

Approach Motivation

The theory of Achievement Motivation and goal directed behavior

Achievement Motivation: history

- Murray's Explorations in Personality
- McClelland and the Need for Achievement
- Atkinson and theory of risk preference
 - Static
 - Dynamic
- Weiner and attribution theory
- Reinvigoration: Elliot and Thrash

Murray's Explorations in Personality

- Intense study of small set of subjects from many different perspectives
- Conceptual identification of needs
- Development of Thematic Apperception Test as an alternative to self report
 - Needs drive perception and production
 - Assessment of needs based upon stories

Need for Achievement

- Desire to approach problems involving challenge and effort
- Joy in success when over coming obstacles
- Analogous to a hunger
- "The little engine that could"
 - "I think I can, I think I can, I think I can"

Thematic Apperception Test

- Consider the following picture:
 - A boy about 18 years old is sitting at his desk in an occupied classroom. A book lies open before him but he is not looking at it. The boy rests his his forehead on one hand as he gazes pensively out towards the viewer.
- Tell us what has happened, is happening, will happen

Brown, 1965

TAT: Story 1

- This chap is doing some heavy meditating. He is sophomore and has reached an intellectual crisis. He cannot make up his mind. He is troubled, worried.
- He is trying to reconcile the philosophies of Descartes and Thomas Aquinas -- at his tender age of 18. He has read several books on philosophy and feels the weight of the world on his shoulders.
- He wants to present a clear cut synthesis of these two conflicting philosophies, to satisfy his ego and to gain academic recognition from his professor.

TAT story 2:

- The boy in the checkered shirt whose name is Ed is in a classroom. He is supposed to be listening to the teacher.
- Ed has been troubled by his father's drunkenness and his matreatment of Ed's mother. He thinks about this often and worries about it.
- Ed is thinking of leaving home for a while in the hope this might shock his parents into getting along.
- He will leave home but will only meet further disillusionment away from home.

McClelland and Need for Achievement

- N-ach and the achievement of nations
- Cultures with a high need for achievement (rather than some other need) will strive to overcome obstacles (other nations?)
 - Greek civilization and Greek literature 900-100 b.c
 - Pre Incan Peru 800 b.c. to 700 a.d.
 - N-ach in children's primers and later economic growth
 - Teaching n-ach as a means for development

Issues in measurement

- Projective measurement
 - Can't trust self reports of motivations
 - Ambiguous stimuli will lead to interpretations in terms of motives
 - Hunger and interpretation of ambiguous slides
 - Achievement and stories
 - "grubby graduate student" versus "professor"

Issues in measurement: II

- Weiner's 3 points:
 - TAT is the best way to measure motivation
 - TAT is the worst way to measure motivation
 - People who use TAT believe 1, people who do not believe 2

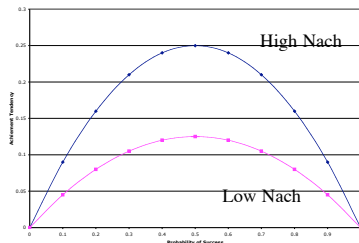
Static theory of risk preference and achievement motivation

- Achievement motivation: the joy of success
- Approach motivation
- Atkinson's theory of risk preference (1957, 1964)
 - An expectancy value theory of motivation
 - Contrasted to drive models of Hull, Spence
- Tendency to approach = Value * Expectancy
Value = Motive * Incentive

Specific model for achievement

- Expectancy = subjective probability of success
- Motive = Individual's need for achievement
- Incentive = difficulty = 1- probability of success
- Conclusion for achievement motivation
 - $T_s = M_s * P_s * (1-P_s)$
 - Implies that motivational strength is quadratic function of probability of success

