Definition (Trace in **UPos**). Given a morphism $f : X \otimes Z \to \mathcal{U}(Y \otimes Z)$ in **UPos**, its trace in is defined as:

$$\mathrm{Tr}_{X,Y}^{Z}(f) : X \to \mathcal{U}Y$$

$$x \mapsto \{y \in Y \mid \bigvee_{z \in Z} \langle y, z \rangle \in f(x,z)\}.$$