





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Keeping balance between loyalty and modification: a Toulminian model as analytical framework

Donghong Liu¹  & Minghui Xiong² 

Toulmin model has been widely applied to *composition-rhetoric* and several modified models have been advanced. However, those modified versions diverge widely from Toulmin model. To Keep loyalty to Toulmin's argumentation and infuse van Eemeren et al.'s pragma-dialectic view, we propose a new modified model as an analytical framework for argumentative essays, with the assumption that a writer is in fact arguing with a potential reader who holds a different view. The proposed framework was applied to explore the Chinese writers' argumentative essays with content analysis employed. Altogether 60 essays were selected, coded, and analyzed. The results show that the Chinese writers preferred parallel arguments (i.e., several arguments supporting the same claim with the same ground-warrant structure) to hierarchical ones, justification to opposition, and descriptive warrant to the other types. Moreover, the adult expert writers wrote more warrants and qualifiers than the novice writers. The results reveal Chinese rhetoric and writing conventions, and prove the effectiveness of our proposed analytical framework.

¹Southeast University, Nanjing, China. ²Zhejiang University, Hangzhou, China. ✉email: xionghui@zju.edu.cn

Background

Toulmin (1999) considered Aristotle's syllogism as too simple to represent the very nature of argument because of its arbitrary restriction to a three-part structure. In fact, most arguments have a more complex structure than the syllogism. With his preliminary concern on jurisprudence, he replaced the terms in syllogism with data, warrant and claim, and considered "the first skeleton of a pattern" (Toulmin, 1999, p. 99) just as a starting point of his argumentation model. In Aristotle's syllogism, the conclusion follows necessarily from the major and minor premises. The inference from major premise to minor premise comes to a *necessary* conclusion. However, according to Toulmin, warrant has various kinds, such as "necessarily" unequivocal warrant and "probably/presumably" tentative one. In other words, the reasoning contained therein is not monotonic, but nonmonotonic and defeasible. In view of the tentative warrant, Toulmin considered it indispensable to make the first skeleton more complicated by adding another three triad—modal qualifiers, rebuttal and backing (Fig. 1).

In this argumentation model of Toulmin (1999), data (D) provides evidence for claim (C). A warrant (W) certifies the claim as true and bridges the gap between data and claim. A claim is a conclusion and the statement that expresses the view of the main point. A backing (B) supports warrant and enables it convincing enough. A rebuttal (R) acknowledges certain conditions under which claim does not hold water. A qualifier (Q) expresses the degree of certainty in claim. Rebuttal and qualifier in Toulmin model of argumentation anticipate the challenging questions raised by people of different opinions. A backing anticipates a challenge to the legitimacy of warrant.

The famous six-component model, Toulmin model, is quite influential and has been applied to many research areas such as court debate, rhetoric, philosophy, medicine, science, first and second language argumentation instruction. Various modifications of Toulmin model emerge in the process of the wide application, such as Crammond (1998), Qin and Karabacak (2010), Voss (2005), Jackson and Schneider (2018). However, deficiencies in these modified versions and discrepancies of view on certain Toulmin components, for example, warrant and data, are more and more obvious and unavoidable. Solutions have to be found.

Another concern is the study of Chinese written works. The dialectic features of Chinese classical works in ancient times have been studied intensively by many scholars such as Garrett (2013), Lu (1998), Mao (2006), Kirkpatrick (1997), and Jin (2014). Only a few studies have focused on the modern Chinese writing and drawn controversial conclusions about whether modern Chinese writing shares many similarities to English rhetorical paradigm.

For instance, by investigating the Chinese textbooks and teaching materials in middle school, Liu (2005), Wang (1994) and Liu (2021) found some Chinese notions and rhetorical conventions quite different from English rhetoric. Wu (2009) supports the view and avers that "while Western rhetoric is primarily practical without much emphasis on aesthetics, which is the task of literary criticism and poetics, modern Chinese rhetoric is and has always been primarily aesthetic and poetic" (Wu, 2009, p.164). Contrarily, other scholars like Kirkparick and Xu (2012), You (2014), Cheng and Chen (2009) hold a different view. They aver that modern Chinese and English rhetorics have similar concerns in ethical, epistemological and psychological aspects due to the great influence of western rhetoric on Chinese rhetoric. You (2005, p.166) contends that Anglo-American rhetoric has helped "revitalize and retrieve the extremely rich Chinese rhetorical tradition in modern Chinese writing" and thus has enriched modern Chinese rhetoric. Apart from the controversial views of modern Chinese rhetoric, few empirical studies engage with Chinese argumentative essays from logical perspective. Admittedly, there is scanty in the studies of Chinese argumentation in Toulmin perspective.

In view of the inadequacies in the modifications of Toulmin model as well as the scarcity of dialectic analysis of modern Chinese essays, this paper attempts to put forward a new analytical framework for argumentative essays and apply it to the investigation of Chinese written argumentation.

Toulmin model and Composition-rhetoric

As a well-defined model of argumentation, the Toulmin model has been extensively used in composition-rhetoric studies by a great number of researchers. One kind of studies focus on the quality or efficiency of Toulmin components in argumentative discourses. Different measurements of the quality of each basic component were designed (Du, 2017; Siregar et al., 2021; Anada et al., 2018; Sundari and Febriyanti, 2021). Another kind of studies treat Toulmin model as a heuristic tool to teach argumentative writing (Lunsford, 2002; Stapleton and Wu, 2015; Latifi et al., 2020; Liu et al., 2024). Moreover, in order to make Toulmin components more transparent to students, some component names have been changed. For example, "Purdue University Online Writing Lab" uses different names for claim (conclusion, opinion), data (ground, evidence, reasons) and warrant (link, assumption).

We are more interested in these studies which try to modify the original Toulmin model and produce an analytical framework to analyze the students' argumentative essays. The original six-component Toulmin Model seems inadequate in explaining and analyzing modern essays. One of the inadequacies is the difficulty in separating data from warrant and distinguishing warrant from backing on some occasions. Another one is the discrepancy of the components. Qualifiers can be such words or phrases: probably, possible, impossible, certainly, presumably, as far as the evidence goes, and necessarily. The other five components may be sentences, sentence clusters or paragraphs. To put it another way, qualifier is at lexical level while all the other components at discourse level. Thus, new components have been added and the original ones redefined or deleted, for one thing to reveal the complicated nature of the modern argumentative essays written by all kinds of writers, and for another to make it more convenient to conduct comprehensive analyses. A quite influential modification is Crammond's (1998) version. This study expanded qualifier to include not only "modality operators" but also "constraints", divided the backing into "warrant backing" and "data backing", and recognized possible "alternative solution" as

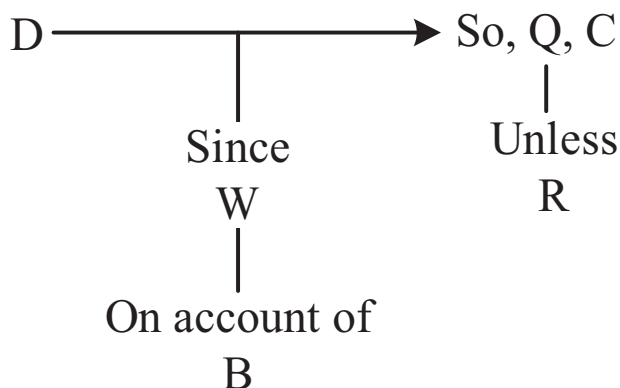


Fig. 1 Toulmin model. It illustrates Toulmin model and is quoted in Toulmin (1999: 104).

well as “countered rebuttal” and “reservation”. The components were classified into necessary and optional. According to Crammond (1998), a claim and the data offered in support of this claim are the elements necessary for an argumentation structure, and warrants together with the remaining substructures are classified as optional or elaborative. Quite a few empirical studies have been conducted within Crammond’s (1998) framework of the modified Toulmin model (Cheng and Chen, 2009; Liu and Wan, 2020; El Majidi et al., 2021). For example, Cheng and Chen (2009) compared the argumentative essays written by Taiwan and American freshmen. Their research results negated cultural difference as a causing factor. Similarly, El Majidi et al. (2021) adopted such components as qualifier of constraint and alternative solutions, and took in the notion of embedded argument, using the term “sub-argument” (i.e., a subordinate argument to back up a superordinate argument).

