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The impact of outcome framing and psychological distance of air pollution consequences on transportation mode choice

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ABSTRACT

Recent years, air pollution phenomenon has become one of the crucial problems of Tehran, Iran. Due to main political and economic role of Tehran, population of this metropolis is high and increasing. Urban transportation of this highly populated city contributes more than 70% of air pollution problem in this city. Although a number of urban transport developments, policy measures and regulations have been employed, Tehran's air pollution has remained crucial thus far. Finding ways to encourage individuals to behave more sustainable can be considered as a substantial approach of tackling environmental problems such as air pollution, since it can be highly cost-effective and fast. This research attempt to evaluate the impacts of two factors of outcome framing and psychological distance of air pollution on citizen's willingness to behave environmental friendly, particularly to change the travel mode choice. Results illustrate that communicating the consequences of air pollution can provoke individuals' to act more environment friendly or in particular to change their intention for using more sustainable mode of transportation. Framing the positive consequences of mitigating air pollution take precedence over framing the negative consequences. Moreover the gains of mitigating air pollution have an impact on the willingness to use of bicycle and bus. Results also show that decreasing the psychological distance of air pollution in order to make manipulated frame more personally relevant has no significant impact on respondents.

Introduction

One of the major environmental risks currently facing the world's population is urban air pollution (Elsom, 1996). A number of factors are responsible for the rise of air pollution in cities, including population growth, industrial and economic expansion, rapid urbanization, and the surge in the number and use of motor vehicles (Bickerstaff and Walker, 2001; United Nations Centre for Human Settlements, 2001; Seitz, 2002). Such industrial and economic expansions are usually accompanied by considerable use of fossil fuels, which potentially result in an increase in the emission of air pollutants and greenhouse gases (Kan et al., 2012). According to WHO, air pollution causes more than two million deaths per year, and nearly half of these deaths occur in developing countries (WHO, 2006). Moreover, air pollution has considerable impacts

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on global warming and climate change, which are among the major concerns in the developing world (Vasconcellos, 1997; Ramanathan and Feng, 2009).

In Iran, industrial development has led to the significant deterioration of the quality of air in a number of metropolises. Tehran, as the largest and the most populated city, and the economic center of Iran, is already suffering from ambient air pollution (Sohrabpour et al., 1998; Naddafi et al., 2012; Hosseinpoor et al., 2005; Halek et al., 2010; Sekhavatjou et al., 2011; Hastaie, 2000). Tehran has been struggling with harmful consequences of air pollution for more than a decade now (World Bank, 2008). The total area of Tehran is 700 km^2 and is surrounded by mountains from north to east. Approximately 8,700,000 people live in this city (Naddafi et al., 2012; Atash, 2007; Asadollah-Fardi, 2001). More than 70% of Tehran's air pollution is caused by motor vehicles (Naddafi et al., 2012; Yokoyama and Takahashi, 2003), while some researchers have reported that the share of transport vehicles are about 90% (for more detailed information see Torkian et al., 2012). According to the World Bank's report, air pollution was the main cause for the death of 9900 inhabitants in Tehran during the year 2006 (World Bank, 2008).

In order to reduce the air pollution in Tehran, various measures have been taken so far. In 1993, Tehran Municipality established the Air Quality Control Company (AQCC) in order to make regular assessments of the quality of air in Tehran (Atash, 2007). In 1995, Tehran Municipality signed an agreement with Japan International Cooperation Agency (JICA) to assess the air pollution of Tehran and develop a master plan to resolve the crisis (Yokoyama and Takahashi, 2003). In 1996, a new plan, named The Comprehensive Study of Transportation and Traffic in Tehran, was set to work in an attempt to change the air in this big city to the one healthy for breathing, during a 10 year period (Tehran Comprehensive Transportation and Traffic Studies Company, 1996). Not long after that, in 2001, the Clean Air Act was passed by The Parliament of Iran (Atash, 2007). Even more measures have been taken during the recent years, including renovating deteriorated cars, technical inspection of vehicles, renovating public transport fleet, and developing rapid bus transport lines, to name a few (for a review see Moradi et al., 2015). Despite the employment of various policies and regulations, Tehran's air pollution has still remained a crucial problem (AQCC, 2012).

