

# Temperature Calculation: Step-by-Step

Given: Logits = [2.0, 1.0, 0.5, 0.2]  
Tokens = ["cat", "dog", "bird", "fish"]

**Step 1: Scale Scaled by 0.5 (MORE FOCUSED)**  
Scaled =  $\frac{[2.0, 1.0, 0.5, 0.2]}{\sqrt{0.5}} = [4.0, 2.0, 1.0, 0.4]$   
Softmax =  $\frac{e^{4.0}}{e^{4.0} + e^{2.0} + e^{1.0} + e^{0.4}}$  → [0.53, 0.19, 0.12, 0.10]  
→ 73% on "cat" (**VERY FOCUSED**)

**Step 2: Scale by T=2.0 (FLATTER)**

$$\text{Softm } p_i = \frac{\exp(\text{logit}_i/T)}{\sum_{j=1}^4 \exp(\text{logit}_j/T)}$$

[0.15, 0.14, 0.17, 0.15] **CH FLATTER**

Lower  $T \rightarrow$  More confident (peaky)

Higher  $T \rightarrow$  More random (flat)

