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Effect of Message Framing on Individuals' Attitudes and Perceptions regarding Air Pollution in Tehran

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Abstract

One of the environmental issues in Tehran is air pollution problem. Part of this problem can be blamed on Tehran citizens. Using communicating methods to inform individuals about their influence on this issue can be effective. In this study, concept of framing was proposed to examine attitudes and perception of Tehran citizens towards air pollution mitigation. Two types of frame, namely, outcome and attribute in four categories of gain-local, loss-local, gain-distant and loss-distant were prepared and participants' response to them was analyzed. Results indicate discussion about air pollution using gain frame can be more effective in comparison to loss and can increases change of attitudes towards air pollution mitigation. Outcome framing in term of gain had a significant effect on belief about the impact of air pollution on human health than the loss group. Despite the recognition of consequences of air pollution on human health and the environment by individuals and acceptance of their negative role, respondents show little interest in their behavior change to the matter of air pollution. Willingness to inform others was positively correlated with perception of current air quality in Tehran, and opinions about the impact of air pollution on human health and the environment. Furthermore psychological distance was influential on prediction of future air quality in Tehran.

Key words: ***air pollution, framing, local-distant issue, individual's perception.***

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Introduction

Air pollution phenomenon is one of the major environmental risks, consequence of unsustainable urban development in big cities, especially in developing countries. Population, industrial and economic expansion, rapid urbanization, and excessive use of vehicles are main reasons for severity of air pollution (Bickerstaff & Walker, 2001; United Nations Centre for Human settlements, 2001). During last decades air pollution has become a major problem in the city of Tehran.

Daily traffic is a big source of Tehran's air pollution. Considering the use of more than 2 million cars, motor vehicles are responsible for more than 70 percent of Tehran's air pollution (Naddafi, et al., 2012). Air pollution was the major cause of death of 9900 inhabitants in Tehran in 2006 (World Bank , 2008)

There have been taken diverse measurements for improving Tehran's air quality so far namely, comprehensive studies on air pollution by the corporation of the Japanese International Cooperation Agency (JICA) (Yokoyama & Takahashi, (2003)), adopting a program entitled "Comprehensive plan to combat air pollution in Tehran" in 2000 which prepared to achieve clean air within 10 years, and in 2007 preparing "Tehran Traffic and Transportation Master Plan" (Metropolitan Tehran Transportation and Traffic Information at a Glance, 1996).

Whilst much policies and researches have been mostly focused on technical, scientific and economic aspects of Tehran's air pollution (Torkian, Bayat, Najafi, Arhami, & Askariyeh, 2012; Hosseinpoor, Forouzanfar, Yunesian, Asghari, Naieni, & Farhood, 2005; Sohrabpour, Mirzaee, Rostami, & Athari, 1999), behavioral surveys on air pollution are very little (Evans & Jacobs, 1981) and the role of citizens in mitigating air pollution has not attracted much attention. So it is important taking steps towards raising dialogue and communication between decision-makers, managers and the public regarding air pollution mitigation (Lorenzoni, Pidgeon, & O'Connor, 2005).

Communicating about environmental issues and other public policy domains is a complex matter, because there is not a single opinion about these domains. For example, (Pidgeon, Lorenzoni, & Poortinga, 2008) survey demonstrated that there are complex beliefs around the future of energy considering climate change reduction in the UK.

Although risk and its communication is pointed out in some academic and policy domains, however there is less evidence of applying the best appropriate methods for expressing and communicating air pollution risks.

The other factor relevance to air pollution is its consequences on health. Findings showed that people were fully aware of adverse impacts of air pollution on health (Hedges, 1993). However awareness of air pollution negative impacts is not the only effective factor on its perception and intention towards its mitigation.

Studies conducted link between perception of air pollution and human health had two interesting findings. In some cases respondents only expressed serious impacts of air pollution when were asked directly (Degroot, Loring, Rihm Jr, Samuels, & Winkelstein Jr,

1966; Schusky, 1966). In others respondents denied air pollution impacts on human health despite of recognition of the existence of air pollution (Wall, 1973; Billingsley, 1975). Therefore, environmental issues are surrounded by complexities which are stemmed from different viewpoints and psychological perception.

