The Ebbinghaus illusion is not a size contrast illusion

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The Ebbinghaus illusion is usually described in terms of size contrast: identical targets look smaller/larger when surrounded by several similar larger/smaller figures. Based on such a description, many researchers have endorsed the idea that size contrast between targets and surrounding figures is the underlying cause of the phenomenon. However, the illusion in its standard form can also be described in terms of the distances of the surrounding figures rather than their sizes: identical targets look smaller/larger when surrounded by several further/nearer figures. Distance has indeed long been recognized as an independent factor affecting the strength of the illusion. Such findings have suggested accounts according to which the illusion is due to distance-dependent processes of attraction and repulsion between the contours of the elements of the illusory displays. We report several experiments using classical and novel variants of the Ebbinghaus display, in order to confront the size contrast account and the contour interactions account of the effect. For better control of distances between the elements of the stimulus constellations, figures with straight contours were used instead of conventional circular shapes. Some displays involved ‘spread contexts’, in which many more surrounding figures were present than in the standard displays, and others involved ‘merged contexts’, in which several surrounding figures were merged into single figures. It was found that, compared to the standard form, spread contexts decreased the strength of the illusion and merged contexts increased it. The results were contrary to the predictions of the size contrast account and in accord with the predictions of the contour interactions account.

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