Supplemental Data

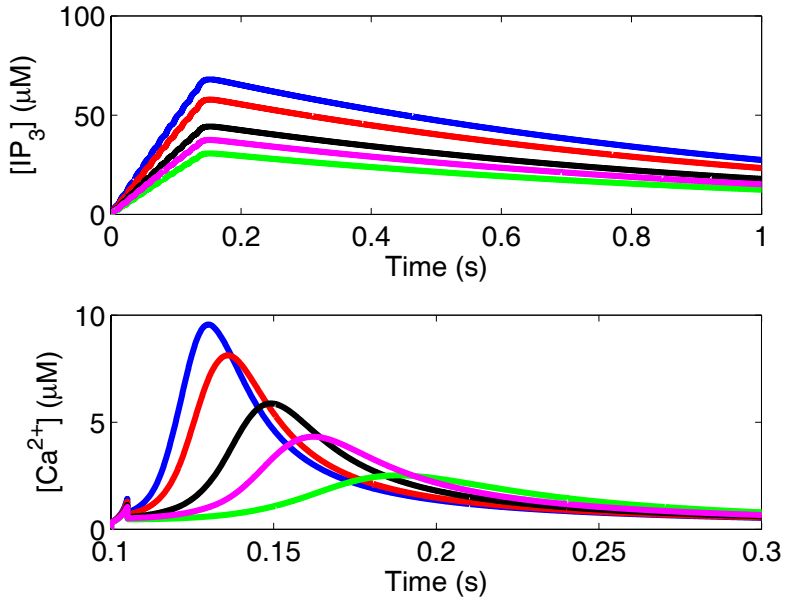

Figure S1 Spine $[Ca^{2+}]$ (lower figure) during coincident activation given various IP_3 profile magnitudes (as shown in the top figure). Ca^{2+} trends in the lower figure are the result of the same-colored IP_3 profile in the top figure. As the magnitude of the IP_3 profile is increased, the delay time (as measured from the small initial peak due to CF activation to the time of significant rise toward the true maximum) decreases. Note the shorter time window in the lower figure as compared to the top figure.

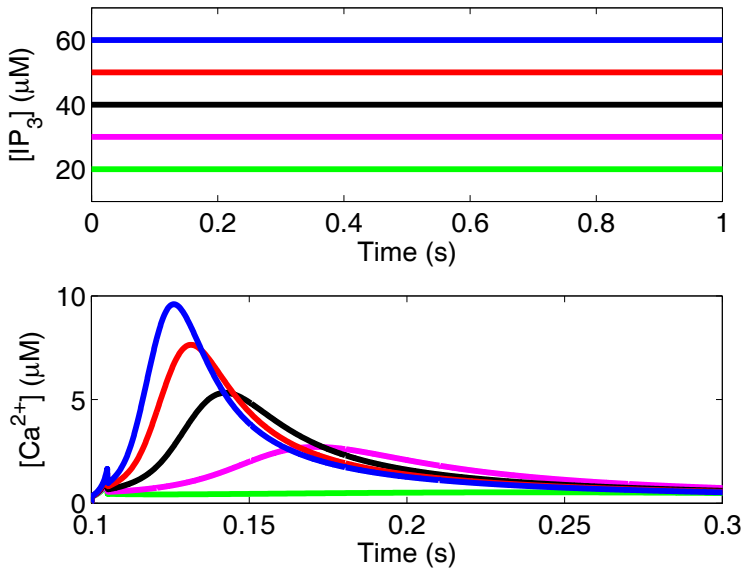

Figure S2 Similar data as Figure S1 but with constant IP_3 profiles. The varying delay is still observed.

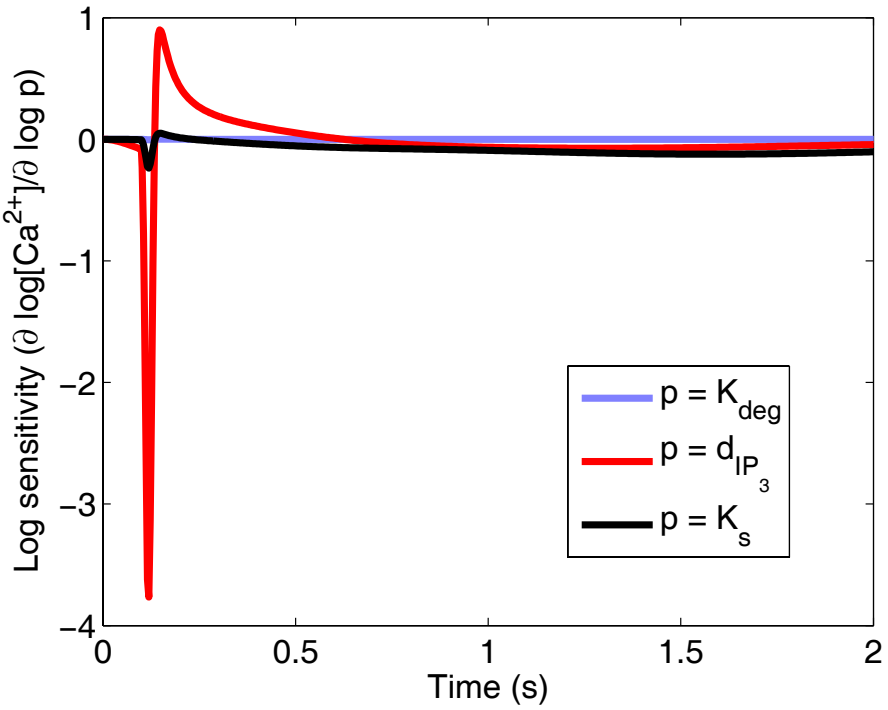

Figure S3 Normalized log sensitivity of spine cytosol Ca^{2+} with respect to three parameters related to IP_3 calculated during the supralinear calcium spike observed during coincident activation (see Figure 9). Changes in the two parameters that govern the decay rate of IP_3 in the system (K_{deg} and K_s) have a very small effect on $[Ca^{2+}]$ As a comparison, the sensitivity of $[Ca^{2+}]$ to d_{IP3} (IP_3R sensitivity to IP_3) is also included. Therefore, adjusting K_{deg} and K_s to account for other phenomena (e.g., IP_3 degradation due to 3-kinase) will have a minimal role in shaping the system response during coincident activation.