Theorem The noncentral t distribution is a special case of the doubly noncentral t distribution when $\gamma = 0$.

Proof Let $X \sim N(\delta, 1)$. Let Y be a noncentral chi-square random variable with parameters n and γ which is independent of X. The random variable

$$\frac{X}{Y/\sqrt{n}}$$

has a doubly noncentral t distribution with parameters n, δ, and γ. When $\gamma = 0$, the random variable Y becomes an ordinary chi-square random variable with n degrees of freedom. This means that

$$\frac{X}{Y/\sqrt{n}}$$

has the noncentral t distribution with parameters δ and n. More on the doubly noncentral t distribution can be found at Krishnan, Marakatha (1968), "Series Representation of the Doubly Noncentral t-Distribution," *Journal of the American Statistical Association*, Volume 63, Number 323, pp. 1004–1012.