Models of eye-movements in reading explain:

What drives and controls eye-movements?

- Where to fixate next?
- When to move the eyes?

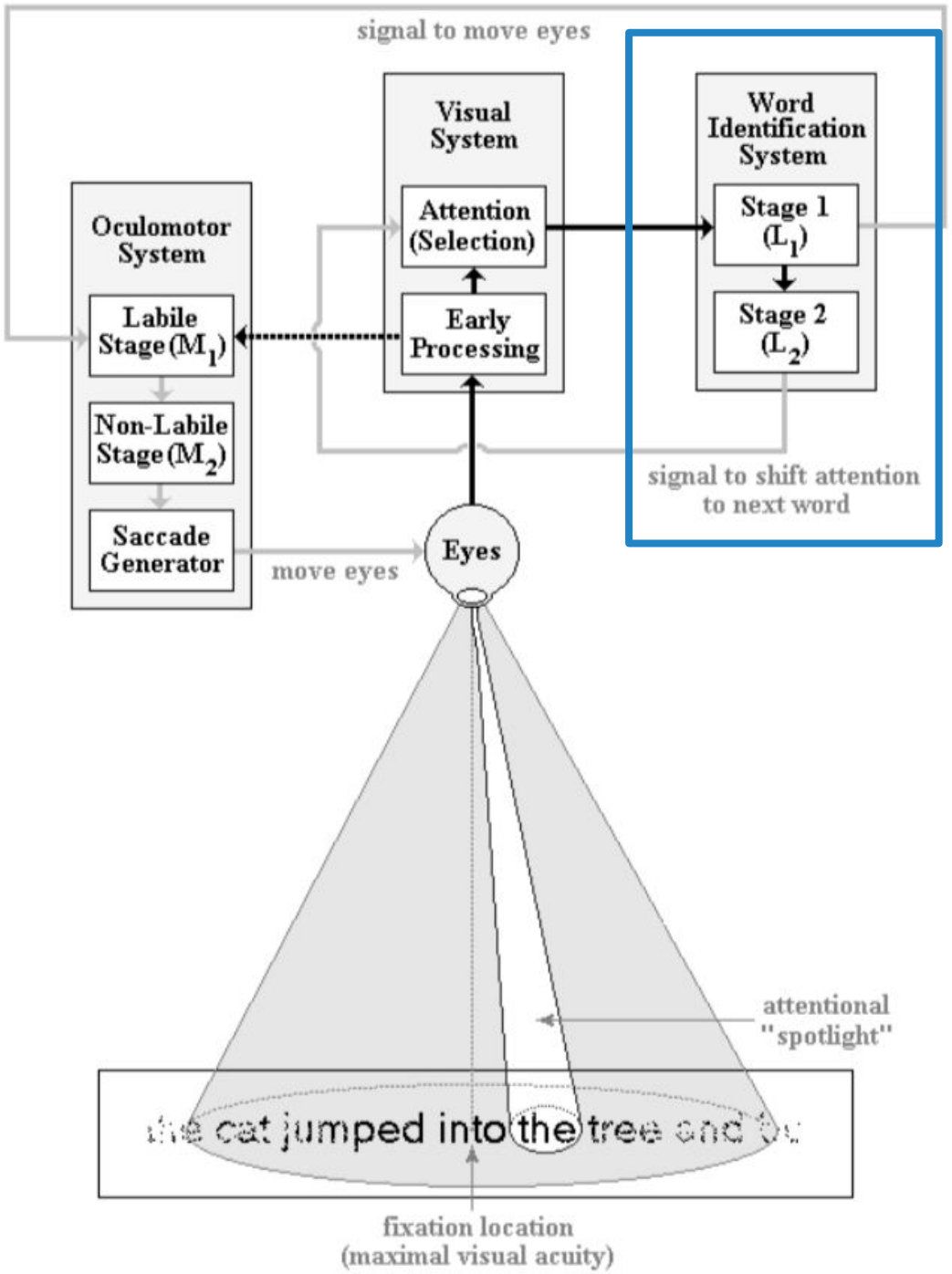
We shall see how different models explain differently

