

# *The Impact of Gender Differences and Two Event-Frames in English News Reports on Chinese Non-native English Learners' Emotions to Climate Change*

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**Abstract:** News organizations increasingly use event-frames to convey the urgency of climate change; yet, little is known about how different event-frames in English news reports affect Chinese Non-native English learners' emotions to climate change with taking gender differences into consideration. Taking some English news reports on climate change from *China Daily* as corpus, this study analyses how using different event-frames to communicate messages about climate change to Chinese non-native English readers. Meanwhile, this study experimentally examines how event-frames of the news reports (i.e., on climate impacts, actions) influence Chinese non-native English learners' emotions, as well as whether the effects depend on gender differences. Results showed that both different event-frames and gender differences have significant influence on Chinese non-native English learners' emotions. News reports on climate impacts can elicit more fear and more anger for Chinese non-native English learners but less hope compared to news reports on climate actions. As for Chinese non-native English learners, emotion at "fear" and "hope" level has no significant gender differences, while emotion at "anger" level has significant gender differences. Moreover, event-frames and gender differences have a disordinal interaction effect.

## 1. Introduction

With the 26th United Nations Climate Change Conference to be held, climate change has gone from a troubling environmental problem to a life-threatening emergency. Media at home and abroad have paid much attention to climate change. Wilson (2000) put forward that news reports are the main source for readers to get information on climate change, thus it makes sense to study how news reports communicate climate change information to readers, because the way news reports used to convey information can affect readers' emotions.

Framing was important in terms of how a message was shared and how it was received (Taylor, 2009), which had been applied into text or content analysis by many scholars (e.g., Hu Zhejun, 2018). However, few scholars pay attention to information exposure with different media forms, which has different influences on readers (e.g., Chang Bo, 2019). Zhang Hui (2021) discussed the

analysis from the point of language acceptance fixed this gap. While most scholars were accustomed to taking native readers as subjects, like Hart (2018) had proved the effect of event-frames. In fact, bilingual speakers frequently report experiencing greater emotional resonance in their first language compared to their second (Caldwell-Harris & Ayçiçeği-Dinn, 2009). Whether the impact of different event-frames can be analysed from the perspective of Chinese non-native English learners?

Based on present studies, the most significant factor in affecting native English learners' emotions is whether news reports focus on climate impacts or climate actions (Feldman & Hart, 2021). One experimental study has found that news stories that emphasize actions to address climate change increase hope and intentions to engage in climate activism, compared to stories that only focused on the negative impacts of climate change (Feldman & Hart 2016, 2018; Hart & Feldman 2016a, 2016b). However, whether news reports that focus on climate impacts and climate solutions can affect the non-native English learners' emotions?

Gender research on climate change was a new issue that had been gradually concerned by multiple disciplines at home and abroad in recent years. As for environmental concern, women expressed more concern than do men about local environmental problems (Blocker & Eckberg, 1997). Gender was a dynamic process that consequently shapes mediation of climate impacts (Lama, Hamza, & Wester, 2021). Whether gender difference in emotions to climate change by reading different news reports with different event-frames?

Based on prior studies, taking gender difference into consideration to study Chinese non-English learners' emotions to news report on climate change is very significant. Under the stimulation of China Daily English news reports, the aim is to explore whether and how different event-frames and gender differences can affect Chinese non-native English learners' emotions. Several hypotheses are put forward.

Hypothesis 1: English news reports on climate-related impacts and actions have an influence on non-native English learners' emotions.

Hypothesis 2: News stories about climate impacts will elicit more fear but less hope compared to news stories about climate actions.

Hypothesis 3: Gender differences are in Chinese non-native English learners' emotions to reading different news reports with different event-frames.

Hypothesis 4: English news reports on impacts of climate change will elicit more fear for Chinese female non-native English learners, but more anger for Chinese male non-native English learners.

Hypothesis 5: English news reports on impacts of climate change will elicit more anger for Chinese male non-native English learners.

Hypothesis 6: English news reports on actions to fight against climate change will elicit more hope for Chinese female non-native English learners than for Chinese male non-native English learners.

Hypothesis 7: Different news reports on climate change with different event -frames and gender difference together affect Chinese non-native English learners' emotions.

