We consider correlations, $p_{n,x}$, arising from measuring a maximally entangled state using $n$ measurements with two outcomes each, constructed from $n$ projections that add up to some scalar times an identity. We show that the correlations $p_{n,x}$ robustly self-test the underlying states and measurements. To achieve this, we lift the group-theoretic Gowers-Hatami based approach for proving robust self-tests to a more natural algebraic framework. A key step is to obtain an analogue of the Gowers-Hatami theorem allowing to perturb an "approximate" representation of the relevant algebra to an exact one. As a corollary, we exhibit a constant-size self-test for measurements of unbounded dimension as well as all maximally entangled states with odd local dimension. (This is a joint work with Laura Mancinska and Christopher Schafhauser.)