Suppose an urn has R red balls and W white balls for a total of $N = R+W$ balls. Suppose that when you take out a white ball, you keep it with probability w (and return it otherwise), and if you take out a red ball, you keep it with probability r. Fix a number n smaller than $\min(R,W)$. Take a sample of n balls from the urn one at a time with the replacement rules described above. Let $X_{(r,w)}$ be the number of white balls that are in the sample. When $r=w=0$, this is the classical "sampling with replacement" and $X_{(0,0)}$ corresponds to the binomial model, while $r=w=1$ is "sampling without replacement" and $X_{(1,1)}$ corresponds to the hypergeometric model. In their paper "To replace or not to replace" Engbers and Hammett study $X_{(0,1)}$. In this project we will work on some open questions regarding $X_{(0,1)}$ and will try to find nice expressions for the density, expectation and variance of $X_{(r,w)}$.