Despite its popularity in rhetoric and composition studies, Crammond’s (1998) model reveals deficiency in logic and strays away from Toulmin’s argumentation. In (in)formal logic an argument consists of reasons (premises) and conclusion (claim or standpoint), and Toulmin accordingly put claim and data at the same level in his model but placed justification including warrant and backing at a lower level. Thus, Crammond’s (1998) model diverges greatly from Toulmin.

Qin and Karabacak (2010) even changed the components by eliminating warrant, backing and qualifier, and splitting the rebuttal into counterargument claim, counterargument data, rebuttal claim and rebuttal data. Their model consists of six components at the same level. Although his model is widely used to teach argumentation or evaluate the written work of the second language learners, the exclusion of warrant alters the Toulmin model. The reasoning from data to claim is missing. The important component warrant makes up the defining feature of an argument structure, together with claim and data. Compared with Crammond’s (1998) model, Qin and Karabacak (2010) diverge even farther from Toulmin.

The problems of warrant and data

According to Toulmin (1999), warrant can be of different kinds of statement such as rules, principles, and licenses for inference. It is a bridge linking data to claim. The role of warrant is to make sure that the inference from data to claim is sound. However, Toulmin’s description and expression of warrant is still general and vague. That causes many scholars to understand and presume in their own ways. Some scholars believe that warrant is equivalent to the major premise of the syllogism, such as Warren (2010), Jin and Zhao (2016). However, Freeman (2006) takes a different view. He contends that warrant is determined by human intuition. He mentions four kinds of intuition: a priori intuition, empirical intuition, institutional intuition, and evaluative intuition. The four kinds of intuition lead to four kinds of warrant. Take the following statements as examples. (A) is a priori warrant since it involves common sense knowledge. (B) is empirical warrant since it depends on previous experience. (C) is institutional warrant on account of the legal rules and (D) is evaluative warrant because of its moral nature.

- (A) A male is a boy but cannot be an old man at the same time.
- (B) A horse that runs fastest will win the game.
- (C) Drunken driving is illegal.
- (D) Lying is a bad behavior.

Freeman’s discussion is noteworthy and has great influence in the world of informal logic and argumentation theory. However, his examples for illustration are just at sentence level. He does not mention what warrant is like in an actual argumentative essay. That can also be attributed to Toulmin’s examples that display

warrant in the form of rules. People have misunderstanding in that warrant can only be a rule and expressed in a short statement. Toulmin (1999) objected to using formal logic to analyze argumentative discourses. Albeit he used simple expressions or formulas, he just treated that as a starting point as his purpose was to take the readers out of formal logic. To Toulmin, the key point of warrant is how to reach the conclusion. It is almost impossible to answer this question by only one statement in actual writing.

Hitchcock (2005) argues that warrant is not the premise itself but an inference-license that allows an inferring movement from the premise to the conclusion. To put it another way, warrant is the process of inference. In our view, Hitchcock’s understanding is closest to Toulmin’s (1999) description of warrant which answers the question—how do you get there? Liu (2020) avers that warrant can not only be a sentence but also a sentence cluster(s) or paragraph(s). Apart from the four types of warrant, Liu (2020) has found a fifth one—“descriptive warrant”, which can hardly be categorized into any of the four types since it mainly depends on describing, analyzing and even commenting. Descriptive warrant performs the function of warrant to bridge the gap between Data and Claim and to guide the readers step by step to the conclusion, as is the case in Example 2. However, the sample size in Liu (2020) is small and more studies have to be done to examine this type of warrant.

Data, another contentious concept, is interpreted inconsistently. Lunsford (2002, pp. 126–127) divided data into two parts: “evidence” referring to information about various kinds of facts and “reasons” used for interpretations of that “evidence”. Packer and Timpane (1997) further classified the evidence into seven kinds: examples, personal experiences, expert opinions, statistics, common sense, logical analysis and analogy. Hegelund and Kock (1999) identified data from two dimensions: theoretical data and specific data. The former involves theories, concepts, definitions drawn from authorities while the latter comes from textual evidence, conceptual analysis, examples, empirical studies and so forth. Hoeken and Hustinx (2003) came up with four types: individual examples, statistics, expert opinions and causal explanations. However, in our view, some interpretations are overlapped with warrant, for example causal explanation (Hoeken and Hustinx, 2003), logical analysis and analogy (Packer and Timpane, 1997), reason (Lunsford, 2002). In fact, Toulmin et al. (1978) clarified data in his book “An Introduction to Reasoning”, by replacing it with *ground* and defining it as a statement specifying particular facts about a situation to support the claim. The facts “are already accepted as true, and can therefore be relied on to clarify and make good the previous claim, or - in the best case - to establish its truth, correctness, or soundness” (Toulmin et al., 1978, pp. 37-38). For example, “What exactly is it about your brother’s behavior that makes you think he is going mad?” “What particular observations about the spread of infection through the hospital point the finger of blame at the food-service equipment?” (1978, p. 38) In this study we keep loyalty to Toulmin et al. (1978) and separate the two concepts: ground and warrant.

Liu (2022) proposed another analytical framework for argumentative essays, as is shown in Fig. 2. The main argument structure consists of claim, justification and opposition. Justification might include more than one argument that is basically made up of subclaim, data, and warrant. The basic component, warrant, is kept in the analytical framework to keep the basic Toulmin model intact. Backing is merged into warrant, considering that warrant has more significance than backing (Ferris, 1994) and the difficulty of distinguishing the two elements (Jackson and Schneider, 2018). Merging the two components is also conducive to coding in quantitative research. Warrant is classified into five kinds: (A) a priori warrant, (B) empirical

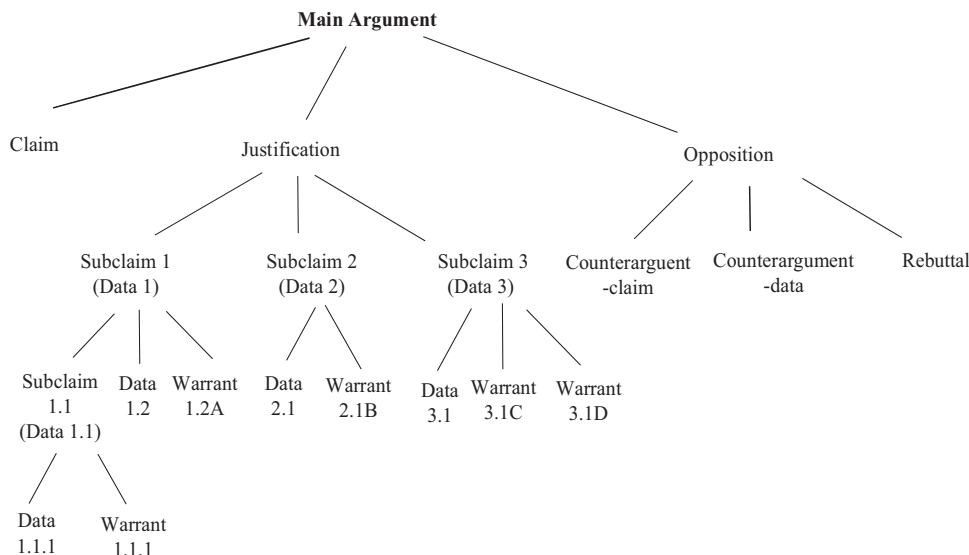


Fig. 2 Analytical framework for argumentative essays (Liu, 2022). This figure displays the complicated hierarchical structures of an argumentative essay.

warrant, (C) institutional warrant, (D) evaluative warrant and (E) descriptive warrant.

