

How do discourse markers indicate emotions?

Xuefeng Gao and Sophia Yat-mei Lee
The Hong Kong Polytechnic University

Emotions are found to be frequently indicated by discourse markers. This paper aims to examine the interaction between discourse markers and emotions in Chinese social media. We propose that there are two types of emotion-switching when discourse markers are used. Discourse markers are one of the most important cues to indicate negative emotions, such as *anger* and *sadness*. Different discourse marker types tend to mark different emotions. Textual discourse markers are most frequently used to indicate emotions. Subjective discourse markers and textual discourse markers tend to indicate *sadness* emotion, while *anger* emotion is mostly highly marked by interpersonal discourse markers. Implicit emotions are frequently applied after the discourse markers. We believe this study could provide a better understanding of the representations of human emotions, which is also essential for study of other disciplines. The findings will have implications for linguistic theory as well as emotion classification studies.

1. Introduction

In recent years, text-based emotion processing has become one of the most attractive research themes in natural language processing. The main task of this area aims to detect, classify and analyze emotions in text automatically. Emotions, as the most complex psychological reactions and feelings of human beings, are prevalent in speech and text. There are some linguistic cues to indicate the presence of emotions, such as emotion words, emoticon, adjectives, etc. Discourse markers, which are usually used in speech and text, tend to indicate emotions as well.

The current study aims to examine the interaction between discourse markers and different emotion types based on an emotion corpus of Chinese social media. We explore the emotion representations and switching when discourse markers are employed. Different types of discourse markers are also examined to reveal a full picture of their close relationship.

This paper is organized as follows. Section 2 discusses the related work on discourse markers and emotions. Section 3 presents the corpus data and annotation scheme. Section 4 describes the data analysis. Section 5 concludes the paper and highlights the contribution of this work.

2. Related work

2.1 Emotion analysis

The study of emotion has a long history. Although emotions are part of life and have been studied in many different disciplines, the definition of emotion is diverse and debatable (James, 1884; Watson, 1924; Cannon, 1929; Plutchik, 1962; Bowlby, 1969; Lazarus, 1975; Frijda, 1986; Ortony et al., 1988; Harkins and Wierzbicka, 2001). Despite different viewpoints, the important issue is that a theory of emotion should be concerned with the relationship inside the body as a result of internal and external stimuli (Lee, 2018).

The classification of emotion is another controversial issue. Various researchers have proposed different methods to classify the basic emotions, varying from two to ten items (Plutchik, 1980; Ekman, 1984; Turner, 2000; Sabini and Silver, 2005; Keltner et al., 2014; Scheff, 2015). Among these studies, every proposal includes *fear* and *anger*, and *happiness* and *sadness* are involved in most of the lists. Therefore, the four primary emotions are *fear*, *anger*, *happiness* and *sadness*. In our study, we will follow the emotion classification proposed by Turner (2000), which identifies five primary emotions, namely *happiness*, *sadness*, *fear*, *anger* and *surprise*.

Emotion words are normally grouped into two categories: expressive emotion words and descriptive emotion words (Kövecses, 2000). Expressive emotion words express emotions directly, while descriptive emotion words are words that describe emotions.

There are two ways to express emotions: explicit and implicit (Lee, 2015). Explicit emotion refers to the emotion-related information which is presented by emotion keywords. For instance, the emotion in the sentence “*He was sad that he broke the glass*” is conveyed by emotion word “*sad*”. Implicit emotion refers to the emotion-related information conveyed through inferences or connotation instead of emotion keywords. In sentence “*I never want to see you again*” indicates “*anger*” emotion without emotion keywords. Implicit emotions can be expressed by means of lexical cues (e.g. adjectives, verbs, adverbs and conjunctions) and syntactic patterns.

2.2 Discourse markers

Discourse markers are sequentially dependent elements which bracket units of talk. They have indexical function and often establish more than one contextual coordinates at once. They allow speakers to construct and integrate multiple planes and dimensions of an emergent reality (Schiffrin, 1987). Fraser (1996, 1999) argues that discourse markers are not independent grammatical category. They, taken to be separate and distinct from the propositional content of the sentence, are the linguistically encoded clues which signal the speaker’s potential communicative intentions. The canonical form of the sequences is <S1. DM+S2>, whereas there are some variations as well, for example, <S1, DM+S2>, <DM+S2, S1>. Blakemore (1987, 1992, 1996, 2002) has explored discourse markers based on the relevance theory. He proposes to apply

conceptual meaning and procedural meaning to analyzing the connotation of discourse markers.

