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Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 39(0)

Authors

Phillips, Steven
Takeda, Yuji
Sugimoto, Fumie

Publication Date

2017

Peer reviewed

Dual-routes and the cost of computing least-costs

Steven Phillips

National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki, Japan

Yuji Takeda

National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki, Japan

Fumie Sugimoto

National Institute of Advanced Industrial Science and Technology, Tsukuba, Ibaraki, Japan

Abstract: Theories of cognition that posit complementary dual-route processes afford better fits to the data when each route explains a part of the data not explained by the other route. However, such theories must also explain why each route is invoked, lest one can fit any data set with enough routes. One possible explanation is that route selection is based on a least-cost principle: the route that requires fewer cognitive resources (including time) relative to the goal at hand. We investigated this explanation with a dual-route version of visual search, where the target could be identified via opposing (easy or hard forms of) feature and conjunction search conditions. The data support a contextualized version of the least-cost principle in that the cost of computing least-cost also influences route selection: participants assessed alternatives, but only when the cost of that assessment was relatively low.