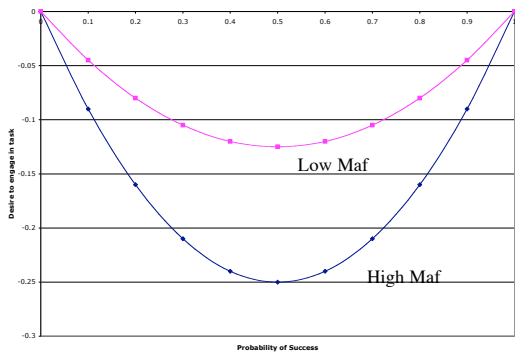
Achievement Motivation varies as probability of success for two levels of N-ach



Fear of Failure: the pain of failure

- Fear of failure -- test anxiety?
- Fear of failure and general avoidance motivation
- Specific assumptions for fear of failure
 - Expectancy of Failure = $P_f = 1 - P_s$
 - Motive to avoid Failure = fear of failure = M_{af}
 - Incentive to avoid failure = - easiness = $-P_s$
 - $T_{af} = M_{af} * (P_f) * (-P_s) = M_{af} * (1 - P_s) * (-P_s)$

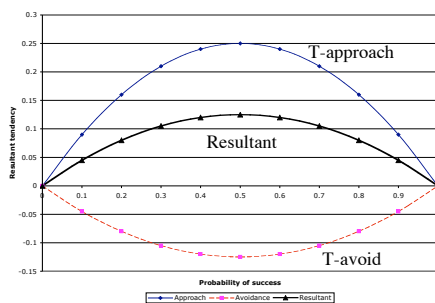
Fear and Failure and Avoidance



Resultant Achievement Motivation

- Resultant tendency = tendency to engage in a task for success + tendency to avoid failing (negative) + extrinsic tendencies
- $T_r = T_s + T_{af} + T_{ext}$
- $T_r = M_s * P_s * (1 - P_s) + M_{af} * (1 - P_s) * (-P_s)$
- $T_r = (M_s - M_{af}) * (1 - P_s) * P_s$

Tendency by Ps by Ms and Maf



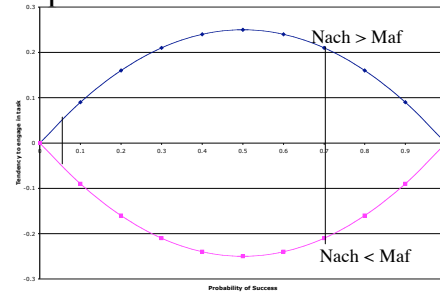
Tests of original theory

- Motivation and risk preference: the ring toss
 - Hamilton
 - Heckhausen
 - Although inverted U, did not peak at .5 difficulty
 - Most preferred level of task difficulty around .3 to .4

Motivation, risk preference and persistence under failure

- Does persistence vary as a function of personality and task difficulty?
- Hi and Low Resultant Motivation
 - Hi resultant (Nach > Maf)
 - Lo resultant (Nach < Maf)
- Failure on tasks said to be moderately easy (p = .7) or very hard (p = .05)

Motivation, risk preference and persistence under failure



Motivation, risk preference and persistence under failure

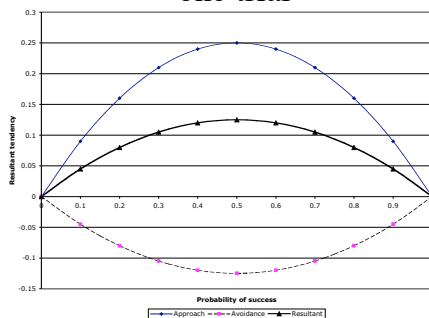
	Easy (p = .7)	Hard (p = .05)
High Nach (Low Maf)	6/8	2/9
Low Nach (High Maf)	3/9	6/8

