$$\begin{CD}
\operatorname{Hom}_L(V_L, W) @>{g \circ - \circ f_L}>> \operatorname{Hom}_L(V'_L, W') \\
@V{\Phi_{V,W}}VV @VV{\Phi_{V',W'}}V \\
\operatorname{Hom}_k(V, W) @>{g \circ - \circ f}>> \operatorname{Hom}_k(V', W')
\end{CD}$$