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 Acquinas -- 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 maltreatment 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

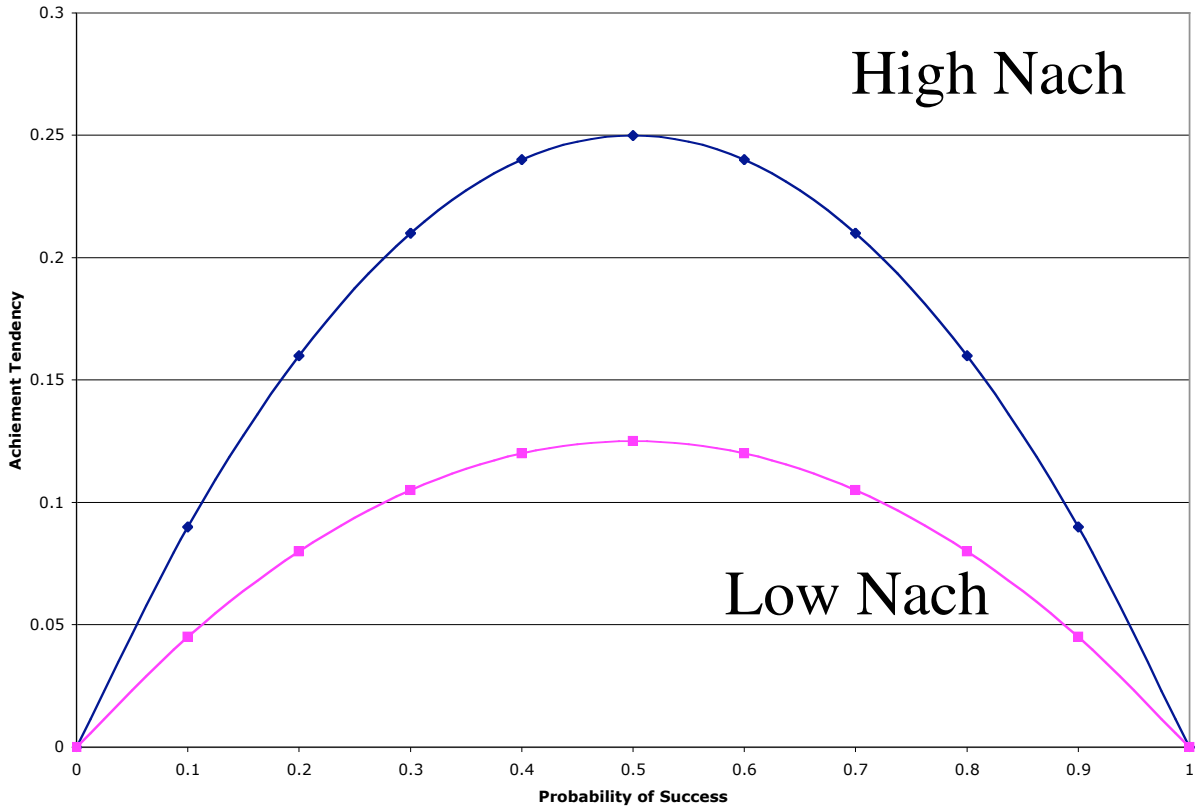
Static theory of risk preference and achievement motivation

- 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
  - $Ts = Ms * P_s * (1-P_s)$
  - Implies that motivational strength is quadratic function of probability of success

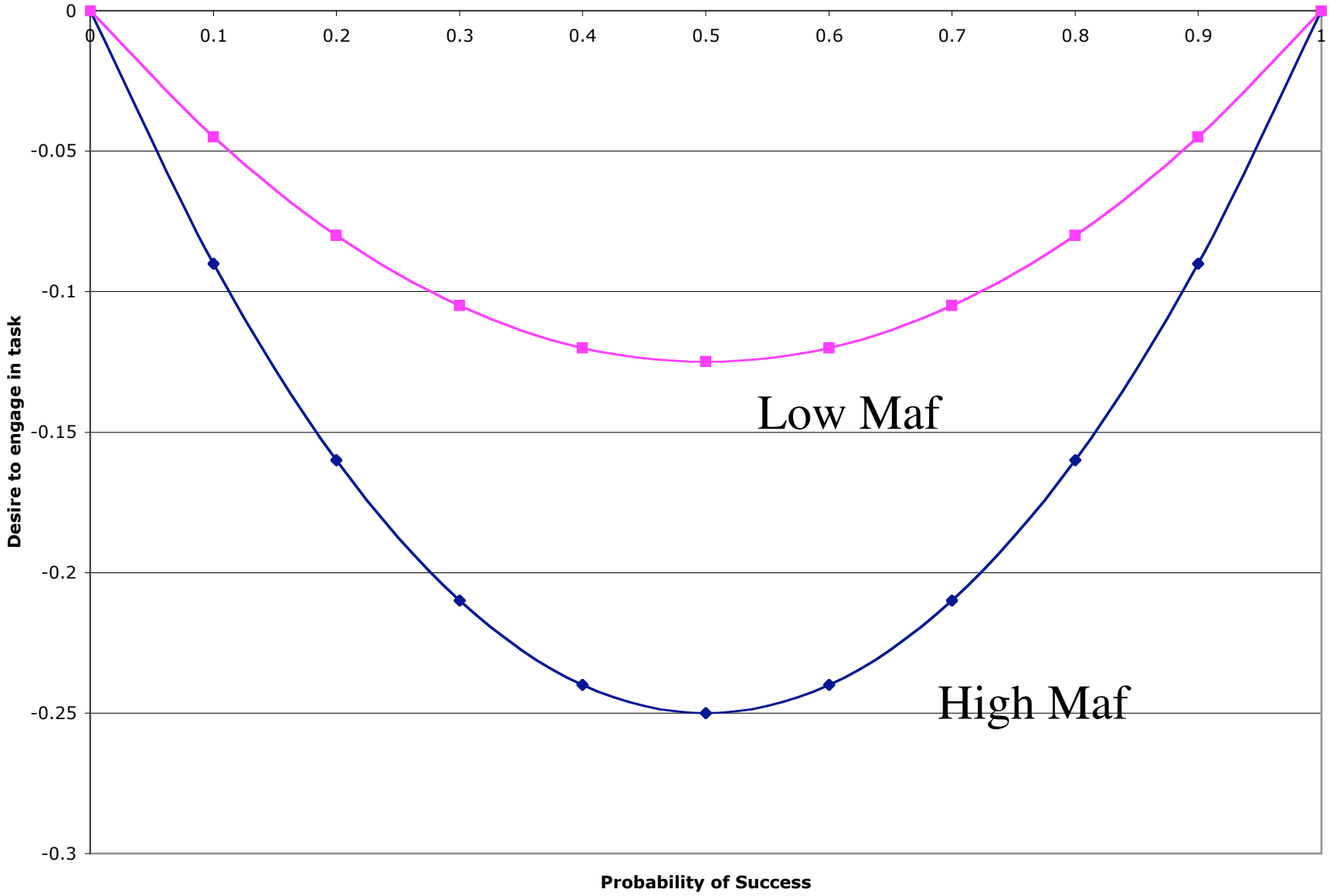
Achievement Motivation varies as probability of success for two levels of N-ach



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 = $P_f = 1\text{-}P_s$
  - Motive to avoid Failure = fear of failure = M_{af}
  - Incentive to avoid failure = - easiness = $- P_s$
  - $T_{af} = M_{af} * (P_f) *(-P_s) = M_{af} * (1\text{-}P_s) * (-P_s)$