Feather, 1964

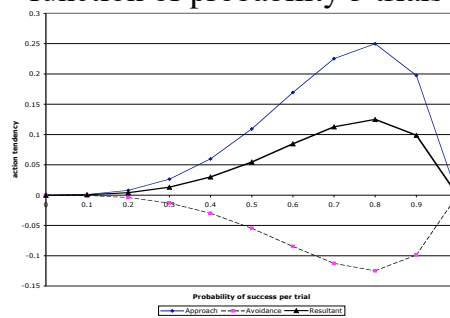
Revisions to Atkinson Theory

- Raynor and the concept of future orientation
 - Life is not a ring toss - tasks are contingent
 - Probability of success at event_i = $\prod p_i = p_1 * p_2 * \dots * p_n$
 - Consider a freshman starting psychology with p = .9
 - 110 201 205 215 301 398 grad MA PhD job tenure full
 - .9 .81 .73 .66 .59 .53 .48 .43 .39 .35 .31 .27
 - Tendency to engage in a task = sum of tendencies for tasks contingent upon that task
- $$T_{rn} = \sum (M_s - M_{af}) * P_{sic} * (1 - P_{sic}) + T_{ext}$$

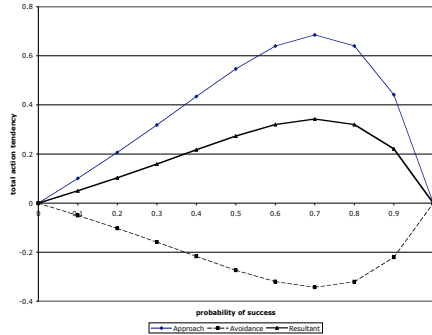
Tendency by Ps by Ms and Maf: one trial



Contingent Paths: Preference as a function of probability 3 trials



Contingent Paths: Total Tendency for 3 trial path



Contingent paths: Evidence for Raynor's hypothesis: GPA

Study 1		Motive to achieve	Low	High
Importance to future				
	High (major)		2.9	3.4
	Low (distro)		3.0	2.6
Study 2	High		3.0	3.5
	Low		3.4	3.4

Implications of contingent paths

- High achievers should set distant goals
 - Low achievers should set immediate goals
- Preferences for task difficulty should vary as a function of number of outcomes contingent upon particular task outcome

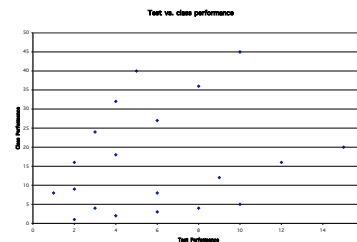
Further explorations: curvilinear models

- Does task performance vary as a curvilinear function of task difficulty
- Is it overachievement or under performance?

Class Performance and Test Scores: A simple model

- Assume variation in ability 1-5
- Assume motivation in class varies 1-4
- Assume motivation in test situation = resting (class) + 1
- Assume efficiency varies as inverted U of motivation (max at 3)
- Assume test performance = ability * efficiency
- Assume cumulative performance = ability * efficiency * time spent

Class and Test Performance



Test and Class Performance

Ability	Motivation in		Efficiency		Performance	
	Class Test	in class	on test	Time Spent	On test	in class2
1	1	2	1	2	1	2
2	1	2	1	2	1	4
3	1	2	1	2	1	6
4	1	2	1	2	1	8
5	1	2	1	2	1	10
1	2	3	2	3	2	3
2	2	3	2	3	2	6
3	2	3	2	3	2	9
4	2	3	2	3	2	12
5	2	3	2	3	2	15
1	3	4	3	2	3	2
2	3	4	3	2	3	4
3	3	4	3	2	3	6
4	3	4	3	2	3	8
5	3	4	3	2	3	10
1	4	5	2	1	4	1
2	4	5	2	1	4	2
3	4	5	2	1	4	3
4	4	5	2	1	4	4
5	4	5	2	1	4	5

Dynamic theory of achievement

- Recognition of inertial properties of motivation
 - Motives persist until satisfied
 - Lewin and the “Herr Ober effect”
 - Zeigarnik and the motive for completion
 - Completed tasks
 - Uncompleted tasks

