A survey study on motivations for citation: A case study on periodicals research and library and information science community in China[①]

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Abstract   A large number of theoretical and empirical studies on citation behavior have been conducted internationally. Although some theoretical studies on such topic have been carried out in China, few studies have focused specifically on this area from an empirical perspective, resulting in the lack of literature on the findings of actual surveys. To address this challenge, we conducted two questionnaire surveys to understand the motivations of the researchers on citation. One survey covers the authors who published articles in *Chinese Journal of Scientific and Technical Periodicals*, while the other targets the most productive and most cited Chinese authors in library and information science. The results show that citation behavior is not only motivated by rational factors, but also by other social factors.

Keywords   Citer, Motivation for citation, Questionnaire survey, Reference

1   Introduction

In his pioneering paper published in 1927, Gross et al.[1], for the first time, used citation counts to evaluate the importance of scientific research. However, it was not until 1960s when SCI was introduced that accessing the citation data has become much easier. Since then, various kinds of citation analyses have been conducted for assessing the national science policies and disciplinary development, the strength of research institutions and laboratories, the quality of books and journals, and the academic achievements of individual scientists. In many cases, the number of citations to peer reviewed papers was used to measure the impact of the work of scientists on the scientific community, as high quality work by a scientist will trigger more responses (citation) from scientific colleagues than low quality work[2].

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The use of citation counts as an indicator for research impact is appropriate only in the following situations: The citation of a document does mean that the citing author used that document; the citation of a document reflects the merit (quality, significance, impact) of that document; and citations are made to the best possible works[3]. Citation counts do not yield insight into the authors' motives for their citing behavior, nor do they tell us what informational unit they are targeting in the cited work[4].

To date, many studies have investigated the question as to the extent to which scientists cite works based on those premises or the reasons that they are motivated to cite certain publications. Content analysis method was often applied to examine the extent of scientists in citing literature; while empirical studies, including postal surveys or face-to-face interviews, have been used to learn the motivation of scientists in citing documents.

A large number of theoretical and empirical studies have been conducted on citation behavior in the international arena. In China, although some theoretical studies on this topic have been undertaken, few empirical studies have ever been launched. This has led to the lack of literature on the findings of actual survey in this area. To fill in this gap, we conducted two questionnaire surveys to learn about the motivations of the individual scientists on citation. One survey covers the authors who published articles in the *Chinese Journal of Scientific and Technical Periodicals*, while the other aims at the most productive and most cited Chinese authors in library and information science.

2　Review of literature about citation behavior

In terms of methodology for the over 30 international studies on citing behavior (with relevant results reported in about 40 publications), they are generally classified into 4 categories: 1) Context analyses of citations in citing documents; 2) content analyses of citations to characterize the cited work; 3) citer motivation surveys or interviews; and 4) studies on the motivations of scientists for non-citing[2].

Garfield[5] published the earliest paper on this topic, which listed 15 possible motivations of citers on the basis of their observed location in the text, their language content, their variations, differences, and regularities in patterns of use. Later, Lipetz[6] divided the different citing behaviors into various types. Although the two authors did not conduct empirical studies and failed to give detailed information on the frequencies of the occurrence of the postulated types of citing, they expounded the concept of motivation of citation, which, in turn, triggered a number of subsequent, empirical investigations on citing behavior.

Brooks[4,7] was the first researcher to ask scholars directly about their particular motivations for specific citations. On the basis of interviewing the authors who had

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recently published academic papers and represent a wide spectrum of university departments (e.g., anatomy, computer science, and education) about their citation motives, Brooks classified the citer motivations named by the authors into three groups: 1) Persuasiveness, positive citation, for communication and social consensus; 2) negative citation; and 3) reader alert and operational information. At the same time, Vinkler[8] surveyed 20 authors of articles on chemistry at the Central Research Institute for Chemistry (CRIC, now Chemical Research Center, Budapest, Hungary) on their citing motivations. The scientists were asked to assess their motivations for a total of 484 citations in their articles (totally 20 articles) according to predefined categories. He categorized the motivations into two major groups: 1) Professional motivations, related to theoretical and practical content of the cited work; and 2) connectional citing behavior, motivated by the wish to build social relationships in the scientific community.