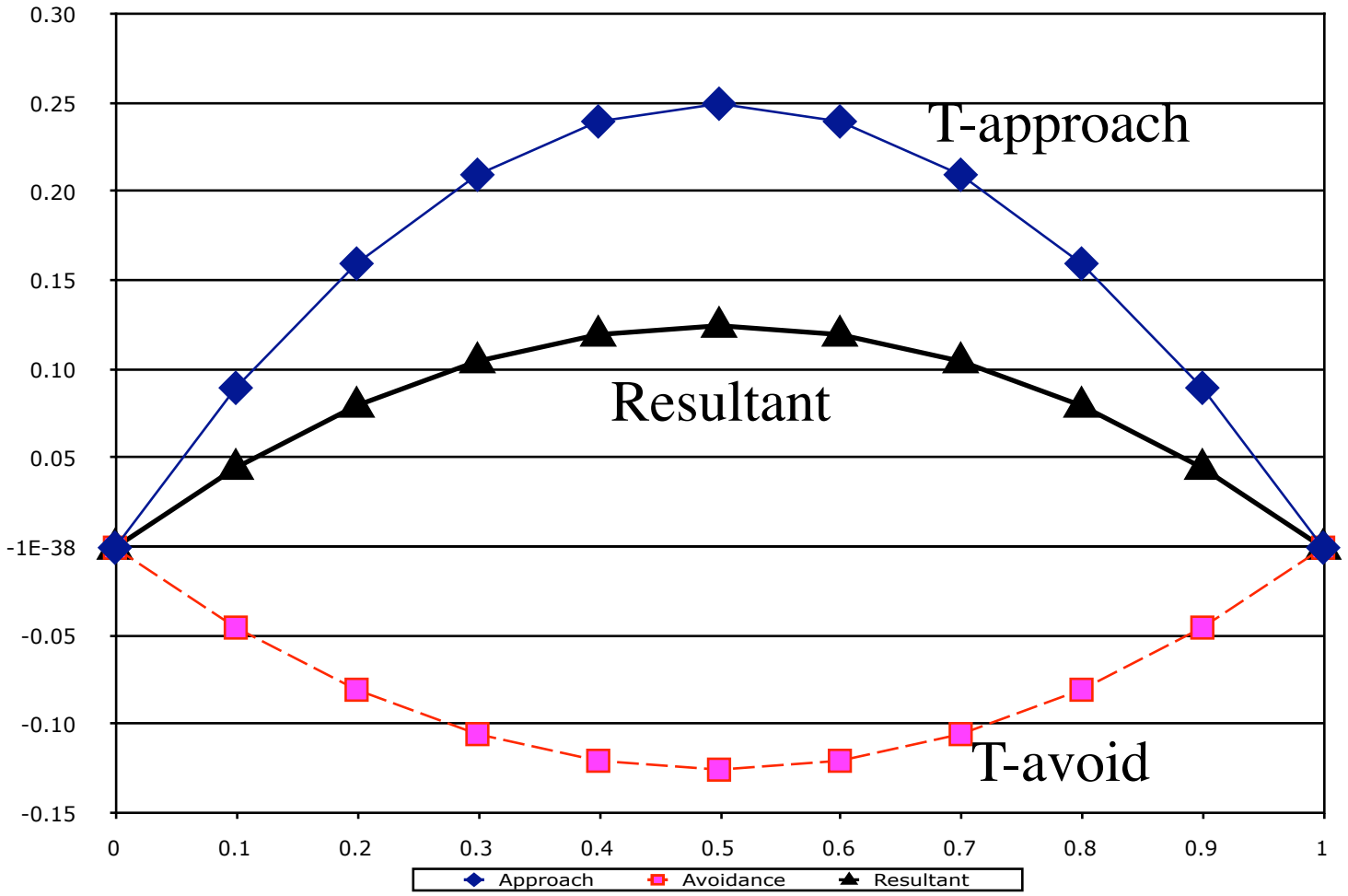
Fear and Failure and Avoidance



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



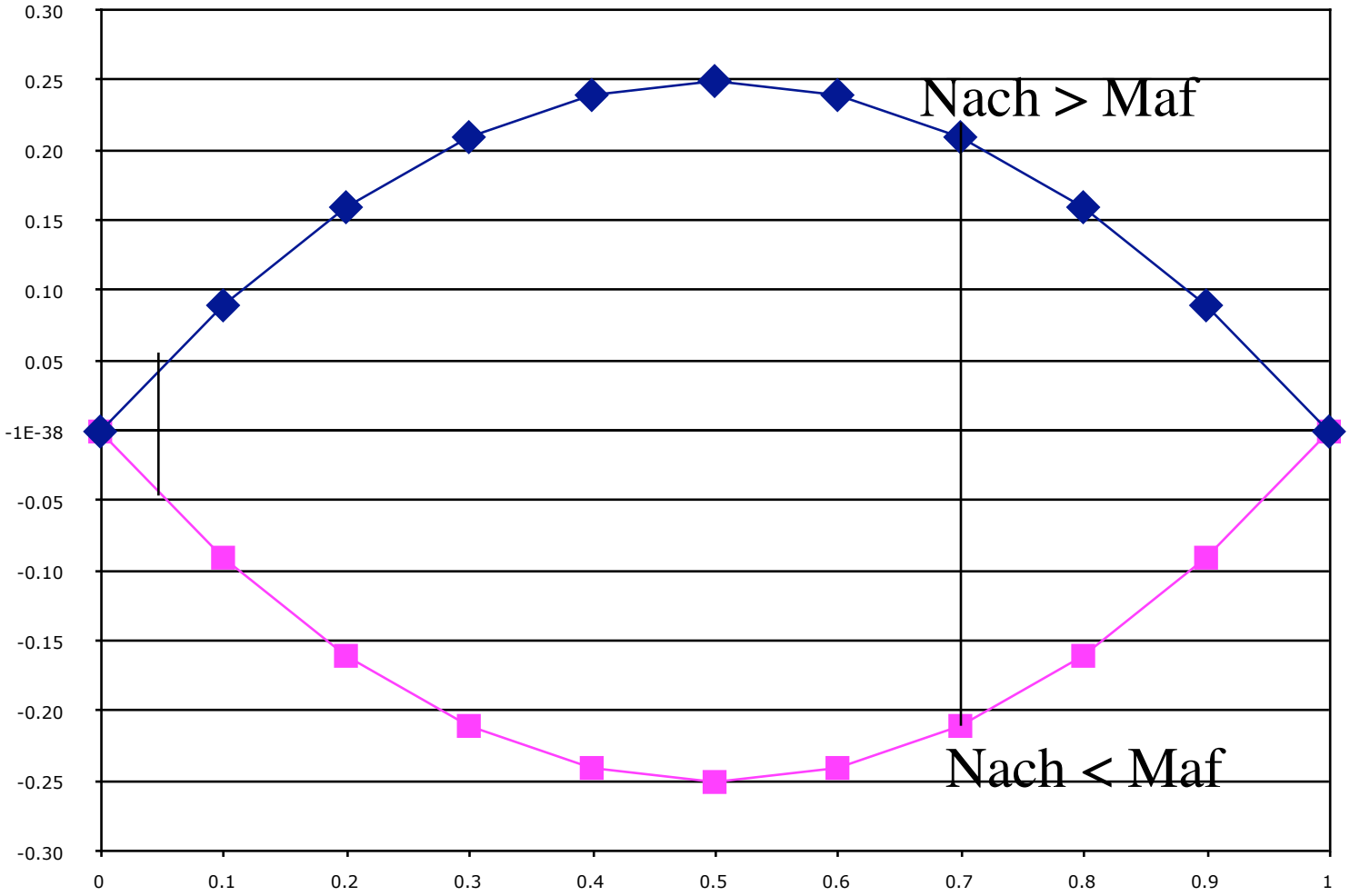
Tests of original theory

- 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? (Feather)
- 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

