Questions as a Pre-event, Pivot Event and Post-event of Emotions

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Abstract

This paper examines the use of information-seeking questions and rhetorical questions in terms of event structures of emotion. An emotion is treated as a pivot event that links the emotion-inducing event (i.e. pre-event) and the event induced by emotion (i.e. post-event). We investigate the role information-seeking questions and rhetorical questions play in the three sub-events. Results show that the overall distributions of the two types of questions used to mark the three sub-events are rather similar. This indicates that both types of questions play an equally important role in emotion expressions. It is found that more than a half (55.6%) of emotion-related questions are used to express emotions, approximately one-third of the questions (36.3%) are used to describe pre-events and the remaining 8.1% are the post-events of emotions. Various linguistic features of pre-events, pivot events and post-events of different emotions are proposed for emotion identification. We believe that this linguistic account of questions in emotion expressions will provide a clearer picture of the nature of emotion, and add rich dimensions to emotion analysis.

1   Introduction

Emotion, be it positive or negative, is a way that individuals interact with the others. Emotion can be communicated by means of words, facial expressions, or bodily reactions etc. In this study, we study emotions in text, with the major focus being placed on a particular clause type – question. Questions can mainly be classified into two types, namely information-seeking questions (IQs) and rhetorical questions (RQs). Information-seeking questions, as suggested by its name, generally aim to make a request for information or for an answer, while rhetorical questions, expecting no answer, aim to achieve a pragmatic goal, such as to emphasize, to persuade, to show emotions etc. (Frank 1990; Roberts and Kreuz 1994). Previous research on the interactions between questions and emotions has extensively focused on rhetorical questions as they usually convey a more complicated meaning that goes beyond the literal. Little work has been done on the correlation between information-seeking questions and emotions. In an attempt to explore whether or not information-seeking questions do play no part in emotion expressions, this paper offers a linguistic account of the use of information-seeking questions and rhetorical questions in expressing emotions using an event-based approach. We take the position that emotion is a pivot event that interacts with its associated events, namely pre-events (i.e. emotion causes), and post events (i.e. reactions to emotion) (Lee et al. 2012). This paper aims to address the following questions:

1) How frequently are information-seeking questions and rhetorical questions used in the three sub-events of emotion?
2) Which position do the subevents introduced by questions often occur in an emotion expression?
3) Do emotions have different preferences for a particular question type over the other one?

4) How do the three sub-events of different emotions being represented by questions?

2 Related Work

2.1 Emotion and the Associated Events

Emotion is a cognitive state that induces bodily reactions to the perceived external stimuli (Cannon 1927). As such, emotion is a pivot event that interacts with its associated events, namely pre-events (i.e. emotion causes), and post events (i.e. reactions to emotion). Most emotion theories regard the recognition of emotion cause as an integral part of emotion elicitation (James 1884; Plutchik 1980; Wierzbicka 1999). Lee et al. (2010) constructed a Chinese emotion-cause annotated corpus for the purpose of extracting emotion causes. They identified seven groups of linguistic cues and two set of linguistic rules that can be used for emotion cause detection. Based on the linguistic rules proposed, Lee et al. (2012) developed a rule-based system for the detection of emotion cause. Drawing from the insight of Lee et al. (2010, 2012), a couple of studies (Gui et al. 2014; Li and Xu 2014; Gao et al. 2015) extended the rule based method for the detection in informal text.

Lee et al. (2013, 2014) constructed another Chinese event-based emotion corpus with both pre-events and post-events annotated. They suggested that there are significant interactions between emotions and pre-events as well as that of between emotions and post-events.

2.2 The Interaction between Questions and Emotions

Information-seeking questions are typically used to elicit an answer, while rhetorical questions are used to make a statement without expecting a direct answer. With regard to the relation between questions and emotions, previous research has extensively focused on rhetorical questions and only a few studies have been done on investigating information-seeking questions. Quan et al. (2010) analyzed emotion expressions in Chinese at sentence level. They suggested that sentences without the presence of negation marker, conjunction or question mark do not convey any emotions if they do not contain any emotional words, while sentences with the presence of the

three items do express emotions even if they do not contain any emotional words. They indicated that questions (including both information-seeking questions and rhetorical questions) can be used to express any emotions, in particular the *anxiety* emotion. Lau and Lee (2018) explored the interaction between emotions and both types of questions in social media. They illustrated that approximately 23% of information-seeking questions are associated with emotions, whereas 94% of rhetorical questions are used to express emotions. It reflects the important role rhetorical questions play in emotion expressions in social media.

