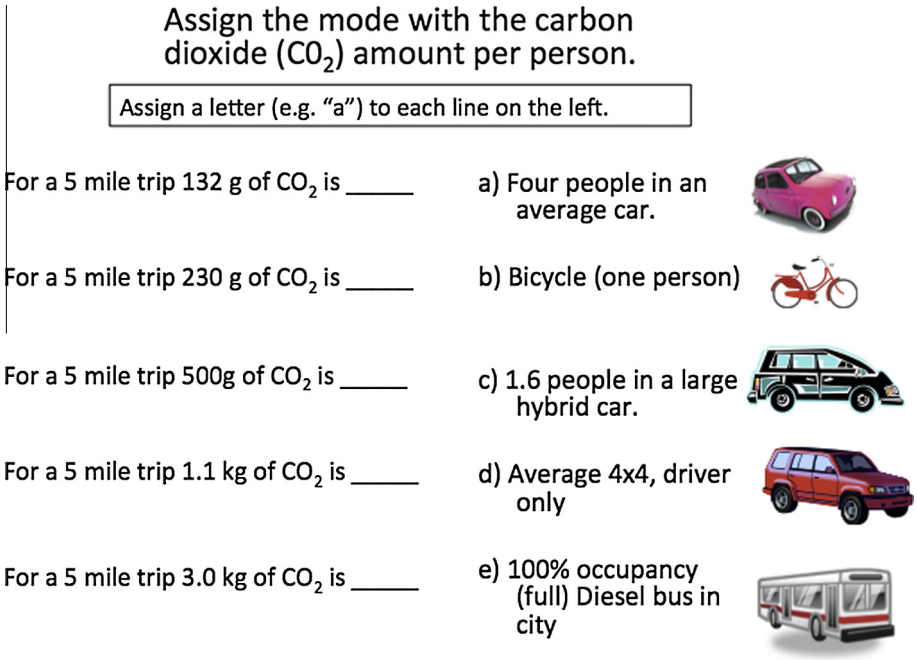

Fig. 2. Matching exercise used to assess knowledge with respect to GHG emissions per passenger by transportation mode (correct responses (according to travelfootprint.org in 2010) were: b, e, a, c, d).

behavior and their attitudes). Previous research has not considered the level of climate change concern when comparing genders. The impact of climate change concern within each gender is therefore examined.

Hypothesis 11 (H11): People of each gender at higher levels of environmentalism should have stronger responses to information on climate change.

Finally, with respect to TTM and the cognitive dissonance theory, and following from environmental concerns and environmental action, we expect that women will have higher behavioral response (BR) than men.

Hypothesis 12 (H12): Women will have stronger responses to climate change information.

3. Method

Paper surveys were distributed at work places or focus groups in five countries associated with the Carbon Aware Travel Choices project (CATCH; www.carbonaware.eu) ($n = 236$; $n_{women} = 102$; $n_{men} = 134$; the full surveys can be found in Waygood and Avineri (2010)). However, in some cases not all questions were completed, so the number of participants for each analysis is given in the results section. The response rate was effectively 100% as the participants were either paid focus group participants or employees at the institutions participating in the project, although not the individuals working on the project (note: responses were not gathered from the researchers' institution to avoid undue bias; thus no direct connection existed between the researchers and any of the participants). The samples were not intended to be representative of the population as a whole, but to be comparable. Thus, the samples of each country are employed individuals with a likelihood of having attained a higher education. Two of the countries (Brazil and China) can be considered transition countries (see Section 3.1), while the remaining three (Great Britain, Italy, and Spain) are considered to be developed countries.

The survey contained questions on behavioral variables, demographic characteristics and individual travel patterns that might be associated with travel-related CO_2 emissions (additional questions that were included in the survey are not of relevance to this study and responses to them are not analyzed). Of the survey questions, one tested general knowledge on CO_2 emissions related to transport (mix-and-match style; Fig. 2), one question tested the effect of each format (see Section 3.2) on the behavioral intention to change car use (see Section 3.3). Following those questions, demographic questions included age, gender, education level, and income level.[4] These were followed by transportation questions related to the participant's usual mode (at least 50% of trips). Respondents were asked whether they performed other daily environmental behaviors: normal (recycling), and less common (composting). Finally, a question asked about the participants' level of environmental stage of change (ESC; see Section 3.3) with respect to climate change. General descriptive statistics by gender and country of residence's development level can be found in Table 1.

[4] Not used in this article, as the income range choices were not country-specific.