The main existing policies which have been performed to reduce fuel consumption and air pollution in Iran are aimed at transport supply management, fuel consumption management, traffic management and air pollution reduction (Moradi et al., 2015). Public participation is a necessary requisite for the effective implementation of some of these policies. However, there is some evidence suggesting that individuals were not willing to participate. For instance, in a twelve months period between 2014 and 2015, only 16% of automobiles which were in need of motor inspection attended the technical inspection centers (IRNA, 2015). To make policies more effective, authorities in charge have usually adopted strict regulations aimed at penalizing disobeying individuals. This can be due to the fact that policy makers have generally assumed that loss framing is more effective than gain framing and results in more encouragement. However, authors suspect that informing people about the consequences of air pollution can be considered as one possible route to encourage cooperation with the policies. Hence, authors are interested in the study of individuals' responses to the communication of environmentally related information; and by doing this, they hope to inform policy makers about the importance of taking human factors into consideration. Moreover, behaviorally based changes that reduce emissions, have major advantages including being very fast and highly cost-effective in comparison with infrastructure changes (Behavioral Insight Team, 2011)

Some researchers have claimed that climate change has a low priority for most people, in comparison with other personal, economic and social issues (Poortinga and Pidgeon, 2003b; Lorenzoni and Pidgeon, 2006), suggesting that air pollution is possibly also of a low priority as well. To the author's knowledge, there is no research or referable data about the priority of the air pollution problem compared to other problems of Tehran inhabitants. However, there is some evidence indicating that people tend to think of air pollution as a less serious issue than unemployment, despite viewing it as being more serious than factory accidents (De Groot et al., 1966; De Groot, 1967).

Nevertheless, some studies have found that communicating environmental risks can lead to a change in both behavioral intention and behavior (Heath and Gifford, 2002; Bamberg and Schmidt, 2003; Verplanken et al., 1998) among individuals. In effect, informing people about environmental risks increases their environmental concerns and consequently changes their attitudes toward green behavior (De Groot and Steg, 2007). According to Ajzen (1985, 1991), one's attitude toward a behavior (i.e. a person's evaluation of that behavior) is one of the main factors determining behavioral intentions. Additionally, Ajzen (1985, 1991) assumed that behavioral intention is the primary antecedent of behavior. Accordingly, in the present study, the behavioral intention to change is assessed as an alternative to the actual behavior, in order to circumvent the constraints that limit the freedom of subjects to act. Behavioral intentions have already been used for travel mode choice in a number of studies (e.g. Bamberg and Schmidt, 2001, 2003; Heath and Gifford, 2002).

Environmental management is the collective responsibility of governments, individuals and communities. Governments have realized the importance of individuals in environmental management, and are incorporating them in the process of making decisions about issues that affect them (EPA, 2014; DETR, 2000). Communicating the health risks associated with air pollution is important to public health, policy makers and regulatory authorities (Chen et al., 2013). To achieve a sustainable improvement in urban air quality, people's personal behavior, or in particular, the decisions that people normally make about their daily transport choices, should be changed toward more environmentally friendly ones (Bickerstaff and Walker, 2001). As such, the purpose of this study is to examine the effect of offering information about air pollution on people's intention to change their transportation behavior. Although assessing the impact of air pollution policies on people is not within the scope of this study, the findings of this research can hopefully be used to make informed changes in the processes Iranian policy makers use to communicate their policy decisions to people.

Outcome framing

A frame refers to a mental model and is a standpoint of a decision problem, includes details about the elements of the decision problems and it may be perceived and interpreted differently by different people or at different times (Johnson-Laird, 1983; Kahneman and Tversky, 1984; Schoemaker and Russo, 2001). Frames determine what we see and lock us into certain ideas (Schoemaker and Russo, 2001).

Framing as gain or loss is a kind of outcome framing and was used by (Kahneman and Tversky, 1979) to propose Prospect Theory. It has been illustrated that the outcomes of risky prospects are evaluated by a value function (see Fig. 1). As Fig. 1 shows, given amount of loss has greater psychological value in comparison with equal amount of gain; individuals are risk averse with respect to potential gains and risk seeking with respect to potential losses; the status quo or current situation is the reference point (Kahneman and Tversky, 1979).

