**Delineating Citation Concepts**

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**ABSTRACT**

In this poster we clarify concepts related to citations and citer analysis that are often overlooked or vaguely addressed by researchers. How one addresses concepts such as citers, self-citations, and recitation can affect outcomes, so it is important to be clear about what is being measured. We outline the different types of citations as self-citations, recitations and their overlap. New areas related to oeuvre citation counting are outlined.

**Keywords**

Citation Analysis, Citer Analysis, Self-citation, Recitation.

**INTRODUCTION**

Citations as a unit of measure have long been used to assess research impact, whether at the publication, author or organizational level. Despite its long-standing use, assumptions are made regarding how citations are counted. Recent research has highlighted the benefits of counting citers as opposed to citations (White, 2000; White, 2001; Ajiferuke & Wolfram, 2010; Ajiferuke, Lu, & Wolfram, Forthcoming), but it also highlighted the need to be specific in how measures of interest are actually counted, whether dealing with the total number of citations, self-citations, number of citers, or number of recitations (i.e., repeatedly citing the same document or author). Clarity in these concepts is important, but rarely addressed in the literature. The purpose of this poster is to delineate citation and citer-based counting as they relate to individual authors and their body of work, called an oeuvre. This investigation also reveals new research areas for further study.

**COUNTING CITATIONS AND CITERS FOR AUTHOR STUDIES**

Counting of citations or citers characteristics of interest can be outlined in a grid identifying the origin of a citation and its destination. For citations, the table is relatively simple (Table 1).

Here, the number of citing publications in the rows represents the total citations an author receives (3). This is different than the Total Oeuvre Citations (6), which citation databases like Web of Science do not count directly.

Sum of Column = Total citations for a given publication

Sum of Row = Number of co-cited publications, if > 1

A tally of the pairwise comparisons of non-zero cells in a row across all citing publications provides the co-citations between two publications in an author’s oeuvre (oeuvre co-citation analysis). This then permits study of how closely related two works are along with the cohesiveness of the author’s oeuvre.

Additional analysis is possible with citers (Table 2). Note that the list of citers represents an author’s citation image makers (White, 2001; Cronin & Shaw, 2002).

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**Table 1. Citation counting over an author’s oeuvre**

<table>
<thead>
<tr>
<th>Citing Pubs</th>
<th>Pub 1</th>
<th>Pub 2</th>
<th>Pub 3</th>
<th>Sum of Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pub A</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Pub B</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pub C</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Sum of Column</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>Total Oeuvre Citations</td>
</tr>
</tbody>
</table>

**Table 2. Citer counting over an author’s oeuvre**

<table>
<thead>
<tr>
<th>Citing Authors</th>
<th>Pub 1</th>
<th>Pub 2</th>
<th>Pub 3</th>
<th>Sum of Row</th>
<th>Count of Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citer 1</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Citer 2</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Citer 3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Sum of Column</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
influenced by a cited author’s work, and differs from a total number of citing publications and total oeuvre citations.

Count of Column = Number of citers per publication, i.e. the reach of a publication. (Ajiferuke & Wolfram, 2010).

Individual Cell = Represents co-terminal citations (Katsaros et al., 2009) or recitations for a given publication if > 1.

Note that the sum of a column would not be the number of citations because citers may be collaborators on the same citation publication. A third dimension could be added to Table 2 to link co-authors on a given publication, but this becomes more challenging to visualize.

ACCOUNTING FOR SELF-CITATIONS AND RECITATIONS

Citation counting may involve the inclusion or exclusion of self-citations (i.e., where at least one of the authors of a citing publication is also an author of the cited publication) (Costas et al., 2010). Citations may also represent recitations (i.e. where an author cites the same publication more than one time), which in turn may or may not represent self-citations. Recitation will not increase the “reach” of an article (the number of citers) because the citing authors are either reciters or self-citers. Fig. 1 outlines the relationships among non-recitations, recitations, self-citations and non-self-citations. The total of A, B, C and D represents all citations. A represents all self-citations that are not recitations. B represents all recitations that include the cited author (Type I recitation), or “self-citation AND recitation”. C represents reciters excluding the cited author (Type II recitation), or “NOT self-citation AND recitation”. D represents all singular citations by others or “(NOT self-citation) AND (NOT recitation). C + D represent the adjusted citation count (total citations minus self-citations). The act of recitation (B + C) can be a form of self-citation or citation by others.

![Figure 1. Categorization of self-citation and recitations in citation counting](image)

EXAMPLE

The following table demonstrates an example of citations for a single publication that fall into different categories outlined in previous section. Note that the example can also be given at the author level:

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>11</td>
<td>10</td>
<td>69</td>
<td>102</td>
<td>79</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Example of Citation Category

The four categories reveal more information than the traditional adjusted citation count and total citation count can give. For example, the number in area A indicates there are 12 self-citations which still introduce new citers since they are not recitations. The number in area C indicates these 10 citations don’t attract new citers although they are not self-citations. With the more detailed categories of different types of citations, we are able to tell more from the counts.

CONCLUSION

How one counts citations and citers will affect outcomes, as will a focus on authors or publications. Consideration of recitations further delineates citation types. Oeuvre citation exhaustivity represents a new focus for assessing how broadly a citing author has been influenced by a cited author’s work. Elaboration and additional examples will be provided in the full poster.

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REFERENCES