Citizens' attitude towards air pollution is a key factor dealing with it, so to scrutinize this subject one requires to consider socio-cultural faucets. Some socio-cultural aspects of this issue could be addressed as the network of communication of information between people, the transformation of beliefs among them and the role of society and its members in mitigating the air pollution. Impact of air pollution on both human health and the environment is another factor that opinion about that plays an important role in the overall attitude and behavior. Furthermore, perceptions of current state of any system and predictions of the future state of that system is another influential factor on people attitudes and hence, their behavior. The main object of this study is exploring some of the factors may be significant in communicating air pollution risks. Nonetheless communicating air pollution may arises complex challenges because, social issues are usually not defined objectively, but mostly relying on the definition of individuals and its value in their point of view (Cohen-Blankshtain, 2008). On the other hand providing information for air pollution in a neutral procedure is very hard to achieve, even though it is necessary to presenting information in a specific context to direct our audience's thoughts. So how information are provided and framed is of crucial importance.

This study examines the influence of message framing on citizen attitude towards air pollution issue with regard to the aforementioned factors.

Frame on social issues

Problem definition can be presented by the concept of frame which adopts a policy frame among other possibilities. The frame leads to choose appropriate option between logically equivalent statements of an issue (Cohen-Blankshtain, 2008). Frame referred to a subjective model is used in the decision making problems. When individuals are given the same information of a specific decision making problem, they interpret information in different ways. These ways of processing information of a unique problem called mental frame. In fact what individuals interpret as a decision making problem neither is a real problem nor its description but a model which is made in person's mind. A frame permits complex issues to be refined and put a greater emphasis on some aspects of those issues (Kahneman & Tversky, 1979). Overall, frame offers a conceptual expression of how policy domains are described and become manageable, so it can provide for both continuity and change (Jasanoff, 2011). Applying frame to environmental policy making has become a growing area of analytical research in the field of social sciences (Banks, et al., 1995; Ogunseitan, 2003; Benford & Snow, 2000; Hovardas & Korfiatis, 2008; Devereux, 2007).

Various types of frame have been implemented in the literature (Levin, Schneider, & Gaeth, 1998). This research enlisted two types of frame, namely, attribute and outcome

framing. Attribute framing, engaged people's judgments by underlining a given attribute of an object or event which is first described relative to an defined reference point, and then evaluate the distance from the reference point positively or negatively (Levin & Lauriola, 2011). It was proposed that in the context of attribute framing evaluation of an issue under the positive frames could be more influential than negative frame (Levin, Schneider, & Gaeth, 1998).

Previous studies showed that the level of air pollution and publicity about it were two sources of influencing people's perception of air pollution in their hometown (Prescott-Clarke, 1982; Zeidner & Shechter, 1988; Auliciems & Burton, 1971; Wall, G, 1974). Hence it is hard to find from the combined research whether people perceived air pollution issue in their environment or if they were more influenced by media coverage (Kirkby, 1972). During five years survey in US from 1965-1970 response to presence of air pollution problem in the immediate environment rocketed up from 28% to 70%. Conversely, data from community concern about air pollution even if they lived in polluted areas revealed less degree of concern (Auliciems & Burton, 1971). Neighborhood halo effect -a cognitive bias- also traced in some survey works, which means reluctance of attributing high level of air pollution to hometown (Kirkby, 1972). Some researchers finding shows that people consider their surrounding areas less polluted than other places (Rankin, 1969). According to one research, less satisfaction with local area leads to more preference to notice air pollution and its harmful impacts (Degroot, Loring, Rihm Jr, Samuels, & Winkelstein Jr, 1966). Considering all of these complexities and ambiguities in perception of air pollution in hometown, there is a need to more focus on effects of localization of air pollution on its perception.

Despite perception of air pollution as a deteriorative mean on public health and environment whether in local scope or across the world, numerous people do not behave in a sustainable manner. This inaction could be the result of a suggestion that air pollution is psychologically distant in which people think of its impact more probable on spatially and temporally distant people (Schusky, 1966). Moreover by emphasising on local impact of air pollution, it may be provided to direct people to act sustainable and in a way of alleviating air pollution. This is in line with Construal Level Theory (CLT) which states in psychologically closer events people make better decisions, in comparison to which are psychologically distant (Räthzel & Uzzell, 2009).

