A key physical chemistry problem in cell biology is the generation of highly curved membrane structures. The epsin1 N-terminal homology (ENTH) domain is a well-studied curvature-generating protein widely believed to shape endocytic pits by inserting a wedge-like amphipathic helix into the membrane. The primary evidence for this mechanism is an increase in membrane bending capacity among a family of ENTH mutants with increasing hydrophobicity of the helix (Ford, Nature 2002). Since this discovery, amphipathic helices have been identified in diverse curved membrane structures including trafficking vesicles, viral buds, and multi-vesicular bodies. However, our recent work has demonstrated that membrane bending by ENTH does not require helix insertion. Specifically, whether ENTH attached to membranes by inserting a helix or using a histidine-NTA interaction, membranes became highly curved when ENTH covered 30% or more of the membrane surface. These results, coupled with analytical modeling, suggest that collisions among densely crowded membrane-bound proteins create steric pressure that drives bending (Stachowiak, Nature Cell Biology 2012). How can these seemingly conflicting results be reconciled? Here we report that increasing the hydrophobicity of ENTH's helix strongly increases the density of membrane-bound proteins, suggesting that helix insertions drive bending by facilitating protein crowding. We correlate lifetime FRET measurements of the density of membrane bound proteins with membrane curvature measured using confocal and transmission electron microscopy, and find that all ENTH mutants drive bending when bound at high densities, regardless of helix hydrophobicity. This work resolves the conflict by demonstrating that the role of amphipathic helices in curving membranes is to create strong bonds between proteins and membranes, rather than to directly bend membranes through wedge insertion. This finding will impact understanding of the broad range of curved membrane structures in which helix insertion participates.