With regard to rhetorical questions, they are considered an effective persuasive device (Petty, 1981; Frank, 1990). As a form of figurative language, rhetorical questions are often studied in a more general way. Previous studies indicated that figurative language is commonly used to express emotions (Kövecses, 1990, 2003; Lakoff and Johnson, 1980; Fussell and Moss, 1998; Gibbs et al., 2002), especially the intense ones (Fainsilber and Ortony, 1987; Fussell, 1992). The frequent use of figurative language for emotion expressions can partly be due to "the subjective nature of emotional experiences appears to lend itself to figurative expression" (Fussell and Moss, 1998: 113). Roberts and Kreuz (1994) examined the discourse goals of eight types of figurative devices, namely hyperbole, idiom, indirect request, irony, understatement, metaphor, rhetorical question, and simile. They suggested that rhetorical questions are used to express both positive and negative emotions, with the latter being more frequent. Leggitt and Gibbs (2000) investigated people's emotion reactions to different figurative devices. They showed that rhetorical questions are used to alert or challenge addressee's problem or behavior. Therefore, rhetorical questions are prone to evoke negative emotions, such as *anger*, *disgust*, and *contempt*. In addition, speakers of rhetorical questions appear to feel more negative emotions than that of other figurative devices. Rhetorical questions are also perceived as having very negative intent. Lee (2017) suggested that there is a close interaction between figurative language and emotion. She found that about one-third of the social media posts contain figurative devices, among which rhetorical questions are the most frequently used one (37%). She also illustrated that

rhetorical questions are particularly productive in evoking negative emotions, i.e. *sadness* and *anger*. Drawing from the insight of Lee (2017), Lau and Lee (2018) further explored the use of rhetorical questions in emotion expressions. Various linguistic cues and syntactic structures are proposed for the identification of five different emotions, namely *happiness*, *sadness*, *anger*, *fear*, and *surprise*.

3 Corpus Data

3.1 Dataset

In this study, an existing event-based emotion corpus was utilized (Lee et al. 2014). The dataset of the event-based emotion corpus was retrieved from the Sinica Corpus which is a tagged balanced corpus of Mandarin Chinese containing ten million words. Lee et al. (2014) extracted 8,973 instances of sentences from the Sinica Corpus by keyword matching based on the list of 91 Chinese primary emotion keywords identified in Chen et al. (2009). Each instance consists of 3 parts, namely the "<FocusSentence>" (i.e. the sentence that contains an emotion keyword), the "<PrefixSentence>" (i.e. the sentence before the focus sentence) and the "<SuffixSentence>" (i.e. the sentence after the focus sentence). The emotion keyword(s) of each instance is indicated as <emo id=0> X </emo>, with its pre-event and post-event being manually annotated as well.

As we observed that some of the questions were not concerned with the identified emotion, we randomly selected 300 instances that contain at least one emotion-related question in one of the three sentences (i.e. prefix, focus, or suffix sentence) for the question and event annotation.

3.2 Question Annotation

Drawing from the insight of Lee (2017), Lau and Lee (2018) categorized questions into 14 subtypes, including A-not-A, echo, particle, *wh*-question and so on. Following Lau and Lee (2018), we also classify questions into those 14 proposed subtypes, among which 8 of them are closed questions, 5 are open questions, and 1 is "series of questions".

Aiming to elicit an open-ended answer, open class questions refer to question with *wh*-words, such as *how*, *what*, *why* etc. As for close class questions, they refer to questions represented in the form of A-not-A, alternative, echo, particle, or other question words that require a pre-determined answer. According to Li and Thompson (1981), A-not-A questions are formed with an affirmative and its negative counterpart juxtaposed, and either the affirmative or its negative counterpart can be chosen as the answer, as in (1).

(1) 你想不想去日本？
    (Do you want to go to Japan?)

Alternative questions directly provide two or more possible options for respondent(s), and the options are mostly connected by 還是 (or), as in (2).

(2) 你想去日本還是韓國？
    (Do you want to go to Japan or Korea?)