Other studies suggest involving people meaningfully in a worldwide problem using pictorial representation and icons of that problem led to removing some of the cognition obstacles that slow down progressing towards sustainable behaviour (Trope & Liberman, 2003). (O'Neill & Hulme, 2009) reached the conclusion that cognitive obstacles which hinder action towards climate change mitigation can be eliminated by iconic approach.

Frame could affect the outcome of decision making problem, which offers prospect theory as an alternative of "Rational choice theory". Prospect theory offers that in a gain situation people take low risks because the perceived subjective value of gain is rather low while people have more inclination to take risks to avert losses owing to the high subjective value

of losses in comparison with gains (Tversky & Kahneman, 1981). The outcome of frame mostly evaluated as a positive or negative form, in comparison to the reference point which is considered neutral. The difference between the reference points can determine which outcome is provided in the form of gain or loss (Nisbet & Mooney, 2007). In addition, it is well known that in case of risky behavior change, loss frame is more functional rather than gain frame which has better application in safe situation (Witte & Allen, 2000). This argument rooted from prospect theory which explains message framing impacts on risk.

While there is a lack of concrete research on communication of air pollution, it is possible arguing air pollution mitigation in term of its positive effects on public and environment rather than its negative impacts. Regarding that communication under highlighting negative aspects of an issue is not necessarily effective, this study draws a comparison between light and dark sides of air pollution issue in term of gain or loss framing. Literatures on outcome framing have well established which examined a particular subject in context of outcome framing (Davis, 1995; Hoffman & Ventresca, 1999). In one study (Spence & Pidgeon, 2010) showed that attitudes change towards climate change mitigation under gain frame can be more effective than loss and considering social impacts besides personal impacts.

(Buijs, Arts, Elands, & Lengkeek, 2011) proposed to revise the concept of cultural resonance to reach the connection between the success of framing strategies and the cultural background of these strategies, and suggested social representations theory as an appropriate method to realize this cultural resonance of spatial and environmental frames. They noticed the application of frame in environmental issues regarding social representations theory. This theory explained why some aspects of behavior and opinion are more amorphous than others. So it is assumed, it would be possible to influence on some isolated aspects of the social issue by framing that. However in some cases framing might be less influential because of anchoring of attitude to societally complicated representation. Social representation theory may help explain why in some cases framing does not apply properly. Whilst an opinion or attitude anchored strongly to a social representation it needed more effort to change it (Liu & Hilton, 2005).

Although a number of opinion researches conducted up to date to examine air pollution issue perception and recognition, however there is a gap in communicating people about this phenomenon which confined the transferability of findings. This study formed regarding the way of communicating people about air pollution. Message framing in terms of attribute and outcome was hired to find out how relative distance (being close or far from an air polluted area) and gain or loss framing affect participants perception and cognition of air pollution. These two types of frame accompanied by pictorial representation of air pollution in terms of local and distant.

Achieving people behaviors change towards air pollution require giving information about this matter. Furthermore how information is given is an important factor on its influence. To select the most appropriate method of providing and presenting information of air pollution, the frame practice can apply.

Objects and Hypothesis

Frame concept can be used in policies about controlling and reducing air pollution. Frame can help in choosing both, the proper information and the best method of presenting information to individuals eventually aiding the process of reducing air pollution.
As discussed above frame has been applied in many environmental issues and reviewed its effect on people perception of an issue. However in case of air pollution most researches carried out in technical, engineering and health fields and there has been less concentration on the method of communicating air pollution mitigation. Those surveys dedicated to perception and recognition of air pollution lacking of integrating socio-environmental aspects under message framing. In this study two types of frame have been manipulated in term of distance (local versus distance) and outcome (gain versus loss) to evaluate people's perceptions and attitudes toward air pollution. This research is a context discovering how psychologically affect people towards sustainable attitudes.
By using appropriate frame, citizen attitude towards air pollution can be changed and also progress can be made in mitigating air pollution. Although one can't expect the individuals view to be similar but these views can be inverted towards an effective idea by using frame.
As discussed above impacts of air pollution tend to be viewed less deteriorative in immediate environment than distant. However some studies suggested that highlighting personally local impacts of air pollution will lead to action. Therefore we hypothesise that manipulation of spatial distance in framing air pollution communication will result in local impacts considered less serious. The other main hypothesise examines the effect of outcome framing on air pollution mitigation. Although in literature loss frame is more effective than gain frame in change of attitudes, in this study it is suggested that air pollution mitigation can be considered as a prevention attitude and so gain frame will be more effective than loss. Moreover, under attribute framing positive manner is more effective on evaluation of an issue, hence, manipulation of combined attribute and outcome framing has been scrutinized to draw comparison between different types of frame.