There are some debates on classification of discourse markers. Fraser (1996) classified discourse markers into four categories: (1) topic change markers; (2) contrastive markers; (3) elaborative markers; (4) inferential markers. Ran (2000) divided Chinese discourse markers into eight subcategories: (1) topic-related markers; (2) evidential markers; (3) inferential markers; (4) reformulation markers; (5) manner-speaking markers; (6) contrastive markers; (7) self-assessment markers; (8) locutionary performatives. Carter and McCarthy (2006) grouped English discourse markers into three types: discourse markers which organize the discourse, monitor the discourse and respond the discourse. Ma (2010) separated Chinese discourse markers into three groups based on their meanings: (1) subjective discourse markers; (2) interpersonal discourse markers; (3) textual discourse markers. We will follow Ma (2010)'s classification as his proposal has more transparent definitions and examples than the others.

Subjective discourse markers express the subjectivity of the speaker. They have three features: the perspective of the speaker, the emotion of the speaker and the cognition of the speaker (e.g. 毫无疑问 *háowúyíwèn* 'unquestionably', 依我看 *yīwǒkàn* 'I think', 遗憾的是 *yíhàndeshì* 'Unfortunately', 以我之见 *yǐwǒ zhī jiàn* 'in my opinion', 我说 *wǒ shuō* 'I think'). The function of interpersonal discourse markers is to activate an interactive scene and its model, which will organize the whole discourse and guide listeners to comprehend it. There are two types of interpersonal discourse markers: lexical discourse markers (e.g. 你听 *nǐ tīng* 'listen', 你知道 *nǐ zhīdào* 'you know', 这不 *zhèbù* 'look', 的确 *díquè* 'indeed', 可不 *kěbù* 'see'), and structural discourse markers (e.g. 说 V 就 V *shuō V jiù V*, A 是 A *A shì A*, V 就 V 了/吧 *V jiù V le/ba*). Textual discourse markers mean that the speaker draws the inferences based on the facts mentioned above (e.g. 众所周知 *zhòngsuǒzhōuzhī* 'it is well known that', 由此可知 *yóucíkězhī* 'it can be seen', 可见 *kějiàn* 'it is thus clear that', 看来 *kànlái* 'it seems that').

2.3 Emotion and discourse marker

There is a close interaction between discourse markers and emotions when discourse markers are used in written and spoken languages. Hölker (1991) believed that one of the basic features of discourse markers is that they have an emotive, expressive function rather than a referential, denotative, or cognitive function. This characteristic is functional in nature. A discourse marker is distinct from the constituent structure of the basic move, relating that move to the dynamic context, signaling the speaker's stance, attitude, emotional state. Both primary and secondary interjections can stand alone as complete utterances, generally indicating a sudden outburst of emotion (Norrick, 2007). Discourse marker *Oh* was used to indicate emotion, which was with the highest ratings of feeling over fact (Abbott et al., 2011).

3. Data collection and annotation

3.1 Corpus data

The corpus data was retrieved from *Sina Weibo*, which is one of the most popular social media platforms where Mainland Chinese citizens express their thoughts and feelings. *Sina Weibo* has 340 million monthly active users and occupies 56.5% of China's microblogging market in terms of active users. People can share their ideas and thoughts and express their attitudes and emotions via *Weibo* in real-time.

The corpus is comprised of 8529 posts randomly extracted from *Sina Weibo* (Lee, 2015). The posts were contributed by 51 users. After removing posts that contained noise (as in (1)), advertisement (as in (2)), and the short posts that contained less than 10 words (as in (3)), manual annotation was conducted.

- (1) 我发起了一个投票【熊市猎人四个字被抢注了，只能换个名字，拜托大家帮忙】

wǒ fāqǐ le yī gè tóupiào 【Xióngshìlièrén sì gè zì bèi
I launch LE one CL vote 【Xióngshìlièrén four CL character BEI
qiǎngzhù le, zhǐ néng huàn gè míngzì, bàituō dàjiā bāngmáng】
register LE, only can change CL name, please everyone help】
'I have launched a vote. 【Xiongshiliren is registered by someone else, so I have
to change my name. Please help me choose a new name.】'

- (2) 黑五兰蔻粉水芝加哥价格非常低

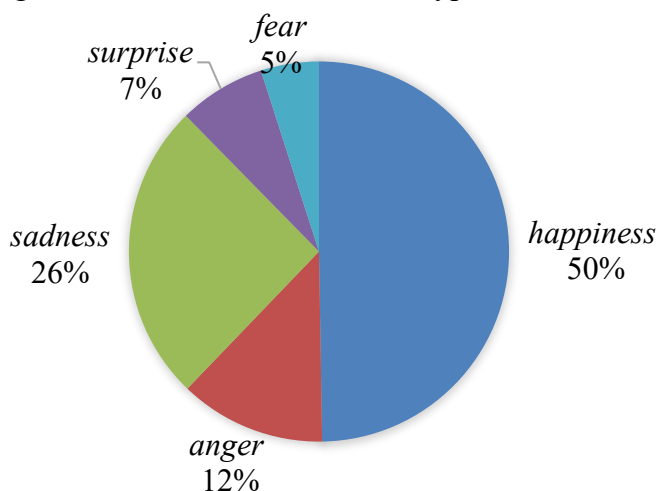
hēiwǔ lánkòu fěnsuǐ zhījiāgē jiàgé fēicháng dī
Black Friday Lancôme Tonique Confort Chicago price very low
'Black Friday, Lancôme Tonique Confort is at a very low price in Chicago.'

