Supposing that crowding is compulsory grouping suggests a remarkably simple model for object recognition — Denis Pelli & Sarah Rosen — Psychology & Neural Science, NYU

Optional abstract

Crowding and grouping have each received much study, but because they can be separated, they have received negligible study together. Here we show that the same image parameters that promote grouping also set the maximum possible efficiency of letter recognition, as measured from central vision. The two things go hand in hand because they arise from an underlying object recognition system, and in this sense, crowding is a special case of grouping. We conclude that the same image parameters that promote separation and recognition also set the maximum efficiency of letter recognition from central vision, and that efficiency is the same whether the target is unconstrained or constrained by crowding. We call this efficiency the universality of letter recognition.

Deductions

- The extent of crowding is proportional to eccentricity and task difficulty.
- Crowding is the smallest grouping.
- The universal recognition unit should be practically the same as for unrestricted vision.
- The human has a vast array of combining fields, one for each size and retinal location.

Conclusion

Parsimony and the experimental result support the idea that object recognition is mediated by a vast array of similar recognition units, of various sizes and locations, each capable of recognizing things no more complex than a simple Roman letter.