Considering the value function (Fig. 1), loss information potentially have stronger impacts on the decision-maker comparing with equivalent gain information, however there is empirical evidence which shows the inconsistency of the impacts of loss frames (Maheswaran and Meyers-Levy, 1990; Rothman et al., 1993). It has been pointed out that to change behaviors which are considered risky, loss frames are more effective whereas to change behaviors which are considered safe, gain frames are more effective (Edwards et al., 2001). For example Spence and Pidgeon (2010) conclude that attitudes toward climate change mitigation may be effectively promoted using gain information of mitigating climate change.

Also some researchers found that in risky situations individuals are become reluctant to act and prefer to preserve their current situation in order to avoid risky choice (Thaler, 1980; Kahneman et al., 1986; Knetsch, 1989). Hence, inclination toward to do nothing or maintaining current or previous decision, literarily expressed as status quo bias (Samuelson and Zeckhauser, 1988). Status quo bias has been considered by some researchers for decision making over real world problems (e.g. Dinner et al., 2011; Glenk, 2010; Herbst et al., 2011). In effect, different sorts of intervention can address the fact that people are generally biased in favor of the default, or status quo (Johnson and Goldstein, 2003).

As (Thaler and Johnson, 1990) pointed out, framing is typically spontaneous and subconscious and decision-makers can be framed. In order to engage people with new emerging problems in the world, framing has become an interesting and increasingly noticeable field of inquiry on issues such as energy policy (Kivimaa and Mickwitz, 2011; Jones et al., 2012; Corner et al., 2011), climate change mitigation (Wende et al., 2012; Barr et al., 2011; Gifford and Comeau, 2011), Conservation of resources (Buijs et al., 2011; Hovardas and Korfiatis, 2008), Transport policy (Cohen-Blankshtain, 2008; Delhomme et al., 2010) in recent years. Today, researchers are increasingly using framing theory to understand environmental issues (Miller, 2000) in order to find out the relevance of individuals and environmental problems (Nisbet and Mooney, 2007).

Psychological distance

Psychological distance from an object or event depends on the way people represent it mentally (Spence et al., 2011). As Trope and Liberman, 2003 suggest, there are four key dimensions for psychological distance, namely spatial or geographical distance (i.e. near or remote places), temporal distance (i.e. current or future events), social distance (i.e. relatives, acquaintances or strangers), and uncertainty (likelihood or unlikelihood of occurrence). Construal Level Theory (CLT) predicts that people make better decisions about the events that are psychologically closer to them, compared to those which are psychologically more distant (Trope and Liberman, 2003). Moreover, some studies have found that participants who receive personalized messages imagine the costs or benefits of a particular action more easily (Behavioral Insight Team, 2014). In other words, the perception of gain or loss also depends on psychological distance.

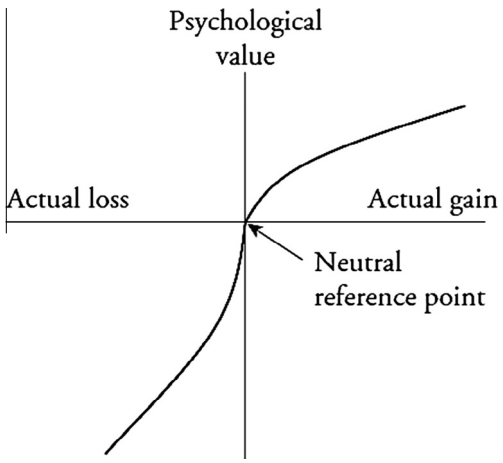


Fig. 1. The Prospect Theory value function (Kahneman and Tversky, 1979).