Materials and Methods

a. Material

The information was extracted from Tehran Air Quality Control Company (AQCC, 2012) and World Bank Group (World Bank , 2008). Text was concentrated on major consequences of air pollution and described the gains from air pollution mitigation or losses will arise from air pollution. Alongside, text was adjusted to refer to local geographical situation or to distant area, i.e. China. Word selection, perspicuous and coherence of text were developed and adjusted by some researchers. Then the primary draft was piloted on a small group of 20 respondents. The focus was on the short-length but comprehensive text. Final form of information presented on a questionnaire included four different parts. In the final draft the participants, first answered to the demographic questions (age, gender, field of study, and grad or under grad), then read the information about air pollution (see appendix 1). The

sentences used in the questionnaires are followed by pictures of clean and polluted air of Tehran and China to create the appropriate image for each type of frame and also to emphasize on the distance factor (see appendix 2). And the last part, ask participants seven questions (see appendix 3). The arrangement of questions was: 1- The respondents' feelings about Tehran's current and future air pollution situation, 2- Individuals effects on air pollution, 3- Effect of air pollution on human health and the environment and 4- inclination to inform about air pollution. Tehran was chosen as a local area because all participants lived there and Beijing in china was chosen as a distant area because it was well known for its pollution and image of its Central Radio and TV Tower was similar to Milad Tower in Tehran.

The main focus of our work was to measure in what extent perception of air pollution leads to reaction. Perception of air pollution was studied by asking questions about feeling of current and upcoming situation of air pollution in Teharn. Two other questions measured how participants perceived negative impacts of air pollution on human health and their surrounding environment. In term of personal or social contribution on air pollution two questions were designed: the beliefs in the role of Tehran citizens and society members in air pollution. Participant's tendency to inform their close relatives or friends about air pollution situation and its consequences was asked to evaluate the reaction against air pollution situation. All questioned scaled on five points.

b. Participants

Two hundred and forty economics and MBA students (148 male & 92 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. Participants were told that they would complete a series of questions about air pollution in an approximate time of 30 min. they were also told that before answering the questions they should read some information about air pollution which provided separately from questionnaire. Finally, following the reading information they were given questionnaire to fill out.

Results

Participants' mean age was 24.77 years (SD = 1.70), and 31.40 % (n = 69) were female. Older participants perceived the current air in Tehran as more polluted, R = .14, p = .040. None of the other variables were correlated with age, ps > .11. Female participants rated the impact of air pollution on human health, $t(217)$ = 3.44, p = .001, and the environment, $t(217)$ = 4.30, p < .001, higher than men. The two sexes were not different regarding the remaining five variables, ts < 1.4, ps > .18. The four experimental groups did not differ

significantly with regard to age, $F(3, 216) = 1.05$, $p = .372$, or sex ratio, $X^2(3, N=220) = 3.64$, $p = .303$.

Table 1 presents the means and standard deviations of the seven main variables in this study. Variable 1 is the behavioral intention for informing others about air pollution, whereas variables 2 to 7 constitute the beliefs and perceptions concerning air pollution. According to the correlations reported in this table, willingness to inform others was positively correlated with perception of current air quality in Tehran, and opinions about the impact of air pollution on human health and the environment. Moreover, there were some significant correlations between different perceptions and beliefs concerning air pollution.

Table 2 presents the descriptive statistics pertaining to beliefs and perceptions as well as the tendency to inform others for the four experimental groups. To examine the effect of framing manipulations on the beliefs and perceptions regarding air pollution, six separate 2 (psychological distance: local, distant) × 2 (outcome framing: gain, loss) analyses of variance were conducted with the attitude measures as dependent variables, controlling for age and gender.