However, this model is more like a modification of Crammond's (1998) model or Qin and Karabacak's (2010) model rather than the Toulmin model. A deficiency might be the neglect of the dialogical relationship inside the sub-arguments. A possible solution is to resort to dialectical argumentation model such as van Eemeren's Pragma-Dialectics to improve Toulmin model since Toulmin did not use *argumentation* in his book "The Uses of Argument" and he only used the term *argument* involving only one party. According to Van Eemeren et al. (2018), *argumentation* means a two-party and interactional critical discussion aiming at resolving a difference of opinion by convincing the other party.

New analytical framework

In this section, we put forward a new analytical framework in an attempt to describe argumentative essays. We agree to Crammond's and Voss' view of complicated hierarchical structure inside the Toulmin model. We adopt the term *argumentation* and the idea in Pragma-dialectics, and advance our modification of Toulmin model as an analytical framework. The writer of an argumentative essay is arguing with a potential reader who is skeptical to the writer's view or even holds a different view. There can be several rounds of argumentation and the writer should anticipate and refute some possible grounds, warrants and rebuttals produced by the reader. The writer may employ several parallel grounds to support the claim or use one or more grounds and warrants to back the previous warrant, hence to form a chain of hierarchical argument structures.

We aver that warrant is a segmented discourse consisting of a sentence, or sentence clusters, or even paragraphs. The warrant in an argumentative essay performs the function of explanation, assumption, or comment and so on for the purpose of guiding the readers to get the writer's viewpoint correctly and accurately from the given facts. In our analytical framework as well as in the Toulmin model, the claim is inferred from the ground, via the warrant and even the rebuttal, and modified by the qualifier.

We contend that qualifiers can not only be words and phrases, but also sentences. The function of qualifier corresponds roughly to hedging. Qualifiers can be used not only to present claims tentatively, but also to "put them (claims) into debates in an

uncommitted way, merely for purposes of discussion ... to treat them as serious but conditional conclusions" (Toulmin et al., 1978, p. 90). In actual writing when showing concession by acknowledging the opposite view, we may just put our claim in discussion under certain conditions. Thus, qualifiers cannot be limited to words or phrases. We may write more, e.g., sentences. To illustrate, "Despite that, there is something reasonable in a part of the opponents' words. However..." "The court supported Grandma Wang in her case. Their decision had sufficient legal foundation. But the case of Grandma Wang cannot serve as an example for the old people to demand money from their daughters-in-law". The underlined sentences can be qualifiers and the following sentences express the authors' views. The negative tone is accordingly moderated. By using qualifier, "we cover ourselves and guard against the charge of thinking carelessly, talking loosely, and shooting from the hip" (Toulmin et al., 1978, p. 90). The definition of each component is displayed in Table 1.

The argument structure is called justification-qualifier (J-Q). In order to differentiate the three components in justification from those in opposition, the word "justification" or "opposition" are added to them, for example, justification-ground (J-G) and opposition-ground (O-G). The claim may be sufficiently justified in horizontal and vertical dimensions; thus, justification has width and depth (see Fig. 3). Argument width indicates the number of parallel J-Qs. Argument depth denotes that a J-Q can be backed by another one at a lower level. As is shown in Fig. 3, J-Q1.1 at the first level can be supported by J-Q2.1 at the second level. Theoretically and ideally, there may be n level where n is an integer greater than zero. Backing is excluded in this model since justification at further levels can perform the function of supporting much better than backing alone. Moreover, a J-Q structure at a lower level can not only support the J-W in a J-Q structure at a higher level, but also back its J-G or J-R. For example, J-Q2.2 supports J-G1.n and J-Q2.n supports J-R1.n (Fig. 3).

Furthermore, argumentation can be "an explicit or (in the case of a monologue) implicit discussion between two parties that have a different position with respect to the same proposition" (Van Eemeren and Henkemans, 2017, p. ix). Thus, written argumentation such as an argumentative essay, can be regarded as a critical discussion between the writer and the reader. The writer may predict an opposite position supported by opposition ground (O-G) and opposition warrant (O-W), and even predict opposition rebuttal (O-R). In the same vein as justification, opposition

Table 1 Definitions of components.

Component	Definition
Claim	An assertion in response to a contentious topic or problem.
J-ground (J-G)	Evidence offered in support of a claim. It can take various forms, such as facts, statistics, experience and so on.
J-warrant (J-W)	Explanation or reasons offered to guide the readers to get the writer’s viewpoint correctly and accurately from the given evidence. It can be a sentence, sentence cluster or paragraph.
J-rebuttal (J-R)	Statements in which the writer responds to opposition by pointing out the possible weakness.
Qualifier	Words, phrases, or sentences which can hedge the claim or express concession to moderate the tone or offer condition/restriction
O-ground (O-G)	Evidence offered in support of a counter-claim. It can take various forms, such as facts, statistics, experience and so on.
O-warrant (O-W)	Explanation or reasons offered to guide the readers to get the viewpoint opposite to the writer’s correctly and accurately from the given evidence. It can be a sentence, sentence cluster or paragraph.
O-rebuttal (O-R)	Statements in which the writer expects the opponent’s response to Justification.