From the perspective of non-native English readers, this study puts gender differences into consideration to enrich and expand researches on news reports based on event-frames focusing on impacts or actions. In practice, this study aims to make constructive suggestions for English news media to adopt more effective ways to communicate climate change information to Chinese non-native English learners, through analysing the ordinal interaction effect between different event-frames and gender differences.

## 2. Theoretical Framework

Based on a cognitive linguistic framework, alternative grammatical constructions can be seen as indexing and invoking alternative event-frames (Talmy 2000). An event frame is defined by Talmy (2000; Hart, 2016) as “a set of conceptual elements and interrelationships that are evoked together or co-evoked each other” in order to provide coherence and organization to a scene and to distinguish it from other types of scene. As for a one-sided action event frame, there is a unidirectional transfer of energy from an AGENT (A) to a PATIENT (P) (Hart, 2016). In such a conceptualization, the AGENT (A) is the sole source of energy in the interaction and the construction of the AGENT (A) will affect the PATIENT’s cognition and acceptance to event-frames. The contrasting event-frames are modelled in Figure 1.

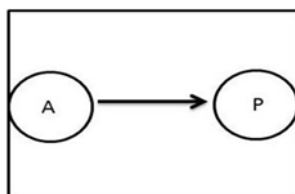


Figure 1: One-sided action event frame

When reporting an event, media may prefer to use one-sided action event frame on purpose to affect readers’ perception. Based on the one-side action event frame, this study constructed a research model as shown in Figure 2. In terms of news reports on climate change, news reports focusing on impacts and solutions are referred to as AGENTS (A1) and AGENTS (A2) and Chinese male non-English learners’ emotions and Chinese female non-English learners’ emotions are referred to as PATIENTS (P1) and PATIENTS (P2). In these event-frames, the construction of the different event-frames of news reports will affect Chinese non-English learners’ emotions to different event-frames with taking gender difference into consideration.

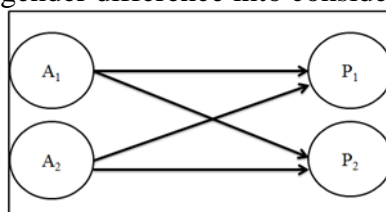


Figure 2: Study Model

## 3. Methodology

When it comes to research instrument, questionnaire survey was adopted to investigate Chinese non-native English readers. According to the way of measuring audience emotions and support for climate mitigation policies designed by Feldman and Hart (2018), the new questionnaire was revised and included two parts: The first part is demographic variables with three questions; The second part is some extracts of news reports on climate change including eight terms evaluated with three emotional level including “1=fear”, “2=hope”, and “3=anger”. *China Daily*, with a daily circulation of more than 300,000 copies on average and one-third of which circulate abroad over 15 countries and regions (*ChinaDaily.com*, 2007), is the largest English-language newspaper published in China that targets primarily non-native English readers. Therefore, news reports corpus were all extracted from *China Daily* in English including four news reports focusing on actions and four news reports focusing on impacts. News reports with different event-frames were arranged out of order. SPASS and Excel were used to carry out two-way ANOVAs mixed analysis.

The study utilized a 2 (type of event-frames: focusing on actions to deal with climate change only, focusing on impacts of climate change only)  $\times$  2 (gender: men, women) fixed design. The experimental news stimulus was embedded within a questionnaire which was distributed on the network survey platform. After filling in the demographic information, participants were instructed to read news reports on climate change carefully, each of which was followed by a survey that measured their emotional reactions to news reports with different event-frames. In order to promote the quality of data, each news report was followed by one reading test question. Data would be considered valid only if participants chose the right answer of reading test question.

Before two-way ANOVAs mixed analysis, there are three null hypotheses.

Null hypothesis 1: Event-frames have no main effect on Chinese non-native English learners' emotion.

Null hypothesis 2: Gender differences have no main effect on Chinese non-native English learners' emotion.

Null hypothesis 3: Event-frames and gender differences have no interaction effect on Chinese non-native English learners' emotion.