Cano[9], by asking a group of scientists working in the field of structural engineering ($n = 42$), classified the citations ($n = 344$) that they had made in two of their recent papers according to the citing behavior definitions proposed by Moravcsik and Murugesan[10]. The results showed that there were 5 major types of citing motivation with a relatively higher proportion: 1) Paying homage to the existing findings (26%); 2) truly useful to help understand the source texts (21%); 3) closely related with each other for the cited text and source text in terms of concept or theory (19%); 4) using the tools or technologies mentioned in the cited literature (12%); and 5) advancing of the cited text (14%) by the source text.

In a survey by Bonzi and Snyder[11], 51 faculty members in natural sciences of the State University of New York College (NY, USA) and Syracuse University (NY, USA) were asked why they chose to cite the literature of themselves and others. The results indicated that "there are no significant differences in the motivations for citing between self-citations and citations to other works". Liu[12] surveyed 415 scientists who had published papers in Chinese Physics between 1981 and 1987. Each scientist was asked to state the proportion of cited works that he or she considered to be essential to his or her research, and the results suggested that "only a minority of scientists said that more than 80% of their citations were essential". Shadish et al.[13] sampled several hundred citations from papers in physics journals and surveyed the authors of these papers about their motivations for citing. The questionnaire contained about 30 pre-listed motivations for citing. They made a factor analysis of the responses to examine patterns among the items and extracted several factors.

Case and Higgins[14] also examined motivations for citing highly-cited papers. They identified all the works of two highly-cited scientists in the discipline of communication studies. All of the authors who cited them ($n = 55$) between 1995 and 1997 were asked the reason that they had cited the works. It was found that

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great differences exist in the proportions of citing motivations for less-cited and highly-cited documents. Tang[15] investigated a total of 49 authors in biology and 50 authors in psychology. The respondents were asked to assess the importance, reason for citation, and relationship to the cited author for each cited reference in his or her own recently published empirical article. The result showed that the importance of cited text to source text depends on various factors.

However, we are not able to ensure the credibility of the above-mentioned studies because they widely vary in design, and their results can hardly be replicated. Many of the studies have methodological weaknesses. Furthermore, there is evidence that the different motivations of citers are "not so different or 'randomly given' to such an extent that the phenomenon of citation would lose its role as a reliable measure of impact". To the best of our knowledge, there is little empirical work in domestic literature. So it is hard to ascertain whether the citing motivations of Chinese researchers are the same as their foreign counterparts. Therefore, we consider it necessary to conduct an investigation of citing motivations of Chinese researchers.

3 A survey study on motivations for citation, exemplified by authors who published articles in *Chinese Journal of Scientific and Technical Periodicals*

3.1 Design

The survey covers the authors who published articles in *Chinese Journal of Scientific and Technical Periodicals* between 2006 and 2007. The primary benefits of this sample are: 1) These authors are from different disciplines, including natural sciences, social sciences, and humanities, so they are more representative than the authors from other journals; 2) many of them do not specialize in journal research, but are principally engaged in scientific research and only take periodical research as their amateur activities; 3) authors who contribute to this journal may be more interested in this questionnaire. Citing motivations survey can also cast new light on the old question of whether citation frequency can measure quality. Citers can tell us about "why citers cite" and answer such questions: "What are your citing motivations?" "What kind of motivation deserves praise?" "What problems may occur in the process of citing?" etc. The answer to those questions would be helpful for understanding the present citing behaviors of Chinese researchers.

3.2 The survey process

We referred to the citing motivations mentioned in some of the previous papers, and added other motivations that we believe may exist. These motivations are categorized into 17 groups. The survey covers all the authors who published articles in *Chinese*

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Journal of Scientific and Technical Periodicals between 2006 and 2007 with their e-mail addresses available. Then 307 questionnaires were sent to these email addresses. These authors were asked to give an assessment of the importance of those17 citation motivation categories. A total of 151 valid responses were received out of 307, representing a 49% response rate. Some respondents did not give importance estimates to certain motivation categories because they considered that the options given are hard to distinguish from each other, so the total number of some options is not 151. Concrete data are provided in the Table 1 below.

3.3   Analysis of the survey responses

A glimpse of the overall data in Table 1 reveals that for each motivation category, the proportion of "totally unimportant" is not high, which shows that all these motivations are real.

Six motivations, e.g. "paying homage to pioneers (founder)", "giving credit for related work (homage to peers)", "providing background reading", "the cited literature made a more comprehensive summary of previous research work", "supporting concepts and ideas or adopting new method introduced in the cited work" and "summarizing previous work for literature review purposes", are considered important or very important by most of the respondents. They can be classified as "perfunctory citation".

