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First Come, First Serve: How Order and Attention Influence Decision Making

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What influences the day to day decisions we make? When choosing between two items, it is more likely that the higher value option will be chosen more often. However, when looking at the items, information is gathered as the option is gazed at, making it more likely to choose the options looked at more. In addition, the order in which items are encountered also affects choice, such that the first seen item is more likely to be picked. A major setback in dissociating value and attention is due to participants being able to freely allocate attention. Few studies have shown the relationship between value and attention in value-based decision-making when attention is controlled. It is still debated whether attention amplifies value effects on choice or provides a boost to the attended item independent of its value. Consequently, attention limiting paradigms are required to isolate effects of attention manipulation on value-based decision-making. These choice dynamics were examined using a paradigm that varies the order and duration of option presentation, guiding visual attention exogenously rather than endogenously by alternating options one at a time. Using deidentified data from the attention-controlled paradigm and a hierarchical drift diffusion model, the order of item presentation was found to effect decision-making by biasing choices relative to the value of the first attended item. It is further shown that when value and attention are orthogonal, effects of relative presentation duration are dependent on value with the non-attended item's value being down weighted. However, attention is discovered to have an additional additive effect when controlling for all other effects. These results demonstrate that decisions are disproportionally shaped by the reference-dependent value of the first seen item, and that when tested independently, attention has both additive and multiplicative effects on value. It is anticipated that these results will aid in the development of targeted treatments for OCD, maladaptive decision-making, and impulsivity.

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