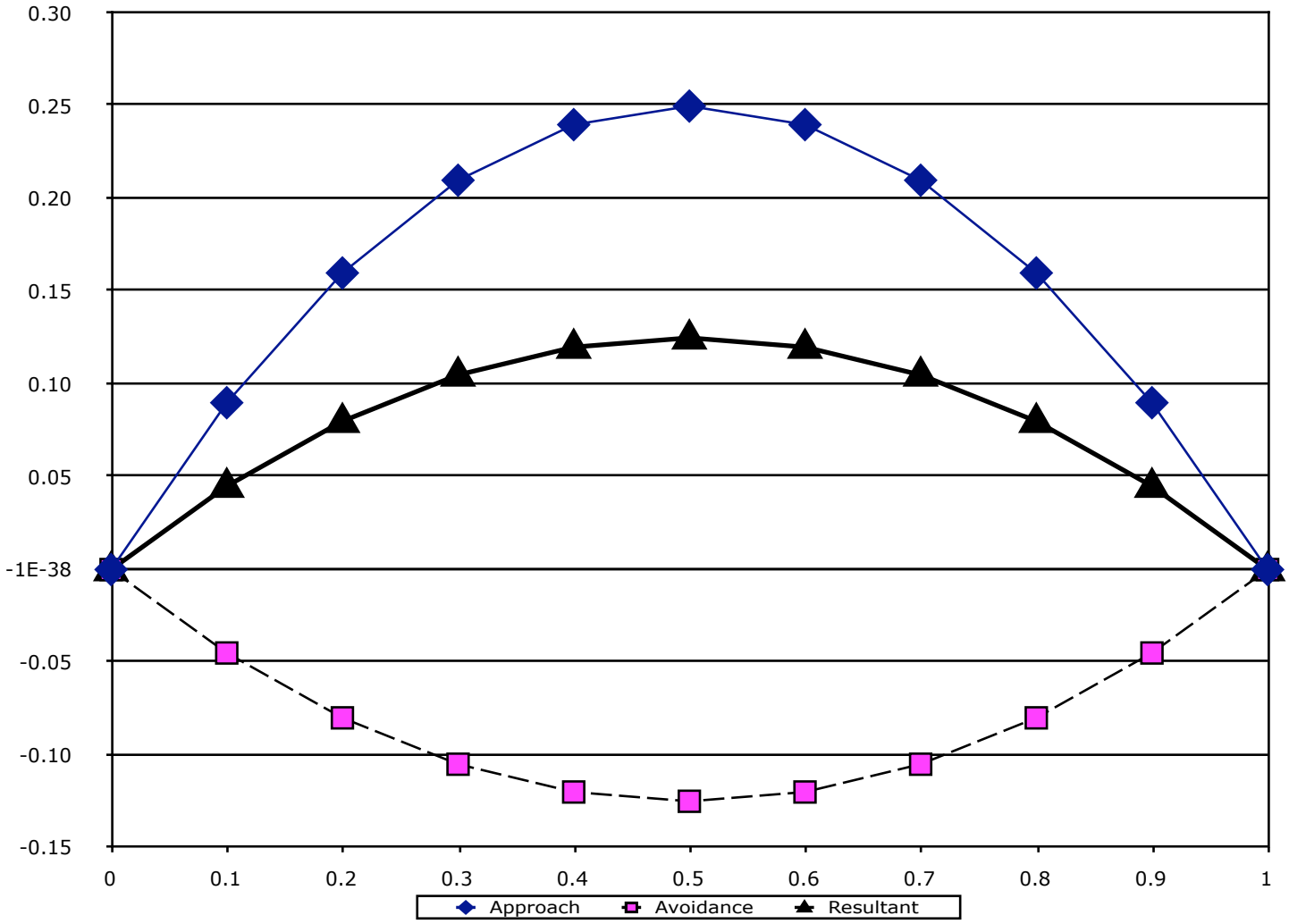
Feather, 1964

Revisions to Atkinson Theory

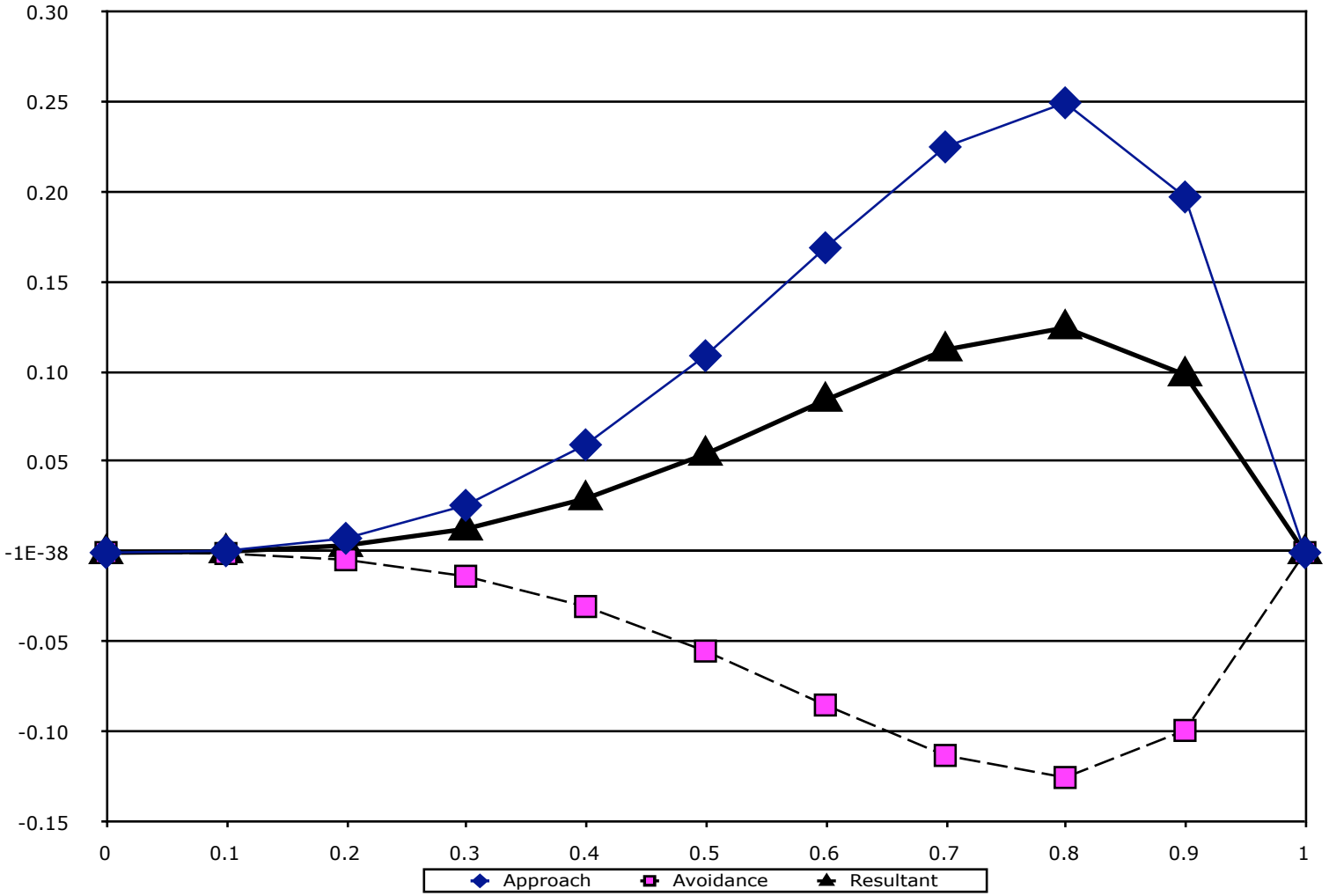
- Raynor and the concept of future orientation
  - Life is not a ring toss - tasks are contingent
  - Probability of success at event$_i$ = $\Pi p_i = p_1 * p_2 \ldots p_n$
  - Consider a freshman starting psychology with p = .9
    - 110 201 205 215 301 398 grad MA PhD job tenure full
    - .9 .81 .73 .66 .59 .53 .48 .43 .39 .35 .31 .27
  - Tendency to engage in a task = sum of tendencies for tasks contingent upon that task

$$T_{rn} = \Sigma(M_s - M_{af}) * P_{sic} * (1 - P_{sic}) + {}_{Text}$$

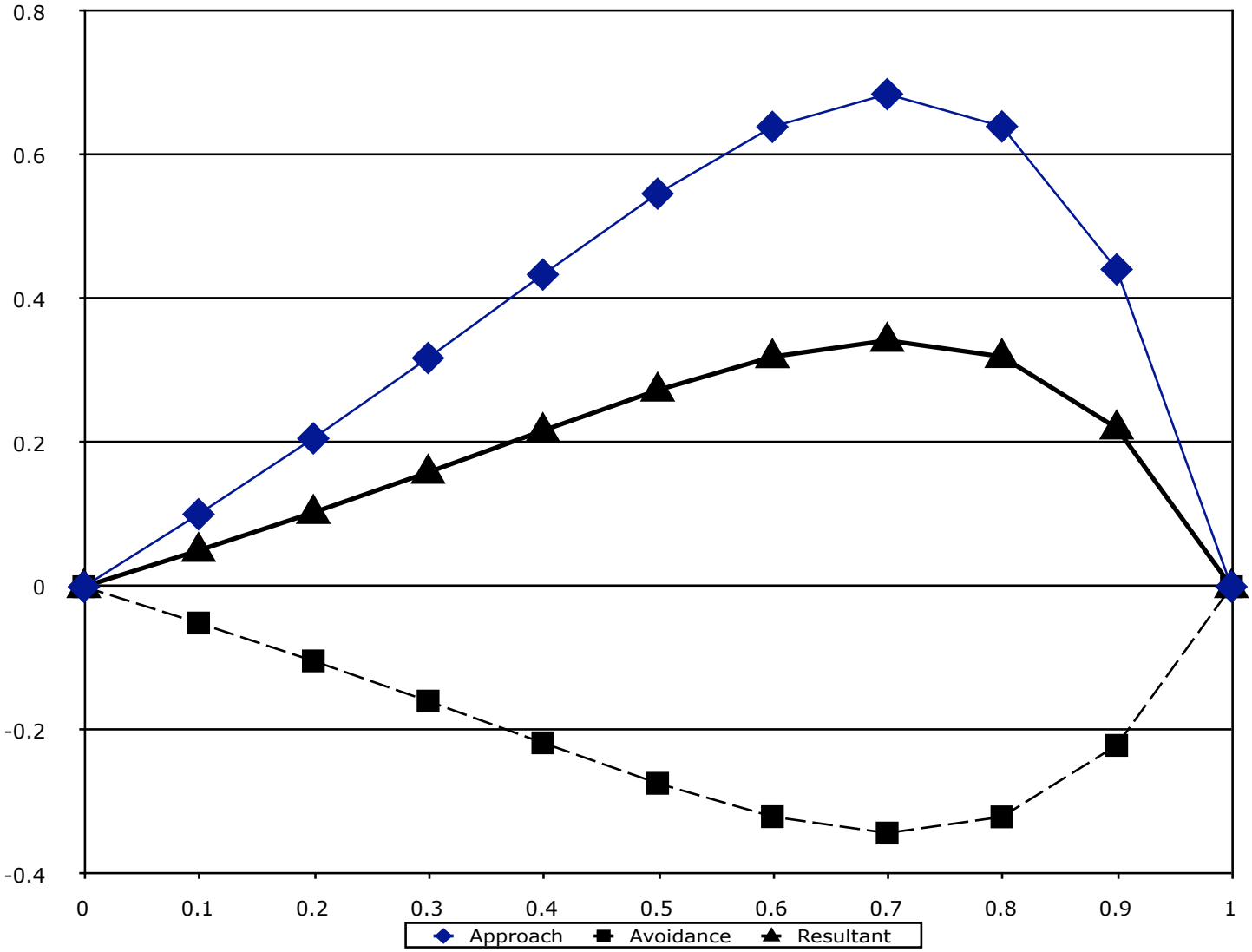
Tendency by Ps by Ms and Maf: one trial



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

Study1		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?

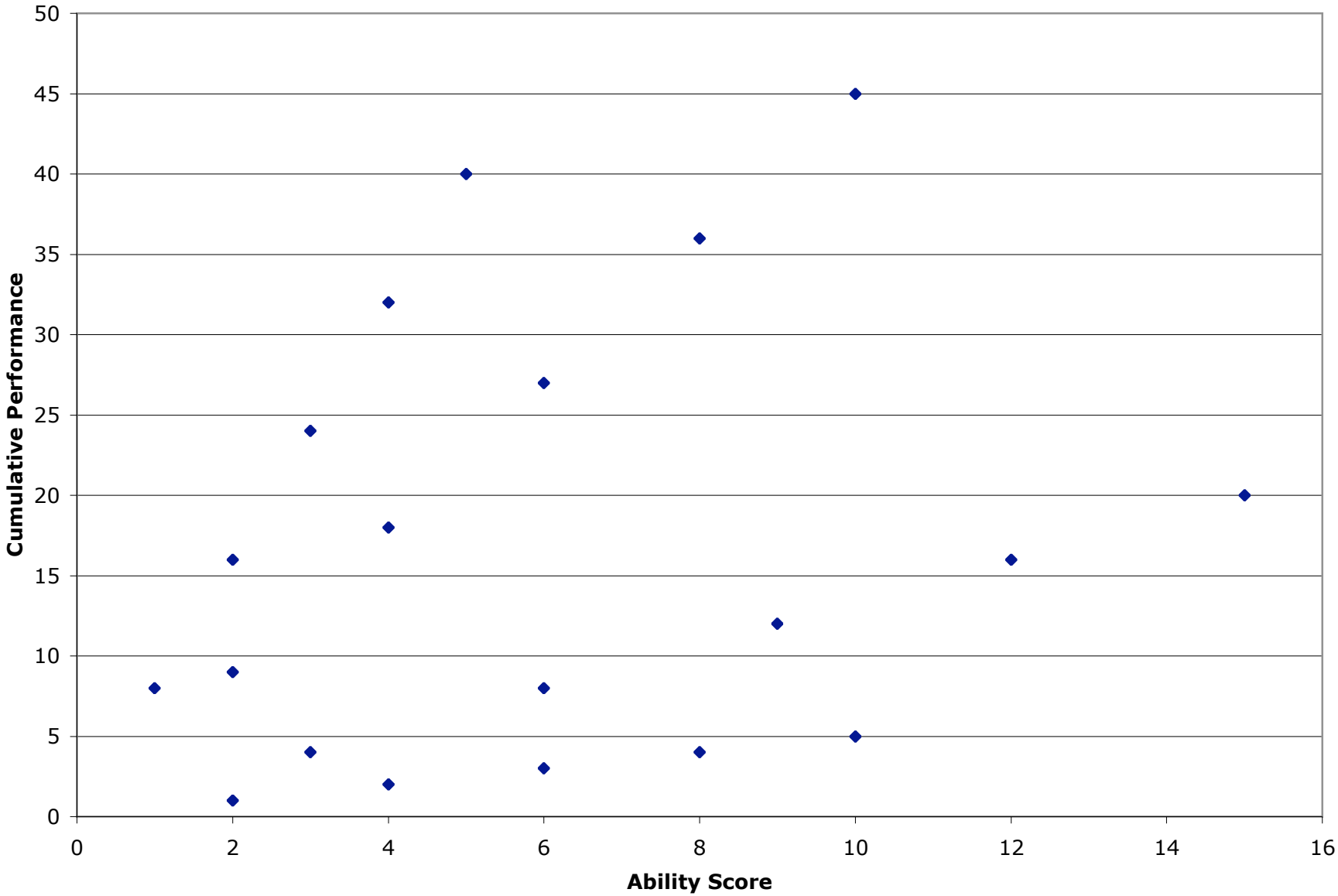
Class Performance and Test Scores: A simple model

- 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

Test and Class Performance

	Motivation in		Efficiency			Performance	
Ability	Class	Test	in class	on test	Time Spent	On test	in class2
1	1	2	1	2	1	2	1
2	1	2	1	2	1	4	2
3	1	2	1	2	1	6	3
4	1	2	1	2	1	8	4
5	1	2	1	2	1	10	5
1	2	3	2	3	2	3	4
2	2	3	2	3	2	6	8
3	2	3	2	3	2	9	12
4	2	3	2	3	2	12	16
5	2	3	2	3	2	15	20
1	3	4	3	2	3	2	9
2	3	4	3	2	3	4	18
3	3	4	3	2	3	6	27
4	3	4	3	2	3	8	36
5	3	4	3	2	3	10	45
1	4	5	2	1	4	1	8
2	4	5	2	1	4	2	16
3	4	5	2	1	4	3	24
4	4	5	2	1	4	4	32
5	4	5	2	1	4	5	40

Class vs Test Performance



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
  - Weiner, carry over effects of feedback

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?)