Echo questions have the form of a declarative sentence but end with a question mark in the written form. Particle questions refer to questions that end with a sentence-final particle, such as 嗎, 呢 and 吧. As for the *others* category, we grouped the question words that are used to pose questions such as 難道, 何必, 豈 etc.

3.3 Event Annotation

In this study, emotion is regarded as a pivot event linking the events inducing emotion (i.e. pre-events), and induced by emotion (i.e. post-events). For each identified question, we manually classified them into one of the three events. Since the 300 instances extracted from the event-based emotion corpus were annotated with pre-events and post-events, we annotate the event types of the questions based on the original tags. As only the immediate pre-events and post-events that are closest to the emotion keywords were annotated in the corpus, we may expand the event boundary. Consider (3) - (5).

(3) 徐姐對選舉十分反感，{{說：做這些花式子幹嘛？}}
    (Xu Jie is totally disgusted with the election, and she {{said, "What's the point of using these ploys?"}})

(4) 母親，她暗暗心想，親愛美好的母親，你
　　為什麼不好心一點，快快死去呢？她被[[自
　　己的想法]]嚇了一跳

(Mom, she thought inwardly, dear wonderful
mom, why don't you do me a kindness and die
quickly? She was shocked by [[her own
thoughts]])

(5) …怎不令人痛心惋惜？
　　(…How can one not being sad?)

In (3) and (4), the pre-event and post-event
originally tagged in the event-based emotion
corpus are marked with "[[…]]" and "{{…}}",
respectively. In (3), the question occurs within the
event boundary, and is therefore annotated as the
post-event of the emotion 生氣 'angry'. As for (4),
although the question is outside the event boundary,
the question is tagged as the pre-event in this study
as the original annotated pre-event 自己的想法
'one's own thoughts' can be referred to the
previous sentence 你為什麼不好心一點，快快死
去呢 'why don't you do me a kindness and die
quickly'. (3) and (4) show a clear causal relation
between the pre-event and emotion, as well as
between the emotion and post-event. The question
in (5) is obviously used to express the *sadness*
emotion. Instead of using a declarative sentence to
convey *sadness*, the writer in (5) expresses the
emotion by means of a rhetorical question. Thus,
the question is neither annotated as the pre-event,
nor post-event but the pivot event.

4 Corpus Analysis

Of the 300 extracted instances, the number of
emotion identified is 306. This indicates that a
couple of instances contain more than one emotion.
Among the five emotions, *surprise* has the highest
frequency (37.9%), following by *anger* (19.3%),
sadness (19.0%), *fear* (14.4%), and *happiness*
(9.5%).

As for the number of questions, 347 questions
were identified, among which 171 (49.3%) are
information-seeking questions and 176 (50.7%) are
rhetorical questions. Figure 1 shows the
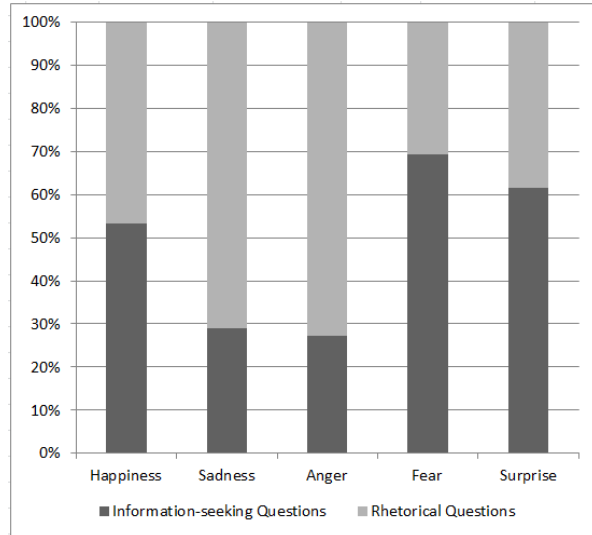distribution of question type per emotion.

Figure 1- Distribution of Question Type per Emotion

Figure 1 is calculated relative to the total
number of posts of a given emotion type. It shows
that different emotions may have different
preferences for a particular question type over the
other one. While information-seeking questions are
more frequently found in the events expressing
happiness, *fear* and *surprise*, rhetorical questions
are more closely associated with events expressing
sadness and *anger*.

In order to explore the frequency of emotion-
related questions functioning as an expression of a
pre-event, pivot event and post-event as well as
their position in an emotion instance, Table 1
shows the distribution of sub-events in terms of the
position.