## 4. Result Analysis

### 4.1. Demographic Statistical Analysis

The first part is demographic statistical analysis. A total of 150 Chinese non-native English readers participated in this survey, of which 120 Chinese non-native English readers (60 men and 60 women) answered the survey effectively with total effective rates being 80%). Survey results show that most of (87.5%) Chinese non-native English readers think that climate change is a serious problem that needs to be addressed. Lots of (97.5%) readers get access to climate change information through news reports in New Media Age.

### 4.2. Effects of Event-Frames and Gender on Emotions

There are two independents (event-frames and gender differences) and one dependent (Chinese non-native English learners' emotions). Based on result analysis shown in the following Tables, above three null hypotheses are false. Firstly, as repeat measurement variables within subjects in Table 1, different event-frames have significant main effect on Chinese non-native English learners' emotions ( $F=268.569$ ,  $df=(1, 475)$ ,  $Sig.=0.000$ ), which proves that hypothesis 1 is reasonable. Furthermore, at different emotional levels in Table 2, the effects of event-frames are significantly differences ("Fear" ( $F=50.667$ ,  $Sig.=0.000$ ); "Hope" ( $F=15.507$ ,  $Sig.=0.000$ ); "Anger" ( $F=209.973$ ,  $Sig.=0.000$ )). As can be seen in Table 3, hope is significantly lower in the impacts condition than in the actions conditions. Fear is significantly lower in the actions condition than in the impacts conditions. Anger in both actions conditions and impacts conditions has no obvious differences. Therefore, hypothesis 2 has been proved reasonable.

Secondly, event-frames and gender differences have significant interaction effect on Chinese non-native English learners' emotion ( $F=13.360$ ,  $df=(1, 475)$ ,  $Sig.=0.000$ ). Gender variables may have different impacts on different levels of the event-frames, or there may have significant gender differences in Chinese non-native English learners' emotions after reading different news reports focusing on climate change impacts or climate change actions. Thus, Different news reports on climate change with different event-frames and gender difference together affect Chinese non-native English learners' emotions, which explain that hypothesis 7 exist reasonably.

Table 1: Tests of Within-Subjects Contrasts

Source	df	F	Sig.
Event-Frames	1	268.569	0.000
Event-Frames*	1	13.360	0.000
Gender Differences			
Error(Event-Frames)	475		

Table 2: Test Effects of Event-frames on Different Levels of Emotions

	Event-Frames	F	Sig.(2-tailed)
Fear	Focusing on actions	50.667	0.000
	Focusing on impacts		
Hope	Focusing on actions	15.507	0.000
	Focusing on impacts		
Anger	Focusing on actions	209.973	0.000
	Focusing on impacts		

Thirdly, as a variable between subjects in Table 3, gender differences have significant main effect on Chinese non-native English learners' emotions ( $F=10.023$   $df=(1, 475)$ ,  $Sig.=0.002$ ), which verifies that hypothesis 3 is reasonable. Moreover, as for the effects of gender on "fear" ( $F=30.039$ ,  $Sig.(2-tailed)=0.829$ ) or "hope" ( $F=13.076$ ,  $Sig. (2-tailed)= 0.089$ ) level of Chinese non-native English learners' emotions have no significant differences between men and women; the effects of gender on "anger" ( $F=32.886$ ,  $Sig.=0.000$ ) level of Chinese non-native English learners' emotions are significantly differences between men and women (Table 4). It is found that there is no gender difference existing in Chinese non-native English learners' emotions after reading news reports on climate change, which cannot verify reasonableness of hypothesis 4 and hypothesis 6. Compared with men, women have less anger (Hypothesis 5) after reading English news reports on climate change.

