

Appendix: List of Models and Properties

Summary of eight core properties outlined in our synthesis:

Category 1: Types of interactions

1. Within-option interactions: Components of a choice option influence how other components of the same option are evaluated
2. Between-option interactions: Components of a choice option influence how components of other options are evaluated

Category 2: Types of transformations

3. Value transformations: Column resolutions (such as payoffs and attribute amounts) are modified
4. Weight transformations: Probabilities, delays, and attribute weights are modified

Category 3: Operations

5. Ordinality: Rankings of resolutions or column weights play a role in determining choice
6. Gains and losses: Positive and negative quantities are evaluated differently
7. Similarity and dissimilarity: Choices involve processing of resolution and weight differences within or across options
8. Statistical distributions: The mean, variance, range and other distributional characteristics of the options influence choice

Note that “X” indicates that the corresponding model does feature the property. For property 2 (value transformations) we exclude the many decision models that transform outcomes based on a utility or value function, without any within or between-option interaction. Likewise, for property 3 (weight transformations) we exclude the many intertemporal discounting models, that apply nonlinear transformations of time delays in the form of discount functions. We have been conservative in our classification of models as having each of the eight properties. There are some models for which we have decided to omit classification. These models could be classified within our taxonomy but the specific classification would depend on the model’s interpretation, which we feel is ambiguous.

RISKY CHOICE	1	2	3	4	5	6	7	8
Disappointment model (Bell, 1985)	X		X			X		X
Distracted decision field theory (Bhatia, 2014)	X			X				X
Rank affected multiplicative weights (Birnbaum, 1997)	X			X	X			
Consequence counting heuristic (Birnbaum, 2005)		X						
Transfer of exchange (Birnbaum, 2008)	X			X	X			
Most probable winner heuristic (Blavatskyy, 2006)		X			X			
Saliency theory (Bordalo et al., 2012)		X		X			X	
Priority heuristic (Brandstätter et al., 2006)	X	X			X			
Decision field theory (Busemeyer & Townsend, 1993)								X
Weighted utility theory (Chew, 1983)	X			X				
Variance skewness preferences (Coomes & Pruitt, 1960)	X		X					X
Disappointment without expectation (Delquie & Cillo, 2006)	X		X			X		
Aspiration level model (Diecidue & Van de Ven, 2008)	X				X			
Risk value model (Dyer & Jia, 1997)	X		X					X
BEAST model (Erev et al., 2017)	X	X			X			
Subjective expected utility model (Edwards, 1955)				X				
Expected loss ratio model (Edwards, 1956)		X	X			X		
Skew symmetric bilinear theory (Fishburn, 1982)	X			X				
Exogenous target risk value model (Fishburn, 1977)			X					
Cumulative prospect theory – GW weighting (Gonzalez & Wu, 1999)	X			X				
Certainty equivalence theory (Handa, 1977)				X				
Venture theory (Hogarth & Einhorn, 1990)	X			X				
Computationally rational model (Howes et al., 2016)		X			X			
Generalized disappointment model (Jia et al., 2001)	X		X			X		X
Prospect theory (Kahneman & Tversky, 1979)	X	X	X	X		X		
Odds based subjective weighted utility (Karmarkar, 1978)				X				
Reference dependence model (Kőszegi & Rabin, 2007)	X	X				X		
Cumulative prospect theory – LBW weighting (Lattimore et al., 1992)	X			X				

