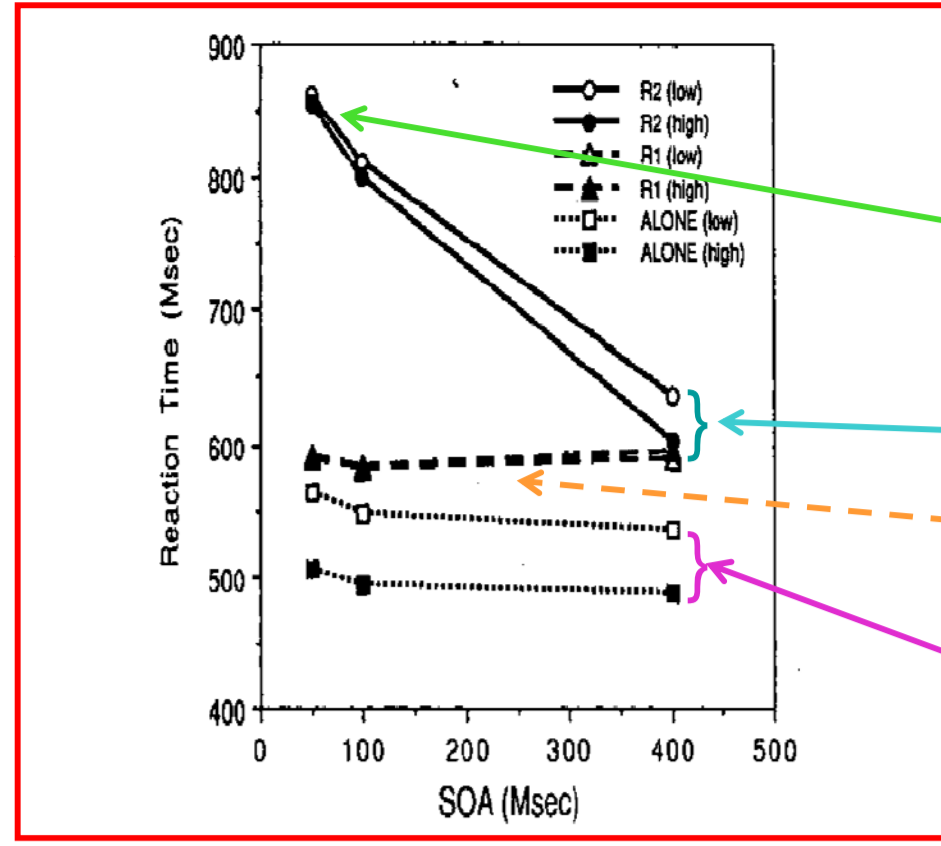


Key Experimental Evidence for Central Bottleneck: How Replicable is it?

Original Report of Finding



THE PATTERN OF RESULTS

Reduction in SOA slows RT2 while shrinking the effect of contrast ...
 ...compared to effect of contrast seen on RT2 at the long SOA values.
 Little effect of SOA or contrast on RT1
 Task-2 done in isolation shows full contrast effect.

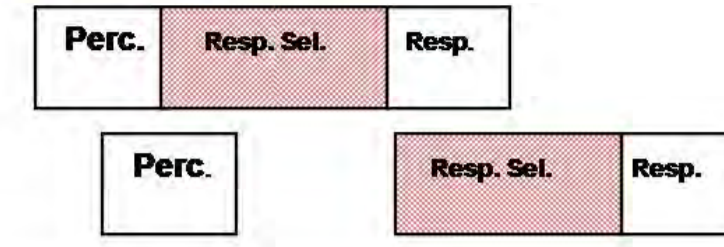
(Expt involves responding to two stimuli in close succession; SOA refers to number of milliseconds between first stimulus and second stimulus; RT2 refers to response time to second stimulus, whose visual contrast is varied in these experiments.)

Pashler & Johnston (1989), *Quarterly Journal of Experimental Psychology*, 41A, 19-45.

