Authorship order and effects of changing bibliometrics practices

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Abstract
Although the authorship order on published research plays a significant role for scientific merit in many research contexts, and therefore should be handled with great care not least for the sake of fairness, the practices of accrediting authorship positions vary greatly between different research areas. This paper makes the point, by help of a current example, that changes in bibliometrics practices may make an already disparate landscape even more confusing.

Keywords
Authorship order, bibliometrics, practice, research ethics

Different research areas have different practices when it comes to handling authorship and authorship order (Cutas and Shaw, 2015; Helgesson and Eriksson, 2019; Marušić et al., 2011; Smith and Williams-Jones, 2012). While there are fields where single-author papers still dominate, much research today is done in collaboration. Single-author practices are also open to collaboration, not least in the form of mutual constructive criticism from peers, but imply that the practices are such that these contributions do not pay off in terms of co-authorship (Cutas and Shaw, 2015; Helgesson, 2011).

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Where collaboration and use of co-authorship is standard practice, there are strong career incentives for the individual researcher to make sure they end up on the authorship list before the paper is submitted, since publications are important academic merits, and everyone has an interest in getting (at least) their fair share in a highly competitive climate (Jabbehdari and Walsh, 2017; Shamoo and Resnik, 2009; Strange 2008; Wager, 2009). The Recommendations for the conduct, reporting, editing, and publication of scholarly work in medical journals, by the International Committee of Medical Journal Editors, present authorship criteria specifying when such inclusion is justified (ICMJE, 2017). The research ethical literature has in the last couple of decades produced many witnesses showing that deviations in the form of tactical gift authorship, overly generous camaraderie, authorship exchange schemes (if you include me on your papers, I’ll include you on mine), enforced inclusion, and unfair exclusions nevertheless occur (e.g. Rennie et al., 1997; Bennett and Taylor, 2003; Feeser and Simon, 2008; Strange, 2008; Shamoo and Resnik, 2009; Barbour, 2010; Eriksson and Helgesson, 2013). In an empirical paper on experiences from doctoral studies, a majority of the respondents, who had recently received their doctoral degree in medicine in Sweden, reported that the ICMJE authorship criteria had been breached in at least one of the articles in their thesis (Helgesson et al., 2018). Also when there is no intentional misuse of authorship, determining and agreeing on co-authorship may be difficult (Claxton, 2005; Rennie et al., 1997; Smith and Williams-Jones, 2012).

The importance of authorship order

While the number of publications researchers can put in their CV certainly matters in evaluations of their academic merits (Smith and Williams-Jones, 2012; Strange, 2008; Wager, 2009), authorship positions on those papers may matter even more. The main reason for acknowledging the authorship position is that it is taken to signal the researcher’s relative contribution to the work (Tscharntke et al., 2007; Wren et al., 2007). Settling the relative contributions of contributing researchers may, of course, be a difficult matter (Helgesson and Eriksson 2019; Stubbs 1997), not least because contributions may be of very different kinds, and disagreements are common (Ilakovac et al., 2007). In order to promote a fair and genuinely merit-based evaluation of researchers, it is important that the allocation of authorship positions is both fair and transparent (when used). If authorship positions are to clearly relate relative contribution, they should ideally mean the same thing to different evaluators. Previous papers have noted that there is no unison understanding of the significance of different authorship positions. In fact, there is a wide variety of interpretations (Brand et al., 2015; Cutas and Shaw, 2015; Helgesson and Eriksson, 2019; Rennie et al., 1997; Wager, 2007).
This is far from ideal, partly because there is no guarantee even that the same interpretation is given on different occasions within a single research field – and partly because transfers between research areas, and therefore evaluation contexts, may have the consequence that one’s research portfolio is thoroughly reinterpreted, while this has nothing to do with the nature of one’s contributions. For instance, if a person comes from an area where researchers are traditionally not ranked by authorship order, and collaborators are instead simply listed alphabetically, and the person then moves to a research area where authorship order is ascribed based on relative contributions, and different positions are differently valued, then the perceived value of previous work in the new context will likely be directly dependent on the initial letter of the person’s surname (which, of course, has nothing to do with the person’s relative contributions to the papers).

All this suggests that the use of authorship and authorship order is not necessarily the best way to communicate contributions – a structured contributorship list, with some less-than-minimal level of detail, may be more informative on both absolute and relative contributions (Cutas and Shaw, 2015; Helgesson and Eriksson, 2019; Shaw and Erren, 2015). What is proposed here is that administrative changes at the university level may add to the disparity of how authorship positions are interpreted as a basis for scientific merit.

