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Author(s): Martin G Erikson and Peter Erlandson

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A taxonomy of motives to cite

Martin G Erikson
School of Education and Behavioural Sciences, University of Borås, Borås, Sweden

Peter Erlandson
Department of Pedagogical, Curricular and Professional Studies, Göteborg University, Göteborg, Sweden

Abstract
In this study, we explicate citing behavior in the writing of scientific papers by presenting a taxonomy of motives to cite. The suggested taxonomy consists of four main categories, which are purely descriptive: Argumentation, Social Alignment, Mercantile Alignment, and Data. These categories are divided into a suggested set of subcategories. We argue that the complexities of citing practice show how little can be assumed about actual citing behavior when studying a finished paper. The discussion supports the claim that it might be misleading to treat all citations as equal in quantitative citation analysis.

Keywords
academic writing, citations, citing behavior, library and information sciences, scientific communication

Scientists put a broad range of social mechanisms into play in the citing practices they use to contextualize their work in the wider corpora of scientific writing. By conforming to such processes, scientists working in different traditions adopt citing behaviors specific to their epistemic communities, forming distinct identities. Although there are differences in citing behavior across the disciplines, it generally holds that scientists establish repertoires of reasons for making citations. The purpose of this article is to

Corresponding author:
Martin G Erikson, School of Education and Behavioural Sciences, University of Borås, SE-501 90 Borås, Sweden.
Email: martin_g.erikson@hb.se

explicate the range of motives that inform such citation practices in the writing of scientific papers (we use the term 'science' in a broad sense, including the natural sciences, social sciences, and the humanities).

It has long been argued that citing practices are embedded in social–psychological mechanisms (Bavelas, 1978; Bazerman, 1988; Roth and Cole, 2010). Rather than simply a function of scientific argumentation in a pure sense, there are many motives for citing authors, a point hidden by, or only implicit in, many functionalist accounts of citation. The understanding of scientific practice is thus advanced by explicitly exploring motives to cite. However, it has particular salience when it comes to studies of citation analysis. As Schoonbaert and Roelants (1996) argue, motivation is perhaps *the* most important issue affecting the validity of citation analysis. Moreover, properly understanding the motives for and effects of citing provides a more subtle and nuanced understanding of quantitative citation analysis, which from its very outset considered whether it is misleading to treat all citations in a paper as equal (Bavelas, 1978; Garfield, 1979; Gilbert, 1977; Moravcsik and Murugesan, 1975). Given the increased interest in quantitative citation analysis and the growing impact of bibliometric results on the funding of science worldwide, such an understanding is even more important today (Bornmann and Daniel, 2008; Safer and Tang, 2009; Willett, 2013). Indeed, it can even be argued that the drive for prestigious citations augurs against sound scientific practice and imperils the entire publication system in its present form (Brembs et al., 2013).

Two conceptual approaches inform the literature on citing behavior (Bornmann and Daniel, 2008; Davis, 2009). The first, based on Robert K. Merton's (1973) model of credit exchange in the scientific community, is normative. Here, citations are seen as a form of symbolic currency for paying intellectual debts. The second approach is social constructionist, and argues that citations cannot be understood merely through functions in intellectual domains. Rather, a citing author also wishes, for example, to persuade or to create a position in a field (Gilbert, 1976, 1977; Latour, 1987). These two approaches are combined by some authors such as Cozzens (1989), who discusses citations as a meeting point between the rhetorical system of creating influence and power, and a system of exchanging credits for work done. In a similar vein, Small (2004) shows the relevance of incorporating the effects of Merton's norms on citing behavior (see also Luukkonen, 1997). Davis' (2009) review of research on citation indicates the difficulty of identifying patterns of citations that conform to the constructionist view, although we find this hardly surprising; persuasive and rhetorical elements are hidden behind a veil of Mertonian reward for the citing authors. Taken together, the above shows the complexity of the motives to cite, which is our point of departure.