Table 1
Select descriptive statistics for the dataset (n = 236).

Measure	Female (n)		Male (n)	
	Transition (31)	Developed (71)	Transition (47)	Developed (87)
Age (years)	38.5 (+/−10.3)	37.1 (+/−13.2)	35.6 (+/−9.9)	39.8 (+/−12.7)
Have a child	38.7%	27.0%	60.9%	38.5%
Have higher education	77.4%	73.2%	75.9%	83.0%
Usual mode is car	48.4%	71.8%	38.3%	75.9%
Environmental stage of change				
– No concern	6.5%	12.7%	2.1%	16.3%
– Concerned but don't know what to do	25.8%	30.2%	34.0%	20.0%
– Will do something soon	32.3%	17.5%	48.9%	36.3%
– Have done something in the last year	35.5%	39.7%	14.9%	27.5%

3.1. Country's level of development

A distinction is made in this study between developed and transition countries. The three developed countries contained in the data used for this research were included in the Franzen and Vogl study discussed above (2013), but the two transition countries were not. Spain, Great Britain, and Italy were in the middle of the table, but towards the bottom of the developed countries. Of the transition countries in the Franzen and Vogl study, only Chile had a higher concern than those three (Spain, GB, and Italy), suggesting that developed countries normally have higher concern for climate change. We therefore expected that concern would be higher for the developed countries in this study. In contrast to that, a recent study out of China found that for university students, 98% wanted to take action to reduce climate change and 87% reported doing energy saving behavior (Li et al., 2015). Those numbers though will not necessarily reflect the general population, as the sample would likely suffer from a self-selection bias where students who are interested in the problem of climate change would take the time to follow up the advertised website (e.g. Coulter et al., 2007). However, the results for our sample did reflect those findings, as nearly all participants from the transition countries reported being concerned and our sample would not suffer from a self-selection bias.

3.2. Formats: how the information is presented

Four different formats (see Table 2) were used in this experiment: mass, tree-equivalent, earth-equivalent, and carbon-budget. The mass of CO_2 was included as it is the scientific measure and an example of simple information content without either environmental or emotional contextual information. It is the most commonly used format for the results of on-line carbon calculators (Avineri and Waygood, 2010). The tree-equivalent format was chosen as a common equivalent that related to the carbon cycle and was associated with environmentalism (inspired by American Forests; www.american-forests.org). It represents a contextualized format that should contain an emotional context, but with less analytical basis (as it lacks a clear limit). The earth-equivalent format was chosen as it was based on a concept of equality, (was believed to) clearly convey sustainability, and was used by well-known environmental groups such as the 'World Wildlife Funds' Footprint calculator (http://footprint.wwf.org.uk). It represents a contextualized format that is more analytical than the tree-equivalent format as it suggests a limit and has emotional associations. To examine the effect of contextual information void of emotional associations, a carbon-budget format based on a fictional limit was included. The limits in the carbon-budget and earth-equivalent formats were the same.

3.3. Applications of the transtheoretical model

A person who is more concerned about climate change will likely respond stronger to information on GHGs (here, we anticipate that they would be motivated to make a change to the problem behavior). Further, according to theories such

Table 2
Formats and information presented in the experiment.

Format	Information presented
Mass	4 tonnes of CO_2
Tree-equivalent	
Earth-equivalent	
Carbon budget	111% of your carbon budget

as the Transtheoretical Model (TTM), one can be concerned about a behavior without changing that behavior. Thus, to measure the participants' current environmental stage of change (ESC) they were asked to choose a phrase related to concern and action that best described them at the end of the survey. The questions were developed based on the first four stages of the TTM model (Fig. 1). These four choices were (TTM relevant levels are given in brackets here, but were not given in the study):

(1) 'I don't worry about climate change' (pre-contemplation).
(2) 'I worry about climate change, but don't know what to change' (contemplation).
(3) 'I worry about climate change and I am planning to reduce my impacts' (preparation).
(4) 'I have made changes in the last year to reduce my impacts' (action/maintenance).

Thus it will be possible to compare whether there is a difference not only in concern, but also how developed is their behavior change path.

The second use of TTM was for the behavioral responses (BR) to transportation CO_2 emissions information. Here, the theory was used to inspire the choices. The potential responses started with no behavioral response (e.g. change nothing), then some future change (i.e., they are thinking about it, but do not have strong intentions to change), to the final response that was an intention to make a change. The participants were given these response choices to choose from (again, TTM relevant levels are given in brackets, but were not included in the study):

(1) Change nothing (pre-contemplation).
(2) Consider a change in the future (contemplation).
(3) Change how you get around (check all that apply): reduce trips by car; shorten trips; change vehicle (e.g. better mileage); or stop driving (preparation/action).