According to Bickerstaff (2004), individuals are generally unwilling to attribute high levels of air pollution to their neighborhood areas compared with more distant areas, a phenomenon known as neighborhood invulnerability. Also, there is evidence showing that geographical distance influences climate change perception (Leiserowitz et al., 2010; Corral-Verdugo et al., 2010). Similarly, it can be hypothesized that people perceive air pollution as a distant event, thinking that air pollution usually happens far from their living area. One possible way to increase the personal relevance of air pollution to people is attribute framing. Attribute Framing is a technique often used with the purpose of influencing the evaluation of objects or events (Levin et al., 1998). It can be defined as the process of highlighting a particular aspect or aspects of the target object or issue (Spence and Pidgeon, 2010). As such, attribute framing of geographical distance is used in this study to manipulate the personal relevance of air pollution and consequently, evaluate the impact of it on participants' inclination toward more environmental friendly modes of transport.

Aims of the research

Most efforts carried out to date, have been focused on technical aspects of air pollution (e.g. measuring the emission of motor vehicles, expanding means of public transport, and elimination of fuel subsidiary). However, apart from all the technical undertakings and developments aimed at improving the quality of air in Tehran, policy makers and authorities must find ways to encourage people to act more environmentally friendly. In doing so, informing Tehran citizens about the possible consequences of air pollution, in order to persuade them to choose more environmental friendly transport modes, can be a necessity. Using appropriate frames for communicating the health risks of air pollution can be considered as the main approach to promoting environmental awareness. As such, the first aim of the present study is to explore the effect of outcome framing on individuals' behavioral intentions to change their mode of transport. More specifically, the gain frame is predicted to have a greater impact on behavioral intentions compared to the loss frame (Hypothesis 1).

Psychological distance of air pollution can be a matter of concern when communicating with people. Using personally relevant information about air pollution has a potential impact on individuals. In particular, people are expected to be more inclined toward responding to personally relevant information (i.e. information about Tehran) compared with the information they find personally irrelevant. Therefore, the second aim of the present research is to evaluate the effects of geographical distance on individuals' behavioral intention to choose greener modes of transport. (Hypothesis 2).

In addition, authors are interested in exploring the effect of the interaction of outcome framing and psychological distance on individuals' willingness to change their choice of transportation mode. More specifically, outcome frame is predicted to have a higher impact on behavioral intentions in the case of personally relevant information. (Hypothesis 3).

Material and methods

As mentioned earlier, the main purpose of this study is to address the effect of outcome framing and psychological distance of information about air pollution consequences on people's willingness to change their preferred mode of transport toward a more sustainable one. To achieve this end, experimental design was employed. The information that was given to participants as the experimental manipulation differed with regard to outcome frame (gain vs. loss) and psychological distance (local vs. distant). Accordingly, the four experimental groups in the present study were Gain-Local, Gain-Distant, Loss-Local and Loss-Distant. To represent geographical distance, Tehran was chosen for the local condition, whereas Beijing from China stood for the distant condition. Also, the gain frame is concerned with positive outcomes of the reduction of air pollution, whereas the loss frame contains information on negative outcomes of the increase of air pollution in the specified city.

Participants

A total number of 220 individuals (150 male, 70 female) participated in this study. All participants were MBA students at Sharif University of Technology, whose ages ranged from 22 to 29 years. Questionnaires were completed by students in classes, as part of their course requirements. Prior to completing the questionnaires, a general instruction about filling out the questionnaire was provided to the respondents.

Questionnaire information

To design the research questionnaires many meetings were held to ensure that questions and framing information fitted the aims of the research. Four questionnaires containing gain-local, gain-distant, loss-local and loss-distant information were designed (see Appendix A). Questionnaires were first administered to a preliminary group of 20 students and revised accordingly. The opening part of the questionnaire consisted of demographic questions (age, gender, field of study, academic degree) in addition to a question asking how they usually transport in the city (see Appendix A). Afterward, there was a second part with specific framing information about air pollution issues (see Appendix B). The framing part was accompanied by pictures to affect participants more directly (see Appendix C). In the next part, they were asked to list the vehicles that they prefer to use for urban transportation in order of priority (see Appendix D).