In previous research on citations, several attempts to classify citations or citing behavior have focused primarily on citations as they appear in published manuscripts. The roles that citations play in the social and cultural processes of scientific publishing, as well as their discursive functions as interpreted from the point of view of a reader, inform such analyses (Bornmann and Daniel, 2008; Moravcsik and Murugesan, 1975; White, 2004). In contrast, our approach is to focus on the citing author's motives. Previous studies with an author-centered perspective have often leaned toward the normative, discussing proper and improper citations. In such studies, citations are merely seen as being

more or less adequate in relation to knowledge building and argumentation (Harwood, 2009; Roth and Cole, 2010; Willett, 2013). In contrast, we explore the reasons for the inclusion of citations, regardless of any normative standards. This approach is supported by Willett's (2013) finding that there is only a limited correlation between authors' reasons for citing and readers' interpretations of likely reasons. We illustrate the multitude of motives to cite by suggesting a taxonomy of motives for including a citation. Given this ambition, we do not present any tools for coding, classification, or large-scale analysis of quantitative data, but instead aim to look at the individual researcher's practice. Our classification should contribute by explicating the rhetorics at play in the production of scientific papers, but also complicates quantitative analyses.

Previous research on citations has presented a multitude of phenomena that influence citing behavior. For example, citing authors are embedded in traditions that have frameworks that inform what should be cited and how, setting limits and possibilities for employing citations. Such discursive elements concern, for example, the degree to which references to canonical and classic books or to recent empirical articles are expected, as well how these various works are expected to be employed. These roles of tradition in scientific discourse have been pointed out in research from a number of scientific fields (Bazerman, 1988; Bott and Hargens, 1991; Cozzens, 1985; Creaser et al., 2011; Lillquist and Green, 2010; Safer and Tang, 2009; Standing, 2009). Changes over time in such citing practices have also been observed (Creaser et al., 2011; Hammarfelt, 2011). Another element covered by tradition is the relative importance of citation to empirical and theoretical writings (Douglas, 1992; Lalumière, 1993). Furthermore, Bavelas (1978) has pointed out that many citations are rather trivial or even irrelevant to the main arguments of a paper. Brooks (1985, 1986) found that giving credit to cited authors is often the least important reason for citing, and that about 70% of citations were included to serve more than one purpose in the eye of the citing author. In similar vein, Vinkler (1987), as well as Shadish et al. (1995), saw a more diversified view of motives for adding citations, including a wish to promote one's own work, dependency on the cited author, and professional or private benefit. Authors also develop personal skills and habits that influence their citing practices. For example, Costas et al. (2012) found that scientists familiar with publishing in high-impact journals tended to use more citations and that veteran scientists tended to cite older sources. Furthermore, we suggest that our focus on motives becomes even more compelling when we consider that motives to cite can be so strong that a citation is included regardless of whether the cited paper was actually read (Simkin and Roychowdhury, 2003; Todd and Ladle, 2008). Moreover, from a methodological point of view, asking a citing author why a reference is included may produce neither accurate nor consistent results. As discussed by Wilkinson et al. (2003), authors' recollections of why they cite are limited by both memory and by unwillingness to disclose self-interested motives. Also noteworthy is Brooks' (1985) finding that some scientists experience their citation practice as being free from self-promoting values.

The structure of the analysis

In our analysis of motives to cite, the point of departure was authors' conceptions of possible readers, as construed by the author during the process of writing. Such possible

Table 1. Main categories and subcategories of motives for citations.

Argumentation	Social Alignment	Mercantile Alignment	Data
Delimitation	Scientific Tradition	Credits	Review
Active Support: gives support for arguments; cited author's claims are treated as correct	Scientific Self-Image	Own Credentials	Meta-analysis
Passive Support	Effort Compensation	Bartering Material: authors are cited in the expectation that they will respond in kind	Text study
Further Reading		Self-Promotion (self-citations) Pledging: citations are included in the attempt to make the right impression on a journal editor or (presumed) reviewers	

readers include cited authors, reviewers, editors, colleagues at one's own department, opponents, financiers, one's own students, or general readers in the scientific community. Not every author will be aware of all these recipients, nor will every author take them into consideration when citing. But some authors will, in some instances. Citing within scientific practice is also guided by expectations about proper scientific communication. On the one hand, this is covered by what are known as the Mertonian norms: communalism, universalism, disinterestedness, originality, and skepticism (Merton, 1973). On the other hand, the practice of citing is also moderated by the need to compete and promote one's own research; this tendency to self-promote is covered by the so-called counter-norms discussed by Mitroff (1974). The context of these norms, together with the context of recipients, provides the author with a discursive field on which to operate when citing.

