In this paper, we study cooperative cognitive radio networks consisting of a primary user (PU) and multiple secondary users (SUs). SUs transmit only when PU is sensed as silent and may interfere with primary transmission due to imperfect sensing. When primary activity is sensed correctly, SUs cooperate with PU by assisting retransmission of failed packets of PU. We analyze packet throughput of PU and SU for three variations of the proposed cooperation method. A signal flow graph-based approach is employed to obtain the closed-form expressions of packet throughput. The analysis is done for two cases: individual sensing and cooperative sensing. Furthermore, we characterize the optimal transmission probability of SUs that maximizes individual secondary packet throughput keeping all queues in the system stable. Results present a comparison of throughput performance of the proposed cooperation methods under different scenarios and show their benefits for both PU and SU throughput.