- **E-Z Reader**
  (Reichle et al., 2003)
- **SWIFT Reader**
  (Engbert, Nuthmann, Richter, & Kliegl, Psych. Rev., 2005)

E-Z Reader model

The fixated word is processed in two stages:

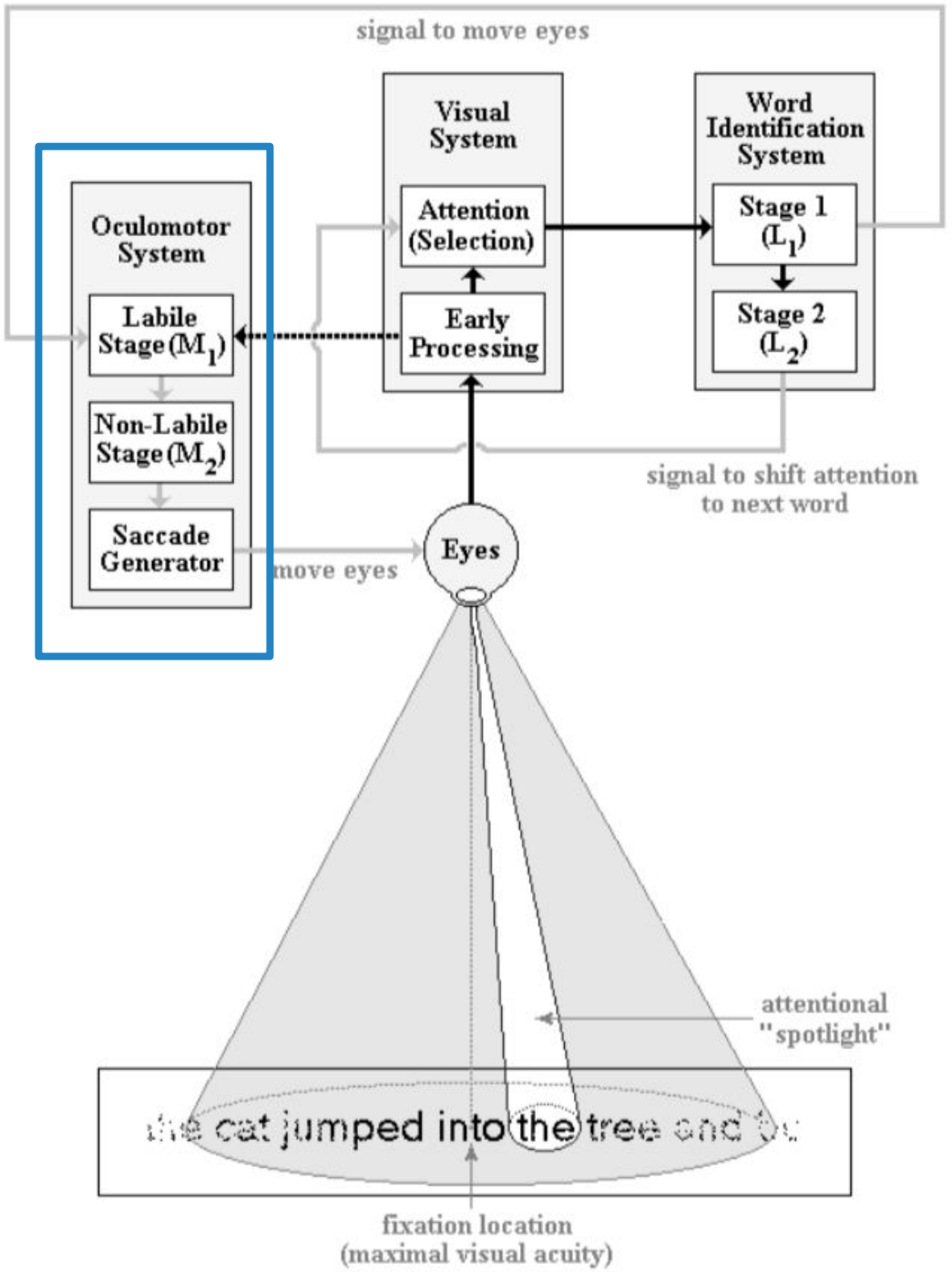
- First, it is checked for familiarity.
- Then, an eye-movement is programmed to the next word.
- Meanwhile, the current word is identified.