Trial to trial carryover effects

- Weiner and Schneider carryover and interpretation of success and failure
 - Classic result
 - Success and failure on verbal learning tasks
 - Anxiety inhibits performance on hard tasks
 - Anxiety facilitates performance on easy task
 - $T_{res} = T_{app} - T_{avoid}$
- But Weiner and Schneider showed that this is probably due to implicit or explicit feedback

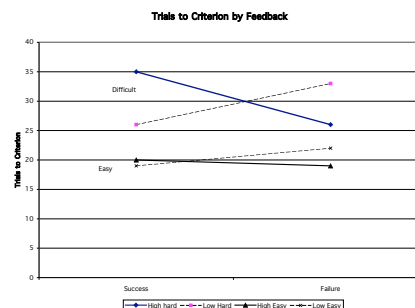
Weiner and Schneider, 1971

- Task: Learn 13 CVC trigrams
 - Easy List: high between item differentiation e.g. PAK, BIM, MOT
 - Difficult list: low between item differentiation e.g. HOV, VOV, RIV, MIV
- Lists presented as serial anticipation (implicit feedback?)
- Subjects were high and low resultant Achievement Motivation (Nach - Naf)
- Feedback - list is (easy/hard) you are doing better/worse than others

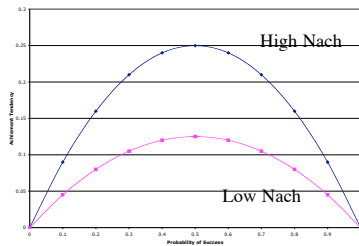
Achievement Motivation, Anxiety and Task Difficulty

- Many studies have replicated the original Spence, Farber and McFann study that shows anxiety facilitates easy task, hinders difficult tasks
- However, all of these have used a serial anticipation technique that confounds task difficulty with implicit feedback to the subject.
- Is it feedback or task difficulty that is most important?

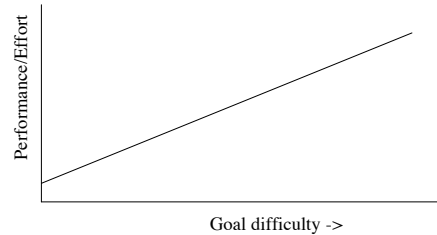
Weiner and Schneider, 1971



Achievement Motivation varies as probability of success for two levels of N-ach



Locke and goal setting: people work hard enough to achieve goals



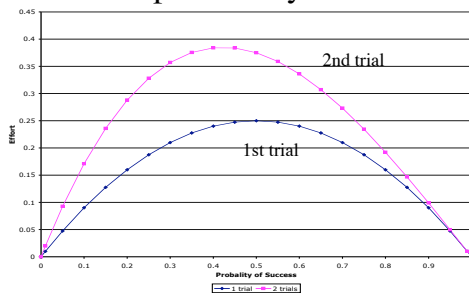
Revelle and Michaels: steps towards dynamics

- How to reconcile the simple try harder the harder the problem (goal setting, see Locke) model with Atkinson model
- Hard tasks take longer to complete and if there is carryover from trial to trial, then motivation should accumulate

Steps towards dynamics: the carryover of motivation

- Effort on trial 1: $(M_s - M_{af}) * (P_s) * (1 - P_s)$
- Effort on Trial 2 is a function of outcome of trial 1:
 - If success on trial 1, then effort $T_2 = T_1$
 - If failure on trial 2, then motivation from trial 1 carries over to trial 2: Effort $T_2 = T_1 + \text{carryover}$
 - Assume perfect carryover $T_2 = T_1 * p + 2T_1 * (1-p)$

