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No Evidence for Reduction in Dyspnea Following Lesions of the Right Insula

To the Editor:

In their article (1), Dr. Schön and colleagues address an important topic: identifying the structures essential to dyspnea perception among those activated in brain-imaging studies of dyspnea. We were disappointed that despite important caveats, including those in the article's DISCUSSION section, the article was published under a title and abstract not supported by the data.

The investigators exposed four healthy subjects and four patients with insular stroke to brief, modest inspiratory loads; the authors termed the resultant sensation "dyspnea". The title and conclusions state that patients with lesions of the right insula show reduced unpleasantness of this sensation. However, mean unpleasantness ratings during resistive loads were the same in patients and healthy controls, and patients with insular stroke rated *more* discomfort in five of eight breathing conditions (see Table 2 and Figure 3). Two patients rated substantially more discomfort at maximal load than did the average control subject (see Figure 4). As the authors state, patients with insular stroke rated more discomfort than control subjects during the baseline condition. They subtracted this elevated baseline from the peak rating, obtaining the statistical difference that led to the misleading conclusion. Furthermore, correction for multiple comparisons (see reference 2, page 41) was not mentioned, calling into question the statistical significance of the finding in this small sample. Figure 1 herein, constructed from data in Schön and colleagues' Table 2, illustrates the salient fact that subjects with insular stroke did not rate less unpleasantness during loaded breathing but did rate greater respiratory unpleasantness at baseline.

A further problem in the data is that ratings of sensation bore no systematic relationship to the physical stimulus in at least two patients with insular stroke (see DISCUSSION and Figure 4). Failure to provide meaningful ratings occurs in some normal subjects (3–5); it is generally not ascribed to a lack of perception, but rather to an inability to translate perception to ratings. When subjects are unable to provide meaningful magnitude ratings, other methods are needed to conclude absence of perception (e.g., systematic analysis of verbal reports, behavioral responses, etc.). As the authors recognize, more study is needed to establish if the inability to rate perceptual magnitude is characteristic of insular stroke.

Finding, recruiting, and testing patients with insular stroke is a major challenge; accumulating a sufficient sample of good studies will take time. We are puzzled by the decision to publish

Figure 1. Mean (+SD) ratings of perceived unpleasantness of inspiratory resistive load (0–10 visual analog scale) in 4 women with insular stroke and 4 matched healthy women during unimpeded breathing through a mouthpiece (baseline) and breathing against inspiratory resistive loads (1 to 23 cmH₂O/L/s). Data plotted are from Reference 1.

these equivocal data under a title and abstract that make unequivocal conclusions not supported by the data.

Conflict of Interest Statement: None of the authors has a financial relationship with a commercial entity that has an interest in the subject of this manuscript.

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From the Authors:

We were surprised that Dr. Adams and colleagues in their letter questioned that the sensation being induced by resistive loads in our study was dyspnea (1). Researchers commonly use loads of comparable magnitude experimentally to induce dyspnea (2, 3) including some of the authors of the letter, who similarly termed the resulting sensation "dyspnea" in their own work (4). Un-