Table 3: Tests of Between-Subjects Effects

Source	df	F	Sig.
Intercept	1	9451.134	0.000
Gender Differences	1	10.023	0.002
Error	475		

Table 4: Test Effects of Gender on Different Levels of Emotions

	Gender	Mean	F	Sig.(2-tailed)
Fear	men	0.788	30.039	0.829
	women	0.797		
Hope	men	2.083	13.076	0.089
	women	2.219		
Anger	men	0.513	32.886	0.005
	women	0.253		

### 4.3. Interactions between Even Frames and Gender Difference

Due to the significant interaction between event-frames and gender differences, simple effect test of event-frames and gender interaction needs to be carried out aiming to find out gender differences in which type of event-frames. Before simple effect test, ordinal interactions and disordinal interactions are identified. As shown in figure 3, the horizontal axis is event-frames including event-frame 1 representing news reports focusing on actions and event-frame 2 representing news reports focusing on impacts. Two straight lines refer to different genders (gender 1: men; gender 2: women). Two lines have an intersection at the level 1 of event-frame, which indicates that there is disordinal

interaction between event-frames and gender. Gender differences at event-frames2 level are obviously larger than that at event-frames1 level. Moreover, after reading English news reports on impacts of climate change, emotional differences between men and women are significant.

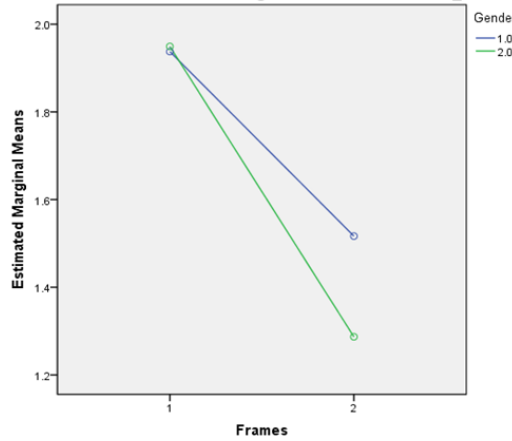


Figure 3: Event-frames\* Gender Differences interactional model

The simple effect test of event-frames and gender includes two steps which are simple effect test for gender differences at different levels of the event-frames and simple effect test for the differences of event-frames at different levels of gender. As a result, it can be found that gender have no simple effect test at the first level of event-frames ( $F(1,475)=0.24$ ;  $Sig.1=0.626$ ) (Table 5), while gender have significantly simple effect test at the second level of event-frames ( $F(1,475)=13.32$ ;  $Sig.2=0.000$ ) (Table 6).

Table 5: Tests Involving “MWTHIN EVENT-FRAMES (1)” Within-subject Effect

Source of Variation	DF	F	Sig if F
WITHIN+RESIDUAL	475		
MWTHIN EVENT-FRAMES(1)	1	25578.46	0.000
GENDER BY MWTHIN EVENT-FRAMES(1)	1	0.24	0.626

EVENT-FRAMES (1): Focusing on actions of dealing with climate change

Table 6: Tests Involving “MWTHIN EVENT-FRAMES (2)” Within-subject Effect

Source of Variation	DF	F	Sig if F
WITHIN+RESIDUAL	475		
MWTHIN EVENT-FRAMES(2)	1	1983.79	0.000
GENDER BY MWTHIN EVENT-FRAMES(2)	1	13.32	0.000

EVENT-FRAMES (2): Focusing on impacts of climate change

Table 7: Tests of between Subjects Effects

Source of Variation	DF	F	Sig if F
WITHIN+RESIDUAL	475		
MWTHIN GENDER(1)	1	5070.25	0.000
MWTHIN GENDER(2)	1	4395.15	0.000

GENDER (1): Women; GENDER (2): Men

Table 8: Tests Involving “EVENT-FRAMES” Within-subject Effect

Source of Variation	DF	F	Sig if F
WITHIN+RESIDUAL	475		
MWITHIN GENDER(1) BY EVENT-FRAMES	1	81.58	0.000
MWITHIN GENDER(2) EVENT-FRAMES	1	199.61	0.000

GENDER (1): Women; GENDER (2): Men

Meanwhile, different event-frames at different levels of gender have significantly simple effect test. It is found that event-frames at both levels of gender have significant simple effect ( $F_1(1,475)=81.58$ ,  $\text{Sig.}_1=0.000$ ;  $F_2(1,475)=199.61$ ;  $\text{Sig.}_2=0.000$ ) (Table 7 and Table 8). Moreover, whether men or women, they have significantly emotional differences after reading news reports with different event-frames.