E-Z Reader model

The programmed saccade goes through two stages:

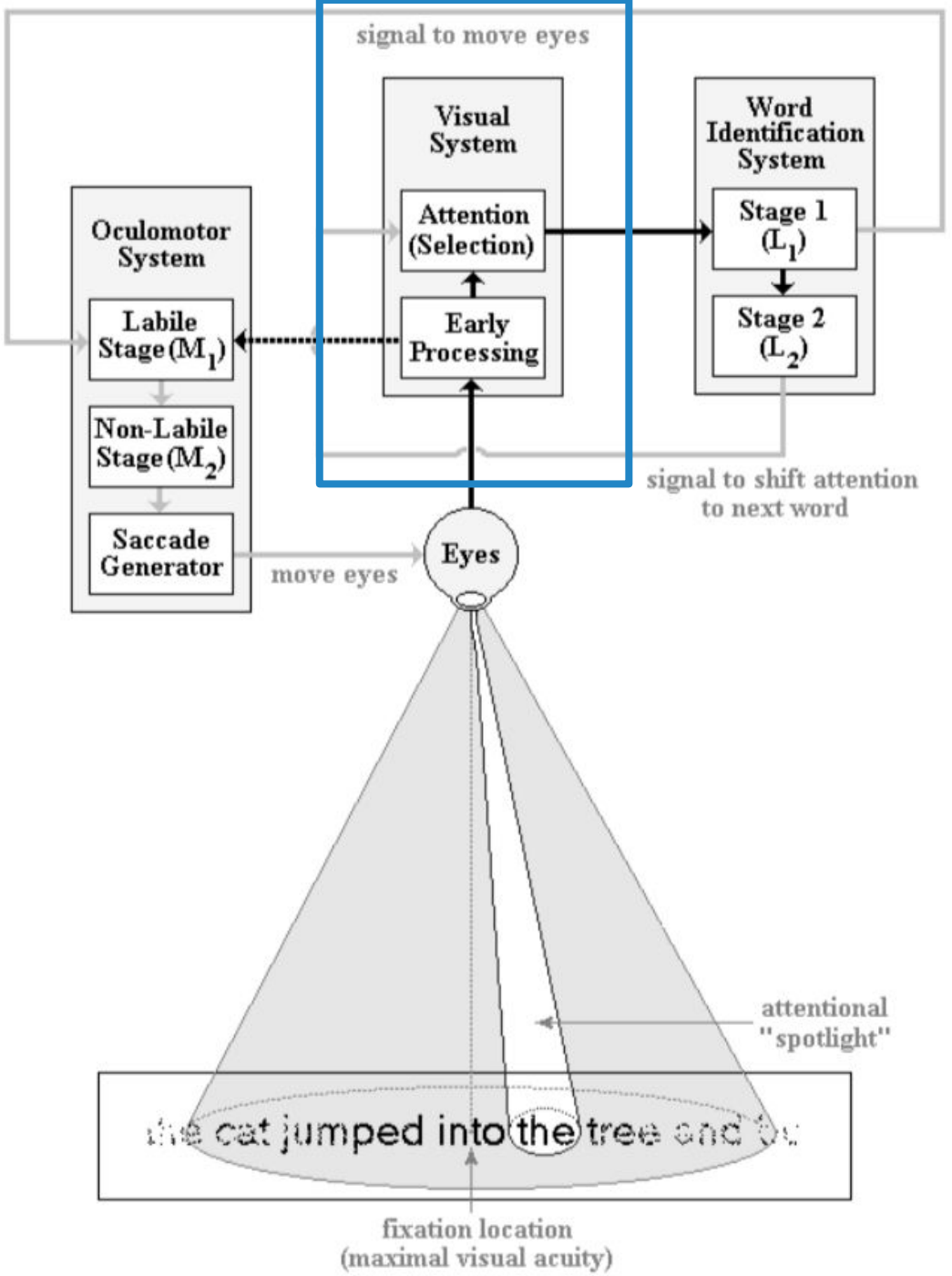
- In the labile stage, the planned saccade can be cancelled.
- In the non-labile stage, the saccade cannot be stopped.
- Then a saccade is triggered to the next word..