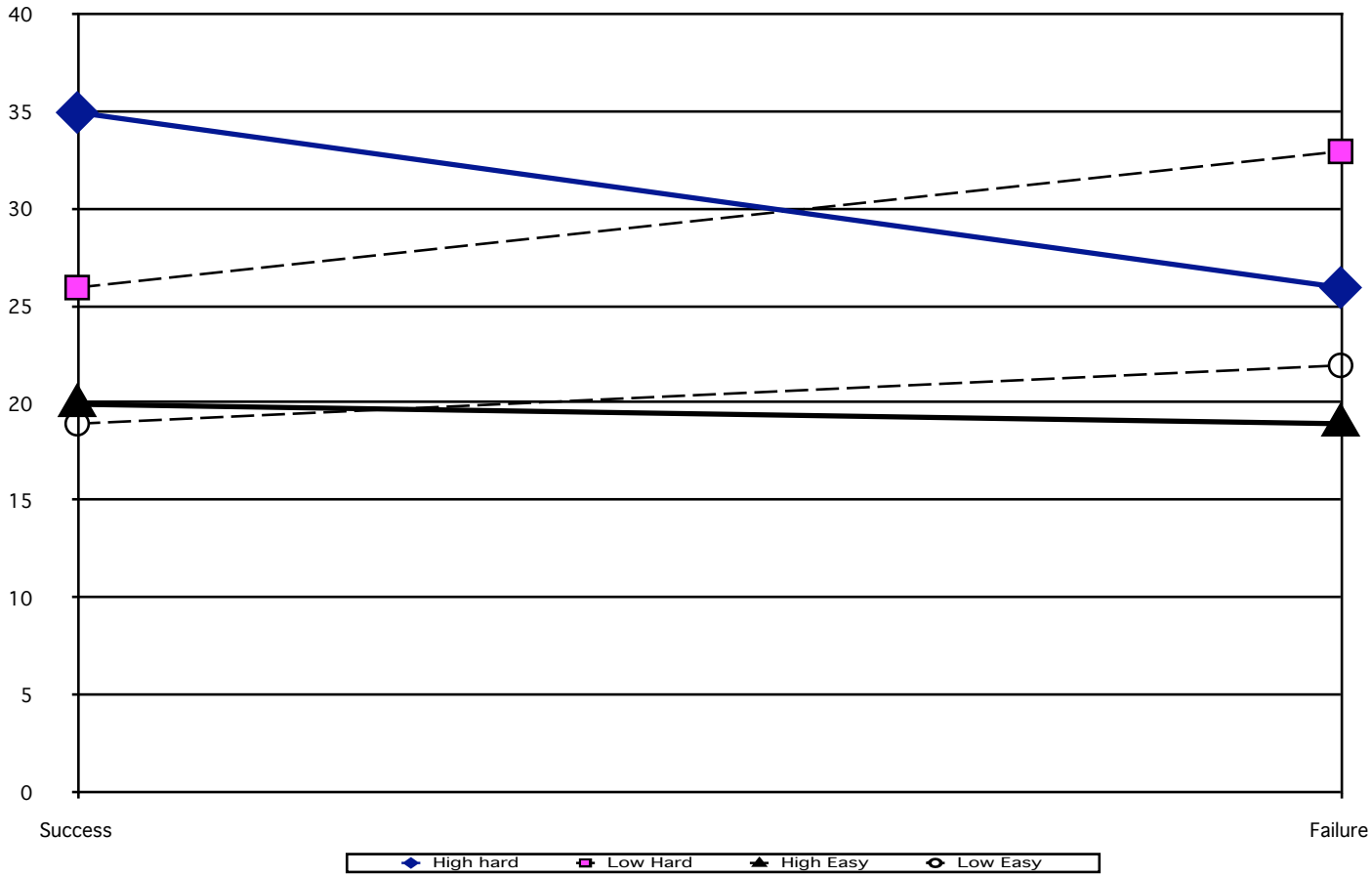
  Subjects were high and low resultant Achievement Motivation (Nach - Naf)

  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?

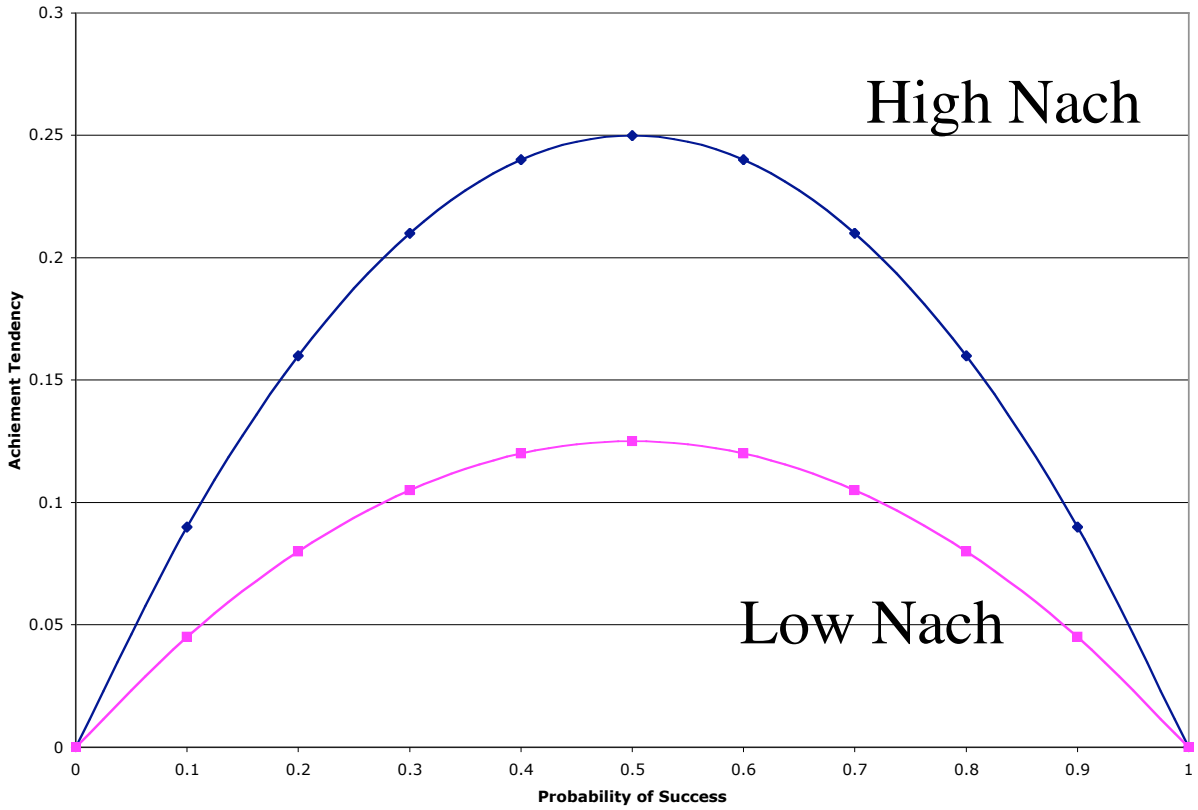
Weiner and Schneider, 1971



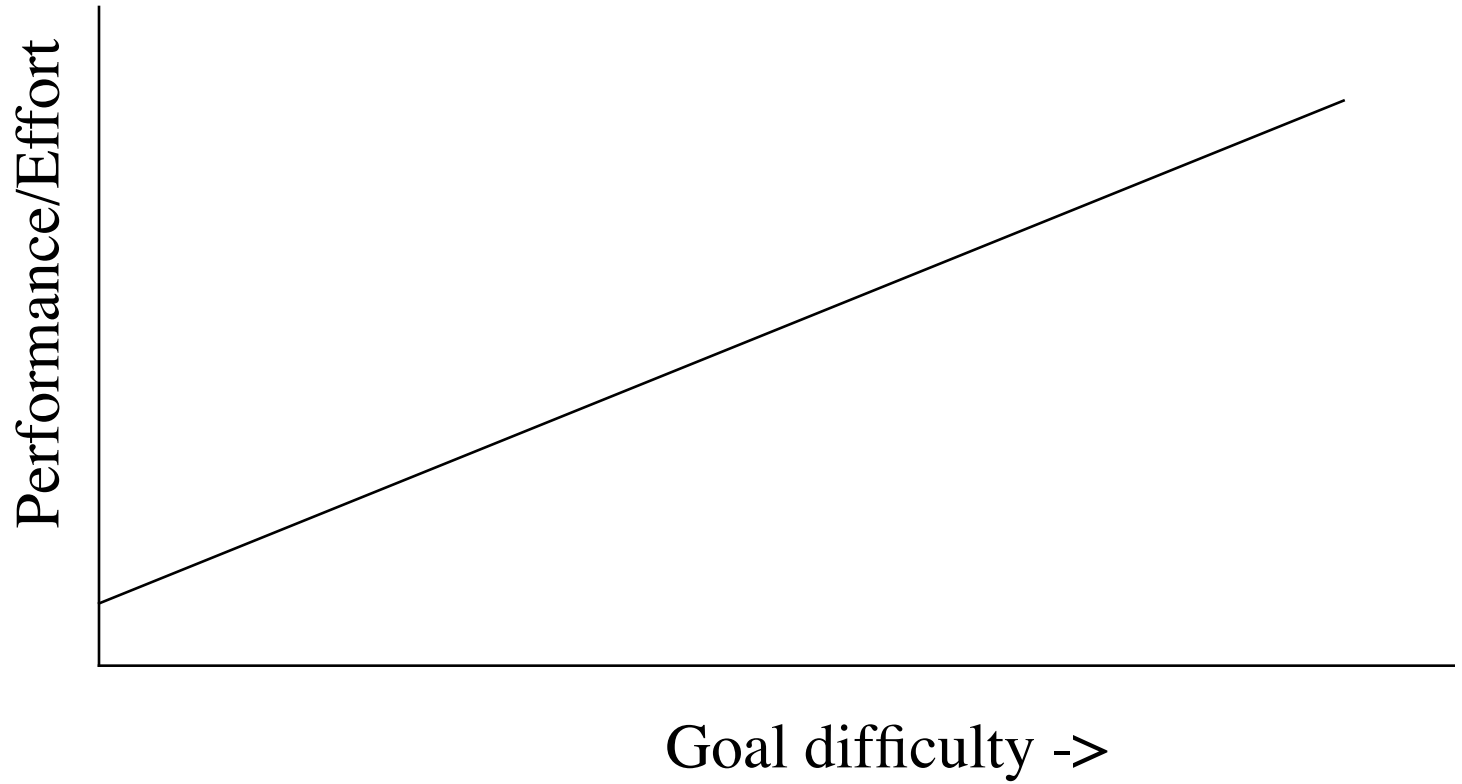
Two theories of perfomance

- Atkinson- Risk Preference and achievement theory predicts curvilinear relationship between task difficulty and performance
- Locke - Goal Theory predicts linear relationship between difficulty and performance
- How can we reconcile these?