Three motivations, i.e., "the cited literature providing arguments for their own ideas; providing empirical support to its own theory; or providing a proof of concept, idea or method proposed by the citer (substantiating claims)" had the greatest responses (92.8%). Almost all the respondents consider these motivations important or very important. It shows that the most common motivation is "literatures are cited by providing evidence". As to the motivation that literatures are cited for being "well-argued and persuasive", author's opinions differ widely. Maybe there are some people who do not regard presentation as important as the content. However, 64.9% of researchers think that presentation is also important. Sometimes the citing paper would be well-argued and integral even if it did not cite argument or argumentation in its full references. In order to enhance the reliability and adequacy of argumentation, however, authors still introduced as adequate argumentation and argument as possible. In fact, some citing is redundant in such a case. These motivations can be classified as "organic positive citation".

Some motivations, including "pointing out the deficiencies in reference", "disclaiming the ideas in the reference", and "disputing the priority claims of the authors of the reference", show a core-and-scatter pattern, but they are also highly controversial. These three motivations can be categorized as "organic negative citation".

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Table 1 "Importance" of various citation motivations as given by *Chinese Journal of Scientific and Technical Periodicals* authors

Citing motivations	Very important		Important		Uncertain		Unimportant		Totally unimportant	
	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)	Number	percentage (%)
1 Paying homage to pioneers (founder)	35	23.2	62	41.1	27	17.9	23	15.2	4	2.6
2 Giving credit for related work (homage to peers)	32	21.2	81	53.6	32	21.2	6	4.0	0	0
3 Providing background reading	37	24.5	99	65.6	10	7.3	4	2.6	0	0
4 The cited literature made a more comprehensive summary of previous research work	33	21.9	69	45.7	38	25.2	8	5.3	3	2.0
5 Supporting concepts and ideas or adopting new method introduced in the cited work	49	32.5	74	49.0	24	15.9	4	2.6	0	0
6 Summarizing previous work for literature review purposes	39	25.8	96	63.6	8	5.3	5	3.3	3	2.0
7 Correcting one's own previous work	9	6.0	38	25.2	65	43.0	32	21.2	7	4.6
8 Disclaiming work or ideas of others (negative citations)	21	13.9	76	50.3	44	29.1	9	6.0	1	0.7
9 Providing introduction to useful work that were poorly disseminated, poorly indexed, or never cited	12	7.9	59	39.1	39	25.8	33	21.9	8	5.3
10 Disputing priority claims of others (negative homage)	5	3.3	29	19.3	65	43.3	32	21.3	19	12.7
11 The cited literature providing arguments for their own ideas; providing empirical support to its own theory; or providing a proof of concept, idea or method proposed by the citer (Substantiating claims)	49	32.5	91	60.3	8	5.3	3	2.0	0	0
12 Identifying original publication or other work describing an eponymic concept or term; Identifying original publications in which an idea or concept was discussed	21	13.9	66	43.7	45	29.8	18	11.9	1	0.7
13 Authenticating data, formula or instruments	14	9.3	91	60.3	33	21.9	11	7.3	2	1.3
14 Arguments in the source publication are well-argued and persuasive	24	15.9	74	49.0	35	23.2	18	11.9	0	0
15 Often exchange knowledge, ideas or conception with cited author, thus get familiar with the cited author	4	2.7	20	13.4	54	36.2	58	38.9	13	8.7
16 Source author (institution) is an authoritative author (institution)	5	3.3	36	23.8	62	41.1	34	22.5	14	9.3
17 The cited literature is published in an prestigious journal in the field	3	2.0	35	23.2	52	34.4	48	31.8	13	8.6

As to one motivation, i.e., source literature is cited because of "authenticating data, formula, fact, tools, etc.", quite a few respondents consider it important or very important. But some respondents consider it unimportant, or hard to assess the importance. The motivations for "Identifying original publication or other work describing an eponymic concept or term; Identifying original publications in which an idea or concept was discussed" and "providing introduction to poorly disseminated, poorly indexed, or uncited useful work" are also controversial. These three kinds can be classified as "organic neutral citation".

In addition, proportional distribution of motivations for social reasons shows a core-and-scatter pattern. But they are the most controversial. For instance, motivations like "often exchanging knowledge, ideas or concepts with cited author, thus getting familiar with the cited author", "authored by someone who might have been influential in the field;" "published in a prestigious journal" fall within this category. Here, citation, as a human behavior in essence, is influenced by social factors.

