While observers are adept at judging the density of features present in a visual texture it has recently been proposed that they also have an independent sense of visual number. Here we explore the notion that these abilities tap into a common mechanism. To this end we examined the effects of manipulating the size, contrast and contrast-polarity of individual elements as well as the attentional resources available to the observer. Our prediction is that if a common mechanism underlies density and number judgements then similar effects should be found on discrimination of density and number. Observers (n=5) always made a 2-IFC discrimination based on the relative numerosity/density of two patches (presented either side of fixation) containing 16-1024 Gaussian blobs. By mismatching patch-size between the two intervals observers were forced to make their judgements based either on density or number. We report that larger stimulus-patches biased perception towards greater density and numerosity, an effect that was amplified under conditions of increased uncertainty about element-size. Mismatching element-size between patches led to large observer biases and elevated thresholds for both density and number discriminations, whilst performance was relatively unaffected by manipulations of element contrast or polarity. Finally, under conditions of increasing attentional load thresholds were similarly elevated for both number and density tasks. Thus, all experimental manipulations had near-identical effects on density and number judgements, supporting the notion of a common underlying metric. Many of our results – in particular the devastating effect of manipulating element-size - are consistent with our model of number/density estimation based not on a representation of individual "objects" but simply on the relative responses of high and low spatial frequency filters.