Results

Seven participants were excluded because of failing to answer the question concerning their current pattern of vehicle use, leaving a final sample of 213 participants for analyses. Participants' mean age was 24.78 years ($SD = 1.72$), and 31.92% ($n = 68$) were female. The four experimental groups did not differ with regard to age, $F(3,209) = .91$, $p = .438$, or sex ratio, $X^2(3, N = 213) = 3.47$, $p = .325$.

As for the vehicle participants ranked in the first place before manipulation, metro (45.1%) was the most common of all, followed by car (23.5%), taxi (17.8%), and bus (10.8%), with only 2.3% of participants specifying bicycle as the vehicle they currently use more often than other transportation means. However, after manipulation, the popularity of bicycle as the first vehicle of choice rose to about six times its baseline percentage (16.0%), leaving taxi (6.6%) and bus (3.8%) behind. Car (29.6%) and metro (44.1%) remained the most common vehicles reported by participants as the first priority. The mentioned order in post-manipulation results was similar across the four experimental groups, $X^2(12, N = 213) = 7.74$, $p = .805$.

Age was negatively correlated with the reported rank for car before manipulation, *Kendall's tau-b* = −.18, $p = .001$, suggesting that older participants are more frequent users of car compared to the younger ones. Conversely, the use of metro, bus, and bicycle decreased with age, .14 < Kendall's tau-bs < .21, $ps < .020$. Taxi usage was not correlated with age, Kendall's tau-b = −.05, $p = .358$. To examine gender differences in transportation preferences, ratings were re-coded so that two respondent groups of high- and low-frequency users were formed for each separate vehicle. Bicycle usage was related to gender, $X^2(1, N = 213) = 9.63$, $p = .002$), with men outnumbering women among the more frequent bicycle riders. The two sexes did not differ significantly in pre-test preference for the remaining four vehicles, $ps > .090$.

Vehicles were divided into two groups based on their supposed role in city pollution. Personal car and taxi take the shares of around 42 and 6.6% of total air pollutants in Tehran respectively and the share of bus is around 1.3% (Torkian et al., 2012). Given this fact along with the fact that people who use bus have less share of total air pollutants which are discharged by bus, car and taxi were categorized as 'non-green' vehicles, whereas bus, metro, and bicycle constituted the 'green' category. Accordingly, a participant's degree of overall "Green"-ness, be it in pre- or post-test, was defined based on the number of 'green' vehicles he or she listed among their first three most preferred vehicles. Before experimental manipulation, 11.3% of respondents were considered to be the least green of all, listing no green vehicle among their first three choices. The majority of respondents listed one and two green vehicles, amounting to 35.7% and 49.8% of the sample respectively. Only a minority of 3.3% qualified as third level greeners. This later percentage increased to 16.0 in post-test, with only one participant categorized as zero level greener. Table 1 presents counts and percentages pertaining to levels of post-test greenness within each of the four experimental groups.

Male and female participants did not differ in pre-test levels of overall green-ness, $X^2(2, N = 213) = 1.36$, $p = .507$. Younger participants were found to have greener baseline transportation habits, Kendall's tau-b = −.25, $p < .001$. However, neither sex, $X^2(2, N = 213) = .65$, $p = .722$, nor age, Kendall's tau-b = −.04, $p = .473$, correlated with post-experimental level of green-ness.

To examine the effect of message framing manipulations on future intention for engaging in green behavior, an ordinal regression analysis was carried out with post-test overall green-ness as the outcome variable and psychological distance, outcome frame, and the interaction of the two as predictors, along with baseline green-ness as the control variable. Table 2 presents the results of this analysis. As expected, pre-test overall green-ness was a significant predictor, with those engaging in less green behavior less likely than higher level greeners to be categorized in lower levels of green-ness after manipulation. Moreover, As hypothesized in Hypothesis 1, outcome frame had an effect on post-manipulation intentions for engaging in green behavior, with those participants in the Gain condition more likely to prefer greener modes of transfer than their counterparts in Loss condition, OR = 2.43; 95%CI, 1.15–5.15. However, contrary to Hypothesis 2, psychological distance did not have an impact on post-test overall green-ness. Lastly, the interaction of the two factors did not reach significance as predictor suggesting that the impact of outcome frame on future behavior intentions was independent of psychological distance.