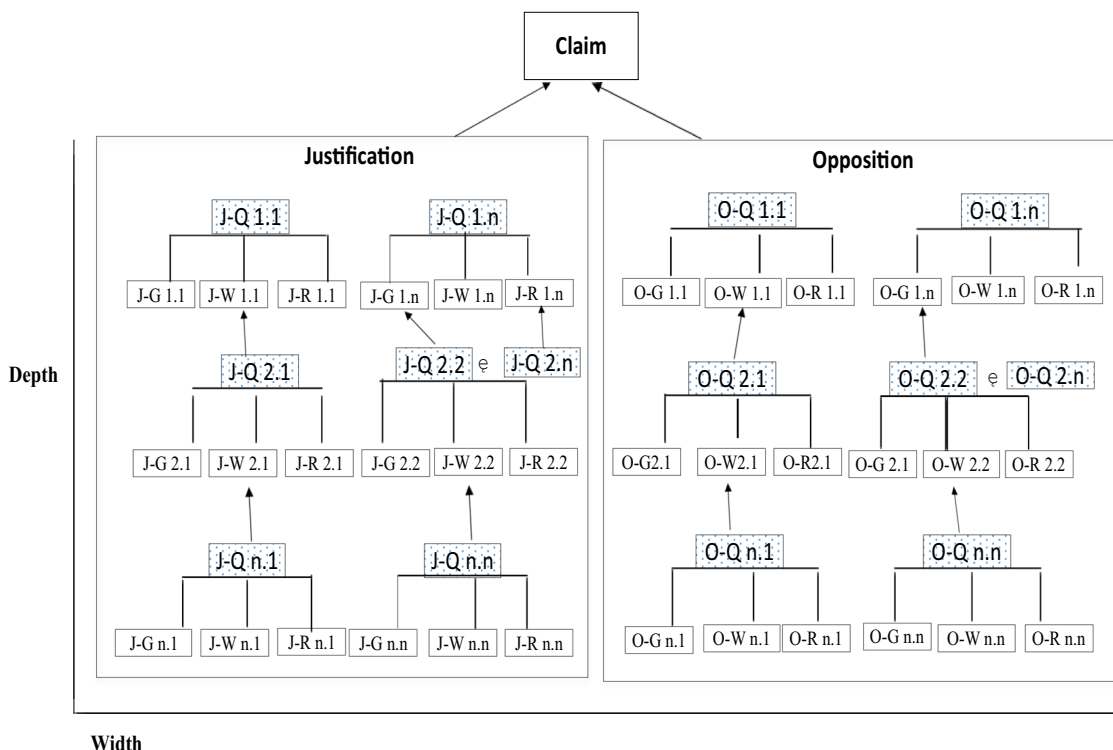


Fig. 3 Proposed analytical framework. The figure demonstrates our proposal of keeping loyalty to the basics of Toulmin model while making modification.

also has depth and width. For instance, O-Q1.1 can be backed by O-Q2.1, and O-Q1.n by O-Q2.2 at the second level, as Fig. 3 displays.

The excerpt of George Orwell’s essays “Why Do We Believe the Earth Is Round (<https://blog.csdn.net/hpdlzu80100/article/details/120196584>)” can be used to illustrate our framework. The author claims “the Earth is round” and imagines some opponents, one of which is Oval Earth man. The excerpt is the argumentation against the oval Earth view. The author proposes four parallel grounds all of which are at the same level. Thus, the J-width is 4 and the J-depth is 1. The author anticipates opposition and interacts with the opponent. The opposition consists of three O-Qs. O-Q1.1 is composed of O-G1.1, O-W1.1 and O-R1.1. Each of the other two O-Qs only has a rebuttal: O-R1.2 and O-R1.3. Therefore, the O-width is 3 and the O-depth is 1. The structure is shown in Fig. 4.

[J-ground 1.1] Against the Oval Earth man, the first card I can play is the analogy of the sun and moon. **[O-ground 1.1]** The Oval Earth man promptly answers that I don’t know, by my own observation, that those bodies are spherical. **[O-**

warrant 1.1] I only know that they are round, and they may perfectly well be flat discs. I have no answer to that one. **[O-rebuttal 1.1]** Besides, he goes on, what reason have I for thinking that the earth must be the same shape as the sun and moon? I can’t answer that one either.

[J-ground 1.2] My second card is the earth’s shadow:**[J-warrant 1.2]** When cast on the moon during eclipses, it appears to be the shadow of a round object. **[O-rebuttal 1.2]** But how do I know, demands the Oval Earth man, that eclipses of the moon are caused by the shadow of the earth? **[J-rebuttal 1.2]** The answer is that I don’t know, but have taken this piece of information blindly from newspaper articles and science booklets.

[J-ground 1.3] Defeated in the minor exchanges, I now play my queen of trumps: the opinion of the experts. The Astronomer Royal, who ought to know, tells me that the earth is round.**[O-rebuttal 1.3]** The Oval Earth man covers the queen with his king. Have I tested the Astronomer Royal’s statement, and would I even know a way of testing

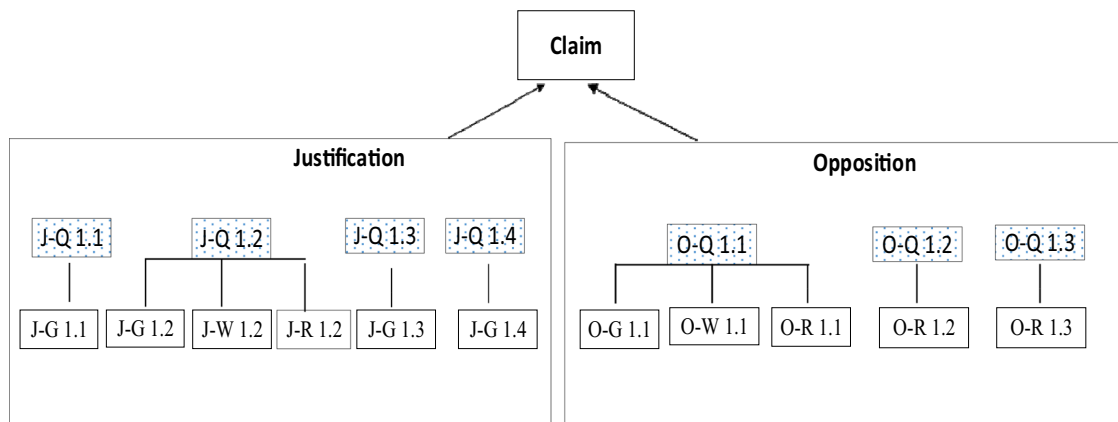


Fig. 4 Diagram of George Orwell's passage. The figure illustrates the argumentative structure of this passage within the proposed analytical framework.

it?[J-ground 1.4] Here I bring out my ace. Yes, I do know one test. The astronomers can foretell eclipses, and this suggests that their opinions about the solar system are pretty sound. I am, to my delight, justified in accepting their say-so about the shape of the earth.

The study

The new analytical framework is designed for investigating argumentative essays. Since the studies of Chinese written argumentation from Toulmin perspective are scarce, the purposes of this study is to test the new model and to find out the features of argumentation that the proficient Chinese writers reveal in their argumentative essays. The research questions of this study are raised as follows:

- (1) How do the Toulmin components represent the argumentation features of the Chinese writers?
- (2) Do they have any preference in argument width and depth?
- (3) Do they have any tendency in Warrant types?

Data source. The Chinese writers refer to the essay writers for newspaper columns and the high school students who were taking National Matriculation Chinese Test (NMCT). Although they wrote Chinese argumentative essays, they had many differences. The first was the freedom of topic selection: the column writers chose their own topics, while the high schoolers had to write on an arbitrary topic. The second was time restriction: the column writers had enough time to reflect and revise while the examinees wrote under time limits. The last difference consisted in writing purpose: the column writers intended to persuade the readers while the high schoolers presumably wanted only to show their competence of reasoning. Our purpose of choosing the two groups of writers was to explore the similarities, the features which could be generalized to Chinese argumentation. We hypothesized that Chinese argumentative essays shared some features despite the heterogeneity of the writers.

We used as data source Southern Weekend, Southern Urban Daily and Guangming Daily, since those newspapers are more frequently read and more influential than other newspapers. The most important reason consists in their “opinion” or “comment” column which embodies argumentation. We set the time span between June of 2019 and June of 2020 and selected 30 essays in the “opinion” or “comment” column which have disputable topics covering artificial intelligence, education, family, consumption, and culture. The essays were written by different authors to avoid the repetition of the same style or writing habit.