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



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



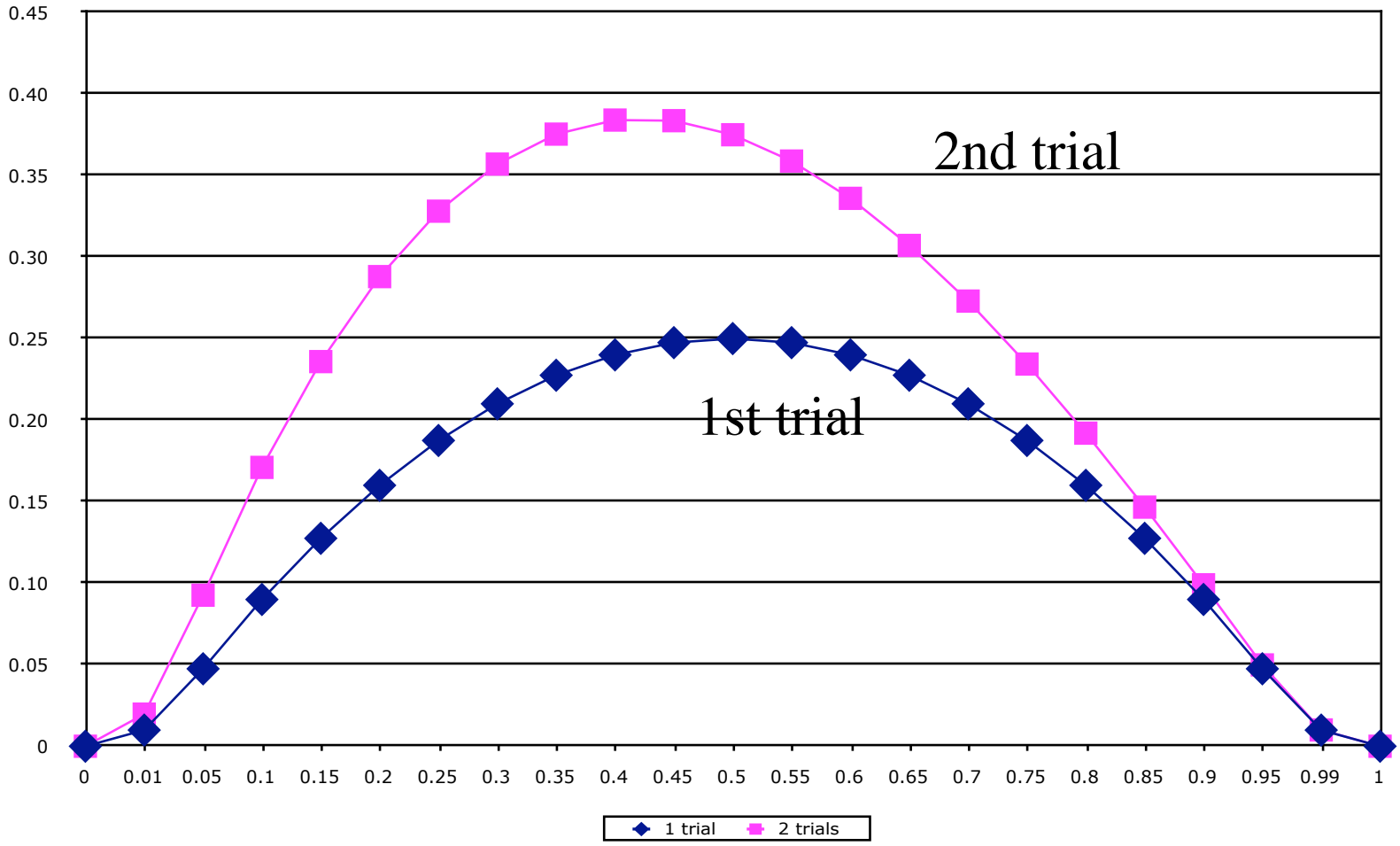
Revelle and Michaels (1984): steps towards dynamics

- 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
- See also Kuhl and Blankenship (1986) for full dynamic model

Steps towards dynamics: the carryover of motivation

- Effort on trial 1: $(M_s\text{-}M_{af)}*(P_s)*(1\text{-}P_s)$
- 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 $T_2 = T_1$ + carryover
  - Assume perfect carryover $T_2 = T_1*p + 2T_1*(1\text{-}p)$
- If at first you don't succeed, try, try again.

Expected Effort as a function of trial and probability of success



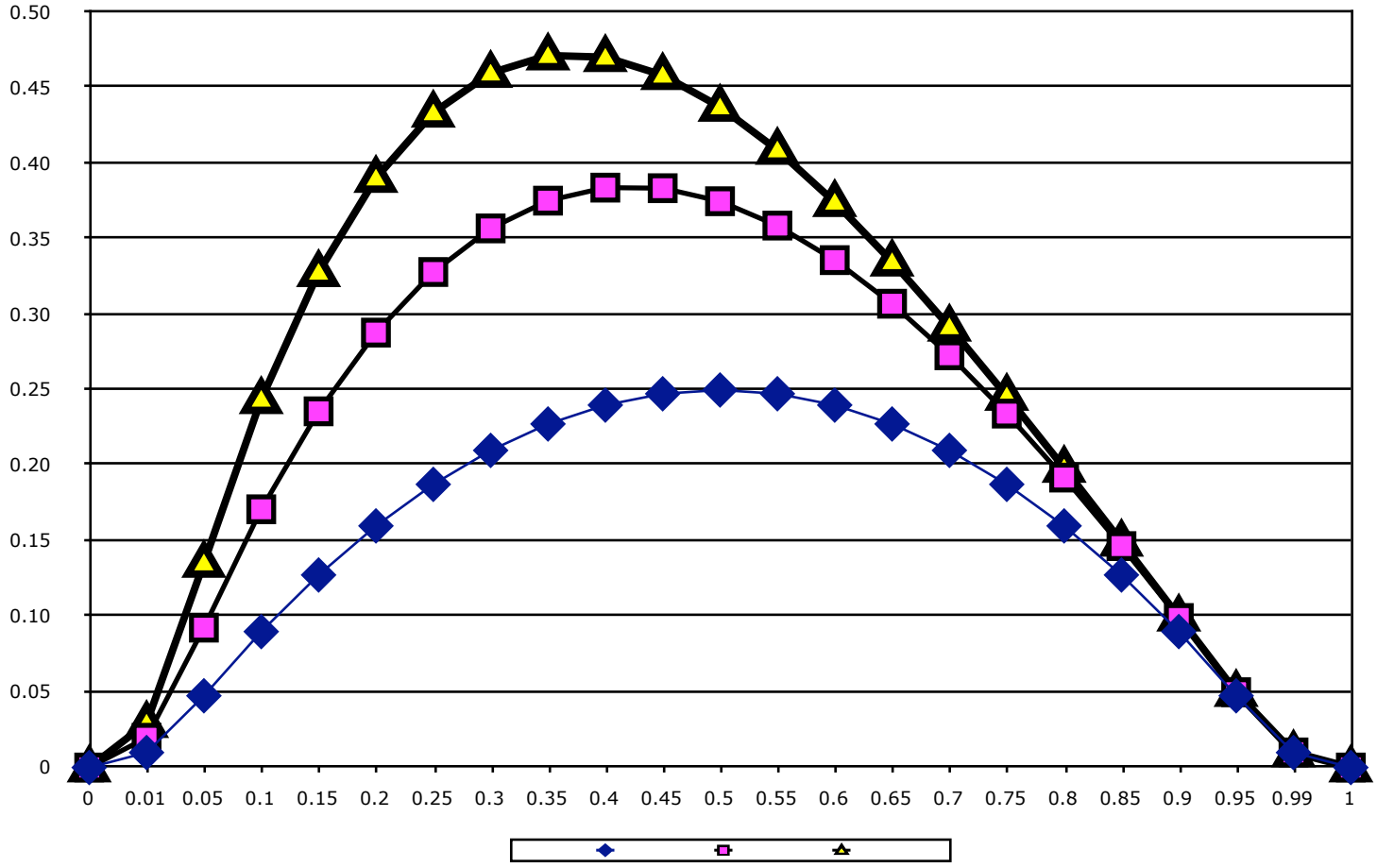
Steps towards dynamics

- 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 = T1
  - If failure on trial 2, then motivation from trial 2 carries over to trial 3: Effort T_3 = T_3 + carryover
  - Assume perfect carryover

Carryover (3 trials)

Trial 1		$T_1=p*(1-p)$			
outcome		p(success)=p		P(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	$3* T_1$

