in the module $C=M$ case, this is $f(g)=gm-m$, so $H^0=\{\text{invariants}\}$

$\varphi \mapsto \psi(g_1,g_2,g_3) = g_1\varphi(g_2,g_3) - \varphi(g_1g_2,g_3) + \varphi(g_1,g_2g_3) - \varphi(g_1,g_2)$

$$\begin{array}{ccccccc} C^0 & \xrightarrow{0} & C^1 & \longrightarrow & C^2 & \longrightarrow & C^3 \\ \{c\} & & \{f\} & & \{\varphi\} & & \{\psi\} \end{array}$$

$f \mapsto \varphi(g_1,g_2) = g_1 f(g_2) - f(g_1g_2) + f(g_1)$

In the "trivial action" case,

$B^1 = 0$ $\quad Z^1 =$ characters (additive) $\quad H^1 =$ additive characters

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$$0 \longrightarrow \mathbb{K} \longrightarrow \hat{G} \longrightarrow G \longrightarrow 0$$

$$\hat{G} = \mathbb{K}\times G$$

$$(c_1,g_1)\cdot(c_2,g_2) = (c_1+c_2+\varphi(g_1,g_2),\, g_1g_2)$$

Associativity implies: $(g_1g_2)g_3 = g_1(g_2g_3)$

$$\varphi(g_1,g_2) + \varphi(g_1g_2,g_3) = \varphi(g_2,g_3) + \varphi(g_1,g_2g_3),$$

which agrees w/ the above.