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# About the importance of the research question: a response to Ming Li et al.'s comments

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It was with great interest that we read Ming Li et al.'s comments on the use of the Cohen's kappa statistic in our paper entitled "Evaluation of the productivity of hospital-based researchers: comparative study between the h-index and the h(fa)-index" (Sebo & de Lucia, 2021). The authors agreed with the conclusion of our study but stated in their letter that we should have used the weighted kappa instead of Cohen's kappa, because we had more than two categories in each group.

The h-index is often used to compare researchers with each other and measure their respective contributions to the scientific community. The aim of our study was to assess the added value of the h(fa)-index (Butson & Yu, 2010), an index introducing a weighting factor for the first author, in a sample of hospital-based researchers practicing general internal medicine in Switzerland. After sorting the researchers by their h-index and h(fa)-index and dividing the two groups into ten quantiles, we used the Cohen's kappa statistic to assess the interrater agreement between the h-index and h(fa)-index.

As a reminder, Cohen's kappa is a statistic that is used to assess interrater reliability for categorical variables. This measure is preferred to the simple calculation of the proportion of agreement, because it takes into account the possibility of agreement occurring by chance. As other authors have done before us (Duro et al., 2012; Tian et al., 2018), we extended the use of the Cohen's kappa statistic to the comparison of two classification measures.

We agree with Ming Li et al. that the weighted kappa may be more adapted than Cohen's kappa when the number of (ordinal) categories per group is greater than two. This is because the weighted kappa takes into account the level of agreement, with the expected and observed proportions of agreement modified to include partial agreements, by assigning a weight between 0 and 1 to each category.

Yet, we believe that the choice between these two statistics should depend primarily on the research question. For example, in our study, we used the Cohen's kappa and not the weighted kappa, because our aim was to determine whether the use of the h(fa)-index was likely to reclassify researchers into categories other than those assigned by the h-index, regardless of the categories considered (i.e., adjacent or non-adjacent categories).

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Because the agreement between the two measures was only moderate ( $Kappa=0.59$  [95% CI 0.56–0.64]), and thus a number of researchers were reclassified into another category using the  $h(fa)$ -index, we concluded that the  $h(fa)$ -index may be a better tool for assessing researcher productivity than the  $h$ -index.

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## Declarations

**Conflict of interest** The authors declare that they have no conflict of interest.

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