The citing author thus struggles to influence readers' reactions, to heighten or avoid them, within the framework of his or her own interests, and to strike a balance through adherence to scientific ideals. In order to elucidate these struggles, we identify a set of distinct functions that citations may have for the author. However, we do not regard any categories as proper or improper per se; they have different functions and have their place in a vast array of meanings and discursive power mechanisms.

Four main categories

We suggest that four main categories of motives to cite can be adopted to give a comprehensive overview of such motives. Each category can be divided into a number of subcategories, as shown in Table 1. It is important to keep in mind that a single citation can fit into a number of categories at the same time, even if it appears only once in a paper. The motives related to the subcategories, taken together, influence the reason for including any given citation.

The four categories we suggest are *Argumentation, Social Alignment, Mercantile Alignment*, and *Data*. The first three can be found in the process of writing all kinds of scientific papers from all kinds of research traditions. The fourth, however, is limited to papers in which the main purpose is to analyze the writings of others, particularly in review papers or meta-analytic studies.

Argumentation

The first category contains the functions of citing usually seen as 'traditional', where a citation is actively referred to in a line of argumentation in order to support a standpoint. We can distinguish five subcategories of Argumentation: Delimitation, Active Support, Active Criticism, Passive Support, and Further Reading.

Delimitation

In proposing the scope of a paper, it is often important to explicitly position the work in relation to various methodological and/or theoretical approaches. These approaches might be seen as controversial in themselves or contain standpoints that can be controversial if taken together. By dealing at the outset with standpoints that are potentially contentious but marginal to a paper, the citing author can move on to focus on the actual topic. In this way, a paper might be made salient for readers who otherwise might have been put off by the marginal matter. In Delimitation, the citations are not used to express criticism or approval of the cited work, but to clarify the citing author's point of departure, for example, by showing that the points made in the cited work are not relevant, although they might appear to be at first glance. When discussed in relation to a finished paper, this has been called a *juxtapositional citation* by Moravcsik and Murugesan (1975), which they define as a citation that suggests an alternative approach not taken by the citing author.

Active Support

Here, the citing author uses the citation to give strength to arguments by showing that others share his or her opinion, or that his or her arguments follow from the writings of others. Active Support is based on the assumption that the cited author's claims are correct. By using a citation in this way, the citing author takes an active standpoint, using references to previous writings as explicit arguments.

Active Support can itself be divided into a number of more specific functions, defending the use of concepts, theories, or research methods. It may also involve a reference to a paper calling for further research, providing rationales for the published study as such. Gilbert (1977) discussed supporting references in terms of persuasion; in order to gain recognition for their work, scientists show that their work takes the knowledge of the field further by relating to and making comparisons with previous research.

Active Criticism

This involves active argumentation, with explicit discussions based on assumed errors of the cited author. Active Criticism can also be divided further into criticism concerning

aspects of methodological details, conceptual shortcomings, and conclusions, as well as criticism of general approaches, schools of thought, or scientific traditions. As in the case of Active Support, Active Criticism can provide the rationales for a study, but in this case by pointing out problems with previous works. It is important to point out that negative citations only constitute a small number of citations published, and it has been suggested that citing authors are actually reluctant to give negative credit (Brooks, 1986; Schoonbaert and Roelants, 1996).