E-Z Reader model

After the saccade has landed on the new word, it processed by the visual system in two stages:

- All physical features of the word are extracted at an early stage.
- Attention shifts to the new word.



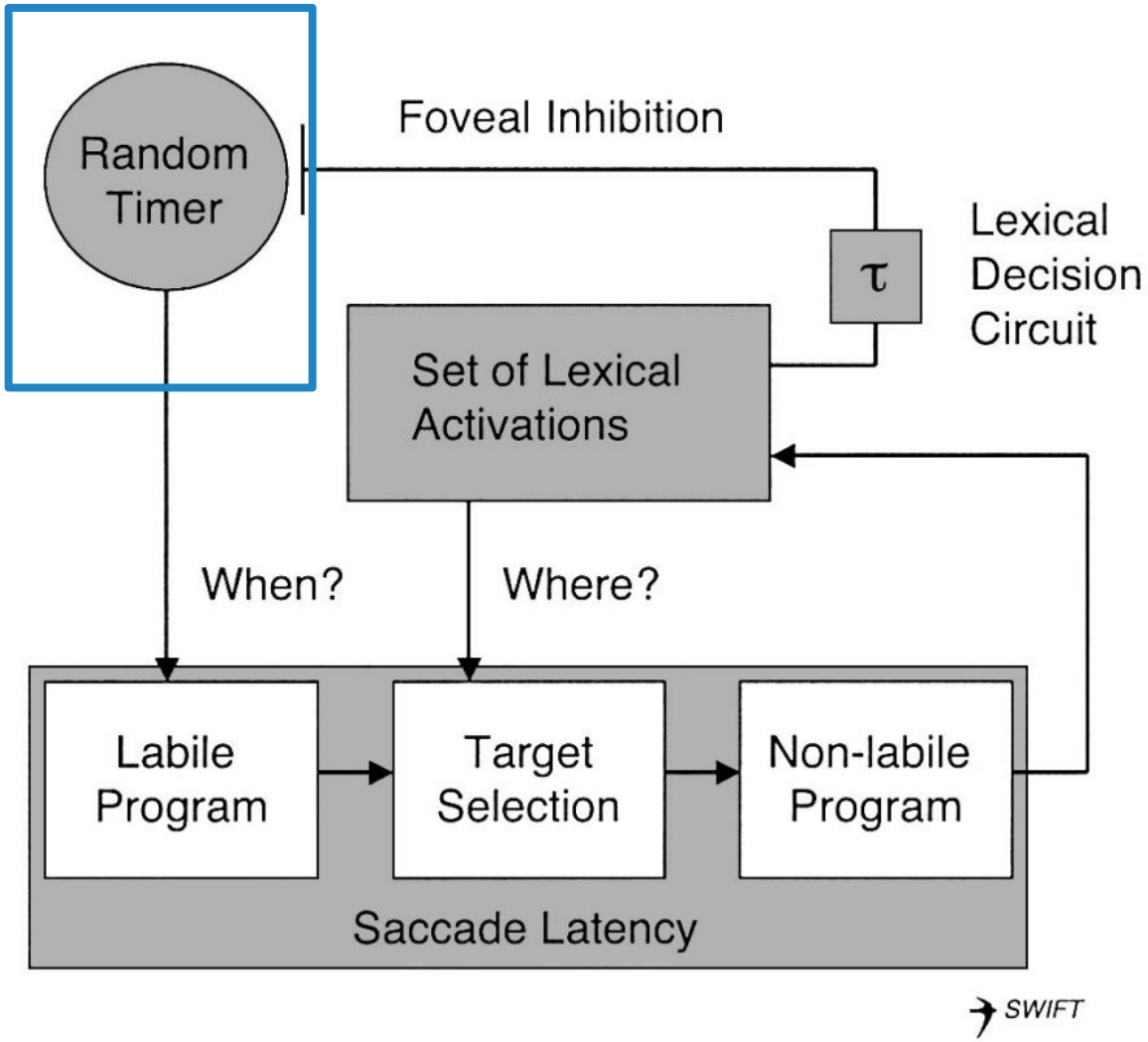
E-Z Reader model

Assumptions:

- Attention is like a spotlight. It's size is fixed.
- Words are processed serially.
- Covert attention independent of overt eye-movements. Eye-movements can be planned to next word while attention is engaged at current word.
- Language processing directly controls saccades.