In order to find out whether the effect of outcome frame on post-manipulation green-ness can be attributed to any particular vehicle or vehicles, priority change for each of the five vehicles was defined by comparing baseline and post-manipulation ranks for that vehicle. The three levels of this variable include gaining higher priority, no change, and losing

Table 1
Post-manipulation behavioral intention according to outcome frame and psychological distance.

Outcome frame	Psychological distance	Post-manipulation level of green-ness				Total (n)
		Zero % (n)	One % (n)	Two % (n)	Three % (n)	
Gain	Local	1.8 (1)	32.7 (18)	49.1 (27)	16.4 (9)	55
	Distant	0 (0)	23.6 (13)	60.0 (33)	16.4 (9)	55
Loss	Local	0 (0)	46.2 (24)	38.5 (20)	15.4 (8)	52
	Distant	0 (0)	51.0 (26)	33.3 (17)	15.7 (8)	51

Table 2
Results of the ordinal regression with post-manipulation green-ness as the outcome variable.

Variable	Parameter	*B*	SE	Lower Bound 95% CI	Upper Bound 95% CI
Pre-manipulation Green-ness (Base = Level 3)	Level 0	−4.891***	1.192	−7.227	−2.556
	Level 1	−4.305***	1.133	−6.526	−2.084
	Level 2	−3.460**	1.121	−5.657	−1.262
Psychological Distance (Base = Distant)	Local	.136	.392	−.632	.903
Outcome Framing (Base = Loss)	Gain	.892*	.383	.140	1.643
Psychological Distance × Outcome Framing	Local × Gain	−.451	.539	−1.507	.605

Nagelkerke Pseudo R^2 = .20.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

priority. For green vehicles, taking precedence translates to becoming greener with reference to the use of that vehicle, whereas in the case of non-green vehicles, i.e. car and taxi, losing precedence is what counts as a green move. Ordinal regression analyses were run with priority change as the outcome variable and psychological distance and outcome frame as predictors, controlling for age and gender. The effect of outcome frame did not reach significance for any of the transportation means, *ps* > .090. However, it was a marginally significant predictor for priority change of bus, OR = 1.54, $p = .097$, and bicycle, OR = 1.80, $p = .094$. In both cases, as predicted, participants in the gain condition were more likely than those in the loss condition to be willing to change their behavior toward a greener use of that vehicle, i.e. attribute a higher priority to the two green vehicles. Moreover, the effect of psychological distance was not significant for any of the vehicles, *ps* > .070. Only priority change for taxi was marginally predicted by it, OR = .63, $p = .072$, with participants in the local condition being more likely than distant participants to decrease their level of preference for taxi as the result of manipulation.

Discussion

Present research has attempted to show that frames of communicating about air pollution (or the way it presents) has a substantial impact on the recipients. As it was pointed out in policy making and academic literature of this issue, there is relatively little systematic experimental research that evaluates the impacts of framing air pollution consequences. Also, this research is one of the first studies which explores the impacts of psychological issues of air pollution on individuals' intention to change the travel mode choice, in Iran. Hence, authors emphasize the need for wider research and much effort around these important issues which concerning the risk communication of air pollution, particularly in Iran.

The results of the study have illustrated that gain frame, in line with initial expectation of the authors from behavioral decision theory, had more impact than loss frame in promoting inclination to environmental greenness. Rothman et al. (2006) conclude in their extensive review research that gain and loss frames have systematic impacts on behavioral intentions and actual behavior, but it depends on the way in which the recipient construes the behavior. Also, according to prospect theory, using gain frames are more advantageous where the information about outcome is construed as low in risk. Consistent with the results of Spence and Pidgeon (2010) on the issue of climate change, using gain frame has led to more behavioral intention among participants of this study, suggesting that individuals perceive air pollution as a low risk outcome. However, this was not studied in this research and should be explored in future studies. Moreover, presenting gain frame about consequences of air pollution might cue the sense of effectiveness, i.e. there is something which can be done about the problem, a condition which is known to be more effective on the acceptance of emotional messages (Moser, 2007).