Expected Effort as a function of trial and probability of success



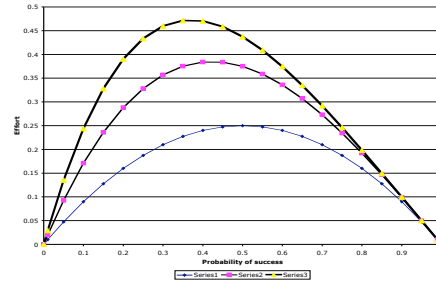
Steps towards dynamics

- Effort on trial 1: $M_s - M_{af} * (P_s) * (1 - P_s)$
- Effort on Trial 3 is a function of outcome of trial 2:
 - If success on trial 2, then effort $T_3 = T_2$
 - If failure on trial 2, then motivation from trial 2 carries over to trial 3: Effort $T_3 = T_2 + \text{carryover}$
 - Assume perfect carryover

Carryover (3 trials)

Trial 1		$T_1 = p*(1-p)$			
outcome		$p(\text{success})=p$			$P(\text{failure})=(1-p)$
Trial 2		T_1			$2* T_1$
outcome		$p(s)=p^2$	$f=p*(1-p)$	$S=(1-p)*p$	$F=(1-p)^2$
Trial 3		T_1	$2* T_1$	T_1	$3* T_1$

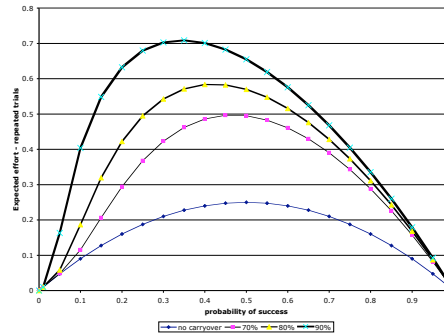
Perfect carryover 1-3 trials



What if there is less than perfect carry over from trial to trial?

- Motivation carries over from trial to trial, but some effort is expended so there is not perfect carryover.
- Consider 90, 80 and 70% carryover