- (3) 分享图片

fēnxiǎng túpiàn
share picture
'Share the picture'

There were 4858 posts (57%) with emotions. Following Lee et al (2013), five basic emotions were annotated in each post, namely *happiness*, *sadness*, *fear*, *anger* and *surprise*. In order to qualify the quality of the annotation, two annotators were asked to annotate the data. Then we used Cohen's Kappa coefficient to calculate the inter-annotator agreement. The Kappa score is $k=0.663$. The distribution of each kind of emotion types is shown in Figure 1.

Figure 1. Distribution of Emotion types in All Posts



Then posts with discourse markers were extracted from the above dataset. There were 131 posts containing discourse markers and emotions. As shown in Table 1, the most frequent emotion indicated by discourse markers is *sadness* (31%), followed by *anger* (28%), *happiness* (24%), *surprise* (9%), and *fear* (8%).

Table1. Distribution of emotion types in posts which was indicated by discourse markers

Emotion Type	Token	Percentage (%)
<i>happiness</i>	32	24
<i>anger</i>	36	28
<i>sadness</i>	40	31
<i>surprise</i>	12	9
<i>fear</i>	11	8
Total	131	100

3.2 Annotation scheme

In order to facilitate our analysis, we designed an annotation scheme and annotated 131 posts. The first step was to search for the discourse markers in the posts. Then we identified the type of discourse markers. The third step was to clarify and annotate emotions before and after the discourse markers. For instance, the emotion is neutral in the clause 每一次买票都是一场赌博 *měi yí cì mǎi piào dōu shì yì chǎng dǔbó* ‘It is a kind of gambling to buy tickets every time’ before discourse marker 毫无疑问 *háowúyíwèn* ‘unquestionably’ in (4), while the *sadness* emotion is expressed after the

discourse marker. The type of 毫无疑问 *háowúyíwèn* ‘unquestionably’ is identified as subjective discourse marker. In (5), *fear* emotion occurs before the discourse marker 看来 *kànlái* ‘it seems that’, and switches to *sadness* emotion after the discourse 看来 *kànlái* ‘it seems that’. 看来 *kànlái* ‘it seems that’ is identified as textual discourse marker.

- (4) [每一次买票都是一场赌博]_{neutral} 毫无疑问_(subjective discourse marker) [这次输得很惨]_{sadness}

[měi yì cì mǎi piào dōu shì yì chǎng dǔbó]_{neutral}
[every one CL buy ticket all be one CL gambling]_{neutral}
háowúyíwèn _(subjective discourse marker) [zhè cì shū de hěn cǎn]_{sadness}
unquestionably _(subjective discourse marker) [this CL lose DE very badly]_{sadness}
‘It is a kind of gambling to buy tickets every time. Unquestionably, I lost a lot this time.’

- (5) [一个麻要生的朋友打电话来问我剖时的感受，我想了想告诉她：躺上手术台那刻我浑身僵硬，麻醉师戳针我在哀嚎，手术中我瞪着眼睛竖着耳朵感受医生护士每个动作细节，手术结束后的 2 个小时我还在浑身颤抖，生娃于我来说除了紧张就是极度紧张！]_{fear} 看来_(textual discourse marker) [我是枚伪女汉纸哪！我压根不是自己一直想像的那么勇敢啊啊]_{sadness}

[yí gè má yào shēng de péngyǒu dǎdiànhuà lái wèn wǒ
[One CL mum will give birth to DE friend call LAI ask me
pōu shí de gǎnshòu, wǒ xiǎng le xiǎng gào sù tā:
cesarean that moment DE feeling, I think LE think tell her:
tǎng shàng shǒushùtái nà kè wǒ húnshēn jiāngyìng,
lie on operating table that moment I all over stiff,
mázuìshī chuō zhēn wǒ zài āiháo, shǒushù zhōng wǒ dèng
anesthetist give injection I am whine, operation PREP I goggle
zhe yǎnjīng shù zhe ěrduǒ gǎnshòu yīshēng hùshì měi gè dòngzuò
ZHE eyes stand ZHE ears feel doctor nurse every CL action
xìjiē, shǒushù jiéshù hòu de 2 gè xiǎoshí wǒ hái zài húnshēn
detail, operation finish after DE two CL hours I still am all over
chàndǒu, shēngwá yú wǒ láishuō chule jǐnzhāng jiù shì
tremble, give birth to a child for me LAISHUO besides nervous thus be
jídu jǐnzhāng]_{fear} *kànlái* _(textual discourse marker) [wǒ shì méi wěi
extreme nervous!]_{fear} it seems that_(textual discourse marker), [I be CL fake
nǚhànzhǐ na! wǒ yāgēn bú shì zìjǐ yìzhí xiǎngxiàng de nàme
tough girl SFP! I totally NEG be self always imagine DE so
yǒnggǎn a a]_{sadness}
brave SFP SFP]_{sadness}

