

$$\begin{aligned} & D_{KL}(p(w|q) || p(w|d)) \\ &= \sum_w p(w|q) \log \frac{p(w|q)}{p(w|d)} \\ &= \sum_w p(w|q) \log p(w|q) - \sum_w p(w|q) \log p(w|d) \\ &\stackrel{\text{rank}}{=} - \sum_w p(w|q) \log p(w|d) \end{aligned}$$