Effort and consumption repeated trials

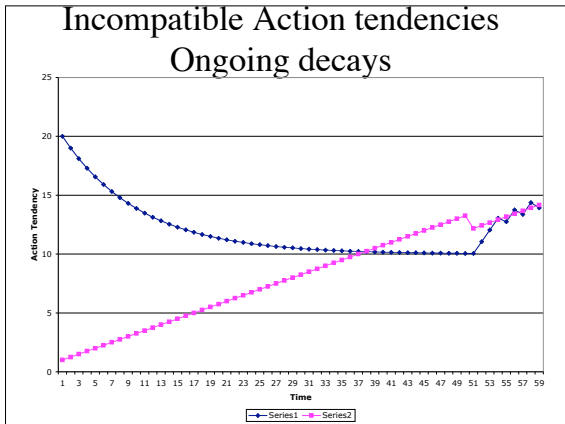
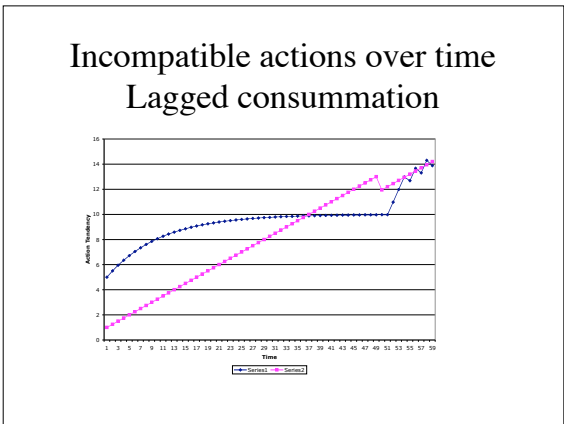
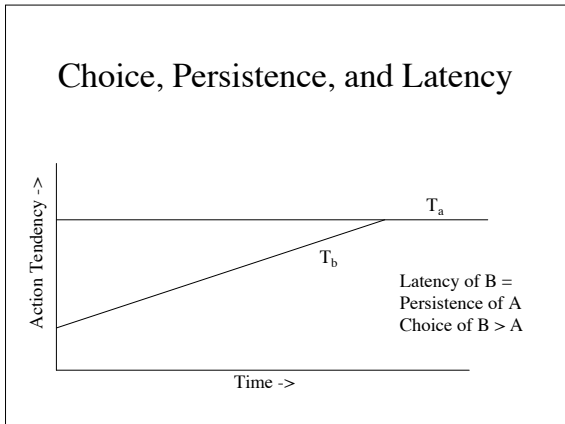
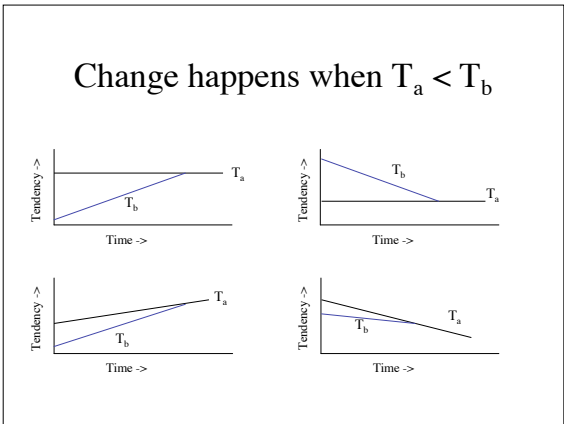
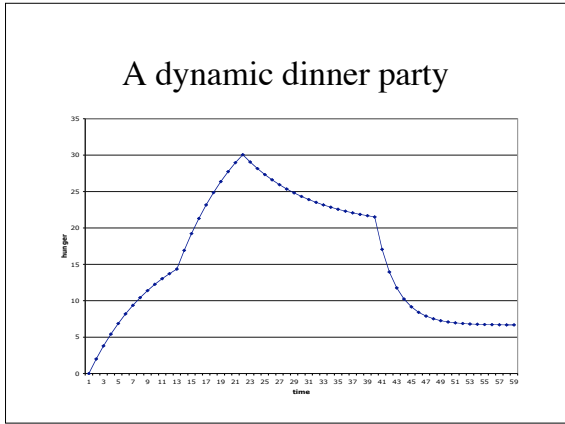
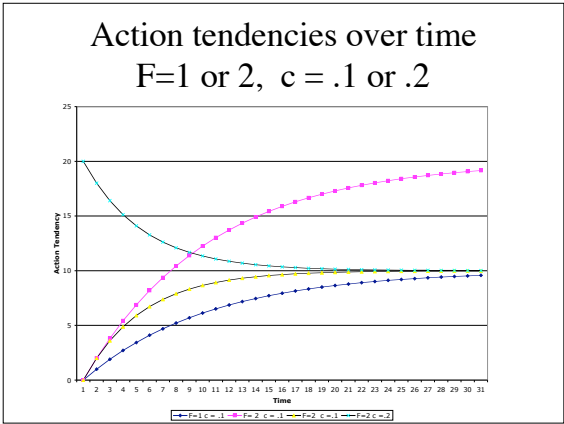


Dynamics of Action: Approach Atkinson and Birch, 1970

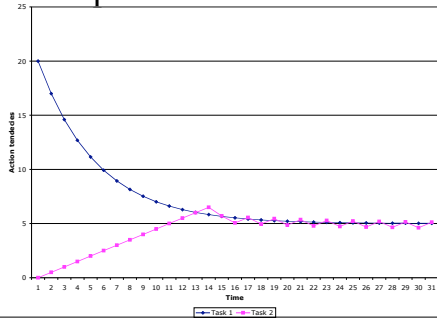
- Action Tendencies as latent needs
- Instigating forces -- situational stimulation and individual sensitivities
- Consummatory forces -- need satisfaction
- Change in action tendencies = $f(\text{instigating forces} - \text{consummatory forces})$