## 5. Discussion

This study has examined whether the effect of gender differences in the context of *China Daily* English news reports that focused on either climate change impacts or actions by taking Chinese non-native English readers as subjects. Results showed that different event-frames and gender differences both have a significant influence on Chinese non-native English learners' emotions and event-frames have an obvious disordinal interaction effect on gender differences. Overall, the results of the study offered mixed support for the proposed hypotheses.

In the initial two-way ANOVAs mixed analysis, both different event-frames and gender differences have a significant influence on Chinese non-native English learners' emotions, which breaks the previous limitations of studying event-frames from text and content analysis (Hu Zhejun, 2018) and expands the way to study the impact of event-frames from the perspective of readers, coupled with gender factors. It is more likely that the present study makes a supplement for previous studies only focusing on the effects of different event-frames on native English learners' emotions (e.g., Laongpol, 2021) and gender differences in the climate change debate (e.g., Holmberg and Hellsten, 2015) or in adopting climate change adaptation measures (e.g., Jin et al., 2015). After further analysis of the influence of event-frames, the present study also found that news stories discussing actions that can be taken to address climate change significantly increased hope, while news stories about impacts can increase Chinese non-native English learners' fear and anger, which is correspond with existed results (Feldman & Hart 2016, 2018; Hart & Feldman 2016a, 2016b). Looking to the effects of gender differences, compared with Chinese females non-native English learners, male learners can be inspired significantly more anger when reading news reports on impacts of climate change. It is very likely that in the face of the impacts brought by climate change, the emotions of men are more radical than those of women. The analysis did not reveal any evidence that emotion at “fear” and “hope” level has no significant gender differences, which departs from the previous studies considering that women are more likely to use more positive and less powerful emotions than those most common to men (Lively, 2008). As a global problem life-threatening emergency, climate change has attracted widespread attention, let alone Chinese non-native English learners both men and women who increase fear to climate change. With more and more positive actions taken at home and abroad reported by *China Daily*, Chinese non-native English learners both men and women are hopeful to fight against climate change. These findings about gender differences have no evidence to support that women consistently expressed more concern than do men when facing with measures of general climate change (Blocker & Eckberg 1997). It also found that different levels of event-frames, the main effect factor, were also

interacted with different levels of gender to affect emotions, both of which have significant simple effects.

Taken together, the findings from this study indicate that different event-frames and gender differences have significant disordinal interaction effect on Chinese non-native English learners. The effects are specifically manifested that news reports focusing on actions that can be taken to address climate change have the potential to promote emotional level. At the same time, the findings of this study indicated that news reports paying attention to impacts brought by climate change could have a boomerang effect on emotion, eliciting more anger for men than women.

## 6. Conclusion

Although this study has discussed the effects of event-frames on emotions by taking gender differences into account from Chinese non-native English learners, there are still some limitations that should be kept in mind as with any study. Owing to experimental news reports in English, it is also possible that the effects of gender differences on emotions varies depending on Chinese non-native English learners' English language ability, which this study did not exclude this factor though designing reading test questions to make sure the quality of data. Future studies may be able to use some technical software to eliminate irrelevant variables to increase the persuasiveness of experimental data. Meanwhile, at "fear" and "hope" level, there is no significant gender difference, recent studies suggest that larger sample sizes than what are indicated by G\*Power may be required to estimate effects of some factors (Gelman et al., 2020); thus, this study may have been under-powered to detect effects of gender difference on emotions. It is hopefully to expand the sample size to test the cumulative effect of gender differences on Chinese non-native English learners' emotions. In terms of news stimuli, just limited number of news reports with typical event-frames that focus on actions or impacts of climate change are selected from China Daily. Given the limited of the news stimuli, the language cues may have been too subtle to produce sizable effects. It is possible for future study to expand the news stimuli.

In a nutshell, from a practical perspective, results suggest that journalists and climate communicators in China should be preoccupied with different event-frames and gender differences, given that different event-frames have significant interaction effects with gender differences in response to English news reports that strongly impacts on Chinese non-native English learners' emotions. Reassuringly, when media transmit negative impacts of climate change, gender as an effect factor to increase anger for Chinese non-native English learners should not be ignorable and event-frames significantly affecting emotions are needed to choose carefully by English media to express actions or impacts of climate change. At the same time, the results reinforce and extend findings from previous research (e.g., Feldman and Hart 2018; Hart and Feldman 2016a) that point to the emotional benefits of considering event-frames about actions or solutions and gender differences in climate change communication.