4. Results

The results will be presented by order of theme: concern, knowledge, action, and behavioral response.

4.1. Not concerned with climate change (H1-H4)

For the hypotheses on *concern* (H1-H4), results from the ESC (see above) are used where the first level ('I don't worry about climate change') is taken as *not concerned*. In a previous version of this paper (Waygood and Avineri, 2014; Appendix A), each hypothesis was tested using χ^2 test of independence for non-parametric analysis (e.g. categories and number). Here, those hypotheses are tested simultaneously in a binary logit regression. Each influence is tested as a dummy variable with respect to (w.r.t.) the condition of not being true.

Confirming the previous findings, only the influence of the country of residence's level of development on whether or not the individual was *not concerned with climate change* was found to be significant. Thus, we can see (Table 3) that for our sample people in developed countries were nearly four times more likely to report being concerned about climate change. Removing all of the non-significant variables results in an improved model (Prob > chi^2 = 0.008) without losing much of the explained variation (Pseudo R^2 = 0.047).

Variations within-the-sex were tested (Table 4). The model for women was not accepted (Prob > chi^2 was not below 0.05). For men, living in a developed country was nearly eight times more likely to be associated with not reporting being concerned with climate change.

Thus, for the proposed hypotheses:

H1: Women, as an aggregate, will report greater concern about climate change, as an environmental problem, than men = Not significant result, but tendency is that men report not being concerned more often.
H2: Higher education will be associated with less concern about climate change = Not significant, the tendency is towards more concern.
H3: Having children will increase concern about climate change = Not significant, but tendency is towards being concerned.
H4: Residents of developed countries will have higher concern for climate change = Rejected. For this sample, people in developed countries were nearly four times more likely to *not* be concerned.

Following previous findings on climate change concern (McCright, 2010), sizeable differences between men and women were *not* found. This is in contrast to other findings on general environmental concern (e.g. Franzen and Vogl, 2013; Stern et al., 1993). From our sample, education was not found to have a significant impact on concern. As well, no statistical difference was found for having children, though the results suggest that the effect for men with children may be stronger than for women, which is counter to "motherhood" versus "market mentality" theory presented above, but is in line with the inconsistent findings reported by Blocker and Eckberg (1997). It is notable that the only variable to have statistical significance on the level of concern was the country of residence's development stage with residents of transition countries more

Table 3
Binary logit regression on *not concerned about climate change* (n = 218).

Independent variables	Odds ratio
Male (w.r.t. female)	1.23
Developed country (w.r.t. transition)	3.97*
Higher education	0.63
Has a child (irrespective of age)	0.63
Constant	0.06***

Prob > chi^2 = 0.072; Pseudo R^2 = 0.057.
* p < 0.05.
*** p < 0.001.

Table 4
Binary logit regression on *not concerned about climate change* within sex.

Independent variables	Odds ratio (female; n = 94)	Odds ratio (male; 124)
Developed country (w.r.t. transition)	2.02	7.92*
Higher education	0.47	0.79
Has a child (irrespective of age)	0.90	0.51
Constant	0.12*	0.04**

Female: Prob > chi^2 = 0.57; Pseudo R^2 = 0.031.
Male: Prob > chi^2 = 0.036; Pseudo R^2 = 0.098.
* p < 0.05.
** p < 0.01.

likely to report at least some concern. Thus, from our findings, it appears that the more difficult task relates to improving concern in the "problem" population (developed countries) where greater emissions per capita occur.

The differences between developed and transition countries' residents were mixed; also, mixed differences between the genders were found. In both genders, residing in a transition country was associated with greater levels of some concern (though not statistically so for women). That finding is contrary to previous findings on differences between countries for environmental attitudes (Franzen and Vogl, 2013). As mentioned in the background, climate change concern may differ from previous research on general environmental concern. This could also be a result of the sample group not being representative of the respective countries, but offering a comparison of similar groups across the countries (for example, there was a high percentage of people with higher education in both country types (81% in transition countries, 75% in developed)).

