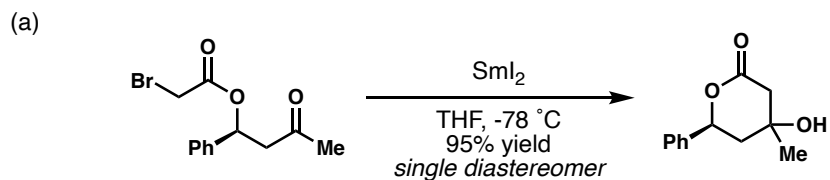
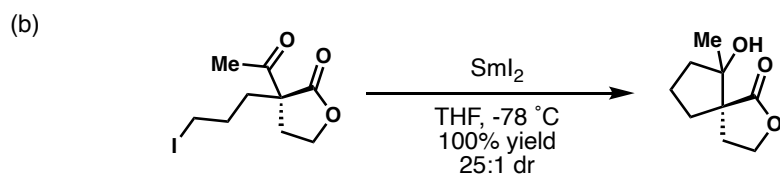


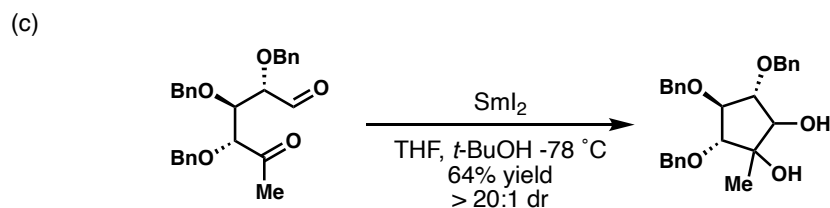
1. **There's only so far stereochemistry goes:** Propose stereochemical outcomes for each of the following transformations and provide the name of each reaction.



Molander, G. A. *et al. J. Am. Chem. Soc.* **1991**, *113*, 8036.

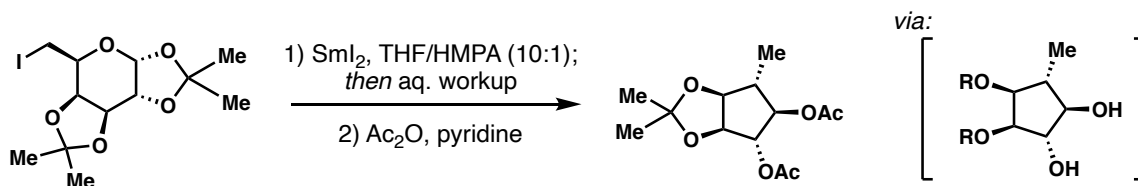


Molander, G. A. *et al. J. Am. Chem. Soc.* **1987**, *109*, 453.



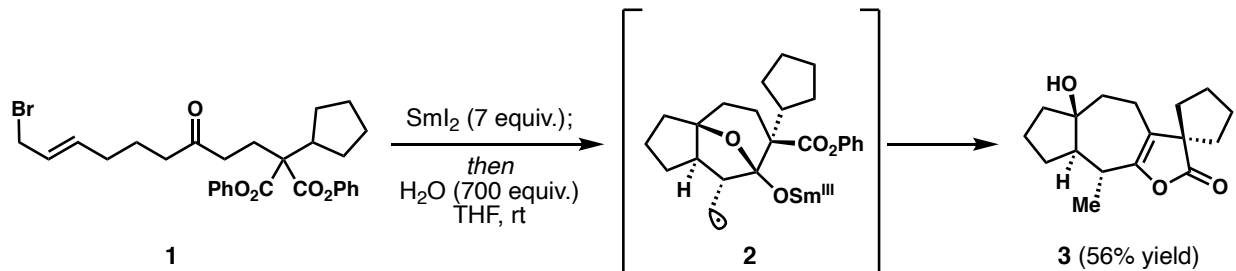
Iadonisi, A. *et al. Tetrahedron* **1997**, *53*, 11767.

2. **The sugar was charming, if a little gauche:** Propose a mechanism for the following transformation.



Chiara, J. L. *et al. J. Org. Chem.* **1996**, *61*, 6488.

3. ***I had a marvelous time annulating everything:*** Procter and co-workers demonstrated that samarium (II) iodide can promote “folding cascades” to access a diverse set of polycycles that could be useful to prepare natural products containing seven-membered carbocycles. One example of these cascades is outlined below. Propose a mechanism for this transformation. Your mechanism should include detailed three-dimensional drawings (chair structures, noncovalent interactions, etc.) to account for the observed diastereoselectivity.



Procter, D. J. *et al. Nat. Commun.* **2018**, *9*, 4802.