We chose 30 full-score compositions in NMCT in China from “Composition Web (Zuowen Wang) (<https://www.zuowen.com/gaokaozw/manfen/>)”. The compositions at this website are open access to the netizens and serve as models for the students preparing for NMCT. Those compositions of the high schoolers also have disputable topics. The time span is longer, from 2011 to 2020. For one reason, NMCT took place just once a year in China and the given topic in the examination was not always contentious. In order to collect the same number of full-score compositions as that of the newspaper essays, we had to search the sources in the past years. For another, the genre of argumentation was not included in NMCT before 2011 on the “Composition Web”.

Data collection. Our analytical framework includes eight Toulmin components: claim, J-ground, J-warrant, J-rebuttal, O-ground, O-warrant, O-rebuttal and qualifier. The eight components were identified and their frequencies were collected from the two groups of essays.

The identification of the Toulmin components relied heavily on the logic and meaning in an essay. Apart from that, linguistic devices were treated as the cues for identifying different elements. Two linguistic patterns were employed to identify Claims: (a) assertions with certainty such as “Without doubt (*hao wu yi wen*)”, “Obviously (*hen ming xian*)”; and (b) statements with such metadiscourse as “personally, I think (*wo ge ren ren wei*)”, “in my opinion (*wo de guan dian shi*)”. To identify Grounds, phrases like “for example (*bi ru*)”, “for instance (*bi fang shuo*)” are suggestive. Warrants can be signaled by explicit connectives or prepositional phrases such as “since (*you yu*)”, “because (*yin wei*)”. However, Chinese language is considered as paratactic since there are not many cohesive devices in a text. In general, semantic and logical considerations served as the major way of identification, and functional expressions as an auxiliary method. For instance, in Ex.1 the three meanings of “*he*” were treated as one segment instead of three separate segments, considering the phrase “for one reason”.

The procedure of doing identification and annotation is as follows: claim > J-ground > J-warrant > J-rebuttal > O-ground > O-warrant > O-rebuttal > qualifier. Once a component was identified, annotation with the name and number in brackets was written before it, such as [J-ground 1.1], [J-warrant 2.1]. We observed the following principle in counting the frequency of claim: if there is a claim in an essay, then the frequency is 1; if the claim is repeated in different places of the essay, the frequency is still 1. As for the other components, the total number of each component in each essay was collected. The calculation of J-width

Table 2 Frequencies of Toulmin components.

Components	All Chinese writers	
	Mean	SD
Claim	0.99	0.09
J-ground	7.82	3.41
J-warrant	2.42	0.92
J-rebuttal	0.70	0.90
O-ground	0.52	0.95
O-warrant	0.23	0.60
O-rebuttal	0.40	0.76
Qualifier	0.23	0.45
J-width	2.81	1.09
J-depth	1.07	0.17
O-width	0.68	0.68
O-depth	0.48	0.51

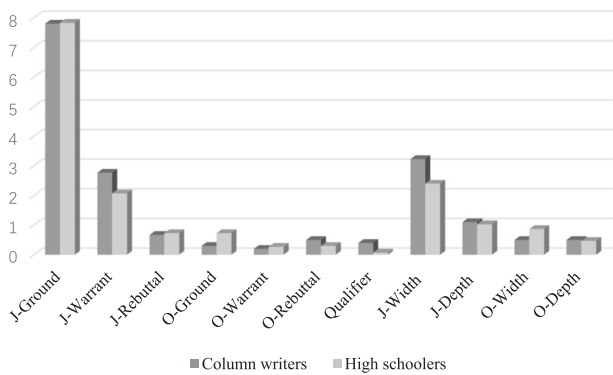


Fig. 5 Bar graph of Toulmin components used by the two groups. The figure displays the comparison between the column writers and the high schoolers.

Table 3 Comparison of Toulmin components between the two groups.

Components	Column writers		High schoolers		Z-value
	mean	SD	mean	SD	
J-ground	7.80	2.96	7.83	3.85	0.11
J-warrant	2.77	0.73	2.07	1.11	2.82**
J-rebuttal	0.67	0.88	0.73	0.91	0.34
O-ground	0.30	0.65	0.73	1.26	1.62
O-warrant	0.20	0.55	0.27	0.64	0.38
O-rebuttal	0.50	0.82	0.30	0.70	1.16
Qualifier	0.40	0.72	0.07	0.25	2.35*
J-width	3.23	1.14	2.40	1.77	2.15*
J-depth	1.10	0.31	1.03	0.18	1.03
O-width	0.50	0.68	0.87	1.31	0.75
O-depth	0.50	0.51	0.47	0.51	0.26

*p < 0.05; **p < 0.01.

depends on the number of parallel J-ground while J-depth depends on the number of J-ground at different levels.

The identification and data collection were done twice by the first author who had done the identification of Toulmin components for five years, with one month as an interval, to make the work as accurate as possible. The intra-coder consistency of each component is as follows: claim 100%, J-ground 90%, J-warrant 85%, J-rebuttal 97%, O-ground 100%,

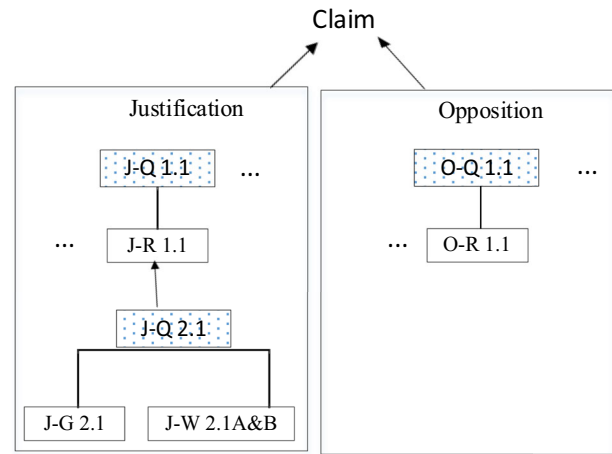


Fig. 6 Structure of J-R hierarchy of Example 1. The figure illustrates the hierarchical structure of Rebuttal in Justification side by using the proposed analytical framework.

O-warrant 95%, O-rebuttal 100%. As for the inconsistent identification, double checking was done before the final annotation was decided. To do comparisons, Mann-Whitney U test was employed for inter-group comparisons while Wilcoxon test was used for intra-group comparisons.

Research results

The frequencies of Toulmin components are shown in Tables 2–4. As can be seen in Table 2, almost each essay has a claim, far more J-grounds than J-warrants (7.82 > 2.42) while the frequencies of the other components are below one, with O-warrant and qualifier the lowest. Moreover, J-width overrides the J-depth (2.81 > 1.07).

Figure 5 demonstrates visually the comparison of Toulmin components used by the two groups. Table 3 shows that no significant difference is found in the use of Toulmin components except J-warrants and qualifiers. Generally speaking, the two groups of writers had more similar features in their writing. These results also reveal that the two groups did not link every J-ground to claim, leaving far more J-grounds unlinked, although the column writers could establish the link between J-ground and claim better than the high schoolers.

Admittedly, the column writers were found more distinguished in using qualifiers. Skillful Chinese writers are expected to avoid direct confrontation and their tone is expected to be moderate. They tended to first acknowledge the opposite view and then put forward their own claim or refuted an opposite view. In Ex. 1 the writer first approved the general O-rebuttal and then refuted the view by narrowing the topic to the way of packaging mooncakes among the upper class in ancient China. As the writer based the rebuttal on the same cultural value as the opponent’s, the essay is more persuasive. J-rebuttal1.1 is not a single sentence, but a cluster of sentences constituting an argument structure J-Q2.1 which includes J-ground2.1, J-warrant2.1 A and J-warrant2.1B, as is shown in Fig. 6. However, the research result here cannot be attributed solely to the writing proficiency since the two groups had other differences such as topic, time restriction, context.