	Pre-event	Emotion	Post-event
Prefix	10.1%	11.0%	0.3%
Focus	18.4%	26.8%	4.9%
Suffix	7.8%	17.9%	2.9%
Total	36.3%	55.6%	8.1%

Table 1 – Distribution of Emotion-related Questions

From Table 1, we can see that more than a half of
emotion-related questions (55.6%) are used to
express emotions. Approximately one-third of
them are used to introduce emotion causes and
only 8.1 % are used to introduce events induced by
emotions. Emotion-related questions, whatever the
event type, appear most frequently in the focus
sentence of the instance, and least likely in the
prefix sentence. We also notice that pre-events are
more likely to occur in prefix than suffix sentences,

whereas post-events tend to occur in suffix than prefix sentences. This is in line with the assumption that there is a sequential ordering among the sub-events of emotions.

Apart from the distributions of the sub-events introduced by means of questions, we also investigate the distribution of questions in terms of emotion type as shown in Table 2.

Table 2 shows that the overall distributions of rhetorical questions and information-seeking questions used to introduce the three sub-events are rather similar. In relation to the event structure, the major function of both types of questions is to express emotions, with rhetorical questions (30.3%) being little more frequently used than information-seeking questions (25.4%). Similar number of rhetorical questions and information-seeking questions are found to indicate emotion causes (i.e. pre-events), accounting for approximately 18% respectively. As compared to pre-events and emotion expressions, post-events are less likely to be expressed by means of questions, in particular rhetorical questions.

	Rhetorical Question			Information-seeking Question			
	Pre-event	Emotion	Post-event	Pre-event	Emotion	Post-event	Total
Happiness	6.7%	40.0%	0.0%	10.0%	36.7%	6.7%	100%
Sadness	20.3%	47.8%	2.9%	5.8%	21.7%	1.4%	100%
Anger	19.7%	47.0%	6.1%	6.1%	13.6%	7.6%	100%
Fear	13.5%	17.3%	0.0%	23.1%	42.3%	3.8%	100%
Surprise	21.5%	15.4%	1.5%	30.0%	23.8%	7.7%	100%
Total	18.4%	30.3%	2.3%	17.9%	25.4%	5.8%	100%

Table 2 - Distribution of Questions in terms of Emotion Type

		Close Class Question					Open Class Question								
	Series of Q	A-not-A	Alternative	Echo	Particle	Others	How	How many/ much	What	Which	Who	Why	Where	When	Total
Pre-event	21%	3%	1%	13%	10%	6%	7%	0%	5%	0%	2%	32%	1%	0%	**100%**
Emotion	20%	9%	1%	4%	18%	6%	10%	0%	17%	1%	3%	10%	2%	1%	**100%**
Post-event	11%	4%	0%	7%	21%	4%	7%	7%	14%	0%	4%	18%	4%	0%	**100%**

Table 3- Distribution of Question Types in terms of Event Types

Regardless of the question type, far more than a half of the questions of each emotion type are used to express the emotion state, except for *surprise*. Instead, questions related to *surprise* are generally used to indicate the pre-events.

Although the general distributions of both types of questions are similar, rhetorical questions and information-seeking questions do play a different role in the event structures of different emotions. For instance, people tend to use rhetorical questions to introduce the emotion causes that trigger *sadness* and *anger*, while information-seeking questions are used to introduce the pre-events of *happiness*, *fear* and *surprise*. As for post-events, information-seeking questions are generally used to mark the post-events of different emotions, except for *sadness*. It is also observed that the post-events of *anger* are more frequently marked by questions, as compared to the other four emotions.

5 The Use of Questions in Emotion Expressions

In this section, we will explore how emotion-related questions are used in the expressions of different emotions in terms of event structure. Table 3 demonstrates the occurrence of different question types used in the three sub-events of emotion. We will discuss the role questions play in the descriptions of pre-event, emotion state and post-event in the following sub-sections.

