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One of the many beautiful features of the fundamental groups of compact three-manifolds is that these groups are coherent (due to Peter Scott). This means that every finitely generated subgroup is finitely presented. We show that, in contrast, free-by-free groups and surface-by-free groups are incoherent except in exceptional circumstances. The methods are very similar to techniques in 3-manifold theory. In contrast to hyperbolic 3-manifolds, we show that these groups do not always virtually algebraically fiber. (Received August 10, 2020)