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We would like to submit a revised version of our manuscript, entitled "Experience-Dependent Perceptual Grouping and Object-Based Attention", for consideration for publication in the *Journal of Experimental Psychology: Human Perception and Performance*.

We have carefully considered the comments, criticisms, and suggestions of all three reviewers. The resulting manuscript has been significantly modified, particularly with respect to the statistical analyses, and to the general discussion, mainly in reference to earlier work. We address the comments of each reviewer in turn:

Reviewer A

One main criticism that this reviewer had concerned the placement of our work in the context of previous work. In particular, the reviewer thought that the work of Chen and Baylis and Driver showing that explicit instructions affect parsing was given short shrift. We do not think that in any way was this work included as an after-thought – it was discussed in the first main sub-section of the General Discussion. We have expanded this discussion, and have includec the reviewer's excellent suggestion that our work can be considered as an extension of this earlier work if one views perceptual experience as a form of implicit instruction about how to parse an image.

A second criticism was that the main issues in the paper should have been framed as a contrast between bottom-up and top-down influences rather than between generic grouping principles and perceptual experience. Our view is that the terms "bottom-up" and "top-down" have different meanings to different groups, in different contexts. Domain knowledge, such as familiar relations between image features, can easily be integrated into "bottom-up" connections in a neural network. This is what MAGIC does. So the same effect, such as the experiments in this paper, can be viewed as either bottom-up or top-down depending on one's theoretical perspective and interpretation of the terms. We have added a paragraph discussing this point to the General Discussion.

A third criticism concerned the size of the manipulation in the final experiment. As Reviewer C noted, these manipulations appear small, but are fairly sizable when considered in the context of the highly position-specific effects found in perceptual learning experiments. A sentence noting this was added to the manuscript. In addition, we clarified that this experiment was not addressing general viewpoint-specificity, but rather a more constrained form of specificity with respect to absolute position.

A fourth criticism concerned the discussion of previous accounts of object-based attention. We agree that this discussion was muddled in the original manuscript. The main issue was not models of object-based attention, but rather the interaction between object- and space-based attention. We have attempted to clarify the discussion.

Minor comments have been addressed as well: we added bump line length information; included the idea of using multiple alternative objects within single experiment in the future work section; clarified wording concerning object effects across blocks; re-labeled the groups in Experiment 1; and included a discussion of the more significant difference for feature location on the Small-Ends versus Large-Ends displays in the final experiment. We also fixed the Vecera & Farah (1994) citations – these were meant to be Vecera (1994).

Reviewer B

This reviewer found that the main weakness of the paper was that it did not quantify the relative influence of Gestalt principles versus recent experience in determining perceptual organization. We agree that this is a critical issue that our paper does not address. Our only answer at this point was to include a discussion of this point in the future work section.

A second criticism of this reviewer concerned the MAGIC model. The reviewer is entirely correct that our findings do not validate this model, and that this model is not the only model that can account for the data. We added a paragraph to this effect in the General Discussion.

A third point made by this reviewer concerns historical context for the work. We've adopted the suggestion that this work be placed in the context of the debate between the Brunswick versus Gestalt schools.

Reviewer C

The reviewer had numerous suggestions about the statistical analysis. In some cases, we only reported on some of the results in order to highlight what we consider the main effects; in other cases, we unintentionally omitted some results. In the new version, we have reported on the full set of ANOVAs, and have also run some new ANOVAs on the old data, following the reviewer's suggestions. For all experiments, error analyses are included along with reaction times. Results of an ANOVA crossing all the main experimental factors, including judgement and orientation, are reported first, followed by separate analyses on separate blocks or groups. Hence the results sections are a bit denser but more thorough and complete.

The reviewer suggested that previous work by Nakayama and colleagues, particularly Joseph and Nakayama (1999) be cited and discussed. We have added these to the General Discussion. We have also included sentences discussing Wertheimer's suggested role for experience in grouping, and Gauthier and Tarr's proposal that object representations may be fuzzy with respect to shape.

All of the more minor comments of this reviewer have been addressed as well, including several rewordings, typos, and figure modifications.

We hope that this answers the comments and objections of the reviewers and look forward to hearing from you.

Thanks and best regards,

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