

$$\begin{array}{ccc}
X_n \otimes X_{a_1} \otimes \cdots \otimes X_{a_n} & \xrightarrow{\tau \otimes 1_{X_{a_1}} \otimes \cdots \otimes 1_{X_{a_n}}} & X_n \otimes X_{a_1} \otimes \cdots \otimes X_{a_n} \\
\downarrow 1_{X_n} \otimes \tau^* & & \downarrow \mu_{a_1, \dots, a_n} \\
X_n \otimes X_{\tau(a_1)} \otimes \cdots \otimes X_{\tau(a_n)} & & X_{a_1 + \cdots + a_n} \\
\searrow \mu_{\tau(a_1), \dots, \tau(a_n)} & \nearrow \tau' & \\
& X_{\tau(a_1) + \cdots + \tau(a_n)} &
\end{array}$$