5.1 Questions as a Pre-event

Table 3 shows that pre-events are most often reported by means of why questions, a series of questions, and echo questions. As mentioned in the previous section, 36.3% of emotion-related questions are used to describe the pre-events of an emotion, with pre-events of *surprise* (51.5%) being the most frequent one, followed by *fear* (36.5%), *sadness* (26.1%), *anger* (25.8%) and *happiness* (16.7%). It is observed that the pre-events of *surprise* often occur in the focus or suffix sentence, while the pre-events of other emotions mostly occur in the prefix or focus sentence. Among all the 14 question types, why questions are mostly found in the pre-events of *surprise*, and they are often represented in the pattern of "奇怪…怎麼/為什麼 + pre-event", as in (6).

(6) 我也覺得奇怪，為什麼這些天老想吵架？
(I also wonder why I always want to quarrel these days.)

Example (6) shows the pattern which is very commonly used to introduce the cause event of *surprise*. After expressing the emotion keyword 奇怪 'surprise', the pre-event usually appears right after the question word 怎麼/為什麼 'why'.

In addition to why questions, echo questions are occasionally used to form the cause events of *surprise*. Different from the echo questions found in the pre-events of other emotions, echo questions associated with *surprise* are relatively short. It serves as a good way to introduce the pre-events and implicitly express the *surprise* emotion in an expressive way. Moreover, the experiencers usually repeat the questions of what the others just said, as in (7).

(7) 夢女再歎一口氣，在我心靈內道：「我要回家。」我愕然叫了出來：「回家？」
(The girl in the dream sighs again, and says to me, "I want to go home." I scream out, "Go home?")

As for the pre-events of *fear*, they are mostly formed with how questions, why questions and A-not-A questions. While how and why questions can also be found to describe the causes of other emotions, A-not-A questions are unique to the description of the pre-events of *fear*. For example, (8) illustrates that A-not-A is used when one is experiencing the *fear* emotion. The pre-events of *fear* following the A-not-A form are a negative event, such as 我功課不好 'I'm not doing well in school' in (8).

(8) 他會害怕說，是不是我功課不好？
(He will be worried, "Is it that I'm not doing well in school?")

Similar to *surprise*, the pre-events of *anger* are occasionally expressed by why questions. While the why questions of *surprise* mostly introduce the emotion cause in a direct way, the why questions of *anger* are usually preceded by another clause which has a transitional relation with the following question. An example is exemplified in (9).

(9) 「我們也知道公司組織要改才能生存，但是為什麼不問我們的意見？」邱垂境生氣地表示。
("We also understand that the organization of the company needs to be changed in order to survive, but why don't you ask for our opinion?" Qiu chuijing said angrily.)

Pre-events of *sadness* are expressed by a couple of question types with similar numbers of occurrence, including a series of questions, others and why questions etc. Pre-events of *happiness* are not often expressed by questions, and rarely do they appear in the suffix sentence.

5.2 Questions as a Pivot Event

According to Table 3, pivot events (i.e. emotion state) are often expressed by means of a series of questions, particle question, and what questions. As suggested in Table 1, more than a half of the questions of the other four emotions are used to mark the pivot event, except for the case of *surprise*. The tendency of questions of each emotion type serving as a pivot event in descending order range from *happiness* (76.7%), *sadness* (69.6%), *anger* (60.6%), *fear* (59.6%), to *surprise* (39.2%).

For the expression of *happiness*, it is observed that most of the questions may not be regarded as an expression of *happiness* if the contextual

information is not taken into account. Consider (10).

(10) 「戴老師，我是你的忠實讀者，很喜歡你的書…」這小姐很興奮地對我說：「您可不可以幫我簽個名？」
(“Mr. Dai, I'm an avid fan of your books, I really like your books…”. This lady said to me very excitedly, “Can you sign me a name?”)

In (10), the A-not-A question is in fact an expression of *happiness*. However, if the emotion keyword 興奮 'excited' is not present, the question may not be comprehended as a *happiness* expression or a *happiness* expression of such strong intensity. Thus, it would be of value to the implicit emotion identification if one could collect this kind of expressions and study how people use them to convey *happiness* implicitly, or what kinds of events usually trigger *happiness*.

Particle questions are quite commonly used in the expression of *happiness*. We found that the clause 真的嗎 'really?' is quite often used in the expressions of *happiness*. The clause is also found in the expressions of *surprise* with slight different structure. For the expression of *surprise*, the clause sometimes co-occurred with a referential phrase, such as 這 'this', 如此 'that', as in “真的如此嗎？” 'Is that really the case?' Such an expression is rarely, if not never, found in the case of *happiness*. The use of these referential phrases can also be found in the expressions of *surprise* formed with other question types. This may be due to the assumption that the experiencers of *surprise* are more aware of the triggering events.