Generally, citing motivation is determined by two factors: Reasonable factors and social factors. Reasonable factors can be divided into four categories: 1) Perfunctory citation, 2) organic positive citation, 3) organic negative citation, and 4) organic neutral citation. However, many kinds of reasonable motivations are mixed with more or less social factors.

It should be mentioned that, as for the various citation motivations learned from our surveys, the factor analysis approach can be adopted for classification. Considering the condition and constraints for the application of factor analysis approach, the classification method[16] is exploited here. White[16] simplified a scheme initially proposed by Moravcsik and Murugesan[10] and outlined four categories of classification: Perfunctory-positive (points to related studies, provides background, invokes a prestigious name), perfunctory-negative (notes omissions in prior studies, justifies present research), organic-positive (discusses in detail; acknowledges concepts, hypotheses, methods, or operations; integral to present research), and organic-negative (attacks, refutes in detail)[15]. However, there are some citing motivations learned from our questionnaires that are not covered by the above four categories, such as "stating previous research work", "motivation involved with personal or social relationship", etc. Therefore, we proposed the above classification, after analyzing the characteristics and scope of White's four categories and the other remaining citation motivations.

4   Survey and analysis on the citing motivations of Chinese core authors in library and information science

4.1   Survey design

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Considering that sampling of authors is relatively "coarse-grained" in last citing motivation surveys that draw sample of researchers from multiple fields, and that

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information learned by asking for motivations for citing particular literature may be more relevant and real, we conduct another survey concerning citing motivations of Chinese core authors in library and information science (LIS). Understanding the citing motivations of Chinese core authors in LIS can help generalize the results to the motivations of all Chinese researchers in LIS. By combining citing motivations of researchers in the specific discipline of LIS with the above survey results for researchers from different disciplines, it would contribute to our learning the citing behavior of a larger group and find out the problems in the citing process.

4.2 The survey process

We take highly cited authors or prolific authors as the operational definition of "core authors". According to the *Academic Impact Report of Chinese Humanities and Social Science* (2000–2004), edited by Prof. Su Xinning of Nanjing University[17], 83 authors are highly cited and highly-productive authors in library, information and archival science. However, two of the core authors have passed away. Additionally, the address of one core author is not available because he went abroad. Therefore, we managed to find a latest journal article(s) for 80 core authors. If he or she produces more than one articles that are published during the similar period with references, we choose those with the core author as the only author. If all the latest articles are found co-authored, we choose the article with the core author being the first author. It is quite possible that each co-author has his or her own opinion on why a particular reference should be cited. In this study, however, we only heed the core author's ideas. It is comforting to see that very few of the latest papers are co-authored. 80 questionnaires were sent to the 80 addressed core authors. They are asked to tell their motivations for citing every piece in their reference list of the latest paper. Although the options of motivation in the two questionnaire are the same, the tasks for the respondents are different. A total of 57 usable responses were received out of 80, representing a 71% response rate.

There are 539 pieces of articles cited by the 57 papers. As an author may cite one article for multiple factors, the total counts of respondents to motivation options are larger than 539, reaching up to 975. The sum of different motivation category as a percentage of total number of cited articles is greater than 100%. Concrete data are provided in the Table 2 below.

4.3 Analysis of the survey findings

Generally, data in Table 2 agree with the results of Table 1, but with some important differences.

- Almost half (45.6%) of the references are cited for "providing arguments for own ideas; providing empirical support to own theory; or providing a proof of concept, idea or method proposed by the citer (substantiating claims)", which

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Table 2   Results of the questionnaire survey about various citation motivations categories by Chinese core authors in library and information science

