

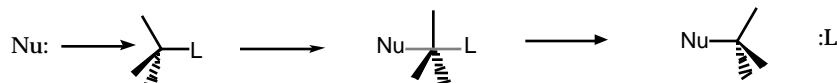
Baldwin's Rules (Suggestions) for Ring Closure

JOC 1977, 42, 3846

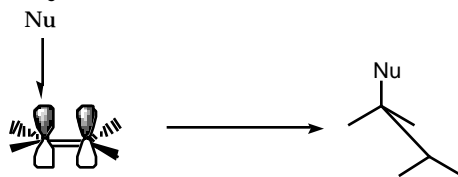
JCSCC 1976, 734, 736, 738

Approach Vector Analysis

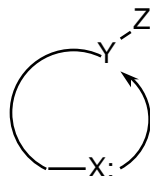
- for an S_N2 displacement at a tetrahedral center, the approach vector of the entering nucleophile is 180° from the departing leaving group



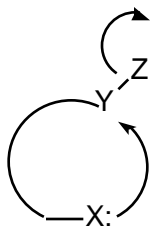
- for the addition of a nucleophile to an Sp^2 center, the nucleophile approaches perpendicular to the π -system.

*Nomenclature*

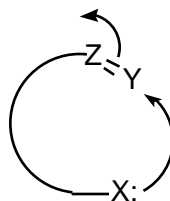
1. indicate ring size being formed
 - 3 membered ring = 3
 - 4 membered ring = 4
 - etc.
2. indicate geometry of electrophilic atom
 - if Y = Sp^3 center; then **Tet** (tetrahedral)
 - if Y = Sp^2 center; then **Trig** (trigonal)
 - if Y = Sp center; then **Dig** (digonal)



3. indicate where displaced electrons end up
 - if the displaced electron pair ends up outside the ring being formed; then **Exo**
 - if the displaced electron pair ends up within the ring being formed; then **Endo**



Exo



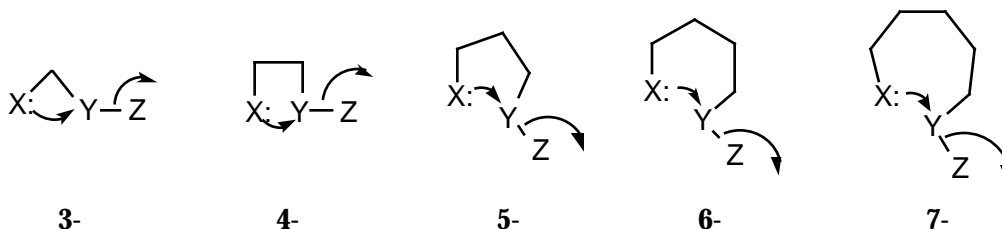
Endo

4. Ring forming reaction is designated as **Favored** or **Disfavored**

disfavored does not imply the reaction can't or won't occur- it only means the reaction is more difficult than favored reactions.