## References

- [1] Wilson, K. M. (2000). *Drought, debate, and uncertainty: measuring reporters' knowledge and ignorance about climate change*. *Public Understanding of Science*, 9(1),1.
- [2] Taylor, M. (2009). *Framing climate change: how we lost 20 years on climate change action*. *Chemistry in Australia*, 76(11), 24-27.
- [3] Hu Zhejun. (2018). *Framework of Climate Change Reports: A Comparative Study of Chinese, American and British Newspapers*, South Central University for Nationalities.
- [4] Chang Bo. (2019). *The Effect of Message Framing of Climate Change on Public Risk Perception and Behavior Intention*, Nan Jing University.



- [5] Zhang Hui. (2021). *Critical Cognitive Linguistics: An Analytical Perceptive from Language Comprehension and Reception-Revisiting the Theoretical Construction of Critical Cognitive Linguistics*. *Foreign and Foreign Teaching*, (03):31-43+147-148.
- [6] Hart, C. (2018). *Event-frames affect blame assignment and perception of aggression in discourse on political protests: An experimental case study in critical discourse analysis*. *Applied Linguistics*, 39(3), 400-421.
- [7] Caldwell-Harris, C. L., & Ayçiçeği-Dinn, A. (2009). *Emotion and lying in a non-native language*. *International Journal of Psychophysiology*, 71(3), 193-204.
- [8] Feldman, L., & Hart, P. (2021). *Upping the ante? The effects of “emergency” and “crisis” framing in climate change news*. *Climatic Change*, 169(1), 1-20.
- [9] Feldman, L., & Hart, P. S. (2016). *Using political efficacy messages to increase climate activism: The mediating role of emotions*. *Science Communication*, 38(1), 99-127.
- [10] Feldman, L., & Hart, P. S. (2018). *Is there any hope? How climate change news imagery and text influence audience emotions and support for climate mitigation policies*. *Risk Analysis*, 38(3), 585-602.
- [11] Hart, P. S., & Feldman, L. (2016a). *The impact of climate change-related imagery and text on public opinion and behavior change*. *Science Communication*, 38(4), 415-441.
- [12] Hart, P. S., & Feldman, L. (2016b). *The influence of climate change efficacy messages and efficacy beliefs on intended political participation*. *PloS one*, 11(8), e0157658.
- [13] Blocker, T. J., & Eckberg, D. L. (1997). *Gender and environmentalism*. *Social Science Quarterly*, 78, 841–858.
- [14] Lama, P., Hamza, M., & Wester, M. (2021). *Gendered dimensions of migration in relation to climate change*. *Climate and Development*, 13(4), 326-336.
- [15] Talmy, L. (2000). *Toward a cognitive semantics (Vol. 2)*. MIT press.
- [16] ChinaDaily.com. (2007). *About the China Daily*. Retrieved June 29, 2022, from [http://www.china-daily.com.cn/cd/2007-06/12/content\\_892204.htm](http://www.china-daily.com.cn/cd/2007-06/12/content_892204.htm).
- [17] Laongpol, J. (2021). *A Contrastive Study on Rhetoric in COVID-19-Related News Headlines from Native and Non-Native English Online Newspapers*. *3L: Language, Linguistics, Literature®*, 27(1).
- [18] Holmberg, K., & Hellsten, I. (2015). *Gender differences in the climate change communication on Twitter*. *Internet Research*.
- [19] Jin, J., Wang, X., & Gao, Y. (2015). *Gender differences in farmers' responses to climate change adaptation in Yongqiao District, China*. *Science of the Total Environment*, 538, 942-948.
- [20] Lively, K. (2008). *Emotional segues and the management of emotion by women and men*. *Social forces*, 87(2), 911-936.
- [21] Blocker, T. J., & Eckberg, D. L. (1997). *Gender and environmentalism*. *Social Science Quarterly*, 78, 841–858.
- [22] Gelman, A., Hill, J., & Vehtari, A. (2020). *Regression and other stories*. Cambridge University Press.