Passive Support

Sometimes the strength of a citation lies not in the arguments presented but in who the cited author is, or in the prestige of the cited journal. Such prestigious authors or publications might be cited to achieve other benefits, but in the case of Passive Support, they are included because the citing author feels that his or her case is made stronger by their inclusion, even if the claims made would be more clearly argued using other cited sources. It can be assumed that there often is ambiguity in the distinction between active and passive support in the eyes of the citing author, but sometimes a citation may have its core value in its passive role. Particular examples are citations supporting a statement that can be regarded as common knowledge. Here, Roth and Cole (2010) noted that the meaning conveyed by the combination of a truism and citations in a finished paper adds a more complicated meaning than first meets the eye; it is not so much a statement about a fact as an acknowledgement that certain scientists are important and worth pointing out.

Further Reading

These citations are those that are not directly related to the arguments made in the paper, but are used as directions for further reading when the scope of the paper is limited. In contrast to the previous forms of argumentative citations, citations in the category Further Reading are indirect in their argumentative function. Still, they are argumentative in that they are pointing out a broader context and thereby strengthen the author's position. From the point of view of the citing author, there is an important distinction between this category and the delimiting citations presented above. Whereas the delimiting citations defined the paper's scope, Further Reading is included as a service to the reader. These citations do not clarify or delimit, but let the author feel that the paper is more complete owing to their presence.

Social Alignment

In the second general category, the motive for citing is found in the author's identity or self-concept. Here, we have identified three subcategories: Scientific Tradition, Scientific Self-image and Effort Compensation. All three refer to ways the citing author presents himself or herself through the text, as well as providing the security of a well-defined field.

Latour (1987) argues that citations often are used to show the citing authors' liaisons and identifications, rather than to support an argument, calling these kinds of references

perfunctory. We suggest that the term perfunctory might be misleading, as these citations play more important and complex roles than Latour originally suggested. By showing affiliations and belongings, the author creates a context for the reader, putting some potential readers off while appealing to others who will read the paper more favorably.

Scientific Tradition

This is a broad and important category, covering at least three dimensions. First, there are obvious differences between different scientific disciplines concerning both the number of citations expected and the kind of content considered worth citing. Second, there are differences in expectations regarding the independence demonstrated in selecting and employing citations, as experienced by the individual researcher. Third, there are differences in expectations about what sources ought to be cited. This concerns which kinds of publications are preferred or expected, such as journal publications or monographs. In addition, there are specific sources in every field – publications widely accepted as seminal to the discipline – that give extra persuasive power to any paper citing them. Gilbert (1977) pointed out that when citing such sources, the citing author shows allegiance to a given school; doing so signifies where the author belongs. It can also be presumed that citations included as Delimitations often have a second function of denoting Scientific Tradition.

Scientific Self-Image

Through the use of citations, the author can make a self-presentation, for example, by appearing to be mainstream and safe or avant-garde. The way the author handles the seminal works of the field or how the arguments are built around theory or method can expose orthodoxy as well as iconoclasm or eclecticism in one's approach. This can also be done most effectively by citing from other traditions, pointing out eclectic ways of combining thoughts from different traditions or disciplines. Here, the citing author is dependent on how various discursive elements are expected to be handled in the tradition at hand. Such factors can influence the selection of citations, where some works are included and others are omitted depending on what the citing author wishes to convey. In other words, citation is not only used to define the tradition with which the author wishes to be identified, but also to convey a desired image of who the author is in relation to this tradition. Communicating Scientific Self-Image may not be altogether about showing a firm standpoint either; Gilbert (1977) wryly noted that 'respected papers may be cited in order to shine in their reflected glory even if they do not seem closely related to the substantive content of the report' (p. 116).

Effort Compensation

Having read a paper only to eventually discover that it really is not in line with the way one's manuscript is developing is an irritating experience, in particular if the paper was long or tedious. In such cases, citing the paper to get at least something back for one's efforts is often tempting; the citation is included as Effort Compensation, or in other

words as self-gratification. If the paper is not only long or tedious but also covers diffi-
cult topics, the inclusion of this citation may also be a matter of improving the author's
self-image, thus making an even stronger case for inclusion.