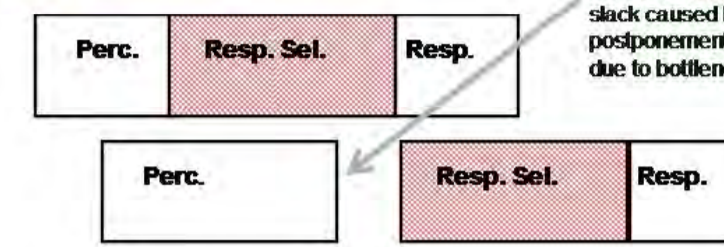
What does the finding mean?

Central processing bottleneck prevents response selection process in task-2 from beginning until response selection in task-1 is complete—generating slack that “eats up” the effect of slowing of pre-bottleneck stages induced by contrast reduction.

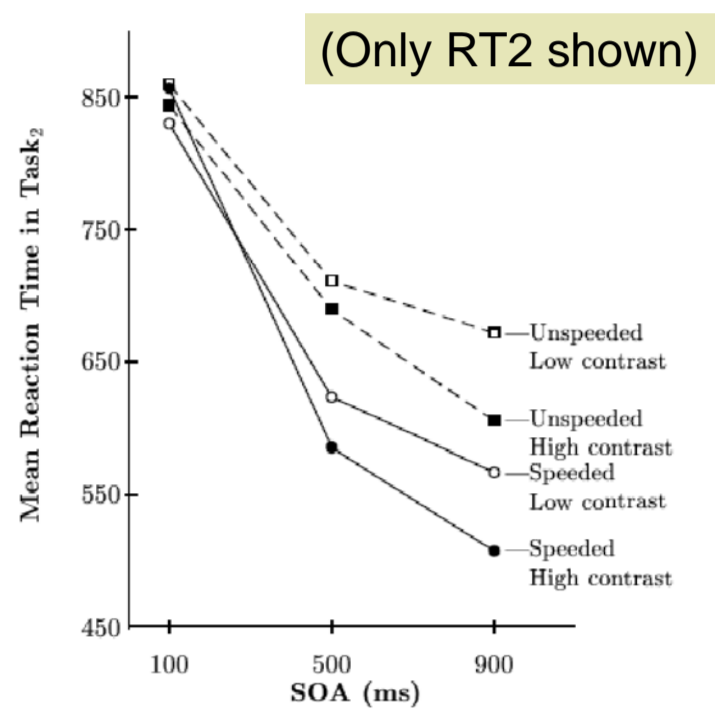
High Contrast Condition



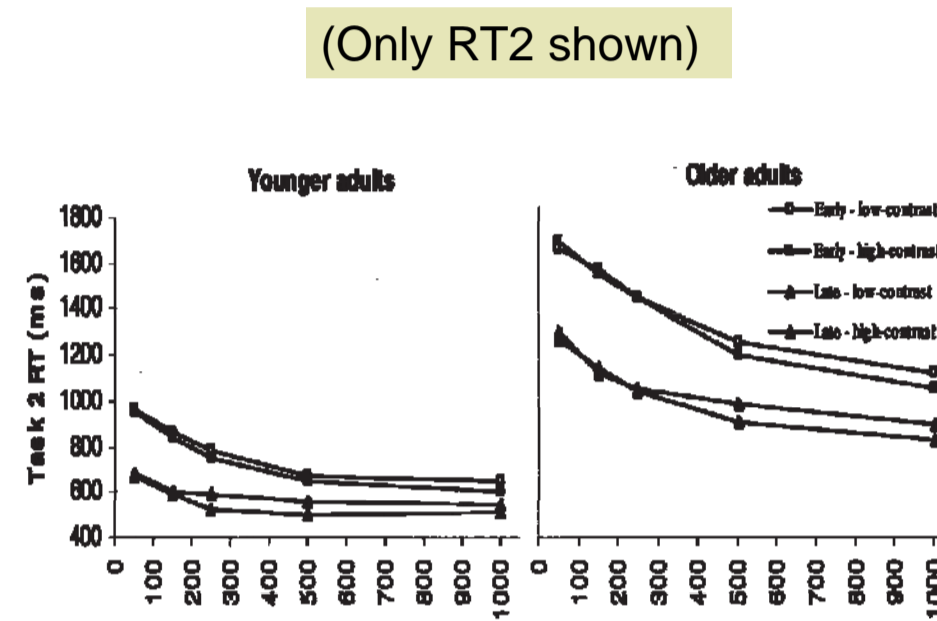
Low Contrast Condition



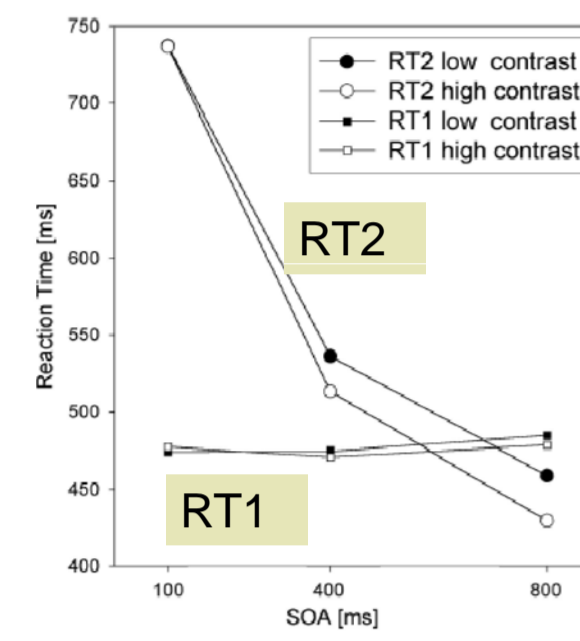
Known Replication Attempts*:



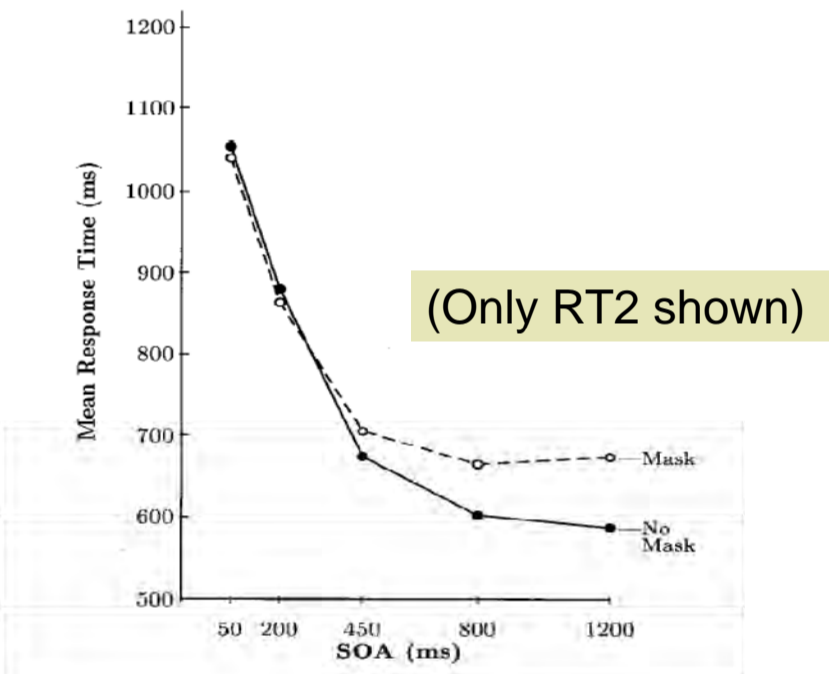
Jolicoeur, Dell'acqua, & Crebolder (2001), University of Waterloo