The effect of psychological distance on prediction of future air quality in Tehran was significant, $F(1, 215) = 7.23$, $p = .008$. Those participants in the local condition ($M = 4.09$) predicted a more polluted air for Tehran in the future compared to their counterparts in the distant condition ($M = 3.84$). No such effect was obtained for the remaining five measures of attitude, $ps > .09$. Outcome framing had a significant effect on belief about the impact of air pollution on human health, $F(1, 214) = 4.38$, $p = .038$, with those in the gain group ($M = 4.55$) rating air pollution as more detrimental to health than the loss group ($M = 4.39$). None of the other five variables were significantly influenced by outcome framing, $ps > .16$. Moreover, the effect of the interaction of psychological distance and outcome framing did not reach statistical significance for any of the six beliefs or perceptions about air pollution, $ps > .15$.

To predict participants' willingness to inform their relatives and friends about air pollution, the measures of attitude as well as the framing manipulations administered in this study were entered simultaneously into a regression analysis as predictors. Given the high correlation between beliefs about the impact of air pollution on human health and the environment (Table 1), the two variables were averaged prior to the analysis ($\alpha = .75$). A similar procedure was conducted for beliefs about the role of Tehran citizens and society members ($\alpha = .72$). According to the results of this regression analysis (Table 3), the only significant predictor was the average of opinions about the consequence of air pollution for health and the environment, with those scoring higher on this combined concern being more inclined than others toward informing their acquaintances about the adverse effects of air pollution. Perception of the current air quality marginally impacted the participants' intentions for informing others in the similar direction. Interestingly, neither of the two framing manipulations, nor their interaction had a significant effect on the reported tendency to make others alert about air pollution and its harmful impacts.

Table 1. Means, standard deviations and Pearson correlations for the main variables

	Mean	*SD*	1	2	3	4	5	6	7
1. Willingness to inform others	3.62	0.99	-	.11	.20**	.08	.25**	.21**	.11
2. Belief in the role of Tehran citizens in its air pollution	4.05	0.78		-	.14*	-.04	.25**	.18**	.57**
3. Perception of current air pollution in Tehran	4.22	0.77			-	.18**	.33**	.25**	.06
4. Prediction of future air quality in Tehran	3.96	0.71				-	.16*	.17*	-.01
5. Opinion on the impact of air pollution on human health	4.47	0.54					-	.60**	.24**
6. Opinion on the impact of air pollution on environment	4.51	0.53						-	.17*
7. Belief in the role of society members in air pollution	4.05	0.69							-

Note: ** $p < .01$; * $p < .05$. $N = 219$.

Table 2. Means (and standard deviations) of the variables according to framing manipulations

	Framing used in the presentation of information on air pollution			
	Gain-Local	Gain-Distant	Loss-Local	Loss-Distant
Willingness to inform others	3.59 (0.98)	3.73 (1.00)	3.55 (1.07)	3.61 (0.92)
Belief in the role of Tehran citizens in its air pollution	4.07 (0.84)	4.12 (0.72)	3.85 (0.83)	4.13 (0.70)
Perception of current air pollution in Tehran	4.25 (0.82)	4.18 (0.77)	4.27 (0.71)	4.17 (0.82)
Prediction of future air quality in Tehran	4.13 (0.58)	3.75 (0.79)	4.05 (0.65)	3.93 (0.75)
Opinion on the impact of air pollution on human health	4.56 (0.54)	4.54 (0.54)	4.44 (0.54)	4.35 (0.55)
Opinion on the impact of air pollution on environment	4.59 (0.53)	4.52 (0.54)	4.56 (0.50)	4.35 (0.52)
Belief in the role of society members in air pollution	4.04 (0.80)	4.09 (0.72)	4.05 (0.68)	4.02 (0.57)
Number of cases (*n*)	54	56	55	54

Discussion

The study conducted to show differences between the ways of communicating air pollution mitigation under framing information. Although, there are several comments on this subjects in literatures, structured experimental researches regarding framing of air pollution mitigation are relatively little. This study is one of the first researches that explore the impact of framing air pollution in terms of outcome frame or psychological distance. Hence, authors emphasize on the broader research on the risk communication of air pollution, particularly in Iran.

