Bootstrap definition

The construction of approximate regions is approached through *bootstrap averages*. We only have one observed mean from *n* replicates for a particular group – leaving aside how that is calculated for the moment. What we need, for a plausible region estimate, is examples of what ‘other means might have looked like’ had we been able to repeat exactly the same sampling protocol, e.g. to obtain another set of *n* replicates at the same time and/or place (or whatever the group represents). We also need the ‘other means’ to be generated without distributional assumptions, in keeping with the rest of our approach. There is no possibility of obtaining this by permutation (permuting the sample labels across groups destroys the group structure we are trying to represent, and permuting within a group does not change its mean!) However, resampling the set of *n* samples *n* times, with replacement, will produce a different sample set (some samples are certain to be missed altogether and some are repeated, possibly a few times), and will have a different mean. This is a *bootstrap* sample, giving a single *bootstrap average*, and repeating this process *b* times will give a set of *b* such averages which are, to some degree, a set of ‘other means which we might have obtained’.

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