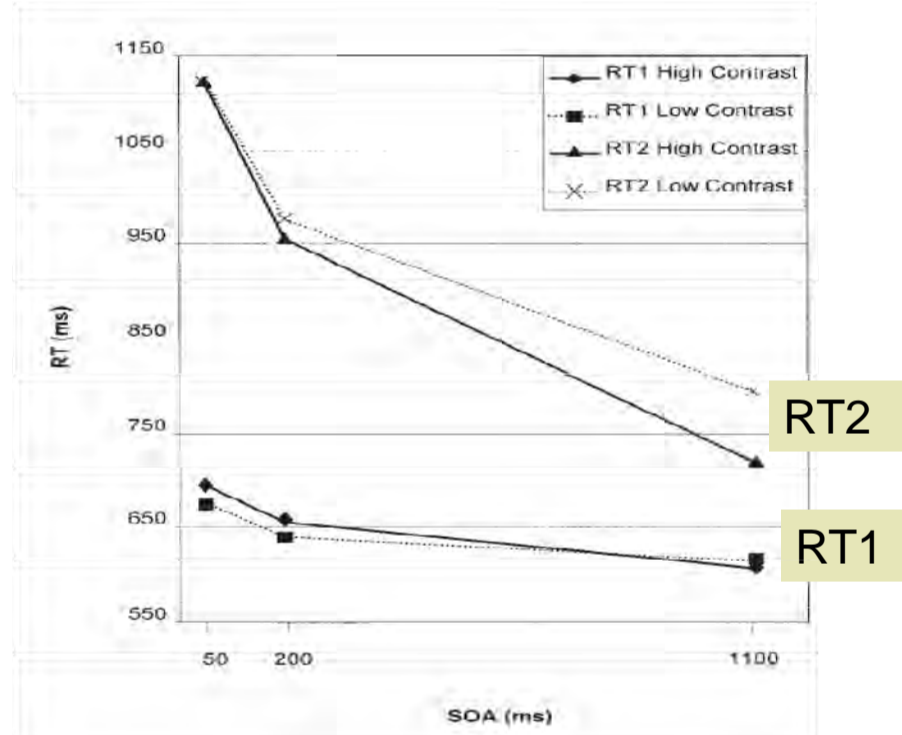
Maquestiaux, Hartley, & Bertsch (2004), Univ of Paris.



Jentsch, Leuthold, & Ulrich (2007), University of St. Andrews



Crebolder, Jolicoeur & McIlwaine (2002), University of Waterloo.



Tomhu & Jolicoeur (2005), University of Waterloo.