Some demographic attributes were related to perceptions about air pollution. In particular, considering age of participants Gold and Goodey (1989) suggested that exploring effect of age on a perception of a phenomenon is a key stone of considering other factors such as gender and ethnicity (Gold & Goodey, 1984). In this study as people were older they had more realistic perception of current air pollution situation and female participants had better understanding of deteriorative effects of air pollution on human health and environment. This argument opens a road for upcoming researches to establish ways of processing information under message framing among different ages and sexes.

Table 3. Summary of regression analysis predicting willingness to inform others about air pollution

	B	***SE B***	**β**
Perception of current air pollution in Tehran	.156	.089	.122†
Prediction of future air quality in Tehran	.060	.096	.043
Average of the opinions on the impact of air pollution on human health and environment	.414	.152	.201**
Average of the beliefs in the role of Tehran citizens and society members in air pollution	.079	.105	.052
Psychological Distance	.082	.066	.083
Outcome Framing	-.016	.066	-.016
Psychological Distance × Outcome Framing	-.011	.065	-.012

Note: ** $p < .01$; † $p < .1$; $R^2 = .0.09$, $p < .01$.

Dividing questions into two main categories of perceptual and intentional it could be found that what more motivate people to inform others (intentional question) are factors stem from surrounding environment (Perception of current air pollution in Tehran, Opinion on the impact of air pollution on human health, Opinion on the impact of air pollution on environment). In fact, whatever people have better understanding of air pollution and its negative impacts, they are prefer to act more sustainable in that case. Therefore perception of a phenomenon is first step towards intention to do something against impacts of that phenomenon. Noteworthy, in comparison to perception of individuals of severity of air

pollution and its harmful impacts, their inclination to inform acquaintances was in lower level. It may be resulted from other factors which are not only under the influence of perception of an issue. Attitude, subjective norms and perceived behavioural control are the key stones of intention (Ajzen, 1991). In spite of existence of beliefs about air pollution consequences, social norms in countries like Iran are completely defined differently from developed societies. Civil rights are not defined properly and environmental issues are not as important as economics. Moreover, the level of satisfaction from central governments is not high enough to motivate them behave in a sustainable manner and perform their civil roles. So it is important taking into account socio-cultural background of any societies in environmental issues. The other point is that although individuals accept their role in severity of air pollution but their tendency to inform others is not in a same level. Therefore, in case of change of attitude policy makers do not only focus on perceptual context of an issue and should consider a broader context including social, cultural, economic and political backgrounds.

Another finding is that perception of harmful impacts of air pollution on human health and environment are related to each other. These are in line with some researches explained interaction between humans and environment (Mikler, 2007; Altman, Rapoport, & Wholwill, 1980). Combined harmful impacts of air pollution on human and environment could be effective on addressing air pollution as an environmental issue. It is a mean for policy makers encouraging people to mitigate air pollution and provoke their intention to react against air pollution.

Results show that under local framing participants perceived more pollution in current situation and anticipate more pollution for future. It is contrary to our assumption and previous findings that air pollution considered psychologically distant. Personally relevant of air pollution might be the reason why local framing makes better perception. As air pollution becomes personally relevant it will be a part of daily lives of people, so people witness its impacts and as a result their perception provoke. The other possible reason is the level of satisfaction from local area. DeGroot et al. (1966) suggested that the level of satisfaction from local area plays a role in attributing high level of air pollution to the area (Degroot, Loring, Rihm Jr, Samuels, & Winkelstein Jr, 1966). Beside there was found no impact of distant framing on attitude change towards air pollution mitigation. Distant frames may target air pollution mitigation rather than emphasizing on personal benefits which might be the reason for changing attitude. This might elucidate absence of differences between local and distant frames.

