

(3.4) Alteration of Medical Images

You have recently finished collecting data for a project related to diffusion-weighted imaging (DWI) for oncologic assessment and are in the process of preparing a manuscript based on the work. In trying to select a representative image to include in the manuscript, you consistently notice in numerous possible examinations prominent ghosting artifacts outside of the tissue of interest. Concerned that this artifact may adversely impact the perception of the work by the reviewers, you apply a paintbrush tool within Photoshop to obscure the artifact such that the region appears to blend in with surrounding background tissues. Given that this artifact seems unrelated to the primary topic of the investigation, you feel that its removal is reasonable in order to provide the highest quality images possible for your study and to maximize the article's likelihood of acceptance. Why might this case comprise professional misconduct?

Commentary

Alteration of medical images has become substantially easier in the current era of digital imaging and desktop publishing, whether using Photoshop or other graphics software. While it may seem that removing an artifact from the image background does not alter the key aspects of the image, such an action indeed poses a substantial concern of misconduct. Journals, along with their editors, reviewers, and readers, expect that the provided images provide an accurate representation of the actual imaging in the given case. Accordingly, any manipulation of the image that alters how the reader perceives it may be deemed misleading. Even details of the image unrelated to the critical findings still communicate valuable information regarding the work that was performed. For instance, an accurate portrayal of the overall quality of the imaging (in this case, the quality of DWI) is important, since such image quality issues may have implications in indicating the authors' skill in the imaging technique at hand, the reliability of the findings, and the reproducibility of the work. While removal of the artifact may lead to a more straightforward presentation of the case, this alteration may unfairly bias the reviewers given the resulting inflated perception of the overall image quality. Inappropriate image manipulation represents a form of scientific misconduct similar to manipulation of the study data itself. In addition, software is now available that journals may use to evaluate submitted images for alteration, facilitating detection of such misconduct.

Authors should note that certain basic image adjustments are generally considered acceptable and may indeed be warranted in some circumstances. For instance, journals typically allow for adjusting the overall window or level of the entire image. In doing so, linear adjustments should be applied, and the adjustments should not be carried out to such an extent as to obscure visualization of any aspect of the image. In comparison, it would not be considered acceptable to apply a non-linear window or level adjustment, to selectively window or level only a portion of the image, or to alter an individual component of the image in some other fashion. It is not appropriate to selectively eliminate artifacts or to suggest a higher level of image quality than was actually achieved. If wishing to more effectively convey a particular aspect of the image, this should be performed via placement of an arrow or other form of image annotation. Cropping of an image may or may not be appropriate. While images are commonly cropped to focus on the area of interest, it is important that no potentially important aspect of the image be selectively removed or misrepresented as a result. If the authors do feel that a particular adjustment beyond standard window and level is required, then such an adjustment should be

disclosed within the Figure Legend. In addition, the authors should maintain an unaltered version of the Figure and be prepared to provide this to the journal if requested.

References

- 1) AMA Manual of Style Committee. AMA Manual of Style: A Guide for Authors and Editors (10th edition). Oxford University Press, March 2007.
<http://www.amamanualofstyle.com/view/10.1093/jama/9780195176339.001.0001/med-9780195176339-chapter-5> Accessed: December 23, 2015.
- 2) Rossner M, Yamada K. What's in a picture? The temptation of image manipulation. J Cell Biol. 2004;166(1):11-15.