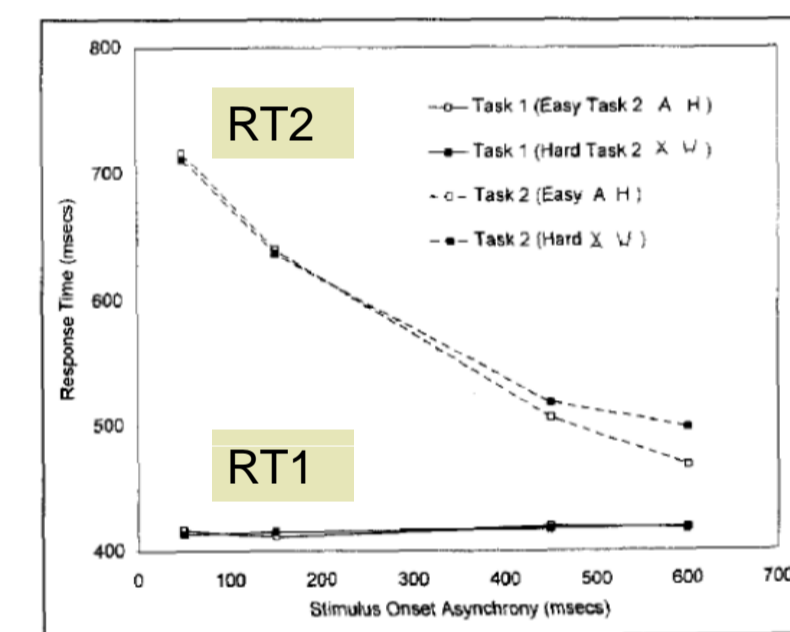
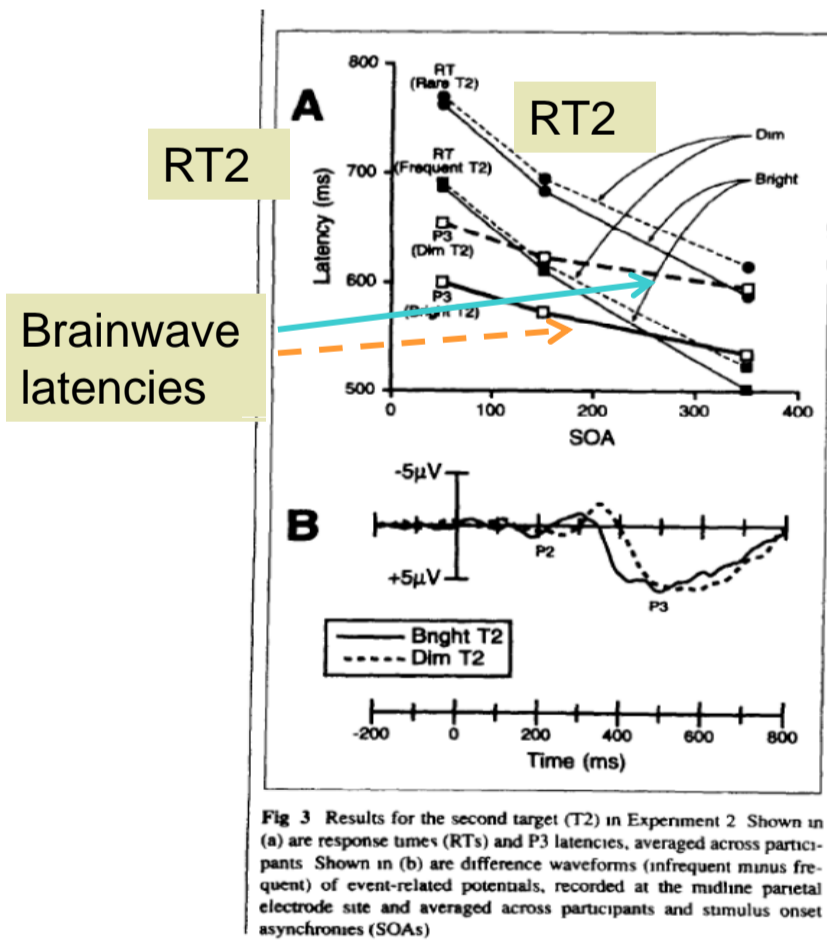
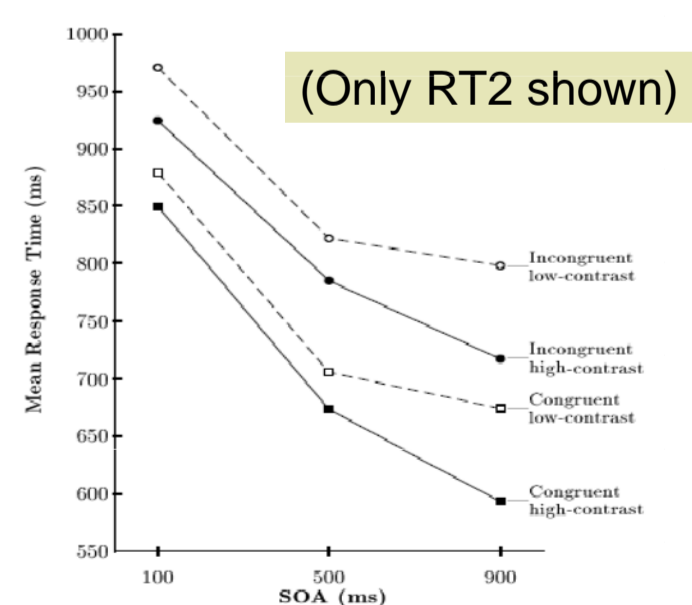


Fig. 2. Response time results from Experiment 1. Solid lines show Task 1 response times, and dashed lines show Task 2 response times, as a function of stimulus onset asynchrony and whether Task 2 used normal (easy) or distorted (hard) letters.