‘A friend who will give birth to a baby asked me how I felt by cesarean. I thought a while and told her. I was stiff when I was lying on the operating table. I was whining when the anesthetist gave me the anesthesia. I googled and felt the details of each movement of the doctors and nurses with my ears. I was still shaking for 2 hours after the end of the operation. For me, giving birth to a baby was extremely nervous except for the tension! It seems that I am a fake tough girl! I am not so brave as I have always imagined.’

If there were three or more emotions involved in one post, only the two emotions occurring before and after the discourse marker were annotated.

4. Data analysis

4.1 Emotion-switching

Discourse marker is an efficient way to indicate and switch emotions in social media posts. According to the data analysis above, we found that there were two types of emotion-switching. The emotion switching types are shown as follows:

- (a) Neutral → one particular emotion (Type 1)
- (b) One type of emotion → another type of emotion (Type 2)

Table 2 shows the distribution of the two patterns. Type 1 has the highest frequency (79%), followed by Type 2 (21%).

Table 2. Distribution of two emotion-switching types

Type	Type 1	Type 2	Total
Token	104	27	131
Percentage	79%	21%	100%

Emotion, which switches from neutral to one particular emotion, is the main pattern of the emotion-switching. For instance, the emotions are neutral before the discourse markers, while switch to *happiness* (as in (6)), *anger* (as in (7)), and *sadness* emotions (as in (8)).

- (6) [女人和女人在一起。海吃海聊。] *neutral* 关键是 (subjective discourse marker) [今天半价][偷笑][哈哈]] *happiness*
 [nǚrén hé nǚrén zài yìqǐ. hǎichī hǎiliáo.] *neutral*
 [woman and woman PREP together. eat a lot chat a lot.] *neutral*
 guānjiàn shì (subjective discourse marker) [jīntiān bànjià [tōuxiào][hāhā]] *happiness*
 key be (subjective discourse marker) [today half-price [titter][smile]] *happiness*
 ‘We women meet together and we (like) eating and chatting a lot. The most important thing is that (the ice cream) is half-price today.’
- (7) [现在的官，] *neutral* 你说 (interpersonal discourse marker) [市区里你交通管制可以理解，高速你也管制。这社会还会好吗？] *anger*
 [xiànzài de guān,] *neutral* nǐshuō (interpersonal discourse marker) [shìqū
 [current DE officer,] *neutral* did you say (interpersonal discourse marker) [urban area
 lǐ nǐ jiāotōng guǎnzhì kěyǐ lǐjiě, gāosù
 inside you traffic regulation can understand, expressway
 nǐ yě guǎnzhì. zhè shèhuì hái huì hǎo ma?] *anger*
 you also regulate. this society still can fine SFP?] *anger*
 ‘We can understand that the current officers regulate traffic in urban areas, and they also control the expressway. Did you say that this society can work well?’
- (8) [离开彭州就不下雨了呢~] *neutral* 看来 (textual discourse marker) [真是该离开了~] *sadness*
 [líkāi Péngzhōu jiù bú xià yǔ le ne ~] *neutral*
 [leave Pengzhou thus NEG rain LES FP ~] *neutral*
 kànlái (textual discourse marker) [zhēn shì gāi líkāi le ~] *sadness*
 it seems (textual discourse marker) [really be should leave LE ~] *sadness*
 ‘It doesn’t rain when I leave Pengzhou. It seems that (I) should leave.’

The distribution of emotion patterns in Type 1 is shown in Table 3. After normalization, the most frequent emotion that is indicated by discourse markers in Type 1 is *anger* (40.69%), while *happiness* emotion is only 10.57%. Compared with Figure 1, 50% of the posts involve *happiness* emotion in our corpus and only 12% express *anger* emotion. This means that discourse markers are cues for people expressing negative emotions, such as *anger* and *sadness*.

Table 3. Distribution of emotion types (Type 1)

Emotion Type	Token	Frequency (%)
<i>happiness</i>	27	10.57
<i>anger</i>	26	40.69
<i>sadness</i>	32	24.45
<i>surprise</i>	11	28.95
<i>fear</i>	8	1.56
Total	104	20.25

Another emotion-switching form is from one type of emotion to another type of emotion (21%). For example, the clause 他也出来的啊! [爱你][花心] *tā yě chūlái de a! [ài nǐ][huāxīn]* ‘he also appeared’ indicates *happiness* emotion in (9), while it switches to *sadness* emotion after the discourse marker 早知道 *zǎozhīdào* ‘if I had known’. In (10), 总的来说 *zǒngdeláishuō* ‘in general’ is a textual discourse marker. *Sadness* emotion and *happiness* emotion are expressed before and after the discourse marker respectively.

