

**Definition** (Semigroup covariant action (preliminary version))  
 A *semigroup **covariant** action* of a semigroup **S** on a set **A** is a map

$$\text{Covact} : \mathbf{S} \times \mathbf{A} \rightarrow \mathbf{A}$$

such that, for all  $a \in \mathbf{A}$ ,

$$\text{Covact}(y, \text{Covact}(x, a)) = \text{Covact}(x \circ_{\mathbf{S}} y, a).$$