discussion of Giraudo & Grainger 2000, Jan. 24, 2011

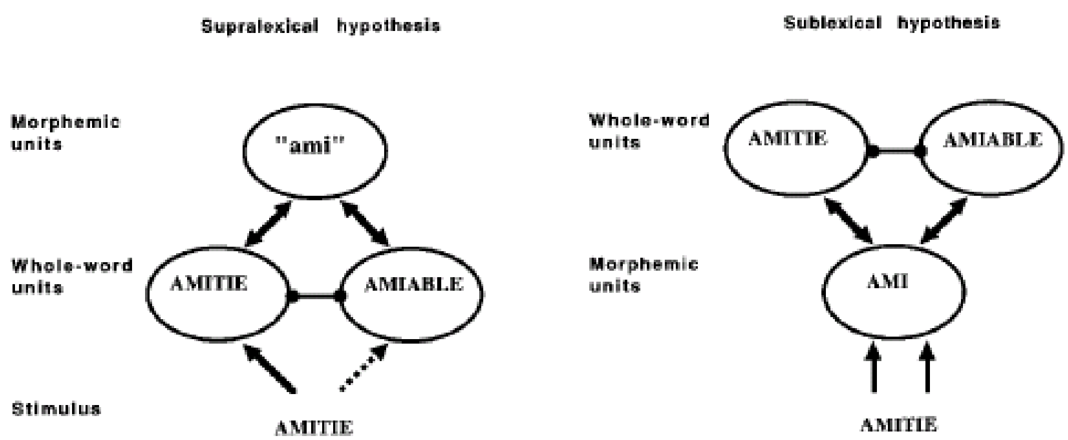
This is a meld of Kristine Yu's notes and Kie's. Blame me [Kie] for mistakes.

(1) Observation

In masked priming (prime exposure of about 60 ms.), schematically...

- *happiness* primes (produces faster response for) *happily* or *happy*
  - → shared unit *happy* that gets activated by *happiness*
- but *happen inhibits happy* (slower and/or less accurate)
  - → competition between nodes at same level
  - same competition between *happiness* and *happy*, but overpowered by facilitatory effect
  - the more frequent *happy* is, the less the competition should matter

(2) Two models of where the shared node is



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To which we can add a third model where the three nodes are all at the same level.

(3) How to tell them apart? (switching now to real example words)

- Vary the frequency of the prime (*amitié*), holding target and root freq. the same
- In masked priming, the idea is that only the prime itself has time to get activated
  - The more frequent *amitié* is to begin with, the greater its activation after exposure.
  - The math isn't spelled out here, but that must mean that activation after exposure is *c*resting_activation* rather than *c + resting_activation*, where *c* is some constant.
  - In the supralexical model, the more frequent *amitié* is, the more it should then facilitate *ami* or, via "preactivation", *amiable*.
  - I wasn't clear on when this is supposed to happen, given the assumption about only the prime itself having time to get activated. Can you help?
  - In sublexical model, activation of *ami* shouldn't depend on frequency of prime *amitié*
    - because under masked priming there hasn't been enough time yet (57 msec) for activation to flow back down from *amitié* to *ami*.

(4) The basic method: masked priming

Mentioned briefly the other day.

- `######` appears on screen for 5000 ms
- `AMITIE` flashes for 57 ms, not enough time to be able to say what the word was
- `amiable` appears until you press the button for lexical decision

(5) Experiment 1: does frequency of the morphologically related prime matter?

- Compare how well high-frequency *amitié* 'friendship' primes high-frequency *ami* 'friend'
- vs. how well low-frequency *amiable* 'amiable' primes *ami*
- vs. how well low-frequency unrelated *amidon* 'starch' primes *ami*

(Actually counterbalanced across groups of subjects: no matter what group you're in, you only get tested on *ami* once.)

- Target is always monomorphemic, to prevent any strategery on part of participants

(6) Exp. 1 results

- Yes, the more frequent the prime the more facilitation.
- → supports supralexical model, on assumption that there really isn't enough time for activation to flow back down from *amitié*.

TABLE 1
Mean lexical decision latencies for correct responses, percentage of errors (in parentheses), standard deviations to word targets and net morphological priming effects relative to the orthographic control condition in Experiment 1

Prime type	*RT*	*SD*	*Net effect*
High frequency morphological primes	596 (1.4)	78.0	25*
Low frequency morphological primes	611 (1.7)	81.8	10
Orthographic control primes	621 (5.0)	88.2	

Note. * $p < .05$ by participants and items.

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(7) Experiment 2: does frequency of the orthographically overlapping prime matter?