- (9) [他也出来的啊! [爱你][花心]]_{happiness} 早知道_(textual discourse marker) [就咬着牙坚持看下去啦!!]_{sadness}

*[tā yě chūlái de a! [ài nǐ] [huāxīn]]*_{happiness}
 [he also show up DE SFP! [love you] [happy]]_{happiness}
zǎozhīdào (textual discourse marker) *[jiù yǎozheyá jiānchí kàn*
 If I had known (textual discourse marker) [thus stick to stick to watch
*xiàqù la!!]*_{sadness}
 the rest SFP!!]_{sadness}
 ‘He also appeared. Had I known, I would have stuck to watch it.’

- (10) [博物馆人山人海, 馆外排完厅外排]_{sadness} 总的来说_(textual discourse marker) [还是值得的, 看到了莫奈、雷诺阿、米勒、卢梭, 都很厉害的样子]_{happiness}

[bówùguǎn rénshānrénhǎi, guǎn wài pái wán tīng wài
 [museum crowded, museum outside queue finish hall outside
*pái]*_{sadness} *zǒngdeláishuō*_(textual discourse marker) *[háishì zhídé de,*
*queue]*_{sadness} in general (textual discourse marker) [still worthwhile DE,
kàndào le Mònài, Léinuòā, Mǐlè, Lúsuō, dōu hěn lihai
 watch LE Monet Renoir Miller Rousseau, all very excellent
*de yàngzi]*_{happiness}
 DE look]_{happiness}

‘The museum is crowded, and we queue up to enter the museum. In general, it is worthwhile. I saw the paintings of Monet, Renoir, Miller and Rousseau, and they were all excellent.’

Table 4 shows the distribution of emotion types before and after discourse markers. *Sadness* and *happiness* emotions that have the highest frequency occurred before the discourse markers, while *anger* is the most frequent emotion happened after the discourse markers.

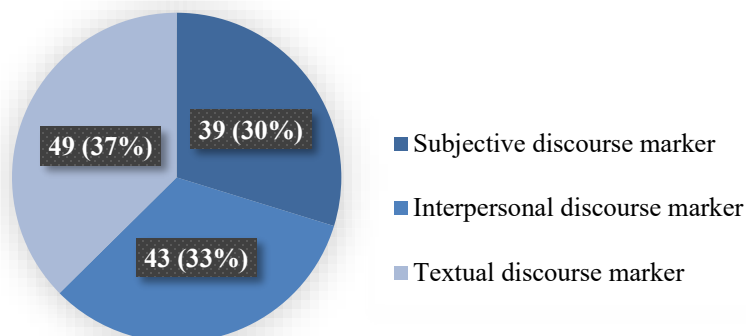
Table 4. Distribution of emotion types (Type 2)

Before DM		Emotion Type	After DM	
Token	Percentage		Percentage	Token
7	25.93%	<i>happiness</i>	18.52%	5
5	18.52%	<i>anger</i>	37.04%	10
7	25.93%	<i>sadness</i>	29.63%	8
5	18.52%	<i>surprise</i>	3.70%	1
3	11.11%	<i>fear</i>	11.11%	3
27	100%	Total	100%	27

4.2 Analysis of discourse marker types

There is a close relationship between discourse markers and emotions. The types of discourse markers influence the emotion expressions as well. Figure 5 shows the distribution of different discourse marker types in emotion expressions. Textual discourse markers are frequently used when people express emotions in our dataset (37%).