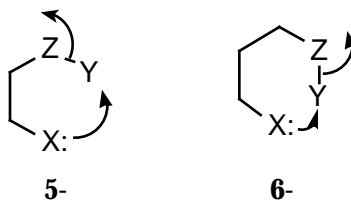
Rules (Suggestions) for Ring Closure

- All **Exo-Tet** reactions are favored



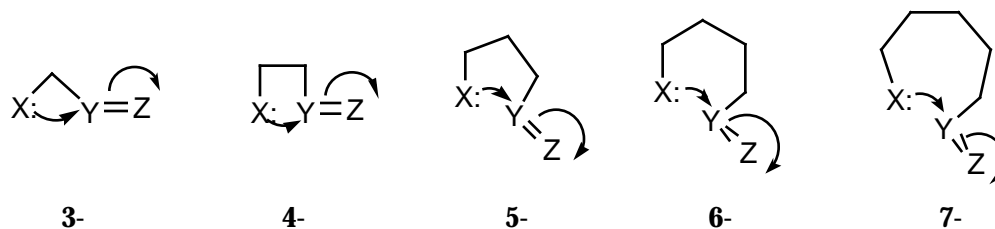
-----Favored-----

- **5-Endo-Tet** and **6-Endo-Tet** are disfavored



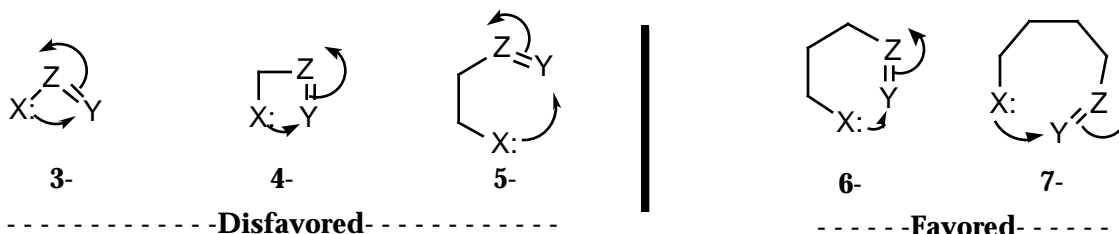
-----Disfavored-----

- All **Exo-Trig** reactions are favored



-----Favored-----

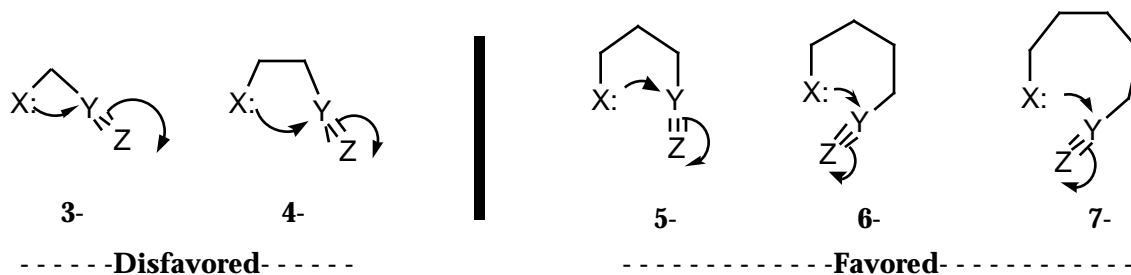
- **3-Endo-Trig**, **4-Endo-Trig** and **5-Endo-Trig** are disfavored; **6-Endo-Trig**, **7-Endo-Trig**, etc. are favored



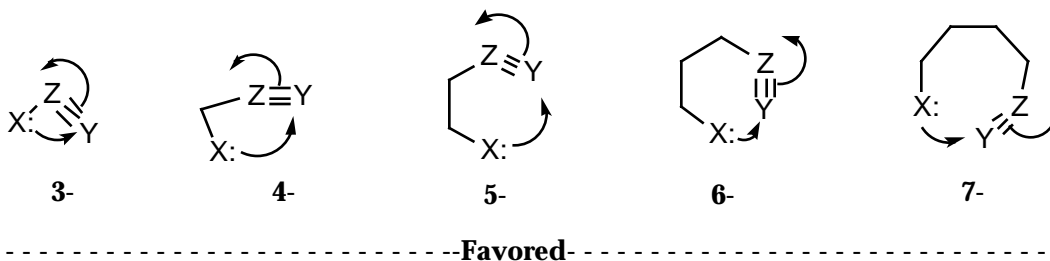
-----Disfavored-----

-----Favored-----

- **3-Exo-Dig** and **4-Exo-Dig** are *disfavored*; **5-Exo-Dig**, **6-Exo-Dig**, **7-Exo-Dig**, etc. are *favored*



- All **Endo-Dig** are *favored*



EXCEPTION:

There are many !!! (see March p 212-214)