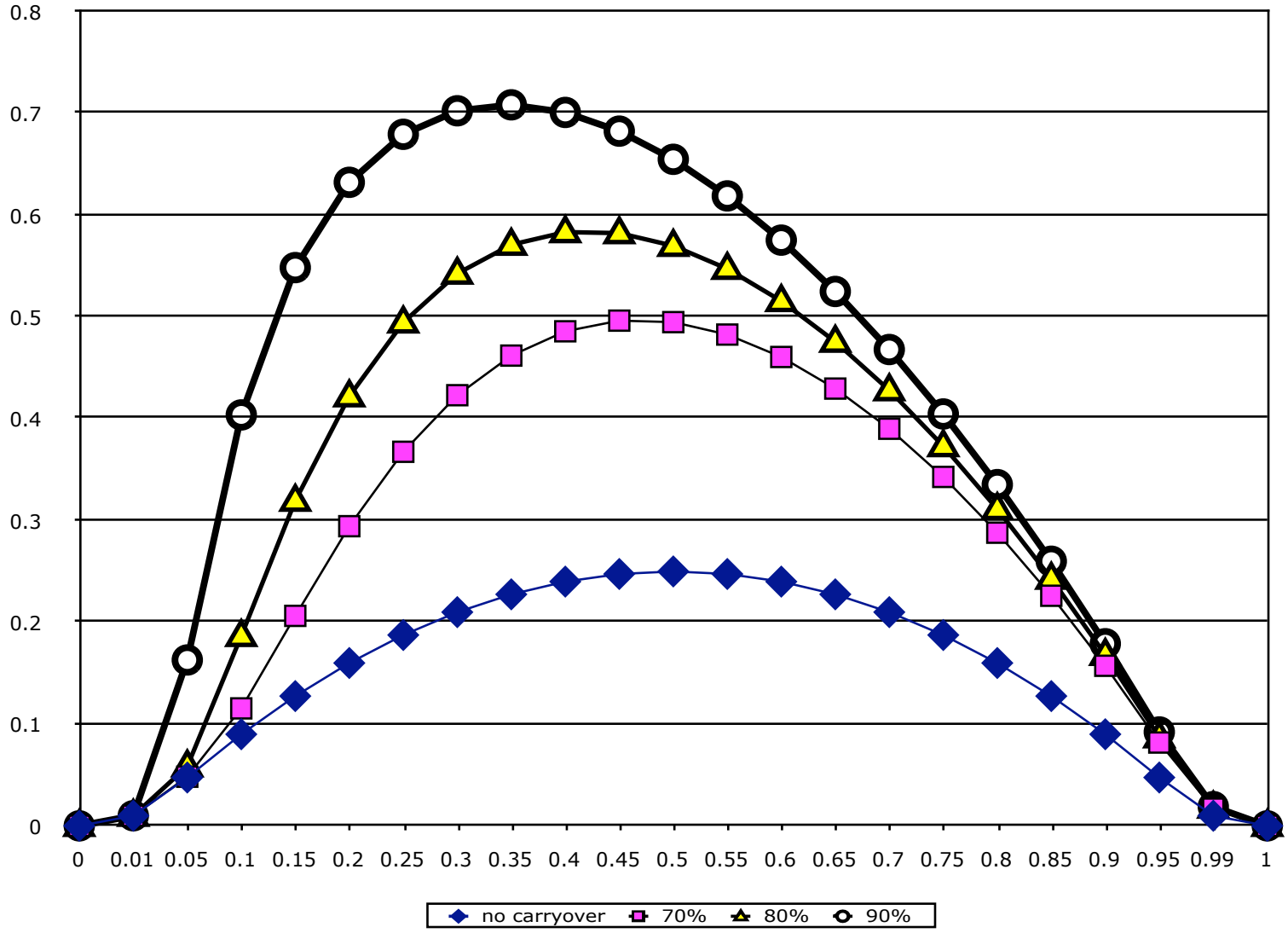
Perfect carryover 1-3 trials



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 consummation repeated trials



Atkinson with inertial carryover predicts Locke data

- Most Locke tasks were multiple trial studies.
- Single trial studies, effort should be curvilinear with difficulty
- Multiple trial studies, effort should be increasing function of difficulty up to high level of difficulty

Atkinson, Locke, and folk wisdom

- If is is worth doing, it is worth doing well
  - Achievement motivation
- If at first you don't succeed, try, try again
  - Carryover
- When the going gets tough, the tough get going
  - More carryover on hard tasks
- Wise men do not beat their heads against brick walls
  - Reality testing of goal setting

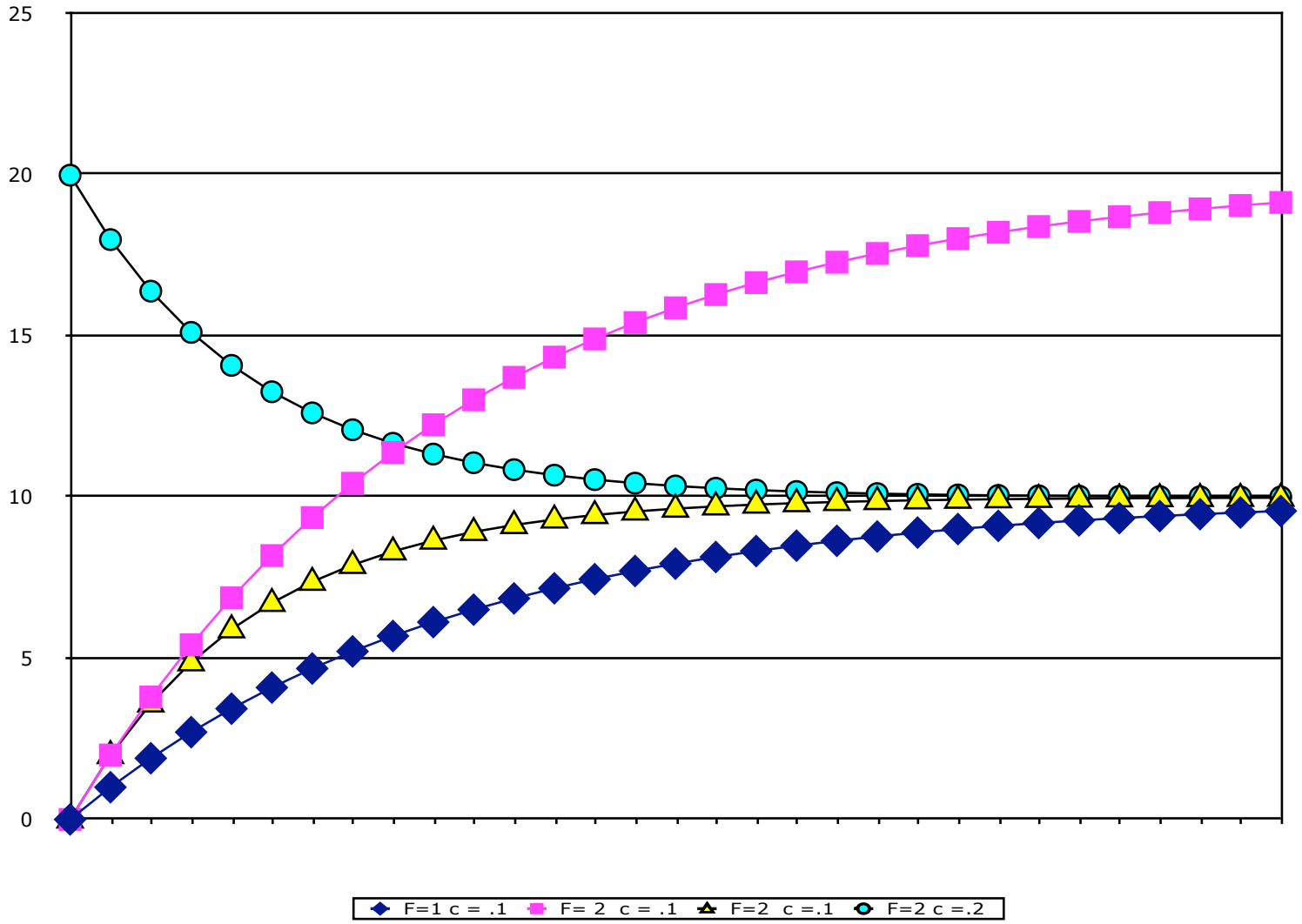
Dynamics of Action: Approach Atkinson and Birch, 1970

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

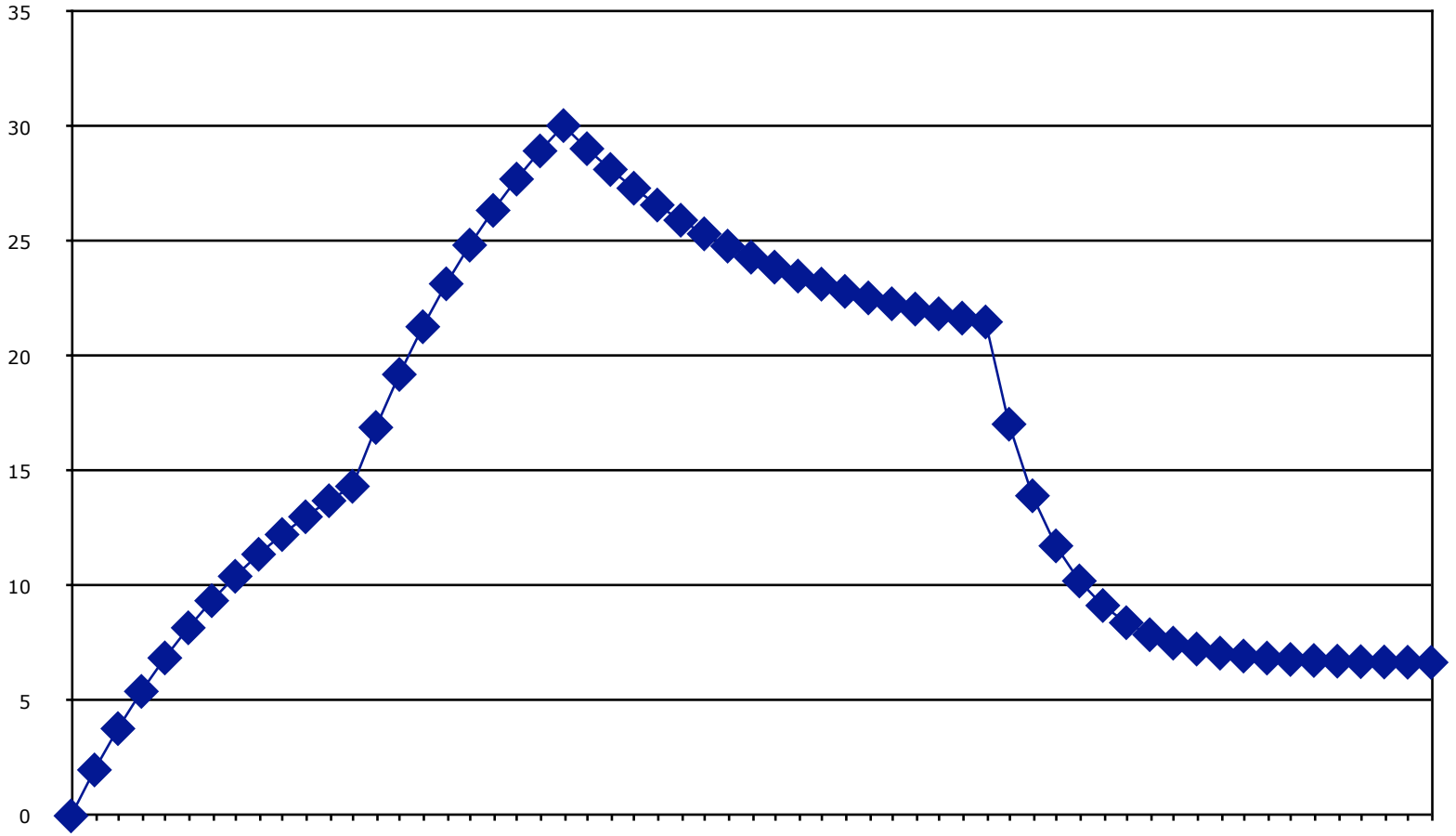
Dynamics of Action
Atkinson and Birch, 1970