Figure 2. Types of discourse markers in emotion expressions

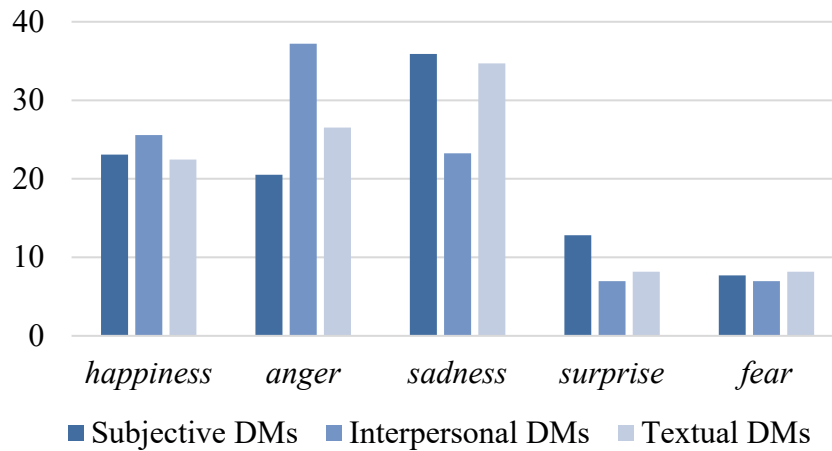


The function of textual discourse markers is bidirectional. The basic structure is [condition]—textual discourse marker—[inference] (Ma, 2010). The textual discourse marker dominates both conditional clause and inferential clause. For example, 哥哥，看哦，这是你给人家买的裙子 *gēge, kàn o, zhè shì nǐ gěi rénjiā mǎi de qúnzi* ‘brother, look, this is the dress that you bought for me’ is the conditional clause of the whole discourse before the textual discourse marker 看看 *kànkàn* ‘please have a look’ in (11), while the inference is 像不像小公主呀 *xiàng bú xiàng xiǎo gōngzhǔ ya* ‘Do I look like a little princess?’ after the discourse marker. Textual discourse marker connects the two sequences and it is the cue to denote the discourse structure.

- (11) [哥哥，看哦，这是你给人家买的裙子，] *neutral* 看看 *(interpersonal discourse marker)*，
 [像不像小公主呀[嘻嘻]、[害羞]@杨瘦瘦不胖 DYJ] *happiness*
[gēge, kàn o, zhè shì nǐ gěi rénjiā mǎi de qúnzi,] neutral
[brother, Look SFP, this be you give me buy DE dress,] neutral
kànkàn (interpersonal discourse marker), [xiàng bú xiàng xiǎo
have a look (interpersonal discourse marker), [look like NEG look like little
gōngzhǔ ya @Yángshòushòubùpàng DYJ] happiness
princess SFP @Yángshòushòubùpàng DYJ] happiness
 ‘Brother, look, this is the dress that you bought for me. Please have a look, and do
 I look like a little princess? @Yángshòushòubùpàng DYJ’

Different discourse markers indicate different emotions. The interaction between different discourse marker types and emotion types is shown in Figure 3. Subjective discourse markers and textual discourse markers tend to indicate *sadness* emotion, while *anger* emotion is most frequently marked by interpersonal discourse markers.

Figure 3. Types of discourse markers in five basic emotions



4.3 Explicit and implicit emotions

Lee (2015) argued that there are two ways that people express their emotions, i.e. explicit and implicit. Posts with emotion keywords and emoticons are all viewed as explicit (see (12)), while the other are implicit (see (13)). *Happiness* emotion is expressed with the emotion keywords 开心 *kāixīn* ‘happy’, so the post conveys the emotion explicitly. While in (13), the *anger* emotion is involved implicitly in the clause 你们也已为人父母，就如此胎教？！ *nǐ men yě yǐ wéi rén fùmǔ, jiù rúcǐ tāijiāo?!* ‘As parents, what fetal education do you offer?’, which is a type of figurative language—rhetorical question.

- (12) [小家伙刚才还在哭呢，]_{sadness} 说着说着_(interpersonal discourse marker) [竟然又开心地笑了起来。]_{happiness}
*[xiǎo jiāhuo gāngcái hái zài kū ne,]*_{sadness}
 [little children just now still ZAI cry SFP,]_{sadness}
shuōzhe shuōzhe _(interpersonal discourse marker) *[jìngrán yòu kāixīn*
 with those words _(interpersonal discourse marker) [unexpectedly again happy
*de xiào le qǐlái.]*_{happiness}
 DE smile LE QILAI.]_{happiness}
 ‘The baby cried just now. With those words, he smiled again unexpectedly.’

- (13) [#悼念天使女孩#愿逝者安息]_{sadness} 看来_(textual discourse marker) [现在已经是做好事都需要前提的了。你们也已为人父母，就如此胎教？！]_{anger}
*[#dàoniàn tiānshǐ nǚhái #yuàn shìzhě ānxi]*_{sadness}
*[#mourn angle girl #wish departed people rest in peace]*_{sadness}
*kànlái*_(textual discourse marker) *[xiànzài yǐjīng shì zuò hǎo shì*
 it seems that _(textual discourse marker) [now already be do good thing
dōu xūyào qiántí de le. nǐ men yě yǐ wéi rén
 even need premise DE LE. you PL also already as people
*fùmǔ, jiù rúcǐ tāijiāo?!]*_{anger}
 parents, thus such fetal education?!]_{anger}
 ‘#Mourn the angel girl #May the departed rest in peace. It seems that it is necessary to think about it for a while when you do good things. As parents, what fetal education do you offer?’

There are 53% posts that express emotions explicitly and 47% posts express emotions implicitly in the whole corpus (Lee, 2015). As illustrated in Table 5, 62% are expressed implicitly in our dataset. This proves that discourse markers have a strong tendency to indicate emotions implicitly.