Ex. 1

[O-rebuttal 1.1] Some people may aver that the cultural creation on mooncakes embodies the inheritance of culture.[Qualifier] Yes. This cannot be denied. [J-rebuttal 1.1][J-ground 2.1] However, even the mooncakes in the ancient royal household were packed mainly in food boxes.[J-warrant 2.1 A] For one reason, “He (box)”is

Table 4 Comparison between width and depth.

	Column writers	High schoolers	All writers
J-width and J-depth	6.83***	3.77**	6.61***
O-width and O-depth	0.38	0.58	0.76

p < 0.01; *p < 0.001.

Table 5 Warrant types used by the two groups.

Warrant type	Column writers		High schoolers		Total	
	Frequency	%	Frequency	%	Frequency	%
a priori	5	6%	4	8%	9	6%
empirical	19	23%	5	8%	24	17%
institutional	23	28%	1	2%	24	17%
evaluative	10	12%	26	41%	36	25%
descriptive	26	31%	26	41%	52	36%
total	83	100%	62	100%	145	100%

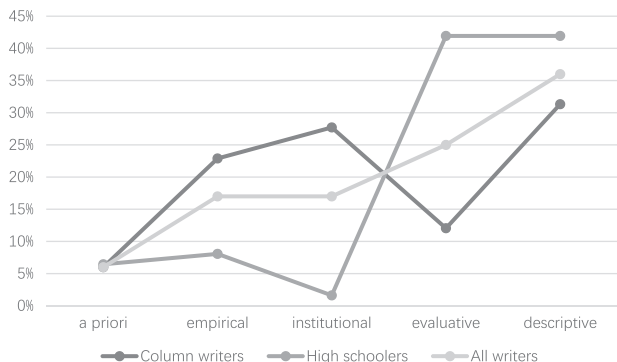


Fig. 7 Line chart of Warrant types used by the two groups. The figure displays the frequencies of five kinds of Warrants used by the column writers and the high schoolers.

pronounced in the same way as “He (harmony)”, “He (unitedness)” and “He (congratulation)” which denotes auspiciousness. [J-warrant 2.1B] For another, the box could be reused later to contain other things in daily life. Thus, the mooncakes were not overpackaged. (Ding, 2019)

Table 4 displays that all the Chinese writers had statistical difference between J-width and J-depth despite the inter-group difference in J-width shown in Table 3. Compared with J-depth, both the column writers and the high schoolers prefer J-width, using more J-grounds to support the claim. However, neither of them showed any significance difference between O-width and O-depth.

When it comes to warrant types, Table 5 and Fig. 7 display that the Chinese writers’ primary preference is descriptive type (36%). The two groups displayed consistency even though they were different in age, proficiency, writing purpose, and time restriction. For instance, Ex. 2 has two levels and thus the J-depth is 2. The writer explains why poor quality of products causes the crisis of trust. The customers’ comments are used as J-ground2.1 to support J-ground1.1. The descriptive warrant1.1 explains the reason why the customers buy those poor products and give positive comments and by speculating the consequence of the betrayed kindness. The structure is shown in Fig. 8.

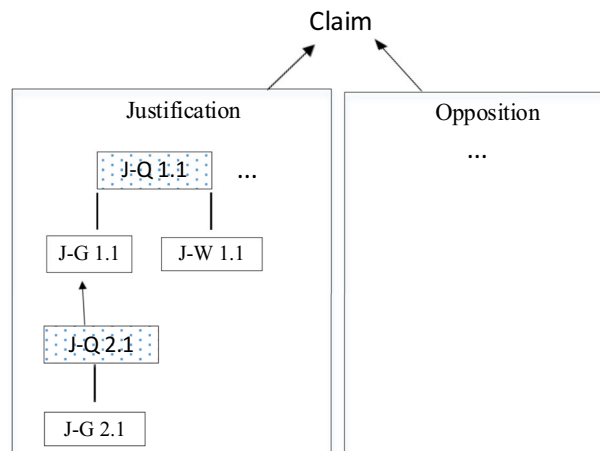


Fig. 8 Structure of Example 2. The figure illustrates the hierarchical structure of Example 2 by using the proposed analytical framework.

Ex. 2

[J-ground 1.1] Another problem is the crisis of trust caused by the poor quality of products. [J-ground 2.1] Below those marketing articles are usually such comments as “Although I found several rotten ones when I received the fruit, I still gave favorable comments”, “I bought the fruit for the purpose of offering support. Hope they are sold out soon”. [Warrant 1.1] Just because of such words as “helping the peasants” appear in the advertisements, many consumers’ purpose of purchase changes from consuming the products to satisfying their affection—helping people by consumption. They never care about the quality of the products even if the actual products are not as good as the advertisement claims. But when they realize all that they have seen is just marketing and being unsalable is a lie to cover poor quality of the products, they feel their kindness betrayed and finally they are harmed deeply. (Liao, 2019)

Discussion on Chinese argumentative essays

Distinguished features in the use of Toulmin components. The results reveal that the Chinese writers did not link every ground to claim although we expanded the scope of warrant by categorizing Hoeken’s and Hustinx’s (2003) causal explanation, Packer’s and Timpane’s (1997) logical analysis and analogy into warrant in our identification work. The modern Chinese writing is still not as explicit as expected despite the influence of Anglo-American rhetoric (You, 2014) and western writing framework on the Chinese writing paradigm (He, 2014) for several decades. It can be speculated that culture may be still considered as a highly probable factor that affects writing conventions and the way of interaction. In the eyes of the Chinese, intelligent people have an outstanding ability both to write in an obscure and implicit way, and to understand unstated things (Ye, 2013). For example, only a few resourceful people who excelled at reasoning could grasp the essentials in ancient Chinese books written by intelligent people because the books were full of implicit expressions and even unconnected sentences.

Writing is a kind of interaction between the writer and the potential reader. “Such interaction might be considered to be enhanced when readers are provided with opportunities to infer the intentions of the writers as is done in reader-responsible prose” (Loi and Evans, 2010, p. 2819). Accordingly, our research result denotes that such interaction in the Chinese argumentation is active and demands more brainwork of the reader since the

scarcity of warrants might motivate the reader to think, infer and get the most of the writer via reading carefully. To put it another way, the absence of warrant in an essay does not mean that the writer's claim is unwarranted. The ancient Chinese rhetoric did not encourage detailed and long argumentation. For example, Confucius' *Analects* encouraged gentlemen to be "prompt in action but prudent in speech". The *Analects* consists of almost all the dialogues between Confucius and his students and the dialogues are short, succinct and thought-provoking. Wang Yangming's *Instructions* is another example. Although they are different from Plato's *Republic* which was developed in full length, those short dialogues are also argumentation, an interaction (Liu and Tang, 2015). This kind of interaction differs from the framework put forward by Jackson and Schneider (2018), in which more than one warrant is provided to explain the same ground to support the claim. In their framework the writer takes more responsibility for smooth interaction.