4.2. Knowledge (H5)

For the hypotheses on *knowledge* (H5), the results from the matching exercise are used. The dependent variable, the number of correct answers, ranges from zero to five and a linear regression model was applied (Fig. 1). In Table 5 it can be seen that the only variable that was statistically associated with a different result was living in a developed country (positive influence). For gender, the value is nearly 0, so it can be taken that there is next to no gender effect here. The regression suggests that, on average, people had below two correctly matched responses and people in developed countries had slightly over two correct responses. Basically, people were likely able to assign the two extremes correctly (see Fig. 1), but then had difficulty with the other examples. This is important, as people in general know about the link between transportation and climate change (e.g. Whitmarsh, 2009), but may not know the relevant details with respect to more complex choices.

Thus, for the proposed hypothesis:

H5: Women, as an aggregate, will demonstrate a lower level of knowledge on climate change as it relates to transportation than men = Rejected.

Following previous findings on knowledge of climate change (McCright, 2010), sizeable differences between men and women were *not* found. While a deep knowledge of climate change was not tested, a simple matching exercise (five items) was used to determine whether people could match a CO_2 amount to a transportation mode. Men and women had equivalent results, suggesting that they had equal levels of knowledge (both "failed" on average) in this sub-category of climate change concern. Thus, people are concerned about climate change, but most do not have sufficient knowledge to make informed decisions about transportation choices to reduce climate change impacts.

4.3. Behavior (H6-H7)

With respect to *environmental behavior* (H6, H7), participants' responses to recycling, composting, ESC level, and usual travel mode are used. Previously (Waygood and Avineri, 2011) it was found that recycling and composting behavior were

Table 5
Regression on number of correct responses in matching exercise (n = 236).

Independent variables	Coefficient	Standard error	t value
Male	0.03	0.18	0.17
Developed country	0.61***	0.19	3.22
Higher education	0.14	0.21	0.64
Constant	1.76***	0.25	6.98

*** $p < 0.001$, Adj. $r^2 = 0.03$.

not statistically different by sex. Here, the likelihood of the individual reporting that they had made some reduction in their CO_2 emissions was examined with those two environmental behaviors used as explanatory (independent) variables. The results of the binary logit regression (Table 6) suggest that women were over twice as likely to report having made such a reduction.

As the behavioral response questions related to a change in driving, here the likelihood that the individual drives was examined (Table 7). The respondents from developed countries were four times more likely to report usually driving.

Thus, for the two proposed hypotheses:

H6: Women will demonstrate more environmental behavior than men = Confirmed for "have reduced my emissions" (but not for recycling or composting).
H7: Women, as an aggregate, will not use cars as much as men = Rejected.

Our sample group did not show any difference between the genders in general household environmental behavior (recycling, composting). For transport, women in our sample were not less likely to report usually using cars to travel (we did not measure overall frequency or distances). This result may be related to surveying employed people who generally had finished higher education degrees. The results suggest that recycling behavior is more developed, though arguments could be made that it is an "easier" (barriers are low in terms of infrastructure and time) environmental behavior that might have a direct financial reward (e.g. deposit refund for returns). That result was found by other research such as Whitmarsh (2009) in the UK and O'Connor et al. (2002) in the USA.

Women were found to be statistically more likely to report having done something to reduce their climate change impact (38% vs 23% for men; Appendix A). This is not dissimilar to findings by Whitmarsh (2009) in a study of UK residents which found that 31% reported having made reductions. The findings for this study suggests that although the percentage of

Table 6
Binary logit regression on probability of reporting having made a reduction in CO_2 emissions (n = 215).

Independent variables	Odds ratio
Male	0.47*
Developed country	1.37
Higher education	1.14
Children	1.05
Compost	1.71
Recycle	1.60
Constant	0.27

Prob > $chi^2 = 0.043$; Pseudo $R^2 = 0.050$.
* $p < 0.05$.

Table 7
Binary logit regression on the likelihood that the person usually drives (n = 215).

Independent variables	Odds ratios
Male	0.85
Higher education	1.01
Developed country	4.32***
Have children	1.41
Compost	1.33
Recycle	1.14
Constant	0.59

Prob > $chi^2 < 0.001$; Pseudo $R^2 = 0.089$.
*** $p < 0.001$.

concerned individuals was not different between the genders, women in this sample were further along the TTM path of behavior change suggesting that they have accepted the problem, investigated ways to address it, and applied one of those. Considering that most gender studies on environmental behavior are decades old, it may be the case that at the time of previous studies recycling was a less common activity, so the findings at the time reflect those found here for the next environmental behavior paradigm. Thus, our findings suggest that although considerable work remains to reduce climate change impacts, it is men who require additional help to reach the action stage of change.