- 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 <=> T=F/c
- Actions with greatest action tendency will occur

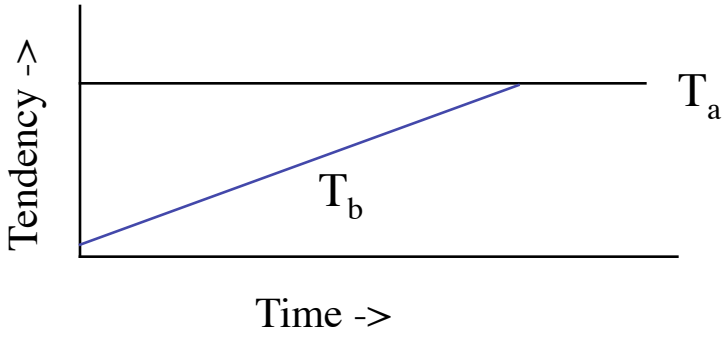
Action tendencies over time
F=1 or 2, c = .1 or .2



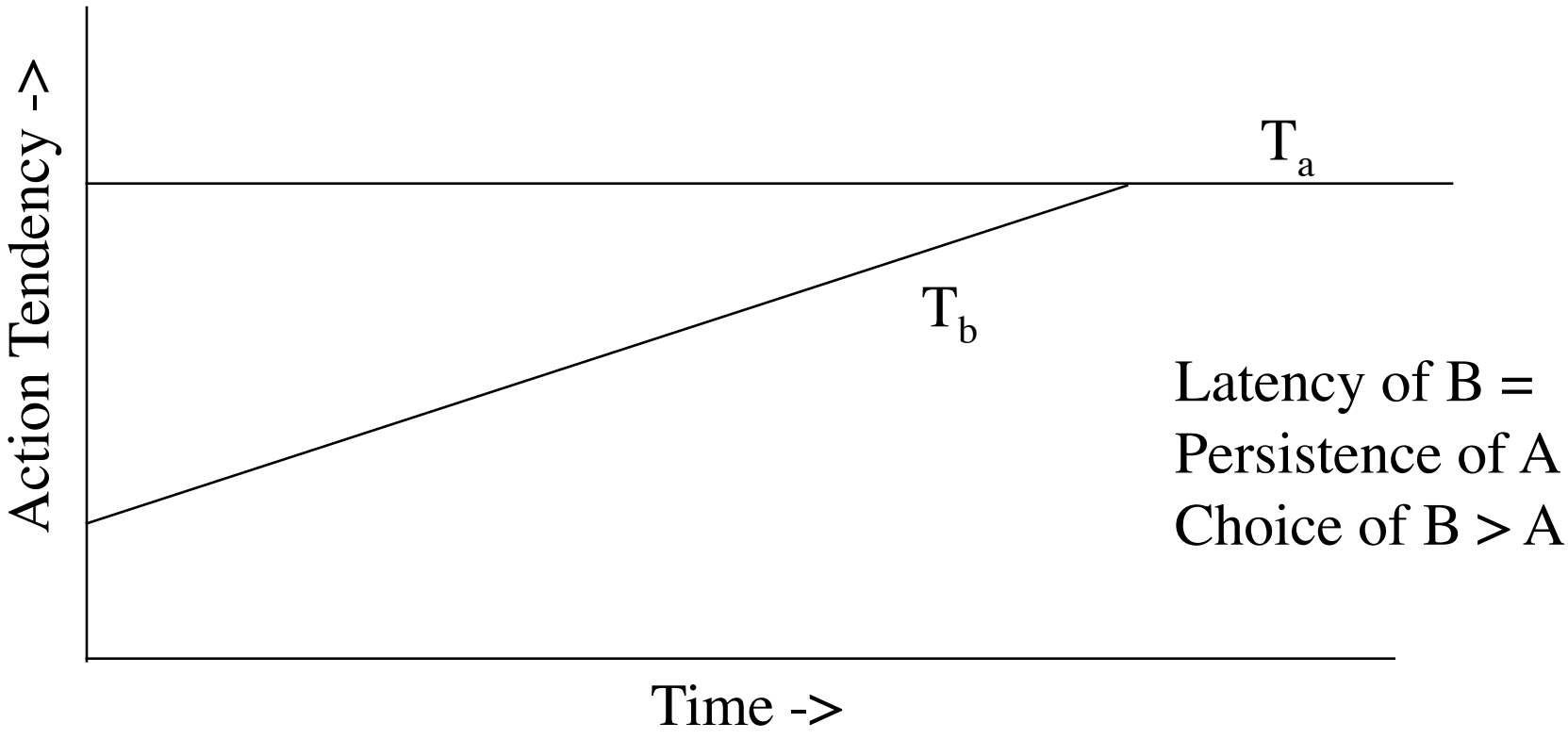
A dynamic dinner party



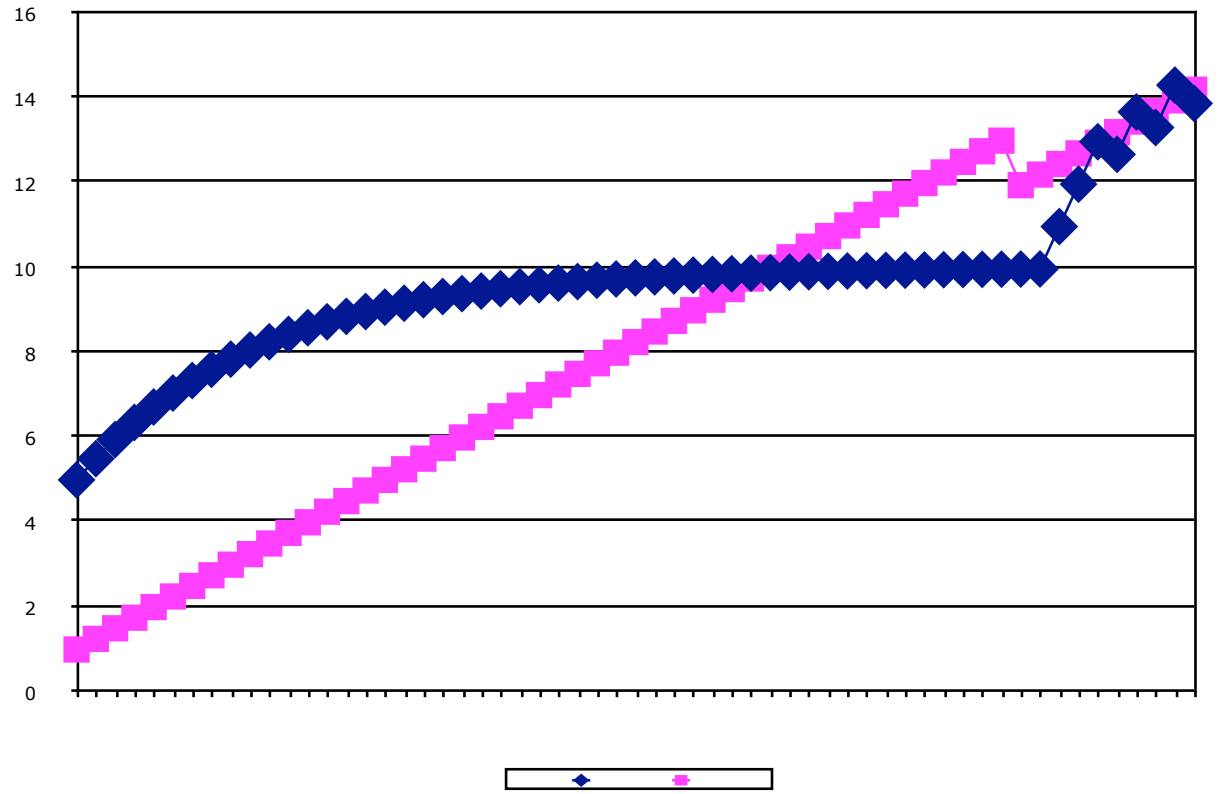
Change happens when $T_a < T_b$



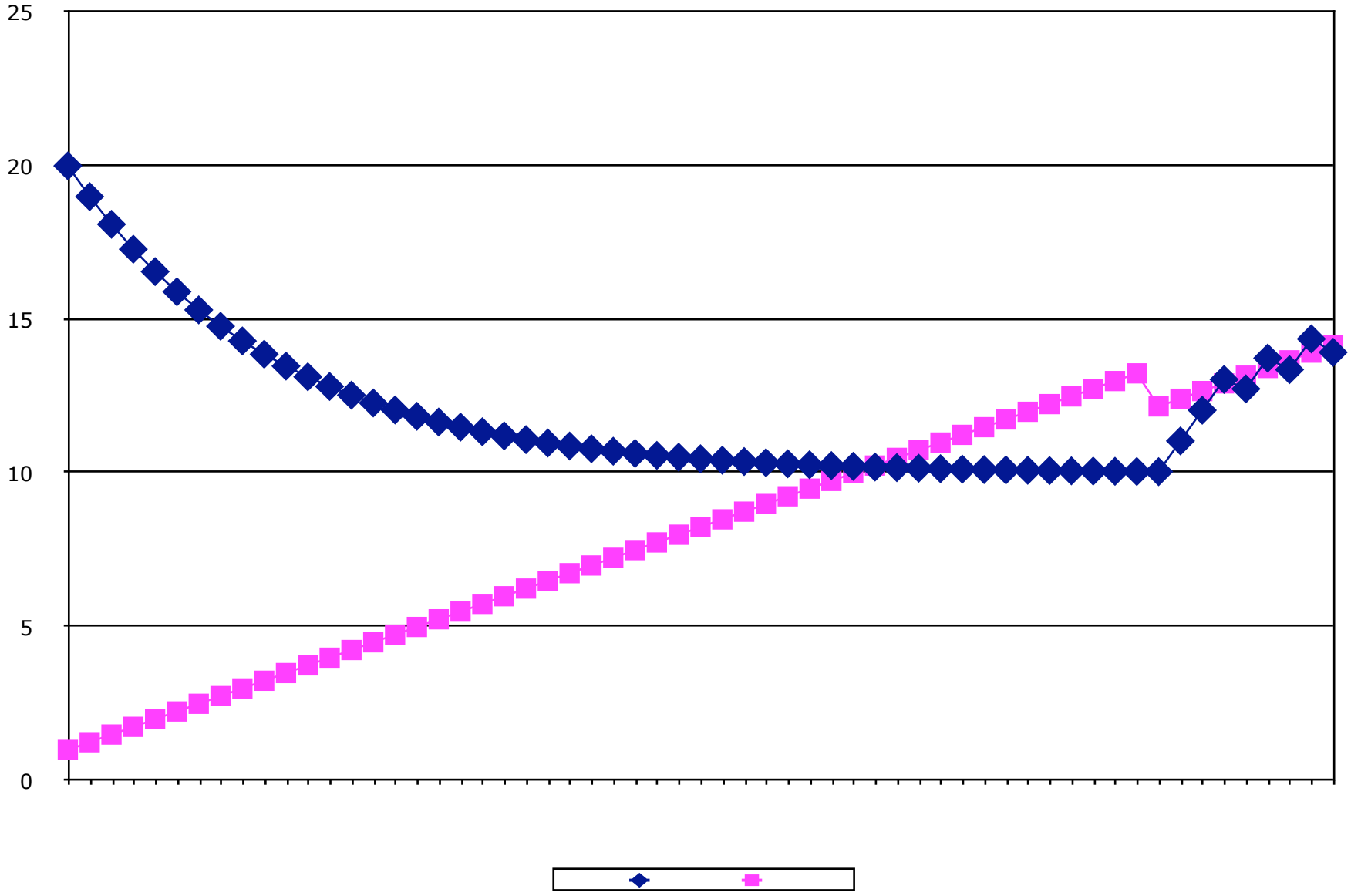
Choice, Persistence, and Latency



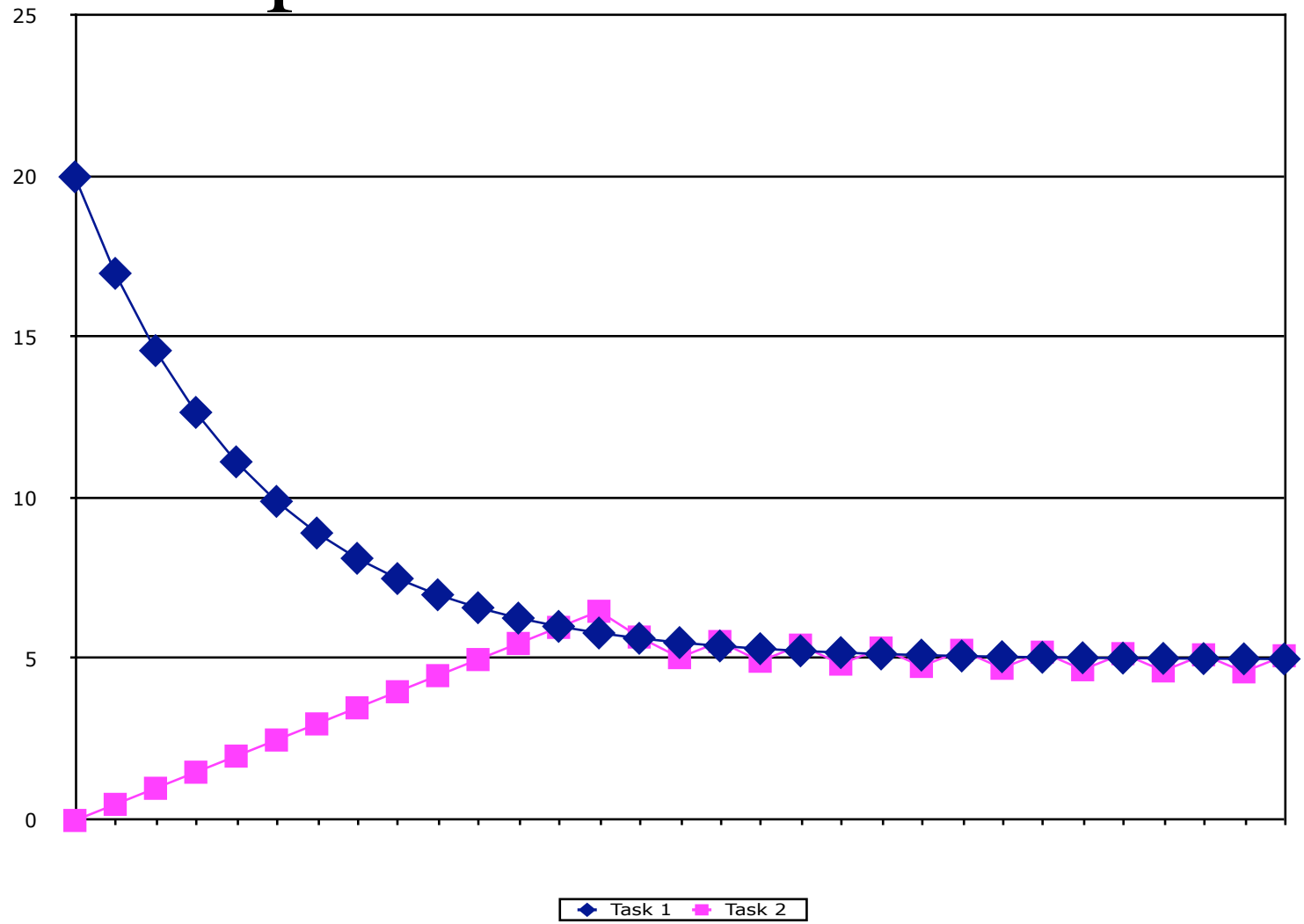