We notice that the adverb 就 tends to appear in the questions expressing *sadness* than the other emotions. The use of 就 implies the meaning that the situation will turn out to be negative to the speaker, but he/she is not capable of preventing it from happening. Thus, it is oftentimes used to express *sadness*. Consider (11).

(11) 哥哥就要這樣被吃掉嗎？
(Is my brother going to be eaten?)

Besides, questions expressing *sadness* may be formed with rhetorical interrogations, such as 何必,

豈, 難道 etc. Although the connotations of some of these adverbs typically indicate *surprise*, our findings reveal that they may also be used in expressing *sadness*.

As for the *anger* emotion, it is commonly expressed by why questions and a series of questions. The frequent use of a series of questions is in line with Lau and Lee (2018) who suggested that the purpose is to vent one's anger to someone who evokes the emotion. This claim can be further supported by the frequent use of 你 'you' in the questions expressing *anger*. As *anger* is typically elicited by unwanted or harmful circumstances which may motivates aggressive behaviors, we observed that the addressee of the question 你 'you' is more explicitly presented in the questions of *anger* than that of the other four emotions. This may be ascribed to the nature of *anger* that when one is eaten up with *anger*, he may vent his *anger* directly to the one who induces the emotion.

Fear is typically triggered when a person thinks that some bad things are going to happen. Therefore, a number of questions are formed to seek help. For example, some may be represented with 怎麼辦 'what to do', and some may be in the structure of “要 (…) 怎麼/如何”. Others questions may describe the bad things that the speaker thinks might happen though he does not want it to happen in that way. These questions may appear in the patterns of “可不/ 豈不/不就…” as in (12).

(12) 我那堆心愛的寶貝不就被燒成烤雞了嗎？
(Wouldn't the bunch of my beloved babies be burnt into roasted chickens?)

5.3 Questions as a Post-event

From Table 1, we can see that post-events are less likely to be introduced by questions as compared to the other sub-events. If the questions do describe the post-events, particle questions and why questions would be the speakers' preferred options as shown in Table 3. Of the questions introducing post-events, questions of *anger* (13.6%) have the highest frequency, followed by *surprise* (9.2%), *happiness* (6.7%), *sadness* (4.3%) and *fear* (3.8%).

With the limited number of instances containing the post-events of emotions, we realize that the use of words describing the action of posing a question may serve as an emotion indicator. For instance, if the word 問 'ask' is used, it implies that the

following question is an information-seeking questions and the speaker is literally seeking information. Therefore, it indicates that the following question is raised out of curiosity and is therefore a post-event of *surprise*. The indicator of *fear* found is 叫道 'shout' and *anger* is 泣訴 'accuse while weeping'. Another commonly used indicator is verb 說 'say', and it is likely expressing an *anger* emotion. Consider (13).

(13) 她火冒三丈的說：「哪裡沒有？」
     (She said with anger, "Haven't you?")

The expressed emotion is hinted by the use of 說 'say'. As what was 'said' is in the form of a question, if the question functions as an information-seeking question, the verb 問 'ask' would be used instead. In other words, the verb 說 'say' reveals that the following question is a rhetorical question which is not used to seek information. As discussed, rhetorical question has a close relation with negative emotions, in particular *sadness* and *anger*. The question is likely the post-event of *anger* or *sadness*. Yet, post-events of *sadness* are found to be least likely expressed by questions. It can therefore be inferred that the question following 說 'say' is the post-event of *anger*, even without the presence of the emotion keyword or the adverb denoting the emotion, such as 火冒三丈 'angry' in (13).

6   Conclusion

This paper examines the use of information-seeking questions and rhetorical questions in terms of event structures of emotion. We investigate whether the two types of questions can be used to introduce the pre-event (i.e. evoking event), pivot event (i.e. caused emotion), and post-event (i.e. event induced by the emotion). Results show that the overall distributions of information-seeking questions and rhetorical question used to mark the three sub-events are rather similar. This indicates that both types of questions play an equally important role in emotion expressions. We find that more than a half (55.6%) of emotion-related questions are used to express emotions, approximately one-third of the questions (36.3%) are used to describe pre-events and the remaining 8.1% are the post-events of emotions. Various

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Acknowledgments

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