In summary, for concern, only the country of residence's stage of development resulted in significantly different results. There were no differences found for knowledge between genders. For action related to usually driving, only the country of residence's stage of development resulted in significantly different results. For action related to reducing emissions, women were more likely to report having done something.

4.4. Behavioral response (H8-H12)

For the hypotheses on *behavioral response* (H8-H12), higher-level responses (e.g. change how you get around, and not "Consider a change in the future" or "Change nothing") will be compared for each format (mass, tree-equivalent, earth-equivalent, and carbon-budget). In this study, making a change is considered as a stronger response as opposed to just thinking about some future change or not changing. The descriptive statistical analysis results are shown in Table 8. There, one can see the percentage of participants who reported that they would make a change to their driving behavior had they received such information.

The binary logit regression analysis of the behavioral responses of the participants to equal amounts of CO_2 emissions by different formats are shown in Table 9. There was no significant gender effect for any of the formats. Usually travelling by car was also not significant for any of the formats. Results that were specific for each format are discussed next.

4.4.1. Mass

When the information was presented as only a mass, people in developed countries were nearly four times *less* likely to be motivated to make a change to their car use, even taking into account whether the individual usually travels by car. Having a higher education was associated with being nearly three times *less* likely to be motivated to make a change. That shouldn't relate simply to lower concern, as that is accounted for with the ESC variable, "Will do something or have done something to reduce GHG emissions." For that variable's influence, those people with a more advanced TTM stage were over twice as likely to report that they would make a change. Combining those results with the results shown in Table 8, it appears that using mass to communicate CO_2 emissions information is the least effective, and is much less likely to work for people who are less concerned and motivated about climate change, who live in a developed country, and who have a higher education. That group is a key part of the global population who could have significant impacts on total emissions (Mayer, 2013).

4.4.2. Trees

The only significant result for the trees format was that individuals with higher education were four times *less* likely to report motivation to change their car behavior. From Table 8, it can be seen that this was a much more effective format in

Table 8
Percentage of each segment that reported a higher behavioral response (BR; a change in car behavior) across the four format types.

	Gender	Secondary division	n	Mass (g)	Trees	Earths	Carbon budget
H9, H12	Female		102	64%	78%	76%	82%
	Male		134	66%	82%	72%	80%
H8	Female	Other mode	36	81%*	91%*	85%	91%
		Car	66	58%*	68%*	70%	76%
	Male	Other mode	50	77%*	89%	84%*	84%
		Car	84	58%*	77%	63%*	77%
H10	Female	Transition country	31	77%*	87%	81%	87%
		Developed country	71	56%*	72%	74%	80%
	Male	Transition country	47	85%*	89%	83%*	89%*
		Developed country	87	50%*	76%	63%*	72%*
H11	Female	ESC_low	37	52%	68%	67%	74%
		ESC_high	57	70%	80%	78%	85%
	Male	ESC_low	46	48%*	79%	61%	73%
		ESC_high	81	74%*	85%	77%	85%

Notes: (1) The percentages refer to the percentage of individuals who indicated that they would make a change to their driving behavior. Thus, in the first line, 64% of the 102 women said they would change something when presented with CO_2 information in a mass format versus 82% who said that they would change something when presented with CO_2 information in a carbon budget format. (2) The statistical analysis is a 2×2 χ^2 test of independence between the secondary division variables and the behavioral response of change something.

* $p < 0.05$.

Table 9
Binary logit analysis of probability to report intention to make a change.

Independent variables	Mass (n = 219)	Trees (n = 219)	Earths (n = 215)	Carbon budget (n = 219)
Male	0.81	1.77	0.92	1.27
Developed country	0.26***	0.69	0.47*	0.52
Higher education	0.37*	0.22*	0.86	0.69
Usually car	0.58	0.48	0.67	0.59
Will do something or have done something to reduce GHG emissions	2.12*	1.78	2.12*	1.70
Constant	9.93***	20.1***	4.14*	8.44

Mass: Prob > chi^2 < 0.001; Pseudo R^2 = 0.123.
Trees: Prob > chi^2 = 0.009; Pseudo R^2 = 0.077.
Earths: Prob > chi^2 = 0.013; Pseudo R^2 = 0.055.
Carbon budget: Prob > chi^2 = 0.092; Pseudo R^2 = 0.046.
* $p < 0.05$.
*** $p < 0.001$.

terms of achieving a "will make a change" response. People with higher education are over 4.5 times less likely to be motivated by such information, but the other variables are not significant, which suggests that it might have a more general effect.