Mercantile Alignment

A citing author can employ citations in order to gain credit of various kinds, thus giving
us subcategories of Mercantile Alignment. Here we get at the core of combining
Mertonian norms with constructionist discussions of positions of influence, some of
which are highly praised as proper science while others are seen as more shady or even
– in some contexts – reproachable. The subcategories of Mercantile Alignment we sug-
gest are Credit, Own Credentials, Bartering Material, Self-Promotion, and Pledging.

Credit

Giving credit to other people's work differs from including it in an argument. Gilbert
(1977) suggested that the persuasive function of citations is actually more important for
most citing authors than acknowledgement of any 'property rights' that may be inferred.
Regardless of the truth in this, the social function of giving credit is paramount and
appropriate citation is a basic signifier of proper science in the eyes of the scientific com-
munity as a whole. At the same time, giving credit is an act of distancing, or showing that
the cited idea is borrowed from someone. In a way, this weakens the citing author's argu-
ments. Hicks and Potter (1991) argue that for each added citation, a part of the credit for
the arguments is transferred from the citing author to the authors cited. Hicks and Potter
(1991) saw this as a troubling consequence for the citing author's ability to show a con-
tribution, but for each added citation, the citing author also gains credit for thoroughness
and knowledge about the field. However, there is a possible advantage in refraining from
citing in order to gain credit by being seen as original. Still, this is more than balanced by
the risk of being accused of not being familiar enough with the literature. This risk of
weakening one's position in a debate by not drawing on a sufficient number of citations
surpasses the risk of diminishing one's originality through citation.

Own Credentials

The act of showing a reader that the author knows the subject is called *exordium* in clas-
sic rhetoric. In fact, we suggest that all citations in a paper may serve this purpose if the
citing author frames them thus. For example, both delimitations and citations pointing to
further reading might serve this purpose as well. A further source of credentials for the
author is also found in the ability to combine various sources, so that they interact with
each other. However, the combined effects of several citations give a qualitatively differ-
ent power to the paper, which a skilled author can employ to his or her advantage. Here,
it should not be denied that citations could be added not because their content adds to the
author's credentials but because a long reference list in itself may do so. For example,
Costas et al. (2012) found that long reference lists are thought to signify a broader knowl-
edge base and a more ambitious approach.

Bartering Material

Here, the citing author includes the citation with the hope that the cited author will cite him or her in return. Citing other authors within one's own school or field increases the chance that one will be cited in return, creating a cycle of mutual citing, as discussed by Roth and Cole (2010). A further effect of the practice of scientists within the same tradition citing each other, as noted by Roth and Cole (2010) as well as Gilbert (1977), is that it adds to the strength of the network, although Roth and Cole (2010) noted the risk that such a citation practice may also inhibit new ideas.

Self-Promotion

This is when the citing author cites his or her own publications with the intent of giving them a wider audience or raising interest in them. For example, O'Connor (2010a, 2010b) argues that the current interest in quantitative citation analysis has increased disproportionately the number of self-citations.

Pledging

This is a matter of making the right impression on a journal editor or (presumed) reviewer. It may be in the form of references to particular theories or authors, or it may be a matter of the number of references. That is, the author might wish to appear thorough. This purpose goes hand in hand with a similar desire in relation to the Scientific Self-concept and Own Credentials. For example, Safer and Tang (2009) found that, as a result of critical reviewers in the peer-review process, authors in psychology tended to include more references in the background parts of their papers than they found strictly necessary for the sole purpose of establishing the background (see also Costas et al., 2012). In addition, some journals routinely recommend that authors include citations to articles previously published in the same journal, a practice that has been criticized in a number of instances (Campanario, 2010; Neuberger and Counsell, 2002). Another variety of Pledging is to insert an additional citation during the revision of a paper because a reviewer has suggested it.

Data

The fourth main category differs from the three previous ones in that the literature cited here is used as data by the citing author. Three subcategories are identified: Review, Meta-analysis, and Text study.

