$$\begin{CD} \operatorname{Hom}(A,A) @>{\operatorname{Hom}[A,f]}>> \operatorname{Hom}(A,B) \\ @VVV @VV{\psi}V \\ \mathcal{F}(A) @>{\eta}>> \mathcal{F}(D) \end{CD}$$