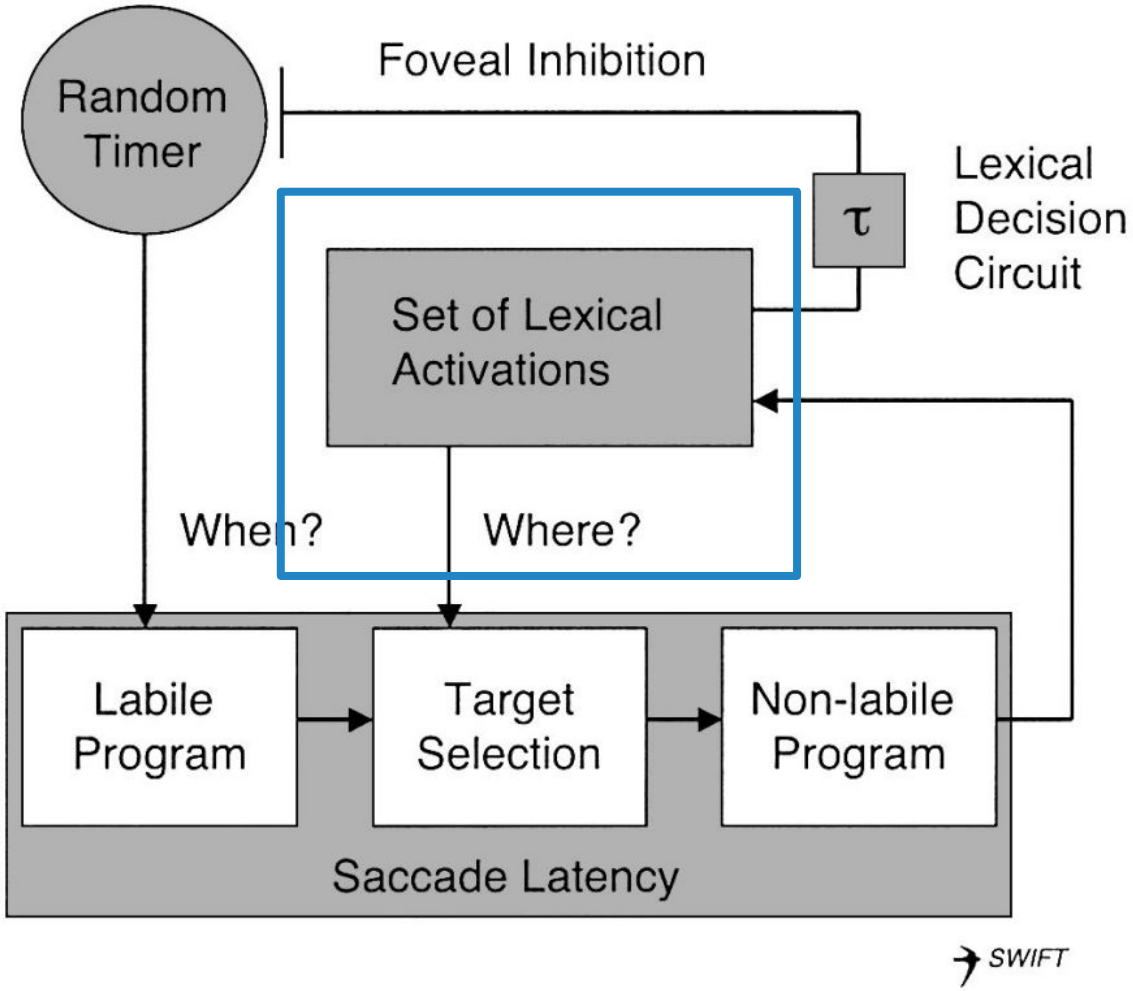
SWIFT model

- Unlike in E-Z Reader model, SWIFT model proposes that saccadic system and lexical system are independent.
- Saccades are generated autonomously at random intervals and not by lexical processes.