Johnston, McCann & Remington NASA Ames, Moffett Field, CA



Luck (1998) Univ of Iowa



Jolicoeur, Dell'acqua, & Crebolder (2001), University of Waterloo

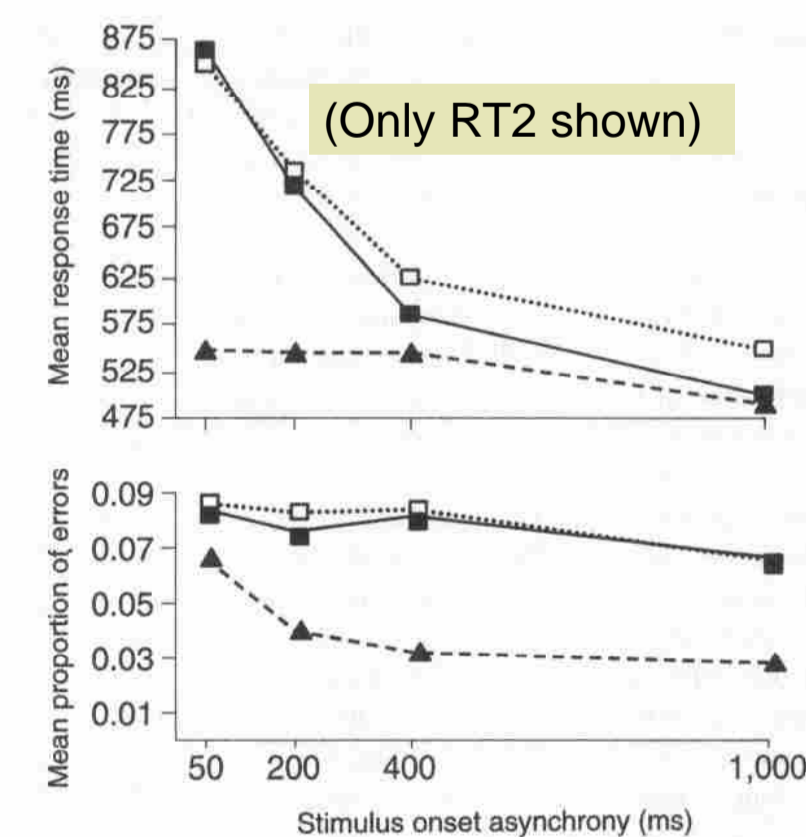
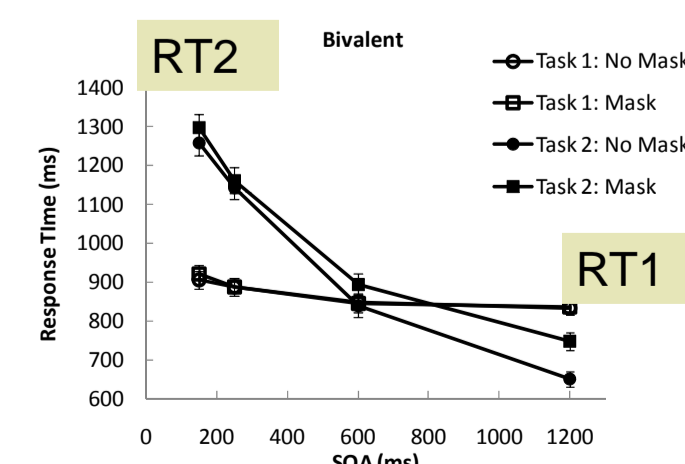
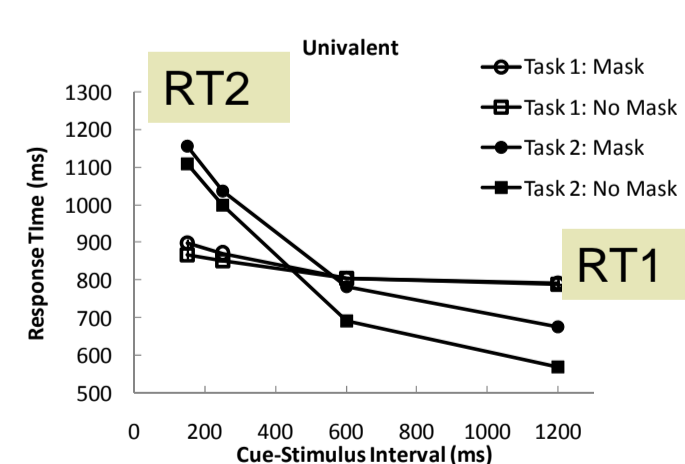


Figure 4. Mean Task 2 reaction times (RTs) for each stimulus onset asynchrony (SOA) in Experiment 3 as a function of contrast (high or low), and mean Task 1 RTs for each SOA. Closed squares—solid lines denote high-contrast trials, Task 2; open squares—dotted lines denote low-contrast trials, Task 2; triangles—dashed lines denote Task 1 (tone) RT.

Oriet & Jolicoeur (2003), University of Waterloo



Ruthruff, Lien, & Johnston (under review), Univ of New Mexico

*This depicts all known replication attempts (published and unpublished) for which investigators graphed data in this mode showing continuous SOA variation. Other results exist that were not graphed in this fashion—and they also confirm under-additive interaction of the sort shown in these graphs.