According to Rothman et al. (2006), there is a distinction between low risk and high risk behaviors, and researchers found that communications designed to impact on attitudes toward a high risk behavior and on high risk behavior (e.g. detecting an underlying health condition) benefit from using loss frame (Edwards et al., 2001). Hence, it is possible that in a given circumstances or for a specific objective loss frames be more effective than gain frames (it depends on the circumstances that recipient deals with or the way that he or she construes the situation). This line of reasoning cue the complexity of framing and presenting information about risks which affect individuals, and suggesting that the objective of communication should be taken under consideration in order to achieve proper frames for more effective communication. Therefore, authors point out the importance of future detailed studies which investigate the impacts of and the contrast between loss and gain frames on environmental risk communication.

Moreover, results have shown the impact of outcome framing on priority change of bicycle and bus. Although the impact was marginally significant for both vehicles, it has highlighted the role of framing air pollution consequences in engaging people with sustainable modes of transport. As for both vehicles, effects of gain were more than loss frame, i.e. respondents

to gain frames had more inclination to use bicycle and bus in their higher levels of priority. Sigurdardottir et al. (2013) suggest that when individuals perceive the high probability of future consequences of air pollution their willingness to place limitation on car travel will increases. Whilst they conclude that individuals with greater intentions to commute by car implying less intentions to commute by bicycle, results of this study show inconsistency with this conclusion. In fact, changing individuals' use of personal car normally has been considered as a change in the high cost behavioral domain (Bamberg and Schmidt, 2003) and often means giving up personal advantages like privacy, flexibility, comfort and convenience (De Groot and Steg, 2010). In addition, authors suggest that this disagreement results from the fact that many other factors which influence the personal car usage (Steg, 2005) have not been considered in the study and they might play a major role in tendency to personal car usage.

As the results have shown that the pre-manipulation green-ness has a significant impact on post-manipulation greenness, authors suggest that status quo bias or inclination to maintain the current mode of transportation can be an serious matter of concern. Inquiring the reasons of individuals' inaction on sustainable transportation behavior (e.g. ineffective role of individuals, small proportion of people who behave sustainable in contrast with those who do not behave, etc.) can open up new horizons for tackling current air pollution situation of Tehran.

Present study has attempted to evaluate the effect of psychological distance as well, using manipulated information about air pollution consequences by reporting similar consequences of air pollution in Tehran and Beijing. Results of the study shows that there is no significant relation between the factor of psychological distance and participants willingness to change of transport behavior. Whilst some researchers suggest that framing and communicating personally relevant information of the risk (e.g. climate change) promote the action (Rayner and Malone, 1997; Spence and Pidgeon, 2010), the author's did not find evidence that qualifies this suggestion. In addition, Spence et al. (2011) found that the greater that participants perceived the climate change as a local risk, the higher their preparedness to act was. This new finding draw attention toward the differences among impacts of personal relevant information on the perception of an environmental issue (such as air pollution or climate change), the preparedness to act and behavioral intention to change. Authors suggest that it can be very important to examine the impacts of personally relevant information about air pollution by increasing the distance of the event (e.g. by using information about the areas that individuals are currently living for local and other countries for distant).

Authors has attempted to find an interaction between two factors, i.e. outcome framing and psychological distance. In line with the results of Spence and Pidgeon (2010) results of this study has shown that there is no interaction between the factor of outcome framing and psychological distance.

Present study was limited to a sample of young well educated adults, however it was of authors' expectation that they had no special environmental knowledge than non-expert people. Therefore, the extent to which the results can be generalized to other people who are living in Tehran is not certain. Authors acknowledge that the number of men in our sample was more than women, however results show that the sample groups did not differ with regard to gender. A future research suggestion is the need for categorizing the groups within Tehran's inhabitants who differ in the way that they react to air pollution.

Conclusion

Impact of framing environmental risks on participants' behavioral intention is the first result of the study. In other words, the way that consequences of air pollution are presented to people has an important role in their intention for changing their behavior. Results of this study shows that communicating the risks of air pollution encourage people to change their mode of transportation and incline them to use more environmental friendly vehicles.