Qualifier is defined as concession or acknowledging opposition in our study, a kind of strategy to moderate the contradiction. The column writers' higher frequency of qualifier might reveal that as cognitively mature and socially experienced writers they are more skillful at maneuvering this strategy than the high school students. In Chinese society, being sophisticated and pliable means socially mature. Such sophistication is embodied in social communication, like avoiding straightforwardness, expressing disapproval indirectly, or never expressing criticism. Straightforwardness in communication must be regulated by propriety; otherwise, it will often cause rudeness, interpersonal conflict, and social disruption (Ye, 2013). In this sense, the Chinese traditional cultural convention coincides with Toulmin's qualifier.

More closely related to this culture are the low frequencies of oppositional components. Opposition is generally viewed by western logicians, dialecticians, and rhetoricians as obvious evidence of reader consideration and therefore the use of these components can in a sense strengthen the persuasiveness of an argumentative essay (Wolfe et al., 2009; Van Eemeren et al., 1996). However, the frequency of oppositional components must not be used as a measurement to examine the persuasiveness of the Chinese argumentation, due to the particularity of culture. It would be unfair to underestimate the Chinese expert writers without considering the cultural context. Rhetoric and writing conventions should be considered as a causing factor in different cultures. Modern Chinese argumentation puts much more emphasis on justification (e.g., using more grounds) than opposition so as to reinforce persuasiveness, although according to Ye (2013), both Taoism and Confucianism stress achieving balance to avoid extremes. "In persuasive writing, the Chinese would write favorably about both sides to achieve agreement because the *Yin* and *Yang* idea subtly plays a decisive role in shaping the way people think and say things" (Ye, 2013, p. 42). But our research result goes against this presumption. The modern writers would not like to observe the traditional writing convention, neither do they conform to the western rhetorical convention as claimed by You (2014).

Argumentation sufficiency and Warrant types. Generally speaking, the Chinese writers, especially the column writers, prefer argument width to depth. The column writers' essays have greater J-width than the high school students'. They used more parallel arguments to support the claim directly, i.e., these arguments are arranged horizontally. The expert writers have more ideas because they are socially experienced and are rich in ideas. Chinese textbooks for composition put much emphasize on the sufficiency of arguments and even the college students in the

interviews agreed on such a criterion of good essay (Liu, 2021). Thus, the writing instruction might be an affecting factor. It can be seen that our results do not corroborate Kirkparick and Xu (2012, p.139) who contend that Chinese writers have a "preference for chain-reasoning" (i.e., J-depth in this study). Their examples are mainly oral discourse except for one paragraph written by Lu Xun, one of the greatest contemporary writers and thinkers in China. But one paragraph written by one author cannot represent a tendency, but just reveals idiosyncratic features of writing.

With regard to warrant types, the Chinese writers, whether expert or novice, prefer descriptive warrant that is "probably particular to Chinese argumentation" (Liu, 2020, p. 92). This empirical study supports Liu's (2020) view. Chinese argumentative essays prefer homiletic reasoning. In the descriptive warrant, the writers subjectively and even emotionally explain and analyze Ground, make assumptions and even imagination. Whereas such a warrant does not concord to Toulmin's definition and different from his examples, it occurs genuinely in actual argumentative writing. The actual Chinese essays are not artificial but natural data source laden with cultural features. Although human beings share some rhetoric conventions, a certain culture might reinforce one of the conventions and hence make it more obvious than in other cultures. We have no intention to uphold relativist view (e.g., the two extremes of high/low context, reader/writer responsible language or direct/indirect thinking). Some logicians such as Xiong and Lu (2016), Ju and He (2014), propose broadening the scope of logic by taking cultural factor into consideration. Their view is reasonable. In Chinese culture, people tend to make judgement according to correlation among things. Chinese writers are apt to mix argumentation with narration and description. Zhu (2018) attributes it to the isomorphism in Chinese language that affects consequently thinking. Isomorphism refers to the Chinese sentence structure that begins with a topic and whose other parts are (loosely) related to the topic. As a result, it is hard to separate inference from narration and description, as is the case in descriptive warrant. That differs from English sentence structure whose predicate must agree with the subject logically and grammatically.

Conclusion

Although many versions of modified Toulmin models have been proposed in composition-rhetoric, they show a wide divergence from Toulmin model. It is advocated in this paper to keep balance between modification and loyalty to Toulmin's argumentation. With van Eemeren et al.'s pragma-dialectic view infused into the Toulmin model, the new analytical framework demonstrates the complexity and hierarchies of argumentative essays. By applying this framework to analyze the modern Chinese argumentative essays, we have found the following features: (1) The Chinese writers did not invariably provide a warrant for every ground and thus the writing is not as transparent as some scholars claim in their studies. This kind of reader-writer interaction involves more active engagement of the reader. (2) The Chinese writers put much more weight on justification than on opposition in that they preferred using more parallel arguments to support the claim so as to achieve persuasiveness. (3) Descriptive warrant, a mixture of inference and description, is the Chinese writers' favorite type.

Those findings cannot be explained without taking cultural factor into consideration. Chinese rhetoric has been and is still being influenced by many factors, and accordingly Chinese argumentation as a part of rhetoric is evolving. Modern Chinese written argumentation is no longer what the studies in 20th century found, such as Kirkpatrick (1997). It neither keeps the features of ancient classical works, nor has been assimilated to

modern English rhetoric. As Wu (2009, p.164) avers, “by selectively adopting components and notions from Japanese and Anglo-American rhetorical traditions, modern Chinese have found new terminologies and theories to develop their own rhetoric, a tradition they continue to esteem, practice, and build upon”. More importantly, our analytical framework has been proved to reveal actual argumentative essays. It is not employed as a measure to make evaluation, but as a tool to make description.

The analytical framework is not designed solely for Chinese essays. It is hoped to be applied to other written argumentation in Asian contexts or European-American contexts. The features of Chinese essays found in this study can also be used as references in the studies of the essays written in other languages. However, the major limitation of this study is the lack of comparison in different contexts. More application studies or comparative rhetoric studies should be done for testing and generalization in the future.

Data availability

The datasets generated and analyzed during the current study are available from OSF https://osf.io/vbh3t/?view_only=f082b48ad49c4d10943b56e529b1d22. These datasets were derived from the following public domain resources. Full-score essays in National Matriculation Chinese Test: <https://www.zuowen.com/gaokaozw/manfen/>. Column essays in Southern Weekend: <https://blog.csdn.net/hpdlzu80100/article/details/120196584>. Southern Urban Daily: https://news.southcn.com/node_64549305f1/. Guangming Daily: <https://guancha.gmw.cn/>.

