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**Sophia Yat Mei Lee**, *Emotion and cause: Linguistic theory and computational implementation* (Studies in East Asian Linguistics). Singapore: Springer, 2019. Pp. xii + 151.

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In *Emotion and Cause: Linguistic Theory and Computational Implementation*, Sophia Yat Mei Lee conducts an innovative and well-systematized study on emotion analysis. Despite the long history of emotion study which dates back to Aristotle, no consensus has been reached on the definition or the classification of emotions nor has there been much work on the study of emotions in Chinese. In this monograph, abundant expansions and supplements are made on both aspects. With special emphasis on the causal links between five primary emotions (Happiness, Sadness, Fear, Anger, and Surprise) and cause events in Chinese, Lee offers a new insight into emotion detection and classification based on a novel assumption that ‘cause events are the most concrete components of emotions’ (141), which opens a new avenue to this longstanding and vibrant field.

The book contains seven chapters. Chapters 1 and 2 focus on the theoretical issues. Chapter 3 discusses the research methodology. Chapters 4 and 5 demonstrate specific corpus linguistic investigations. Chapter 6 elucidates a new emotion representation model proposed by the author, and Chapter 7 concentrates on the

computational implementation of the proposed model. What follows is a more detailed presentation of these chapters.

Chapter 1 provides a holistic review of previous studies on emotion, ranging from its nature, definition and classification in general to linguistic theories of emotion. Starting with a critical study on the concept of emotions, the author discusses several aspects of the relationship between emotions and feelings, on the distinction of expressive and descriptive emotions, and on primary human emotions. An introduction to various approaches to emotion classification is then presented, which covers a wide range of fields including linguistics, neuropsychology and computer science. Among them, Wierzbicka's (1972) Natural Semantic Metalanguage (NSM) model and Pustejovsky's (1991, 1995) Generative Lexicon (GL) theory are specifically selected as the basic framework for emotion study in this book and the cornerstone of the linguistic model for emotion expression constructed in Chapter 6.

Chapter 2 turns the spotlight to the study of the linguistic expression of emotion and cause in the Chinese language. Through reviewing some major studies on the linguistic expression of emotion in Chinese (including emotion verbs, adjectives and adverbials), the author argues that Chinese emotion taxonomies are mostly intuition driven and lack theoretical support. In view of this issue, Lee endeavors to reclassify Chinese emotion expressions. In light of Plutchik's (1980) and Turner's (2000) taxonomies, Lee selects a neuropsychological-based approach in her classification, and substantially replenishes it with more frequently used emotion keywords. This taxonomy is claimed to be more flexible in defining complex emotions compared to other emotion taxonomies. Lee then applies this revised Turner–Plutchik emotion taxonomy to analysing Chinese emotion expressions, referring to a comprehensive list offered by Xu & Tao (2003). She selects some Chinese emotion keywords from the cognitive-based feeling words listed therein. Finally in this chapter, the author completes her reclassification of Chinese emotion expressions, and identifies five primary emotions in Chinese, namely Happiness, Sadness, Fear, Anger, and Surprise. All later analyses in this book are based on this improved taxonomy.

Chapters 1 and 2 provide the preliminary theoretical basis for the current study. Chapter 3 discusses the methodology of this research. The author introduces the corpora (the Academia Sinica Balanced Corpus of Modern Chinese (Sinica Corpus), the Chinese Gigaword Corpus, in Section 3.1.1, and most specifically a self-developed Emotion Annotated Corpus, in Section 3.2), a data collection tool (Chinese Word Sketch) used in this research, and her research data. Ten target words are selected within the five primary emotions already identified and two emotion verb types (change-of-state emotion verbs and homogeneous state emotion verbs), each of which is the most frequent one for relevant categories. With this methodology, Chapters 4 and 5 investigate the semantic and the syntactic features (i.e. transitivity and epistemic markers) of emotion cause events.

Chapter 4 explores the relation between the semantic features of cause events (in regard to their degree of transitivity) and emotions, namely emotion verb classes (i.e. Happiness, Sadness, Fear, Anger, and Surprise) and emotion verb types (change-

of-state emotion verbs and homogeneous state emotion verbs). Upon an overview of three key studies on the concepts of transitivity from a prototypical perspective, which enables us to better account for transitivity as a continuum, Lee identifies three semantic features (namely agentivity, kinesis, and participation) to examine ‘how and to what extent the cause event affects the experiencer of the emotion’ (51). A total of 1000 emotional sentences with cause events (100 sentences from each of the ten emotion verbs proposed in Chapter 3) are examined. Through corpus analysis, it is confirmed that strong correlations exist between emotion verb classes (e.g. Happiness and Sadness) and their corresponding causes regarding transitivity. Most interestingly, the author finds that homogeneous state verbs generally have a stronger tendency of exhibiting cause event features than change-of-state verbs (68). For example, 快乐 *kuai4le4* ‘to be happy’ (a homogeneous state verb) has a stronger tendency of exhibiting agentivity (97%), motion events (78%), and self-participating events (85%) compared to that of 高兴 *gao1xing4* ‘becoming happy’ (a change-of-state verb), i.e. 89% for agentivity, 51% for kinesis, 75% for participation.

Chapter 5 deals with the linguistic identification of emotion cause events with regard to epistemic markers, i.e. ‘verbs that mark the experiencer’s cognitive awareness of the cause event’ (85). It is observed that emotion cause events are usually expressed by embedded clauses headed by epistemic markers, as in (1).

