

$$\mathcal{L}_{\text{NCE}} \left( \phi, \psi; \{s_i, a_i, s'_i, g_i\}_{i=1}^N \right) = \sum_{i=1}^N \log \left( \frac{e^{f(s_i, a_i, g_i)}}{\sum_{j=1}^N e^{f(s_j, a_j, g_i)}} \right)$$

$$\mathcal{L}_{\mathcal{I}} \left( \phi, \psi; \{s_i, a_i, s'_i, g_i\}_{i=1}^N \right) = \sum_{i,j=1}^N d_{\text{MRN}} \left( \psi(s_i), \phi(s_i, a_j) \right)$$

$$\mathcal{L}_{\mathcal{T}} \left( \phi, \psi; \{s_i, a_i, s'_i, g_i\}_{i=1}^N \right) = \sum_{i,j=1}^N D_T \left( d_{\text{MRN}}(\phi(s_i, a_i), \psi(g_j)), d_{\text{MRN}}(\psi(s'_i), \psi(g_j)) - \log \gamma \right)$$