Generalized similarity model (Leland, 1994)		X					X	
Importance sampling model (Lieder et al., 2017)		X		X			X	
Dual systems model (Loewenstein et al., 2015)	X			X				
Regret theory (Loomes & Sugden, 1982)		X	X				X	
Disappointment aversion (Loomes & Sugden, 1986)	X		X			X	X	X
PRAM model (Loomes, 2010)		X	X					
Security potential/aspiration model (Lopes, 1987)	X			X	X			
Rank and sign dependent utility (Luce & Fishburn, 1991)	X			X	X	X		
Noisy retrieval model (Marchiori et al., 2015)	X			X				
Relative risk value model (Markowitz, 1959)	X		X					X
Gain decomposition utility (Marley & Luce, 2001)	X			X				
Decision affect theory (Mellers et al., 1999)	X	X	X			X		X
Dual systems model of risk (Mukherjee, 2010)	X			X				
Information processing model (Payne & Braunstein, 1971)	X	X			X			
Cumulative prospect theory – Prelec weighting (Prelec, 1998)	X			X				
Rank dependent utility (Quiggin, 1982)	X			X	X			
Similarity relation model (Rubinstein, 1988)		X					X	
Third generation prospect theory (Schmidt et al., 2008)	X			X	X			
Additive model of risk (Slovic & Lichtenstein, 1968)						X		
Decision by sampling (Stewart et al., 2006)		X	X		X			
Minimax heuristic (Thorngate, 1980)	X	X			X			
Equiprobable heuristic (Thorngate, 1980)								
Maximax heuristic (Thorngate, 1980)	X	X			X			
Minmax regret heuristic (Thorngate, 1980)	X	X			X		X	
Better than average heuristic (Thorngate, 1980)					X			
Low payoff elimination heuristic (Thorngate, 1980)	X	X			X			
Most likely heuristic (Thorngate, 1980)	X				X			
Least likely heuristic (Thorngate, 1980)	X				X			
Probable heuristic (Thorngate, 1980)					X			
Low expected payoff elimination heuristic (Thorngate, 1980)	X	X			X			

Cumulative prospect theory (Tversky & Kahneman, 1992)	X		X	X	X	X		
Prospective reference theory (Viscusi, 1989)	X			X				
Expected utility theory (von Neumann & Morgenstern, 1944)			X					
Coefficient of variance model (Weber et al., 2004)	X		X					X
Dual theory (Yaari, 1987)	X			X	X			

MULTIATTRIBUTE CHOICE	1	2	3	4	5	6	7	8
Subjective dominance heuristic (Ariely & Wallsten, 1995)		X			X	X		
Ordinal multiattribute counter (Aschenbrenner et al., 1984)								
Continuous multiattribute counter (Aschenbrenner et al., 1984)								
Comparative judgment model (Bhargava et al., 2000)		X	X					
Associative accumulation model (Bhatia, 2013)		X		X			X	X
Accumulator rules model (Bhatia, 2017)		X		X				
Range configural weight (Birnbaum & Stegner, 1979)	X			X				X
Rank configural weight (Birnbaum & Zimmermann, 1998)	X			X	X			
Multiplicative configural weight (Birnbaum, 1974)	X			X				
Multiattribute salience theory (Bordalo et al., 2013)		X		X			X	
Wandering vector model (Carroll & De Soete, 1991)		X					X	
Random regret minimization (Chorus et al., 2008)		X	X				X	
Conjunctive model (Dawes, 1964)	X				X			
Disjunctive model (Dawes, 1964)	X				X			
Equal weights heuristic (Dawes, 1979)								
Matching heuristic (Dhali & Harries, 2001)		X						
Similarity in context (Dhar & Glazer, 1996)		X	X				X	
Nonlinear model (Einhorn, 1970)	X		X					
Lexicographic heuristic (Fishburn, 1974)		X			X			
Multiattribute attentional drift diffusion model (Fisher, 2017)		X						
Sparsemax model (Gabaix, 2014)		X		X			X	

Attribute scatter model (Ganzach, 1995)	X		X					X
Parallel constraint satisfaction network (Glöckner & Betsch, 2008)	X	X		X				X
Stochastic difference model (González-Vallejo, 2002)		X	X				X	X
Comparison grouping model (Guo & Holyoak, 2002)		X					X	
Random dominance (Hogarth & Karelaia, 2005)		X			X	X		
CO3/ECHO model (Holyoak & Simon, 1999)	X	X		X				X
Feature matching model (Houston et al., 1989)		X		X			X	
Weighted tallying heuristic (Huber, 1979)		X			X			
Hierarchical competition model (Hunt et al., 2014)		X						
Contextual concavity model (Kivetz et al., 2004)		X	X				X	X
Contextual loss aversion (Kivetz et al., 2004)		X	X			X		X
Attentional drift diffusion model (Krajbich et al., 2010)		X						
Sequential accumulation model (Lee & Cummins, 2004)								
Divisive normalization model (Louie et al., 2013)		X						
ACT-R heuristics (Marewski & Mehlhorn, 2011)		X			X			
Similarity contrast model (Mellers & Biagini, 1994)		X	X				X	
Elimination least attractive heuristic (Montgomery & Svenson, 1976)		X			X			
Range frequency theory (Parducci, 1974)		X	X		X			X
Similarity overlap model (Restle, 1961)		X					X	
Context sensitive value model (Rigoli et al., 2017)		X						X
Multialternative decision field theory (Roe et al., 2001)		X					X	
Contextual utility model (Roederkerk et al., 2011)		X					X	X
Multiattribute decision by sampling (Ronayne & Brown, 2017)		X	X		X			
Tallying heuristic (Russo & Doshier, 1983)		X			X			
Fair market value model (Shenoy & Yu, 2013)		X						
Options as information model (Sher & McKenzie, 2014)		X	X		X			
Expected loss minimization model (Sheng et al, 2005)		X				X		
Satisficing heuristic (Simon, 1955)		X						
Range normalization model (Soltani et al., 2012)		X	X					X
Multi alternative linear ballistic accumulator (Trueblood et al., 2014)		X	X			X	X	

