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Module Theory With Group Von Neumann Algebras.

There are connections between the structure of a group G (e.g., amenability) and the module-theoretic properties (e.g., flatness, injectivity, projectivity, homology and cohomology calculations) of the group von Neumann algebra $N(G)$ and related modules (such as $L^p(G)$ and the algebra of affiliated operators) over the complex group ring $\mathbb{C}G$. For example, $N(G)$ is flat over $\mathbb{C}G$ if G is locally virtually cyclic, and the converse has been established for certain subclasses of elementary amenable groups. Other recent results and accessible open conjectures will be discussed. The flexibility of $N(G)$ as a C^*-algebra which is open to both algebraic and analytic investigation will be highlighted. (Received September 26, 2017)