Citing motivations	Total number of options	As a percentage of total respondents (%)	As a percentage of cited references (%)
1 Paying homage to pioneers (founder)	32	3.3	5.9
2 Giving credit for related work (homage to peers)	89	9.1	16.5
3 Providing background reading	187	19.2	34.7
4 The cited literature made a more comprehensive summary of previous research work	67	6.9	12.4
5 Supporting concepts and ideas or adopting new method introduced in the cited work	113	11.6	21.0
6 Summarizing previous work for literature review purposes	102	10.5	18.9
7 Correcting one's own previous work	1	0.1	0.2
8 Disclaiming work or ideas of others (negative citations)	7	0.7	1.3
9 Providing introduction to useful work that were poorly disseminated, poorly indexed, or never cited	12	1.2	2.2
10 Disputing priority claims of others (negative homage)	0	0	0
11 The cited literature providing arguments for own ideas; providing empirical support to own theory; or providing a proof of concept, idea or method proposed by the citer (substantiating claims)	246	25.3	45.6
12 Identifying original publication or other work describing an eponymic concept or term; Identifying original publications in which an idea or concept was discussed	8	0.8	1.5
13 Authenticating data, formula or instruments	3	0.3	0.6
14 Arguments in the source publication are well-argued and persuasive	24	2.5	4.5
15 Often exchanging knowledge, ideas or concepts with cited author, thus getting familiar with the cited author	10	0.9	1.7
16 Source author (institution) is an authoritative author (institution)	51	5.2	9.5
17 The cited literature is published in an prestigious journal in the field	23	2.4	4.3

is pretty much consistent with the results in Table 1. It can be explained by some previous findings. The social constructivists who study the rhetoric of science view citing behavior as a kind of rhetorical device to persuade others. The British sociologist Gilbert[18], who has been particularly associated with the constructivist view of citing behavior, brought forward the idea that citing is an aid to persuasion: A scientist who has obtained results which he believes to be true and important has to persuade the scientific community (or, more precisely, certain parts of that community) to share his opinions of the value of his work. Accordingly, authors typically show how the results of their work represent an advance on previous research; they relate their particular findings to the current literature of their field; and they provide evidence and argument to persuade their audience that their work has not been vitiated by error, that appropriate and adequate techniques and theories have been employed, and that alternative, contradictory hypotheses have been examined and rejected.

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- "Perfunctory citations" account for a large proportion. In the responses to our survey, perfunctory citation make up a percentage of 60.6% (590 out of 975), which is very much in agreement with Table 1.

- Table 1 shows that in regard to "correcting one's own previous work" or "disputing priority claims of others (negative homage)", most respondents find it hard to judge their importance. From Table 2, we can see that respondents seldom cited this motivation, even it needs to correct previous work or criticize some undesirable phenomena in academic research. It may also be due to the fact that the authors are not so sure about whether it is necessary to correct it or not, or find it hard to get absolute hard proof to indicate others' plagiarism. Others consider it "troublesome or not very effective to criticize or correct".

- As seen from Table 1, citing references for "identifying original publication or other work describing an eponymic concept or term; identifying original publications in which an idea or concept was discussed" are considered important motivations by many respondents. But it is also considered uncertain or unimportant by some other respondents. The case is similar to option 13 "authenticating data, formula or instruments". When we look at Table 2, we could find that a certain number of researchers actually cite references for "identifying or authenticating". In comparison with other citing process, it is more difficult to identify or authenticate data, formula, etc., which requires the researchers to spend more time and energy. More often than not, authors tend to "just bring and use" the existed findings, unwilling to identify or authenticate source literature. But the fact is that previous work or existed literature is not always accurate and credible. Before citing, it is necessary to check the source of literature and the truth or validity of data. Also the researcher is expected to ascertain whether an original idea or concept has been discussed or not, so as to avoid duplication of effort.

- Table 1 suggests that many researchers think the motivation "arguments in the source publication are well-argued and persuasive" is important, but a significant portion of the respondents consider it hard to tell its importance extent, with some people thinking it unimportant at all. However, it can be recognized from Table 2 that expression skill has impact on the visibility or total cites of articles. The data in these two tables show that persuasiveness had achieved remarkable success as a citing motivation. When the same or similar issues are discussed in several articles, the authors tend to cite those article that are articulate, simple, clear, well-argued, persuasive and to the point, though the articles of good expression are not always the storehouses of best thoughts, opinions or contents among the similar articles.

- In Table 1, there is a big divergence concerning citation motivations of social factors. Most of the respondents in the first survey find it hard to assess their importance. It can be seen from Table 2 that social factors also affect citation

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behavior. The normative theory of citation behavior has a bias toward rational factors, assuming that articles are cited more because of their "instrumental and symbolic functions". Instrumentally, it tells us of work we may not have known before, some of which may hold further interest for us; symbolically, it registers in the enduring archives the intellectual property of the acknowledged source by providing a pellet of peer recognition of the knowledge claim, accepted or expressly rejected, that was made in that source"[2]. However, in the social constructivist view of citing behavior, scientists have complex citing motives that, depending on the intellectual and practical environment, are variously socially constructed (e.g. to defend their claims against attack, advance their interests, convince others, and gain a dominant position in their scientific community). It is generally recognized that citation is a result of both rational factors and social factors. But researchers differ greatly on which is the decisive factor.