Rank weighted leaky accumulator (Tsetsos et al., 2012)		X			X			
Componential context model (Tversky & Simonson, 1993)		X	X			X		
Lexicographic semiorder heuristic (Tversky, 1969)		X					X	
Additive difference rule (Tversky, 1969)		X	X				X	
Elimination by aspects (Tversky, 1972)		X						
Loss averse leaky competitive accumulator (Usher & McClelland, 2004)		X	X			X	X	
Dynamic threshold neural network (Usher & Zakay, 1993)		X						
Cortical attractor model (Wang, 2002)		X						
Descriptive multiattribute utility model (Weiss et al., 2010)								
Contextual utility model (Wilcox, 2011)		X					X	
2nary choice tree model (Wollschläger & Diederich, 2012)		X						

INTERTEMPORAL CHOICE	1	2	3	4	5	6	7	8
Satiation model (Baucells & Sarin, 2007)	X		X					
Satiation and habit formation model (Baucells & Sarin, 2010)	X		X					
Conditional utility independence model (Bell, 1977)	X							
Proportional difference (Cheng & Gonzalez-Vallejo, 2016)		X	X	X	X			X
Weighted multiattribute intertemporal choice model (Cubitt et al., 2018)		X		X				
Absolute dynamic differences model (Dai & Busemeyer, 2014)		X	X	X				
Relative dynamic differences model (Dai & Busemeyer, 2014)		X	X	X				
Constant sensitivity (Ebert & Prelec, 2007)				X				
ITCH model (Ericson et al., 2015)		X	X	X				X
Common aspect attenuation (Green et al., 2005)		X		X				
Proportional discounting (Harvey, 1994)								
ASAP model (Kable & Glimcher, 2010)		X		X	X			
Additive discounting model (Killeen, 2009)			X					
Focusing model (Kőszegi & Szeidl, 2013)		X	X	X			X	X
Quasi hyperbolic model (Laibson, 1997)			X	X				

Difference similarity model (Leland, 2002)		X					X	
Ratio similarity model (Leland, 2002)		X					X	
Hyperbolic discounting model (Loewenstein & Prelec, 1992)						X		
Preferences over sequences model (Loewenstein & Prelec, 1993)	X		X					X
Dual systems model (Loewenstein et al., 2015)			X	X				
Hyperbolic discounting model (Mazur, 1987)				X				
Double exponential discounting model (McClure et al., 2004)								
Mental accounting of savings and debt (Prelec & Loewenstein, 1998)	X		X					
Extended tradeoff model (Read & Scholten, 2012)	X	X	X	X		X	X	
DRIFT model (Read et al., 2013)		X	X					X
Interval model (Read, 2001)		X		X				
Exponential time model (Roelofsma, 1996)				X				
Exponential discounting model (Samuelson, 1937)								
Extended interval model (Scholten & Read, 2006)		X		X				
Tradeoff model (Scholten & Read, 2010)		X	X	X				
Extended interval model (Scholten et al., 2014)		X	X	X				
Hyperbolic discounting with value transformation (Scholten et al., 2014)			X			X		
Cumulative weighting tradeoff model (Scholten et al., 2016)	X	X	X	X				