Review

In this case, the purpose of the citation is to present the reader with an overview of a field, typically in a review paper or dissertation. The fact that a paper is included for the purpose of reviewing does not prevent the author from seeing it as fulfilling any of the other functions discussed above.

Meta-analysis

Here, the purpose of citing is to use the data on which the cited paper is based as a foundation for a new study. Comparing and combining the results of previously published studies can reveal patterns in the results, thus indicating strengths and weaknesses in the theories and methods under scrutiny. There is often an overlap between Meta-analysis and Review, as meta-studies of this kind are a tool for systematic reviews.

Text study

In this case, the cited text is regarded as data in an empirical study. Typical examples are various forms of discourse analysis (Gee, 2005). Here, it is also often the case that the paper cited is not written as a scientific text, but is expressing opinions. Still this kind of citation, where the analysis of a single paper is often the main point of departure for a whole study, can also be employed to say something about the authors' various social alignments.

Conclusion

We have presented a taxonomy of motives to cite, our purpose being to illustrate the breadth and complexity of the social psychology of citing. As our taxonomy illustrates, it is not possible to tell from a published paper whether a citation was chosen by a citing author because it had had a significant influence on the author's thoughts, because the cited author was on the editorial board of the intended journal, because it demonstrated knowledge about the field, or because a senior professor at the citing author's department held it in high regard. The complexity of citing motivation illustrated by our taxonomy supports Willett's (2013) findings; it is very difficult to draw any certain conclusions about citing authors' motives when reading a finished paper.

   As is evident from the literature, citing phenomena concern in particular the workings of scientific, social, and cultural traditions (Bazerman, 1988; Bott and Hargens, 1991; Cozzens, 1985; Creaser et al., 2011; Douglas, 1992; Hammarfelt, 2011; Lalumière, 1993; Lillquist and Green, 2010; Safer and Tang, 2009; Standing, 2009). We believe that our taxonomy can be adopted as an organizing tool for continuing theoretical reasoning and research on citing phenomena. We also believe that the taxonomy can be employed as a tool for empirical studies. For example, the taxonomy can provide a theoretical basis for an empirical investigation of how junior researchers develop a citation practice within a research group. In the same vein, we suggest that different research traditions can be compared with this taxonomy as an analytical framework, for example, in interviews with researchers.

   We do not wish to suggest that our set of categories is in any way final. They can be merged, combined, or divided in any number of ways. To the extent that the social practice of scientific writing, publication patterns, and evaluation models change, other ways to categorize citations will arise. We suggest that the categories discussed in this article make sense in the current scientific landscape, but this will change over time; instability is not a weakness in our model. Rather, it is a strength in that it demonstrates the complexity of citation.

We stress that our model should not be read normatively. The model suggests the need for citation analysis to account for various ways in which a cited paper could be influential in line with the current discussion on the consequences of publication impact (e.g. Brembs et al., 2013). A possible implication of our taxonomy is that a citation that defines a field and provides a citing author with a Scientific Self-Image could be seen as at least as important in terms of impact as a citation that provides arguments for new studies.

Finally, we wish to add a touch of reflexivity. Thinking of our own writing of this article, we can definitely state that to some extent every single category in the taxonomy has at one time or another been at play when we have added citations to the text. Indeed, on many occasions several categories were simultaneously active in intricate patterns; these patterns would have been altered had we tried to untangle and explicate them. In the spirit of furthering critical and engaged scholarship, we gladly challenge readers to draw conclusions about our motives to cite based on the way our citations appear in the finished paper.

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Author biographies

Martin G Erikson completed his PhD in psychology at Lund University, Sweden, and is currently Senior Lecturer in psychology at University of Borås, Sweden. His main research interests concern various aspects of the self-concept, for example, in relation to eating disorders, and to science studies.

Peter Erlandson completed his PhD in philosophy of education at University of Gothenburg, Sweden, and is currently Senior Lecturer at the Department of Pedagogical, Curricular, and Professional studies at University of Gothenburg. His main research interests concern philosophy of education, professional practice, and science studies.