(1) 我很高兴看到他们回来。

*wo3 hen3 gao1xing4 kan4dao4 ta1men hui2lai2*  
 1.SG very becoming.happy see 3.PL return

‘I am happy to see that they came back.’

The emotion verb 高兴 *gao1xing4* ‘becoming happy’ is caused by the event depicted in the embedded clause 他们回来 *ta1menhui2lai2* ‘they came back’ which is headed by the verb, i.e. epistemic marker 看到 *kan4dao4* ‘to see’. Lee hypothesizes that such epistemic markers ‘tend to appear in constructions of change-of-state emotion verbs rather than that of homogeneous state emotion verbs’ (75). To verify this hypothesis, Lee investigated the concordances of the selected ten emotional keywords and the epistemic markers which are grouped into five types (Seeing, Hearing, Knowing, Discovery, and Existence). Through analysing the resulting data, not only is the hypothesis confirmed but the data also reveals that ‘the higher motivation the experiencer has to assert the certainty of the emotion, the more explicit the epistemic marking of cause events’ (82).

Chapter 6 focuses on the enrichment of the Natural Semantic Metalanguage (NSM) model introduced in Chapter 1 by integrating the linguistic findings of emotion cause events from Chapters 4 and 5 into it. This chapter serves as a further explanation of emotions viewed as events from a linguistic point of view. To this end, the model is first applied to defining the five primary emotions in Chinese (identified in Chapter 2), i.e. Happiness, Sadness, Fear, Anger, and Surprise. In this process, a drawback of this theory is revealed, that the description – or ‘semantic

explication', in Wierzbicka's (1992: 556) words – of the primitive concepts under NSM is constricted to representations about whether the context of an emotion is good or bad. In view of this problem, the remedy that Lee suggests is to enrich NSM by incorporating Generative Lexicon (GL) theory's event structures, as well as the semantic properties (i.e. transitivity) and syntactic features (i.e. epistemicity) of emotion cause events into it. To be specific, given GL's event structures, emotion in the resultant model is viewed as an event type ('emotional state'), and assumed to be a component of a series of events that constitutes an emotion construction, namely cause events, emotional states and elicited events (in temporal order).

Chapter 7 develops an automatic system for cause event detection in order to attest to the previous linguistic findings in Chapters 4–6. Following a concise review of the previous work on automatic emotion analysis, an intensive and rigorous elucidation on a text-driven, rule-based approach to emotion cause detection is presented: based on a proposed annotation scheme, an emotion cause corpus is first constructed, generating seven groups of linguistic cues and two sets of linguistic rules for detecting emotion causes. A two-phase evaluation scheme is then proposed to assess the effectiveness and feasibility of the system. Finally, a series of experiments is conducted to test its performance, achieving quite positive results. With an overall evaluation, which includes precision to measure the accuracy of the system, recall to measure the fullness of the system, and F-score to provide the mean of the precision and recall scores, the overall performance of the rule-based system is shown to be better than a baseline procedure (i.e. finding a verb to the left of the keyword in question and considering the clause containing the verb as the cause of the emotion in question). In Phase 1, the rule-based system shows great ability to deal with emotion constructions with explicit causes and to detect the correct cause at least three times more frequently than the baseline. In Phase 2, the linguistic rules improve the performance of cause recognition effectively compared to the baseline. To evaluate the performance of linguistic rules, the author illustrates the accuracy and contribution of each rule with multiple examples. The detailed implementation of the rule-based system on detecting the emotion causes on the one hand indicates the effectiveness of the system, and on the other hand verifies the significance of linguistic analysis and modelling.

In sum, *Emotion and Cause: Linguistic Theory and Computational Implementation* is a well-written and thought-provoking work. It offers a particularly useful research resource and makes a valuable contribution to the study of emotion in several ways. First, the book includes plentiful concepts, scientific research methods, critical discussion of previous theories, and rigorous exploration of findings, which is a good reference for researchers. Secondly, it expands the range of emotion analysis by taking the interaction of cause events and emotions into account, and provides a new perspective on how to define and classify emotions, which used to be considered undefinable. Thirdly, although emotion study has a long history in research in general, it is sparse in Chinese. This work supplements current emotion research with novel data and perspectives, offering an excellent encouragement for researchers to study emotions in other languages not studied in

depth in this field. Finally, in addition to its important implications for the linguistic theory of emotions, the current study also has extremely high application value. The computational implementation of emotion cause detection discussed in the final chapter is relevant to applications concerned with emotions in the real world, ranging from economic forecasting through public opinion mining to product design.

Nonetheless, there are also some minor weaknesses that are worth noting. First, the book lacks a concise introductory chapter or paragraph. The reader would benefit from a quick glimpse of the whole study at the beginning of the book. Second, there are some minor errors in data presentation, which could have been avoided with more proofreading work. For example, the percentage of the cause events of surprise marked by epistemic verbs should be 3.8% rather than 3.5% as shown on page 82, and ‘all the threads of the linguistic analyses’ should come together in Chapter 6 rather than Chapter 5, as shown on page 141.

In any case, *Emotion and Cause: Linguistic Theory and Computational Implementation* is an excellent work, which provides complementary evidence to theoretical arguments, research methodology, and practical implementation of emotion analysis. This book would be of great value to anyone interested in emotion study and corpus linguistics.

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**Naoko Taguchi (ed.)**, *The Routledge handbook of second language acquisition and pragmatics*. New York & London: Taylor & Francis, 2019. Pp. xiii + 522.

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At a time when publishers' catalogues are flooded with handbooks, *The Routledge Handbook of Second Language Acquisition and Pragmatics* deserves credit in its