Table 5. Explicit emotion and implicit emotion in dataset

	Token	Frequency
Explicit Emotion	49	37.4%
Implicit Emotion	82	62.6%
Total	131	100%

4.4 Analysis of discourse marker 看来 *kànlái* ‘it seems that’

The textual discourse marker 看来 *kànlái* ‘it seems that’ is most frequently used in our dataset (7%). The meaning of 看来 *kànlái* ‘it seems that’ is the speculation or evaluation of the situation (Lv, 1999; Liu et al., 2001; Hu, 2011; Zhang, 2018). The inference of 看来 *kànlái* ‘it seems that’ is not the first-hand message, which has high inferential capability and low requirement of the evidence. So literary works often use 看来 *kànlái* ‘it seems that’ to express uncertainty. 看来 *kànlái* ‘it seems that’ is always utilized to predict the future as well (Meng, 2015). *Sadness* emotion has high frequency in posts with the textual discourse marker 看来. For instance, the sequence 我也是充话费送的 *wǒ yěshì chōng huàfèi sòng de* ‘I was also given as a gift after paying the phone bills’ after 看来 *kànlái* ‘it seems that’ expresses *sadness* emotion and it is also the evaluation of the issue, which is her mother’s ignorance of her illness.

- (14) [感冒了两天我妈都没知觉，还是我说感冒了，她吃惊滴说，你感冒了啊，] *neutral* 看来 *kànlái* (textual discourse marker) [我也是充话费送的，@若初的小猪窝 @小时少爷 911 @土豆家的徐小白 @饭团喵喵 同志们，恭喜我也加入到队伍中了吧，同是充话费送的孩纸们] *sadness*
- [gǎnmào le liǎng tiān wǒ mā dōu méi zhījué, háishì wǒ
[catch a cold LE two day my mom even NEG feeling, finally I
shuō gǎnmào le, tā chījīng di shuō, nǐ gǎnmào
say catch a cold LE, she surprisingly DE say, you catch a cold
le a,] *neutral* *kànlái* (textual discourse marker) [wǒ yěshì chōng huàfèi
LE SFP,] *neutral* it seems that (textual discourse marker) [I also pay phone bill
sòng de, @Ruòchūdexiǎozhūwō @Xiǎoshíshǎoyé 911 @tǔdòujiādexúxiǎobái
give DE, @Ruòchūdexiǎozhūwō @Xiǎoshíshǎoyé 911 @tǔdòujiādexúxiǎobái
@fàntuánmiāowū tóngzhì men, gōngxǐ wǒ yě jiārù dào duìwǔ
@fàntuánmiāowū comrade PL, congratulate I also join PREP team
zhōng le ba, tóngshì chōng huàfèi sòng de háizhǐ men] *sadness*
inside LE SFP, same as charge phone bill give DE child PL] *sadness*
‘My mother didn’t feel that I caught a cold. I told her I had a cold. She said that you caught a cold surprisingly. It seems that I was also given as a gift after paying the phone bills. @Ruòchūdexiǎozhūwō @Xiǎoshíshǎoyé 911

@tǔdòujiādexúxiǎobái @fàntuánmiāowū Comrades, congratulations, I also join the team, which is the same as you all.'

5. Conclusion

This paper explores the interaction between the discourse markers and emotions. We argue that there is a close relationship between them and propose that discourse markers are an efficient way to indicate and switch emotions in social media. There are two patterns of emotion-switching in Chinese social media posts when the discourse markers are used. The first emotion-switching type is from neutral to one particular emotion, while the other one is from one type of emotion to another type of emotion. We found that discourse markers are linguistic cues for people expressing negative emotions, such as *anger* and *sadness*. As to discourse marker types, textual discourse markers are most frequently used when people express emotions in our dataset. Subjective discourse markers and textual discourse markers tend to indicate *sadness* emotion, while *anger* emotion is marked by interpersonal discourse markers in most cases. Moreover, the emotions after the discourse markers are mostly expressed implicitly. We believe that the linguistic account of the relationship between discourse markers and emotions could provide a better understanding of the representations of human emotions, which is also essential for studies in other disciplines. The findings will have implications for linguistic theory as well as emotion classification studies.

Acknowledgement

This research work is supported by a General Research Fund project sponsored by the Research Grants Council, Hong Kong (Project No. B-Q50Z) and a Faculty Research Grant sponsored by the Hong Kong Polytechnic University (Project No. 1-ZEVK).

REFERENCES

- ABBOTT, ROB, MARILYN WALKER, PRANAV ANAND, JEAN E. FOX TREE, ROBESON BOWMANI, and JOSEPH KING. 2011. How can you say such things?!?: Recognizing disagreement in informal political argument. *Proceedings of the Workshop on Languages in Social Media*, 2-11.
- BLAKEMORE, DIANE. 1987. *Semantic constraints on relevance*. Oxford: Blackwell.
- BLAKEMORE, DIANE. 1992. *Understanding utterances*. Oxford: Blackwell.
- BLAKEMORE, DIANE. 1996. Are apposition markers discourse markers?. *Journal of Linguistics* 32: 325-47.
- BLAKEMORE, DIANE. 2002. *Relevance and linguistic meaning: The semantics and pragmatics of discourse markers*. Cambridge: Cambridge University Press.
- BOWLBY, JOHN. 1969. *Attachment and loss: Vol 1, Attachment*. New York: Basic Books.
- CANNON, WALTER BRADFORD. 1929. *Bodily changes in pain, hunger, fear and rage*. Oxford, England: Appleton.