The case: changing the use of bibliometrics

After a long period of having used bibliometrics as a basis for distribution of faculty funding to the departments, in a way where each contribution counted the same – no distinction was made between authorship positions – Karolinska Institutet, Stockholm, Sweden, decided in 2018 to introduce weights that would distinguish between (1) major and minor contributions to papers and (2) papers where the university played a central role versus papers where it played a more peripheral role. Relating to individual contributors, the following weights were introduced: Maximum value (1.0) is contributed to the department if a person from the department is first, last, or corresponding author; 0.6 if the person is second author or second-to-last author; other weights are also applied, but they do not matter for the present discussion and are therefore left out here (Karolinska Institutet, 2018).

It should be stressed that these weights are used in calculations to determine the distribution of faculty funding to the departments at the university, and for this purpose only. Karolinska Institutet is not using these weights as a valuation of individual research contributions, nor are they suggested to be used when evaluating individuals’ CVs. Nevertheless, they constitute a way of valuing authorship positions and might influence, locally, the perceived desirability of different authorship positions.
While the relative values attributed to different positions with these weights are mainly clearly in line with the existing understanding of authorship positions at KI, there is one exception. Until now, the most common ranking order of authorship positions at the university has been the following:

- First position
- Last position
- Second position
- Third, fourth, fifth, etc. position down to
- Second-to-last position

First and last positions have traditionally been top-ranked, with a margin to the rest (cf. Walker et al., 2010). It follows from the above ranking that the second position is also important. Second-to-last, however, is not.

As pointed out elsewhere, the ranking of the second-to-last position is inconsistent in medicine, and may be so even within a single research group: in smaller collaborations, second to last is the lowest-ranked position, while in large high-profile projects, such as large EU collaborations, a set of early and a set of late positions are the top-ranked (including first, second, last and second to last) while the middle positions are the lowest ranked (Helgesson and Eriksson, 2019). This ambiguous use is present also at KI, which means that the upgrading of the second-to-last position is not entirely surprising, although it probably doesn’t reflect the understanding in the majority of cases. Stressing the first two and the last two positions, as in the new KI bibliometrics scheme, may also be a way to account for the increasing use of shared first and shared last positions.

**Administrative changes may change valuations of authorship positions**

If an overall summary of the valuation of authorship positions in medicine and the natural sciences is that ‘It’s a mess’ (Helgesson and Eriksson, 2019), the point this paper tries to add is that local administrative changes, for instance, in the use of bibliometrics, might muddle the valuations further. The ambiguous understanding of the second-to-last authorship position can be clarified in the individual case, for instance in a CV, by adding a comment stating what kind of second-to-last is intended on each occasion. However, the changed bibliometrics incentives might in the longer run bring about a change in perceptions, for instance, so that second to last will no longer be perceived as the lowest-ranked position. In the meantime, there may be an increased uncertainty regarding how that position should be valued. Besides, if the change in perception is only local, this puts additional strain on the individual to keep track of what messages regarding scientific merit are sent to what receivers.
As the (as far as I know unconfirmed) story goes, such change in valuing positions took place in the past regarding the last authorship position. The perhaps surprising practice of ranking the last position as a top position, instead of sticking with the straightforward order first, second, third, etc. down to the last, is said to have arisen because of a well-established professor’s generosity towards younger colleagues – ‘You can have the better positions and I can settle with the last’ (then least valued position); as doing so became a spread habit among senior professors, this changed the perception of the last position. If this story is true or not, I cannot tell, but it suggests that an influential change in practice regarding authorship positions might lead to an eventual change in valuations of these positions.

One might perhaps like to add that the story actually also tells another thing, namely that as time passes, the confusion settles as the new understanding of the authorship position gets established. This point would be well taken if it were true that the change in how the last authorship position is valued were universal. As a matter of fact it is not, as colleagues and I have observed: in some places and research areas, the last position is still considered the lowest-ranked, while elsewhere it is one of the two top-ranked positions. Whether such a change in valuing authorship positions will become universal or not is simply hard to tell beforehand.

Conclusion

There is no uniform understanding of either scientific authorship or the meaning of different authorship positions across nations or research fields. Administrative changes relating to authorship order may increase the disparity of how different authorship positions are interpreted and valued.

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