39. (a) No external torques act on the system consisting of the man, bricks, and platform, so the total angular momentum of the system is conserved. Let I_i be the initial rotational inertia of the system and let I_f be the final rotational inertia. Then $I_i\omega_i = I_f\omega_f$ and

$$\begin{aligned}\omega_f &= \left(\frac{I_i}{I_f}\right)\omega_i \\ &= \left(\frac{6.0\,\mathrm{kg\cdot m^2}}{2.0\,\mathrm{kg\cdot m^2}}\right)(1.2\,\mathrm{rev/s}) \\ &= 3.6\ \mathrm{rev/s}\ .\end{aligned}$$

(b) The initial kinetic energy is $K_i = \frac{1}{2}I_i\omega_i^2$, the final kinetic energy is $K_f = \frac{1}{2}I_f\omega_f^2$, and their ratio is

$$\frac{K_f}{K_i} = \frac{I_f\omega_f^2}{I_i\omega_i^2} = \frac{(2.0\,\mathrm{kg\cdot m^2})(3.6\,\mathrm{rev/s})^2}{(6.0\,\mathrm{kg\cdot m^2})(1.2\,\mathrm{rev/s})^2} = 3.0\ .$$

(c) The man did work in decreasing the rotational inertia by pulling the bricks closer to his body. This energy came from the man's store of internal energy.