Stephen M. Gagola, Jr.* (gagola@math.kent.edu), Department of Mathematics, Kent State University, Kent, OH 44242. Subgroups of $S_{n+1}$ normalized by and coprime to a regular subgroup of order $n$. Preliminary report.

Let $H$ be a regular subgroup of the symmetric group $S_n$, and regard $S_n < S_{n+1}$ so that $H$ may be viewed as permuting $n + 1$ points and having two orbits, one regular and one trivial. We determine conditions on $H$ so that $H$ normalizes a nontrivial subgroup $K < S_{n+1}$ of order coprime to that of $H$, and are interested in determining the number of such subgroups $K$.

As an example, if $n = p$ is a prime number, then $H$ must be cyclic and generated by a $p$-cycle. Furthermore, $p = 2^q - 1$ must be a Mersenne prime, and the number of subgroups $K$ of order not divisible by $p$ that are normalized by $H$ is $(2^q - 2)/q$. (Received July 28, 2009)