Corrigendum

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We now publish corrections to an error identified in the original Fig. 9. We substitute the original incorrect Fig. 9 and legend with the corrected figure and legend, together with an explanation of the error, the revised conclusion, and relevant references.

Explanation of the Error

After revisiting the analysis code associated with Fig. 9, we identified a programming error in which the order of the two variables used to compute values of the y-axis (Effort Value) was reversed. Specifically, Effort Value (Hz) should have been computed as Low_Effort—High_Effort; however, the error resulted in the value being computed as High_Effort—Low_Effort. This error resulted in the y-axis values becoming reversed in sign. Correcting this error resulted in a positive slope of the regression lines in each subplot (see revised Fig. 9 and legend above), indicating a positive relationship between the firing rate of ACC neurons and outcome value.

Revised Conclusion

The results of the revised analysis now indicate a positive relationship between the firing responses of neurons and the anticipated value of an outcome. No such relationship was observed in the analysis that was performed prior to the correction. Although this change does not alter the main findings of the original paper: that ACC neurons integrate anticipated effort and reward and action sequences, and that effort- and reward-related responses only occur after action-selection, the figure makes an important point. In particular, the positive correlation suggests that our results are now in accord with results from other studies such as those of Kennerley and Wallis (2009) and Croxson et al. (2009), which suggest that ACC neurons do not simply respond to reward or effort, but to a more generalized measure of outcome value.

REFERENCES


Fig. 9. Effort- and reward-selective neurons respond to the type of outcome and outcome value. If ACC neurons respond to the expected value of outcomes, regardless of outcome type, then firing responses to positive outcomes should be similar in the effort and reward conditions (e.g., respond to both low effort and high reward). Responses to low-value outcomes should also generalize across conditions. To examine this issue, the difference in firing activity to anticipated low or high effort was compared with differences between high and low reward. These two values were computed for each neuron and plotted. Analysis was restricted to the 600-ms window preceding door entry. A response to value predicts that neurons will cluster in the top right or bottom left quadrants of the plot, and regression analysis should indicate a positive slope. A: responses of all ACC neurons. A positive regression slope was observed (P = 0.00006, r = 0.21). Bars in the bottom right corner of each plot represent the relative number of points in the top left and bottom right quadrants (left bar) relative to the points in the bottom left and top right quadrants (right bar). B and C: the slope was positive for the populations of effort (B)- and reward (C)-selective neurons; however, the regression was significant for the population of effort-selective cells (P = 0.0002, r = 0.41), but not for the reward-selective neurons (P = 0.26, r = 0.20).