SWIFT model

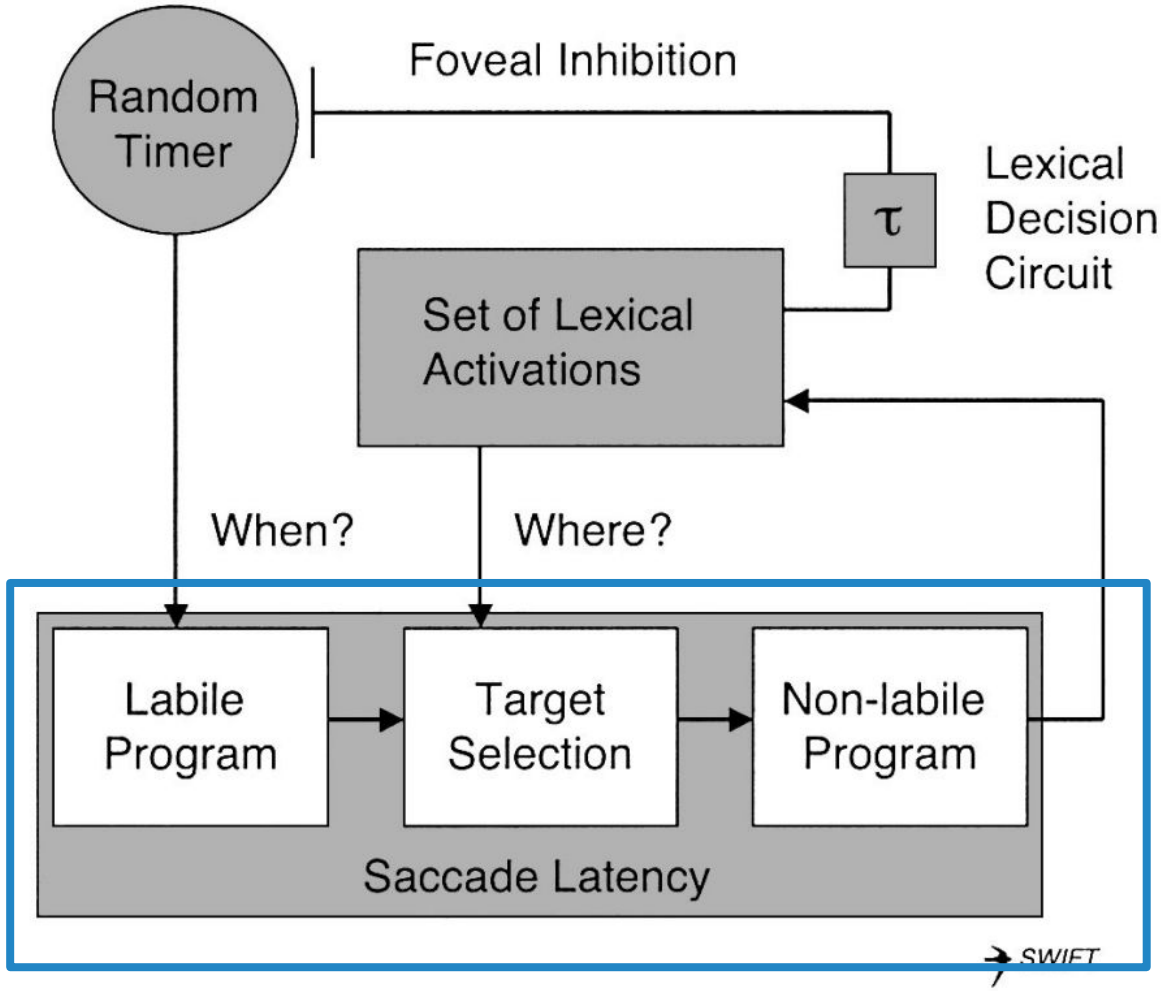
- The endpoint of the saccade is determined by activation values that each word carries
- Saccades land on the word with the highest activation value in descending order.
- The activation values are computed in parallel



SWIFT model

Similar to E-Z model, saccades are executed in two stages:

- Early and cancellable stage: Labile stage
- Late and not cancellable stage: Non-labile stage.



SWIFT model

Assumptions:

- Attention is understood as a graded spotlight.
- Parallel processing of all words.
- No direct control over timing of saccades.