

Reply to comment on: 'Second to fourth digit ratio (2D:4D), breast cancer risk factors, and breast cancer risk: a prospective cohort study'

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Sir,

We thank Costas *et al* (2012, this issue) for their interest in our recently published paper (Muller *et al*, 2012). They raise the important point that Δ_{r-1} , the difference between right and left 2D:4D, is subject to greater measurement error than 2D:4D itself. This fact is uncontentious, and follows directly from the propagation of measurement errors from both left and right 2D:4D. Despite this, in our study we found measurement of Δ_{r-1} to be acceptably reliable, with intraclass correlation coefficients of 0.72 and 0.54 for intra- and inter-rater reliability, respectively.

Costas *et al*, correctly note that non-differential measurement error tends to bias estimates towards the null, except in the case of a categorical variable with more than two levels. They state in their correspondence: 'However, if the exposure variable has more than two levels, like it is the case, bias away from the null may be present'. As we clearly stated in the methods and results sections of our paper, we analysed Δ_{r-1} as a continuous variate. At no stage did we consider Δ_{r-1} as a categorical variable. We would thus

expect any bias arising as a result of measurement error to be towards the null. Such bias would reinforce our results.

Finally, we agree completely with Costas *et al* that it is important to include information on the reliability of measurements. That this information was incomplete in our paper was an oversight, and we are glad that we could rectify that oversight in this letter.

REFERENCES

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