- Most motivations in the questionnaires are reasons for which researchers cite other's articles. Although some core authors mentioned self-citations, motivations for these citations are unknown. In the survey of Bonzi and Snyder[10] mentioned above, the results showed that "there are no significant differences in the motivations for citing between self-citations and citations to other works". But the authors surveyed are from natural sciences. Considering that characteristics and traditions differ between natural sciences and social sciences, self-citations in social sciences may involve more social factors.

- A few core authors did not fill in the questionnaire, but have proposed their suggestions or ideas on citing motivations or questionnaire-related issues. Two core authors stated that they cite literatures with little consideration. One author argued that she didn't take the reason for citation into much account. However, she has the habit of make a mark in the cited text. She thought that it is possible to identify her motivations by analyzing the marked content and context. She added that she cited the references because of adopting the ideas of others.

- Some respondents just gave us comments or suggestions. A few motivation categories are regarded as not articulated reasonably or appropriately. Still others said that citing motivations to some particular cited references is puzzling, ambiguous, or inexplicable. In addition, some respondents thought that their actual motivations are similar with but not identical with the statement in the questionnaire. In this sense, the reasons for citing to particular cited references are quite complicated and citing motivations is affected by many reasonable, social or other factors.

- In addition to all of the above motivations, there are other causes for citation, such as "evaluation of standards", "citation to standards", "because I took part in writing some of the cited pieces" and so on. These would fill in the category of "perfunctory citation".

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5 Analysis of other information

A lot of related information was offered by some respondents from the survey on the authors of *Chinese Journal of Scientific and Technical Periodicals*. Also a few core authors from library and information science provided plenty of very detailed reasons for citing, process of citation and related issues. It allows us to learn more about citation behavior by coming results of surveys with supplementary information. Taken as a whole, the thoughts or views reflected in the additional information are in agreement with the results of surveys, but enriched the information that questionnaire alone cannot provide. Here are the main points:

5.1 Other citing motivations

Some authors argue that "citation is the basis of research work", considering citation as the foundation for research. For them, it is necessary to conduct literature review and data investigation to determine the science value before carrying out research work. Some articles were listed as references for bringing inspiration to the researchers. Some authors cite because they are "standing on the shoulders of giants" to "trace the development of certain discipline, field or subject". Other authors cite for the purpose of "providing important clues in further research for readers". These cases testify the instrumental functions of references. Some authors think that direct citation to research results (such as analytical data, background information, and so on) of others is helpful for reducing simple duplication of research work. Some references were cited when the contents of the references are related to the research of author. It might go without citing to the references sometimes, but the authors cite them for "giving credit for related work". These can be classified into "perfunctory citation".

Many respondents have mentioned that references are also cited for other reasons, such as "following research standards and academic ethical codes", "requirements of scientific journal editors to the authors", "increasing the impact factor of the journal", "showing off", "it is difficult for manuscripts to get published without any references or with too few references", "increasing the citation counts of one's own work". Some editorial boards require that contributors should list references, with some even requiring that the number of reference should reach a certain threshold. In writing a paper, researchers may read a large number of articles, which are similar to each other with the same point of view, but some Chinese researchers chose to only list literature which is written in foreign languages, or which is published in well-known journals, written by well-known institutions or well-known authors. The purpose for researcher to do these may be as follows, such as "to achieve the requirements of journal editors", or "to raise the authority of their articles". Reference was also cited to "improve the level and value of research findings". Some researchers cite for "showing friendship to the cited author" or cite "the literature written by

colleagues" or for other special purposes. Such citation is called "pseudo-citation". All these can be classified as "social factors".

5.2　Randomness of citation

Some authors mentioned that they cite literature out of the habit of academic research, without much consideration of the motivation. It seems just logical to cite, no matter which paper to cite. In comparison, it does not seem very important to choose which article should be cited. For example, a number of "alternative articles" can be chosen to cite when a lot of articles deal with the same subject. It is not necessary to consider whether to cite an article when the reference citing is not a must. Some authors in the survey never or seldom cited other people's articles. Some papers by core authors even have no references at all. But a number of respondents also argued that "reference is cited implicitly, but not listed as references".