- high-frequency `AMIRAL` 'admiral' as prime for `ami`
- vs. low-frequency `AMIDON` as prime for `ami`
- vs. medium-frequency unrelated `CHAUME` 'thatch' as prime for `ami`

o Before we look at the results, let's think through what each model predicts.

(8) Exp. 2 results

TABLE 2
Mean lexical decision latencies for correct responses, percentage of errors (in parentheses), standard deviations to word targets and net orthographic priming effects relative to the unrelated condition in Experiment 2

Prime type	*RT*	*SD*	*Net effect*
High frequency orthographic primes	659 (6.7)	60.4	14
Low frequency orthographic primes	662 (2.3)	76.9	11
Unrelated primes	673 (3.3)	83.3	

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- No interference effect from orthographic primes; frequency doesn't matter
  - lack of effect maybe because less overlap (3 letters) than in other studies, maybe because high-frequency target, so resistant to competition
- But higher error rate with high-frequency orthographic prime.
- In any case, higher-frequency prime doesn't facilitate, so the effect in Exp. 1 was due to morphological relatedness.

(9) Experiment 3: putting it together

- high- and low-frequency morph. related primes, AMITIE, AMIABLE
- high- and low-frequency orth. overlapping primes, AMIRAL, AMIDON
- high- and low-frequency unrelated primes, JUILLET 'July', MORPION 'brat, tic-tac-toe'
- high- and low-frequency morph. related primes, AMITIE, AMIABLE

(10) Exp. 3 results

- In morph. related primes, higher frequency facilitates more
- In orth. overlapping primes, frequency doesn't matter (no inhibition found this time)
- In unrelated primes, frequency doesn't matter

TABLE 3

Mean correct lexical decision latencies, percentage of errors (in parentheses) and standard deviations of RTs to word targets in each priming condition. Net morphological priming effects relative to the unrelated condition are given for each prime frequency in Experiment 3

	Prime type						
	Morphological		*Orthographic*		*Unrelated*		
Prime frequency	*RT*	*SD*	*RT*	*SD*	*RT*	*SD*	*Net effects*
High frequency primes	622 (1.3)	97	648 (4.2)	98	655 (3.8)	100	33*
Low frequency primes	640 (3.5)	89	642 (4.2)	84	645 (4.0)	90	5

Note. * $p < .05$ by participants and items.

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(11) This is supposed to be problematic for dual-route models

- Since the target is high-frequency, the whole-word route should dominate
- → Frequency or even presence of morph. related prime shouldn't matter
- But what if a high-frequency prime, by activating *ami* a lot, can make the decomposed route faster than the whole-word route?
- In such models, cumulative root frequency (summed frequency of all words that contain the root) is supposed to speed the decomposed route.
- → see if prime frequency and cumulative root frequency interact

o I didn't totally follow the logic there either. Can you help?

(12) Experiment 4: target with low vs. high cumulative root frequency

- ours 'bear' vs. cire 'wax'
- but, frequency of primes not varied--all had lowish frequency

(13) Exp. 4 results

- Null result.

TABLE 4

Mean correct lexical decision latencies, percentage of errors (in parentheses) and standard deviations to word targets with low and high morphemic frequencies. Net morphological priming effects relative to the unrelated condition are given for each type of target in Experiment 4

	Type of primes						
	Morphological		*Orthographic*		*Unrelated*		
Type of target	*RT*	*SD*	*RT*	*SD*	*RT*	*SD*	*Net effects*
Low cumulative frequency	653 (4.4)	77	682 (6.4)	80	691 (5.6)	64	38*
High cumulative frequency	652 (3.1)	62	673 (5.3)	60	698 (3.6)	66	46*

Note. * $p < .05$ by participants and items.

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- o Is the lowish frequency of the primes a problem?
- Says other studies finding cumulative root effects have used lowish-frequency targets.
- o Exp. 4 is supposed to refute a dual-route interpretation of Exp. 1 & 3 results. What do you think?

(14) Conclusions

- Morphological priming can happen, even with free-root target
  - no possibility of morphological strategy
  - sidesteps question of whether non-word fillers should contain a real stem or affix, or both
  - → morphologically related words are somehow connected
- Morphological priming can happen even when target is high frequency, so that decompositional route should be irrelevant in dual-route model
  - → undermines dual-route race model
- Higher-frequency morphological prime facilitates more
  - → supports supralexical over sublexical model
  - also supported by other work from same researchers showing no priming by pseudoroots, pseudoaffixes
- If morpheme nodes are learned after whole-word nodes, expect cross-linguistic differences in which morphemes get their own nodes and their "relative weight" in parsing stimuli.

References

Giraudo, Hélène & Jonathan Grainger. 2000. Effects of prime word frequency and cumulative root frequency in masked morphological priming. *Language and Cognitive Processes* 15(4). 421. doi:10.1080/01690960050119652.