Moreover, communicating the benefits of mitigating air pollution can take precedence over losses of not mitigating. That is, unlike the way that most of current policy measures in Tehran are presented, focusing on the gains of air pollution reduction can generate more inclination toward green behavior, or in particular using more environmental friendly transport vehicles. Also, the higher impact of gain framing on bus and bicycle is of consequences of the research.

The mode of transportation that individuals currently use has an impact on their future intention for transport mode choice. Although, in this study, factor of psychological distance had no impact on the respondents' willingness to change, authors emphasize the need for more detailed research about the impacts of this factor using different psychological distances.

Appendix A

How do you normally carry out your daily urban transport? (In case of traveling by Personal Car, Metro, Bicycle, Taxi or Bus, please list the more used vehicles before the less used ones.)

Appendix B

Frame information

(a) Gain

- By mitigation of air pollution we can decrease the Cardiovascular and respiratory disease.
- Air pollution mitigation prevents weakening of the plants, emergence of pests and diseases such as dried spots on the leaves, plant growth reduction and yield loss.
- By mitigation of air pollution Acid rain mitigates. (Acid rain causes the death of aquatic creatures, plants nutrients scour and erosion of the surface of buildings, bridges, dams, etc.)
- By mitigating of air pollution the amount of greenhouse gases will decrease. Greenhouse gases reduction prevents the global warming.

(b) Loss

- Without mitigation of air pollution we can expect to have more Cardiovascular and respiratory disease.
- Air pollution increase causes weakening of the plants, emergence of pests and diseases such as dried spots on the leaves, plant growth reduction and yield loss.
- Without mitigation of air pollution more Acid rain will occur. (Acid rain causes the death of aquatic creatures, plants nutrients scour and erosion of the surface of buildings, bridges, dams, etc.)
- Without mitigating of air pollution the amount of greenhouse gases will increase. By increase of greenhouse gases we will see global warming.

(c) Distant

- A total economic loss of air pollution in Beijing, China are estimated around 7.8 billion USD Annually.
- About 220 days in the year of 2010, the air quality of Beijing, China was in the unhealthy situation.
- About 10000 people die prematurely in Beijing, China each year because of outdoor air pollution.

(d) Local

- A total economic loss of air pollution in Tehran is estimated around 7.6 billion USD annually.
- About 220 days in the year of 2011, the air quality of Tehran was in the unhealthy situation.
- About 10000 people die prematurely in Tehran each year because of outdoor air pollution.

Appendix C

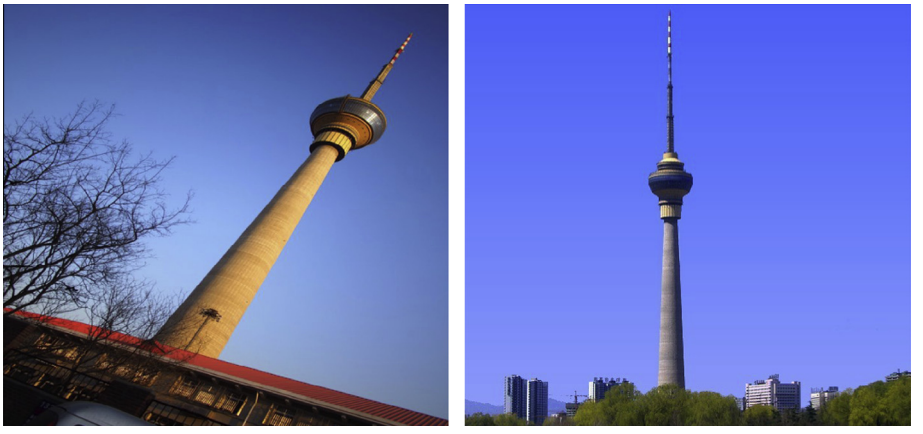
The pictures were used in questionnaire

(a) Loss-local

(b) Gain-local

(c) Loss-distant

(d) Gain-distant



Appendix D

Question

How do you prefer to carry out your daily urban transport? (Prioritize your favored vehicles between Personal Car, Metro, Bicycle, Taxi or Bus and please list the more preferred vehicles before the less preferred ones.)

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