All these indicate that the citing behavior takes on a certain degree of randomness, but it also shows that the motivations for citing or not citing are very complex, and that citation is not always necessary or important.

5.3　Problems in the process of citing

Many respondents also pointed out the problem caused by "second citing", or "second reference". Some authors have not actually read the source articles at all, but list the references in the others' papers, which are closely related or consistent with the parts of their papers, as their own "references". Such problems as "false citation", "inappropriate citation", "citation to articles which should not be cited", " not citing articles which should be cited", etc. arise very often, which are subject to the social and personal factors. Sometimes authors' citing habits are not well formulated and they cite quite randomly, which means that the authors actually cited a number of literature, but only listed part of the references they should list, or they did not list the most relevant literature but cited less relevant ones.

It was mentioned that the "forced citation" also exists. Generally, reference should have two characteristics: relevant to the content of citing article; and actually read by citing author. But sometimes, in order to meet the requirements of journals editors or increase the chance of the papers to be published, some authors have listed articles which are not closely related to their work or which they had ever read. Similar problems also exist in foreign countries. Evans et al.[19] checked the references in papers in three medical journals and determined that 48% were incorrect: "the data support the hypothesis that authors do not check their references or may not even read them". In a similar investigation, Eichorn and Yankauer[20] found that "31% of the 150 references had citation errors, one out of 10 being a major error (reference not locatable)". Broadus[21] estimated a range of 10–60% for references that contain some error.

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6　Conclusions

In China, few empirical studies have focused on the citation behavior of journals authors, especially their citing motivation. Few studies have been conducted on citation behavior by applying the method of content analysis. Therefore, it is important to collect information about researcher's citing motivation in order to explain author's citing motivation and improve the assessment function of cited counts in scientific evaluation. This paper aims to understand the citing motivations of individual researchers, and related issues in literature citation by means of two questionnaire-based surveys.

Citation is a result of the interaction of various factors: 1) Rational factors (e.g. introduction of views or ideas put forward by others, using other's methods or analytical data to demonstrate his or her own arguments); 2) social factors (e.g. establishment of contacts with others or to improve the chance of getting one's paper published); and 3) random factors (e.g. availability of literature or choosing alternative literature). We have found that the citing motivation can be either of a material, knowledge-based or social kind, in any combination and to any degree.

Despite the fact that the citing motivations of different researchers vary greatly, the most common motivations are found to be: 1) Paying homage to pioneers, founders or peers; 2) using references for background reading materials; 3) borrowing ideas, viewpoints or method of others; 4) using references as a source of arguments; 5) for the need of summarizing, checking, verification, proof, comment, evaluation, correction or criticism; 6) persuasive expression or authoritative journals (or institutions, authors) in the mind of authors.

The impact of cited articles on the concepts, ideas, viewpoints, methods, and empirical work of citing authors may be subtle, which makes it difficult to give qualitative description. When listing specific papers as references, the author might be uncertain which articles should be listed, and which articles should not be included. But it is generally accepted that the references listed should satisfy two preconditions: Actually read and understood by the citing author; and actually cited or mentioned in the citing paper.

Citing is a "human" behavior in nature, influenced by social factors. Also due to the fact that no consensus has been reached as to the definition, boundaries and labeling methods of references, such problems as "forced citing", "false citing", "citing for special inappropriate purposes", "second citing", inevitably emerge. It is widely believed that citing is helpful to the researchers and that references play a vital role in shaping ideas, thoughts and in the scientific practice. The reference serves both instrumental and symbolic functions in disseminating and expanding knowledge. Despite the references have such positive roles, there are many problems in the process of citing and authors have different ideas on references utilization and their positive roles.

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In future, content analysis and citing motivations analysis should be combined to look deeper into citing behavior. In addition to the research on citing motivation, empirical studies need to be undertaken on the specific reasons for not citing and self-citation. One could make citation evaluation from objective and subjective perspectives. Ambiguous definition, characteristics, boundary, and labeling methods for citations should be made clear. The number of references, language or source journals, and source institutions should neither become the only nor the most important indicators in the quality assessment of the scientific papers, while a comprehensive evaluation indicator system should be developed. As more and more quantitative data on citation and cited documents are currently available, it is necessary to collect more qualitative and subjective data from the viewpoint of citers in the future. The qualitative and quantitative data can be integrated to identify the problems and develop a standard for citing documents so that the references can better play its roles of disseminating and expanding knowledge.

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