

## Definition (Kleisli composition)

Let  $\langle M, \text{mu}, \text{un} \rangle$  be a monad on a category  $\mathbf{C}$ , let  $X, Y, Z \in \text{Ob}_{\mathbf{C}}$ , and let  $f : X \rightarrow MY$  and  $g : Y \rightarrow MZ$  be morphisms in  $\mathbf{C}$  (so, they are Kleisli morphisms). Their *Kleisli composition* is the morphism in  $\mathbf{C}$  given by the composition

$$X \xrightarrow{f} M(Y) \xrightarrow{Mg} (M \circ M)(Z) \xrightarrow{\text{mu}_Z} M(Z).$$