The other finding of this study is effect of outcome frame on how individuals confronting air pollution. Although there were not significant differences between gain and loss frame but in some cases as authors predicted gain had more influence on perception of detrimental impacts of air pollution on human and environment. Despite expecting that loss is more efficient in perception of a phenomenon (Mikler, 2007) results show gain frame can be better than loss in air pollution perception. Hence, gain frame can be applied in communicating air pollution issue to people. Overall gain frame is somehow more effective

than loss frame and considering interaction between psychological distance and outcome frame may not be useful in influencing individual's behaviour change.
What more important in this study is effect of environmental condition on behaviour of individuals towards air pollution. At any level, perception of current air pollution situation and its effects on health and environment are better motivator of inclination to action (inform relatives). None of the two frame manipulations, i.e. psychological distance and outcome framing, had any effect on willingness to inform others. It is possible that the frames lead to more complexity.
Interestingly, there were no differences between evaluation of personal and social impacts on air pollution severity under combined frames. It is an appropriate argument for future research to examine the role of personal benefits in communicating air pollution mitigation.
Results demonstrate that albeit individuals are aware of air pollution and its consequences their tendency towards informing about air pollution is not influenced by each type of frame. Like another items, the factor that has more impact on individuals is negative consequences on their surrounding environment. Although individuals realise the worse situation of air pollution but change aversion lead them to status quo bias which is preference for the current situation that biases people against any action (Ittelson, Proshansky, Rivlin, & Winkel, 1974; Leiserowitz , 2005).

Conclusion

Presenting information of air pollution problem with frame practice can affect people's perception of this problem and change their attitude toward air pollution. The main result of this study was the advantages of gain frame against loss frame, and local frame against distant frame, specifically for their contribution to air pollution phenomena. According to the prospect theory, deterrent behaviour is considered as a low risk behaviour which is in the gain area. So communicating with gain frame would be more effective in prevention of air pollution. Furthermore people were aware of the harmful effects of air pollution on human health and the environment and admitted their role on air pollution increase. Also they don't believe in the mitigation of air pollution in the future. Furthermore they have little tendency to inform about air pollution and its consequences compared to other questions. Finally it could be noticed that frame effects on perception of individuals more than that make them to action.
This study is a first step for promising researches communicating air pollution mitigation under application of psychological framing. In developing countries like Iran environmental challenges are not in top priority. Many external factors should be taken into account. Hence, socio-cultural backgrounds of society should be considered in any research communicating an environmental issues, in this case air pollution, alongside the level of satisfaction from authorities. An upcoming research could examine how framing effects turn into actual behaviour.

Appendix
Appendix 1: frame information

frame	Information extracts
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 and dams and …). By mitigating of air pollution the amount of greenhouse gases will decrease. Greenhouse gases reduction prevents the global warming.
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 and dams and …) Without mitigating of air pollution the amount of greenhouse gases will increase. By increase of greenhouse gases we will see global warming.
Distant	A total economic loss of air pollution in Shanghai, Guangzhou and Xi'an (metropolises in China), China are estimated around 1.08 billion USD in 2012. In 2011 Beijing enjoyed 285 days of blue sky, the amount reduced to 179 days in 2013. 10000 people die prematurely in Beijing, China each year because of outdoor air pollution.
Local	A total economic loss of air pollution in Tehran is estimated around 7 billion USD annually. In 2011 Tehran enjoyed 217 days of blue sky, the amount reduced to 147 days in 2012. 10000 people die prematurely in Tehran each year because of outdoor air pollution.

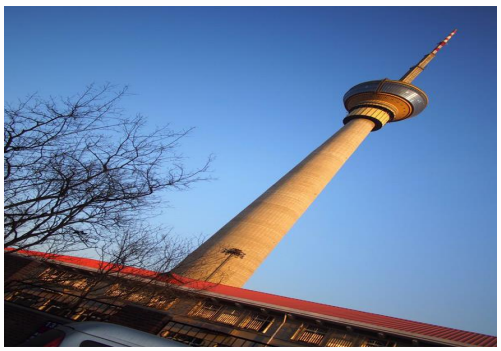
Appendix 2: Pictures used in frame

1- *Loss – local*


2- *Gain – local*


3- *Loss – distant*


4- *Gain - distant*

Appendix 3: Questions

question	scale
How do you feel about present air quality of Tehran?	much good – much bad
What is your prediction of air quality of Tehran?	much better – much worse
In your opinion, to what extent air pollution impacts on human health?	very much - it has no impact
In your opinion, to what extent air pollution impacts on environment?	very much - it has no impact
As a member of society, how much do members of society play a role in air pollution rate?	very much - very little
In your opinion, how much do citizens of Tehran play a role in air pollution rate?	very much - very little
How much would you like to inform your relations and acquaintance about the current situation of air pollution and its consequences?	very much - very little

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