4.4.3. Earths

Only people who planned to make or had made emissions reductions were statistically more likely (2.13×) to report being motivated to make a change. From Table 8, it can be seen that it was the second worst at motivating people to make a change. As with the mass format, people who are already motivated and people from the transition countries responded stronger (i.e. they were more likely to say they would make a change). However, if the odds ratios were significant it may be the most effective for people with higher education and those who travel by car.

4.4.4. Carbon budget

None of the independent variables were statistically significant in explaining a difference in motivation to change. From Table 8 it can be seen that this format was possibly the most effective at motivating a change. As well, as the variables were not significant, the format may be the most generally efficient means of communicating CO_2 emissions.

Thus, for the proposed hypotheses:

H8: People who do not report using a car as their usual mode of travel, will be more likely to report being motivated to change travel behavior = Mixed results (rejected on combined sample; confirmed for women for all formats except Earth).
H9: Women will have stronger responses than men to climate change information that is framed as a risk = Rejected.
H10: People of each gender in transition countries (despite potentially having lower concern), will have stronger responses to climate change information = Mixed results (accepted for the mass and Earths formats; confirmed for men, not confirmed for women).
H11: People of each gender at higher levels of environmentalism should have stronger responses to information on climate change = Mixed results (confirmed for mass and Earths formats).
H12: Women will have stronger responses to climate change information = Rejected.

In the combined sample, people who reported using other modes were not statistically more likely to have reported a higher BR (Table 8). The influence appeared stronger for women, as it was statistically significant for all formats except the Earths format (Table 9). It was rejected in all of the within-men analysis.

The only straightforward finding for the behavioral responses was with respect to *H9*. Although the Earths format was the only format to eliminate the influence of the independent variables, it had the second lowest response rate for motivating a change (Table 8).

In both genders, individuals residing in transition countries were more likely to have a high BR to the information presented as a mass (thus, without any context). Thus for *H10* it could be argued that it is only in the situation where people do not have sufficient information to interpret the findings would their country of residence matter. The within-sex analysis found that for the mass format, the impact was quite significant with individuals from the transition countries being eight times more likely to respond that they would change. The result was also significant for men presented with the Earths format where the probability that they intended to make a change was 2.7 times greater (1/0.37). In general (Table 8), the percentage differences were larger for men, with men from developed countries being the least likely to report high BR to change their car use. Women from developed countries reported the highest BR for the analytical format of carbon-budget, while men from developed countries reported their highest BR for the emotional tree-equivalent format (see Waygood and Avineri (2013) for an analysis from an analytical-emotional perspective). For both men and women in transition countries, those two formats (tree and carbon-budget) were equally most effective at stimulating high BR. Thus,

our findings suggest that the type of format can impact BR, but it is not possible to say from these results that there is a "best" format for improving BR. However, the high rates of higher BR (Table 8) and the lack of statistically significant influences by the independent variables (Table 9), might suggest that the carbon budget format is a promising means of communicating this information.

For ESC, people who reported being at higher levels (will reduce or have reduced emissions) were found to have higher BR (Table 8), but only statistically so for the mass and Earths formats (Table 9). The influence appeared stronger for women than for men, as it was significant in all of the formats except for the Earths format, whereas for men, it was only significant in the mass and Earths format (Table 10). For women reporting low ESC, the carbon-budget format had the highest BR, while for men with low ESC the format tree-equivalent was best. For women and men who reported high ESC, the carbon-budget format was the best (though it tied with the tree-equivalent format in men). Surprisingly, the earth-equivalents format only performed better than the contextless mass format (Table 8). Thus, it appears that as long as some context is given, the impact of being further along an environmental stage of change on BR is less important.

As discussed in Section 2.1.1, the Transtheoretical Model TTM was used to gage the stage of change of the participants with respect to climate change (ESC). The theory being that individuals who are sufficiently concerned and have thought about how they might change (or have changed) would likely respond to related information more than those who are not concerned. As well, TTM was used as a measure for the behavioral responses. In that, it was assumed that if no change was made, this would reflect that the information did not influence the individual. A response of a future change would suggest that it at least made the individual reflect on the problem. A response of some change would suggest that the information might have sufficient influence as to motivate a change. The behavioral responses organized by the individual's ESC and the format of information are presented in Table 11.

Two general trends can be observed clearly for the mass format (Table 11). First, as expected, the contextless information of mass is associated with ESCs "Change nothing" response. Second, the likelihood of a "Change nothing" response decreases as the ESC increases.