- CARTER, RONALD, and MICHAEL MCCARTHY. 2006. *Cambridge grammar of English*. Cambridge: Cambridge University Press.
- EKMAN, PAUL. 1984. Expression and the nature of emotion. *Approaches to emotion*, edited by Klaus R. Scherer and Paul Ekman, 319–43. Lawrence Erlbaum, Hillsdale.
- FRASER, BRUCE. 1996. Pragmatic markers. *Pragmatics* 6.2: 167-90.
- FRASER, BRUCE. 1999. What are discourse markers?. *Journal of Pragmatics* 31.7: 931-52.
- FRIJDA, NICO H. 1986. *The emotions*. Cambridge University Press.
- HARKINS, JEAN, and ANNA WIERZBICKA (eds.). 2001. *Emotions in crosslinguistic perspective*. Mouton de Gruyter.
- HÖLKER, KLAUS. 1991. Französisch: Partikelforschung. *Lexikon der romanistischen Linguistik* 5.1: 77-88
- HU, YUSHU. 2011. *Contemporary Chinese*. Revised edition. Shanghai: Shanghai Educational Publishing House.
- JAMES, WILLIAM. 1884. What is an Emotion? *Mind* 9.34: 188–205.
- KELTNER, DACHER, OATLEY KEITH, and JENNIFER M. JENKINS. 2014. *Understanding emotions*. Hoboken, NJ: Wiley.
- KÖVECSES, ZOLTÁN. 2000. *Metaphor and emotion: Language, culture and body in human feeling*. Cambridge: Cambridge University Press.
- LAZARUS, RICHARD S. 1975. A cognitively oriented psychologist looks at biofeedback. *American Psychologist* 30.5: 553-61.
- LEE, SOPHIA YAT MEI, YING CHEN, CHU-REN HUANG, and SHOUSHAN LI. 2013. Detecting emotion causes with a linguistic rule-based approach. *Computational intelligence, special issues on computational approaches to analysis of emotion in text*. Wiley-Blackwell.
- LEE, SOPHIA YAT MEI. 2015. A linguistic analysis of implicit emotions. *Chinese lexical semantics*, edited by Qin Lu and Helena Hong Gao, 185-94. Springer.
- LEE, SOPHIA YAT MEI. 2018. *Emotion and cause: Linguistic theory and computational implementation*. Berlin: Springer.
- LIU, YUEHUA, WENYU PAN, and WEI GU. 2001. *Practical contemporary Chinese grammar*. Revised edition. Beijing: Commercial Press.
- LV, SHUXIANG. 1999. *Contemporary Chinese eight hundred words*. Revised edition. Beijing: Commercial Press.
- MA, GUOYAN. 2010. *Chunking of discourse: Markers and boundary*. Doctoral dissertation. Fudan University.
- MENG, WEN. 2015. The comparative analysis of modern Chinese words of *kanlai* and *kejian*. *TCSOL Studies* 58.2: 89-95.
- NORRICK, NEAL R. 2007. Discussion article: Pragmatic markers, interjections and discourse. *Catalan Journal of Linguistics* 6.1: 159-68.

- ORTONY, ANDREW, GERALD L. CLORE, and ALLAN COLLINS. 1988. *The cognitive structure of emotions*. New York: Cambridge University Press.
- PLUTCHIK, ROBERT. 1962. *The emotions: Fact, theories and a new model*. New York: Random House.
- PLUTCHIK, ROBERT. 1980. *Emotions: A psychoevolutionary synthesis*. New York: Harper & Row.
- RAN, YONGPING. 2000. *Pragmatics of discourse markers*. Doctoral dissertation. Guangdong University of Foreign Studies
- SABINI, JOHN, and MAURY SILVER. 2005. Ekman's basic emotions: Why not love and jealousy? *Cognition and Emotion* 19: 693-712.
- SCHEFF, THOMAS. 2015. Toward defining basic emotions. *Qualitative Inquiry* 21: 111-21.
- SCHIFFRIN, DEBORAH. 1987. *Discourse markers*. Cambridge University Press.
- TURNER, JONATHAN. 2000. *On the origins of human emotions: A sociological inquiry into the evolution of human affect*. California: Stanford University Press.
- WATSON, JOHN B. 1924. *Psychology: From the standpoint of a behaviorist*. Philadelphia, PA: J B Lippincott Company.
- ZHANG, BIN. 2018. *Contemporary Chinese*. Second edition. Shanghai: Fudan University Press.