Dynamics of Action Atkinson and Birch, 1970

- Action Tendencies increase as a function of instigating forces, decrease as a function of action.
 - $dT = F$ (if not ongoing)
 - $dT = F - cT$ (if ongoing)
 - Stable state occurs when $dT = 0 \iff T = F/c$
- Actions with greatest action tendency will occur



Incompatible actions over time, the problem of “chatter”



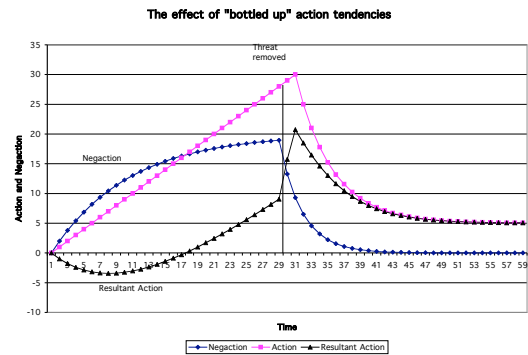
Avoidance and Inhibitory Motivation -- Negaction

- Negaction tendencies inhibit behavior
- Inhibitory forces increase negaction
- Resistance forces decrease negaction
- $dN = I - rN \iff N \rightarrow I/r$ at limit

Inhibition and resultant action tendencies

- Resultant action tendency = $T - N$
- Resultant action tendency will grow if not ongoing
- Example of bottled up action tendencies
 - A classroom with an authoritarian teacher
 - Strong inhibitory forces lower T_r but not T
 - Release of inhibition releases “bottled up action tendency”

Inhibition and Delay of onset



Personality as rates of change in states

- What is stable is how rapidly one changes
- Sociability as rate of becoming sociable
- Anxiety as rate of change of becoming anxious
- Intelligence as rate of change in problem space
- Need achievement as rate of growth in approach motivation when faced with achievement goals

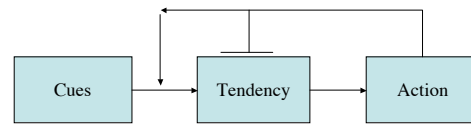
Personality as rates of change

- Growth rates, decay rates, inhibitory strengths
- Growth of tendency when stimulated
 - $dTa = \text{personality} \times \text{situation}$
- Decay of Ta when ongoing
 - Adaptation rate?
- Strength of inhibitory processes

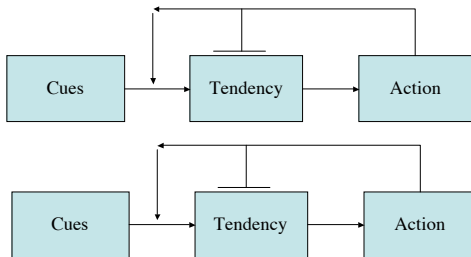
Revised Dynamics of Action

- Cues
- Action Tendencies
- Actions
- Cues elicit action Tendencies
- Tendencies strengthen actions
- Actions reduce Tendencies
- Decision rule is mutual inhibition

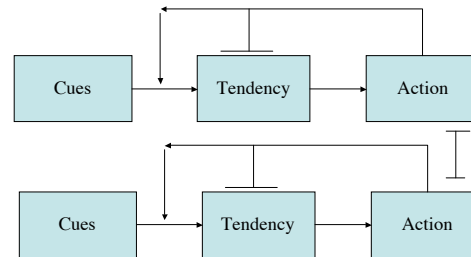
Cues, Tendencies, Action



Cues, Tendencies, Action Compatible actions



Cues, Tendencies, Action Incompatible actions



Computer simulations as formal theory

- Theory as a system of differential equations
- Simulations in terms of difference equations
- Predictions are consequences of the model and are not always obvious
- Computer simulations of the CTA model
 - Dynamic variables
 - [Simple simulations](#) in Excel

Elliot and Thrash, 2002