Table 10
Binary logit analysis of probability to report intention to make a change within-sex variation.

Independent variables	Mass		Trees		Earth		Carbon budget	
	Female (n = 93)	Male (n = 126)	Female (n = 92)	Male (n = 127)	Female (n = 91)	Male (n = 124)	Female (n = 93)	Male (n = 126)
Developed country	0.56	0.12***	0.65	0.72	0.57	0.37*	0.62	0.41
Higher education	0.36+	0.32*	0.07*	0.48	1.46	0.49	0.68	0.53
Usually travel by car	0.28*	1.10	0.22*	0.77	0.65	0.74	0.26+	1.06
Will or have reduced emissions	2.4+	2.27*	3.46*	1.23	1.92	2.12+	2.64+	1.24
Constant	9.15**	9.68***	78.3***	15.7**	2.59	6.59**	11.0**	12.5

Mass.Female: Prob > chi^2 = 0.011; Pseudo R^2 = 0.106; Mass.Male: Prob > chi^2 < 0.001; Pseudo R^2 = 0.169.
Trees.Female: Prob > chi^2 = 0.003; Pseudo R^2 = 0.174; Prob > chi^2 = 0.746; Pseudo R^2 = 0.0194.
Earths.Female: Prob > chi^2 = 0.245; Pseudo R^2 = 0.040; Earths.Male: Prob > chi^2 = 0.022; Pseudo R^2 = 0.074.
Carbon budget.Female: Prob > chi^2 = 0.070; Pseudo R^2 = 0.089; Carbon budget. Male: Prob > chi^2 = 0.447; Pseudo R^2 = 0.032.
+ $p < 0.10$.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Table 11
Behavioral responses by environmental stage of change (ESC) and format of emissions information.

ESC	Behavioral response	Mass	Tree	Earth	Carbon budget
No concern (n = 26)	Change nothing	32%	4%	4%	8%
	Future change	27%	21%	38%	19%
	Change something	41%	75%	58%	73%
Concerned but don't know what to do (n = 59)	Change nothing	22%	3%	12%	3%
	Future change	19%	15%	23%	22%
	Change something	59%	81%	65%	75%
Will do something soon (n = 75)	Change nothing	12%	4%	5%	3%
	Future change	40%	12%	16%	12%
	Change something	48%	84%	78%	85%
Have done something in the last year (n = 67)	Change nothing	8%	5%	5%	6%
	Future change	21%	12%	20%	16%
	Change something	71%	83%	75%	78%

The Tree and Carbon budget formats were associated with the highest percentages of "Change something" for the remaining formats (Tree, Earth, Carbon budget). As well, when a format with some context was used, the majority of participants responded that they would make a change (not just a future change).

In summary, a number of important findings are reported here. First, *even if a person usually used a car to get around*, they reported high BR, in particular for the carbon-budget format (Table 8). Second, people from transition countries more frequently reported high BR (Table 8). Third, although women and men had similar rates of high BR for each format, differences were evident when intra-gender analyses were conducted suggesting that intra-gender heterogeneity is an important consideration (Tables 8 and 10). Fourth, ESC showed that when people are not already concerned how poorly the most commonly used format of communicating CO_2 information, mass, was at stimulating a high BR (Table 11). Finally, considering the results for usual mode and ESC, CO_2 information with some context resulted in most people reporting high BR suggesting that if given useful information on climate change people might change their behavior to reduce their impacts.

4.5. Recommendations related to findings

(1) Provide context-based CO_2 emissions information that relates to a recommended limit to facilitate informed decisions and motivate a behavioral response towards less damaging behavior. Thus, for future studies on the influence of emissions information on car choice or other transportation behavior, the potential difference in responses related to how the information was presented should be taken into account.
(2) Focus efforts on changing the behavior of men, particularly in developed countries, as they are both the greater problem segment and the less motivated to change.

4.6. Limitations

This research examined mostly employed individuals and had a high percentage of participants with higher education, thus it is not a representative sample of the population in the five countries. It is however an examination of similar socio-demographic groups across the five countries. Moreover, this research did not examine actual behavior response, so the potential for socially acceptable responses exists. As well, the ESC was self-reported and it is not clear what change the individuals had made and whether it actually reduced their climate change impact. Whitmarsh (2009) found that many people that reported having made reductions actually conducted environmental behaviors unrelated to climate change. Finally, a larger sample size would improve future research.

