

## Redundant Signals in the Triple Conjunction Effect

Ada D. Mishler

University of Central Florida, [ada\\_mishler@yahoo.com](mailto:ada_mishler@yahoo.com)

Mark B. Neider

University of Central Florida, [Mark.Neider@ucf.edu](mailto:Mark.Neider@ucf.edu)

Follow this and additional works at: <https://commons.erau.edu/hfap>



Part of the [Cognition and Perception Commons](#)

---

Mishler, Ada D. and Neider, Mark B., "Redundant Signals in the Triple Conjunction Effect" (2016). *Human Factors and Applied Psychology Student Conference*. 11.  
<https://commons.erau.edu/hfap/hfap-2015/papers/11>

This Paper is brought to you for free and open access by the Human Factors and Applied Psychology Student Conference at Scholarly Commons. It has been accepted for inclusion in Human Factors and Applied Psychology Student Conference by an authorized administrator of Scholarly Commons. For more information, please contact [commons@erau.edu](mailto:commons@erau.edu).

## **Redundant Signals in the Triple Conjunction Effect**

Ada D. Mishler and Mark B. Neider

University of Central Florida

Keywords: visual search, triple conjunction search, redundant signals, redundant targets, coactivation models

The triple conjunction effect (TCE) is characterized by faster response times (RT) when a target is defined by three features than when it is defined by three features. Similarly, the redundant signals effect (RSE) is characterized by faster RTs when a display contains multiple features that are each sufficient to define a target. When a single display element contains multiple target features in separate feature dimensions, the RSE may be attributable to feature coactivation, in which information from multiple features combines to reach a response threshold. Because triple conjunctions contain an extra distinguishing feature, they are comparable to the RSE, and feature coactivation may therefore be expected. In the current study, participants searched for the presence of a target letter in 4 blocks of conjunction search trials (2 of color and orientation, and 2 of form and orientation) and 2 blocks of triple conjunction search trials (color, form, and orientation). Each trial contained 4 or 8 letters subtending  $2^\circ$  by  $2^\circ$  on an invisible circle  $8^\circ$  from the center of the display. Trials were terminated if participants moved their eyes more than  $2.75^\circ$  from the center or did not respond within 4 seconds. A similar second experiment was conducted with distractor homogeneity equated across conjunction and triple conjunction searches. Results indicated that the TCE occurred in both experiments; RTs were  $\sim 206$  ms faster in triple conjunction than conjunction search. The Townsend Bound, a theoretical minimum for triple conjunction RT under the assumption that no coactivation occurred, was violated at several quantiles (5-16 of 18 quantiles, depending on experiment, set size, and target) when RT was averaged across participants. Additionally, most participants individually violated the Townsend Bound in at least some conditions, providing further evidence for coactivation. The results suggest that the TCE is at least partially due to coactivation of target-relevant features.