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References

- Anada RP, Arsyad S, Dharmayana IW (2018) Argumentative features of International English Language testing system (IELTS) essays: a rhetorical analysis on successful exam essays. *Int J Lang Educ* 2(1):1–13
- Cheng F, Chen Y (2009) Taiwanese argumentation skills: contrastive rhetoric perspective. *Taiwan Int ESP J* 1(1):23–50
- Crammond J (1998) The uses and complexity of argument structures in expert and student persuasive writing. *Writ Commun* 15(4):230–268
- Ding S (2019) Mooncakes carrying culture shouldn't be over packaged. *Southern Metropolis Daily*, September 1
- Du F (2017) The analysis of argument-counterargument structure in Chinese EFL learners' argumentative writing. *J Stud Educ* 7(3):121–129
- El Majidi A, Janssen D, de Graaff R (2021) The effects of in-class debates on argumentation skills in second language education. *System* 101:102–116
- Ferris DR (1994) Rhetorical strategies in student persuasive writing: differences between native and non-native English speakers. *Res Teach Engl* 28:45–62
- Freeman JB (2006) Systemizing Toulmin's warrants: an epistemic approach. *Argumentation* 19:331–346
- Garrett M (2013) What need is there of words? The Rhetoric of Lu's. *Ann RHETORICA* 30(4):354–374
- He T (2014) *A Brief History of Chinese Writing Conventions*. Qinghua University Press, Beijing
- Hegelund S, Kock C (1999) Macro-Toulmin: the argument model as structural guideline in academic writing. *OSSA Conf Arch* 25:231–256
- Hitchcock D (2005) Good reasoning on the Toulmin model. *Argumentation* 19:373–391
- Hoeken H, Hustinx LGMM (2003) The relative persuasiveness of anecdotal, statistical, causal, and expert evidence. In FH van Eemeren, JA Blair, CA Willard (eds) *Proceedings of the Fifth Conference of the International Society for the Study of Argumentation*. Sic Sat, Amsterdam: 497–502
- Jackson S, Schneider J (2018) Cochrane Review as a “Warranting Device” for Reasoning about Health. *Argumentation* 32:241–272
- Jin L, Zhao J (2016) Logical analysis of the analogy based on Toulmin model. *Fujian Forum (humanity and social sciences version)* (1): 81–86
- Jin R (2014) The theory of Tuilei and the justification for the characteristics of ancient Chinese logic. *Soc Sci* (4):127–136
- Ju S, He Y (2014) Study of the logic in ancient China from the perspective of broad argumentation: argumentation by composing poems in Spring and Autumn Period. *Philosophical Researches* (1):102–110
- Kirkparick A, Xu Z (2012) *Chinese Rhetoric and Writing: An introduction for language teachers*. The WAC Clearinghouse, Fort Collins
- Kirkpatrick A (1997) Traditional Chinese text structures and their influence on the writing in Chinese and English of contemporary mainland Chinese students. *J Second Lang Writ* 6(3):223–244
- Latifi S, Noroozi O, Talaei E (2020) Worked example or scripting? Fostering students' online argumentative peer feedback, essay writing and learning. *Interact Learn Environ* 31(2):655–669
- Liao Y (2019) Be Aware of marketing with misery. *Southern Weekend*, August 29
- Liu L (2005) Rhetorical education through writing instruction across cultures: a comparative analysis of select online instructional materials on argumentative writing. *J Second Lang Writ* 14(1):1–18
- Liu D (2020) Toulmin Element “Warrant” and Modern Chinese Argumentative Discourse. *Contemporary Rhetoric* (3): 86–95
- Liu D (2021) Comparative rhetorical approach to Chinese expository paragraphs. In: Lloyd K (ed) *Routledge Handbook of Comparative World Rhetorics*. Routledge, Philadelphia, p 206–216
- Liu D (2022) New Modification to Toulmin Model as an Analytical Framework for Argumentative Essays. In: Chen Y, Zhang S (eds). *Artificial Intelligence Logic and Applications*. AILA 2022. *Communications in Computer and Information Science* 1657. Springer, Singapore, p 211–224
- Liu D, Gan Q, Ma H (2024) Activating argumentation schema to write argumentatively and tactfully. *Acta Psychologica* 246
- Liu D, Wan F (2020) What Makes Proficient Writers' Essays More Persuasive?—A Toulmin perspective. *Int J TESOL Stud* (1):1–13
- Liu Q, Tang X (2015) Bellicose language is still constraining us—a dialogue on public argumentation culture. *Adv Same Boat* (4):8–12
- Loi CK, Evans MS (2010) Cultural differences in the organization of research article introductions from the field of educational psychology: English and Chinese. *J Pragmat* 42:2814–2825
- Lu X (1998) *Rhetoric in Ancient China, Fifth to Third Century B C E*. University of South Carolina Press, Columbia
- Lunsford KJ (2002) Contextualizing Toulmin's model in the writing classroom: a case study. *Writ Commun* 19(1):109–174
- Mao L (2006) *Reading Chinese Fortune Cookie: The Making of Chinese American Rhetoric*. Utah State UP, Logan
- Packer NH, Timpane J (1997) *Writing worth reading: The critical process*. Bedford /St. Martin's, New York
- Qin J, Karabacak E (2010) The analysis of Toulmin elements in Chinese EFL university argumentative writing. *System* 38:444–456
- Siregar RN, Syarif H, Amri Z (2021) An Analysis of Argument of Students' Argumentative Essay by Using Toulmin Model. In *Eighth International Conference on English Language and Teaching (ICOELT-8 2020)*. Atlantis Press: 98–102
- Stapleton P, Wu Y (2015) Assessing the quality of arguments in students' persuasive writing: A case study analyzing the relationship between surface structure and substance. *J Engl Acad Purp* 17:12–23
- Sundari H, Febriyanti RH (2021) The analysis of Indonesian EFL argumentative writing using Toulmin's model: The structure and struggles from the learners. *J Engl Lang Teach* 5(2):67–78
- Toulmin S, Rieke R, Janik A (1978) *An Introduction to Reasoning*. Macmillan Publishing Co, Inc, New York
- Toulmin S (1999) *The Uses of Argument* (updated edition). Cambridge University Press, Cambridge
- Van Eemeren FH, Garssen B, Krabbe ECW et al. (2018) *Handbook of Argumentation Theory*. Springer, New York
- Van Eemeren FH, Henkemans AFS (2017) *Argumentation: Analysis and evaluation*, 2nd edition. Routledge, New York
- Van Eemeren FH, Grootendorst R, Henkemans FS (1996) *Fundamentals of Argumentation Theory*. Laurence Erlbaum Associates, Mahwah
- Voss JF (2005) Toulmin's model and the solving of ill-structured problems. *Argumentation* 19:321–329
- Wang X (1994) Writing concepts in Chinese writing instruction. *Issues Appl Linguist* 2:211–229
- Warren JE (2010) Taming the warrant in Toulmin's model of argument. *Engl J* 99(6):41–46
- Wolfe CR, Britt MA, Butler JA (2009) Argumentation Schema and the Myside Bias in Written Argumentation. *Writ Commun* 26(2):183–209
- Wu H (2009) Lost and found in translation: modern conceptualization of Chinese Rhetoric. *Rhetor Rev* 28(2):148–166
- Xiong M, Lu Y (2016) The Rationality and Logic for Confucian Philosophical Argumentation (Chinese). *Journal of Sichuan Normal University (Social Sciences Editions)* 43(3):18–26

- Ye W (2013) Achieving Coherence in Persuasive Discourse: A Study Of Chinese ESL Undergraduates in The United States. Unpublished dissertation, Indiana University of Pennsylvania
- You X (2014) A comparative-rhetoric view of contrastive rhetoric. *J Second Lang Writ* 25:116–117
- You X (2005) Conflation of Rhetorical traditions: the formation of modern Chinese writing instruction. *Rhetor Rev* 24(2):150–168
- Zhu H (2018) *Exploring Intercultural Communication: Language in Action*. Taylor & Francis Group, New York

Author contributions

The first author Donghong Liu did conception, data collection and analysis, drafting, drawing the figures, and revising the manuscript. The second and corresponding author Minghui Xiong did conception, designing and drawing Fig. 3 and revising the manuscript.

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Competing interests

The authors declare no competing interests.

Ethical approval

Ethical approval was not required as the study did not involve human participants. The data source and the examples used are from the open sources online.

Informed consent

Informed consent was not required as the study did not involve human participants.

Additional information

Correspondence and requests for materials should be addressed to Minghui Xiong.

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