5. Conclusions

The objectives of the study were to examine: (1) how gender might explain concern, knowledge, and action in terms of transportation and climate change; (2) behavioral responses to transportation climate change information; (3) whether the effect on behavioral responses of how the information is presented might be explained by gender. We find that: (1) Confirming previous findings related to climate change, differences between men and women on general concern and knowledge were not found. However, looking at action and not just concern, women were more likely to report having done something to reduce their climate change impact, thus suggesting that they are further along the stage of change sequence. (2) Women's usual mode of travel was found to significantly influence the degree to which transportation CO_2 emissions information motivated a change in driving behavior, but not so for men. An individual's environmental stage of change (with respect to climate change concern and behavior) significantly related to intentions to change behavior in response to transportation CO_2 emissions information, though more frequently for women. (3) Gender was not found to have a significant impact on the behavioral response related to how the information was presented. The level of development for the country was also found to have an influence on the results. (1) People who live in transition countries showed greater concern over climate change, lower knowledge on transport emissions, were less likely to use a car as their usual mode of travel, but they were not more likely to report having a made reductions to their emissions. (2) People in transition countries were, in general, more likely to state that they would change in response to information on CO_2 emissions. (3) Statistical differences were observed for the mass and Earths formats, with people in the transition countries more likely to say that they would make a change.

Thus, from this study, it appears that the development stage of the country of residence and the individual's climate change concern and their behavior with respect to their personal emissions is more important than gender. All results suggest that CO_2 emissions information with some context could lead to personal behavior change to reduce climate change impacts and that greater efforts will be required to convince men in developed countries to reduce their impacts from driving.

Appendix A

See Table A1.

Table A1
Results for hypotheses related to concern, knowledge, and environmental behavior. Suffix *w* (women; n = 102) and *m* (men; n = 134) are used to indicate intra-gender analyses (n = 236).

Hypothesis: A/B	Measure	A	B	Interpretation and implications
H1: women/men	Concern	89%	89%	H1 *rejected*.[a] Both genders have equal levels of concern (ESC) with respect to climate change
H2: normal/higher education	Concern	86%	90%	H2 *rejected*. People with higher education showed a tendency to be more concerned
H2.w: normal/ higher education	Concern	83%	91%	H2.w *not supported*. However, possibility that a larger sample would be significant
H2.m: normal/ higher education	Concern	89%	89%	H2.m *rejected*. Results were equal
H3: child/no children	Concern	92%	87%	H3 *not supported*. People with children are possibly more concerned, but not significant here
H3.w: child/no children	Concern	90%	89%	H3.w *rejected*. Results are essentially equal
H3.m: child/no children	Concern	93%	85%	H3.m *not supported*. Men with children may be more concerned, but not significant here
H4: transition/ developed*	Concern	96%	85%	H3 *confirmed*. Residents of transition countries were statistically more likely to be concerned
H4.w: transition/ developed	Concern	94%	87%	H3.w *not supported*. Female residents of transition countries were more likely to be concerned, but not statistically so
H4.m: transition/ developed*	Concern	98%	84%	H3.m *confirmed*. Male residents in transition countries were statistically more likely to be concerned
H5: women/men	Knowledge	46%	46%	H4 *rejected*. Men and women both struggle to rank different travel scenarios by their CO_2 emission amounts
H6.recycle: women/men	Recycle	74%	70%	H5.recycle *rejected*. Women were not statistically more likely to recycle in this sample
H6.compost: women/men	Compost	30%	27%	H5.compost *rejected*. Women were not statistically more likely to compost in this sample
H6.ESC_4: women/men*	ESC_4	38%	23%	H5.ESC_4 *confirmed*. Women were more likely to report having done something, implying that they are further along the behavioral change stages (TTM)
H7: women/men	Travel by car	65%	63%	H6 *rejected*. Women reported that the car was there usual mode of transport as often as men in this sample. However, distances and frequencies were not requested

Notes: (1) The percentages refer to the percentage of individuals who responded positively to the *Measure* (*except for *Knowledge*, where the percentage of individuals who got 3/5 is shown). Thus, in the first line, 89% of the 102 women said they were concerned versus 89% of the 134 men who said that they were concerned. (2) The statistical analysis is a 2×2 χ^2 test of independence between *A* and *B* variables and the relevant *Measure*.

[a] *rejected* = Not statistically different and difference was less than 5%; *not supported* = not statistically different, but difference was greater than 5%; *confirmed* = statistically different $p < 0.05$.

* $p < 0.05$.

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