Incompatible actions over time
Lagged consummation



Incompatible Action tendencies
Ongoing decays



Incompatible actions over time, the problem of “chatter”



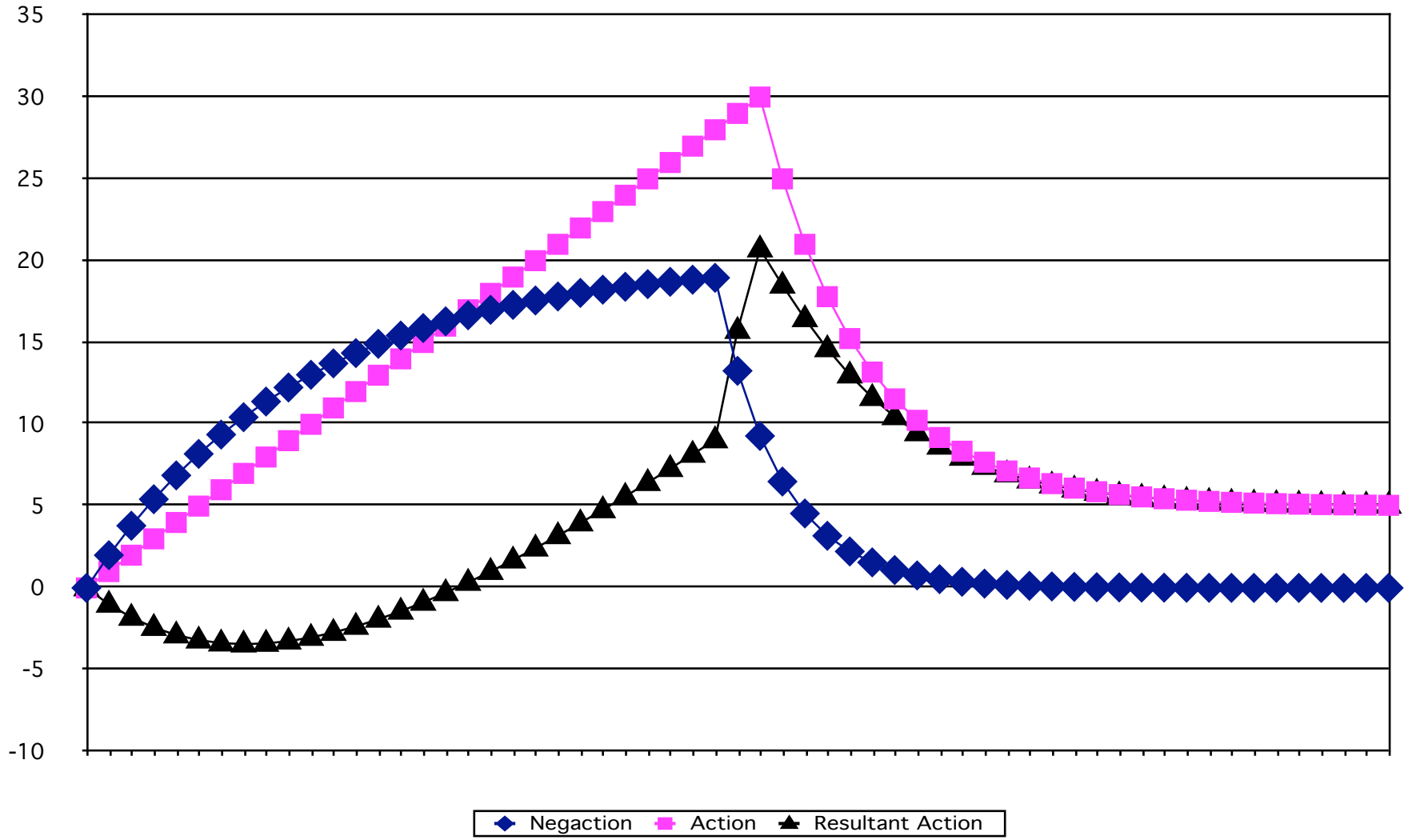
Avoidance and Inhibitory Motivation -- Negaction

- Negaction tendencies inhibit behavior
- Inhibitory forces increase negaction
- Resistance forces decrease negaction
- dN=I-rN <=> N -> 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 Tr 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

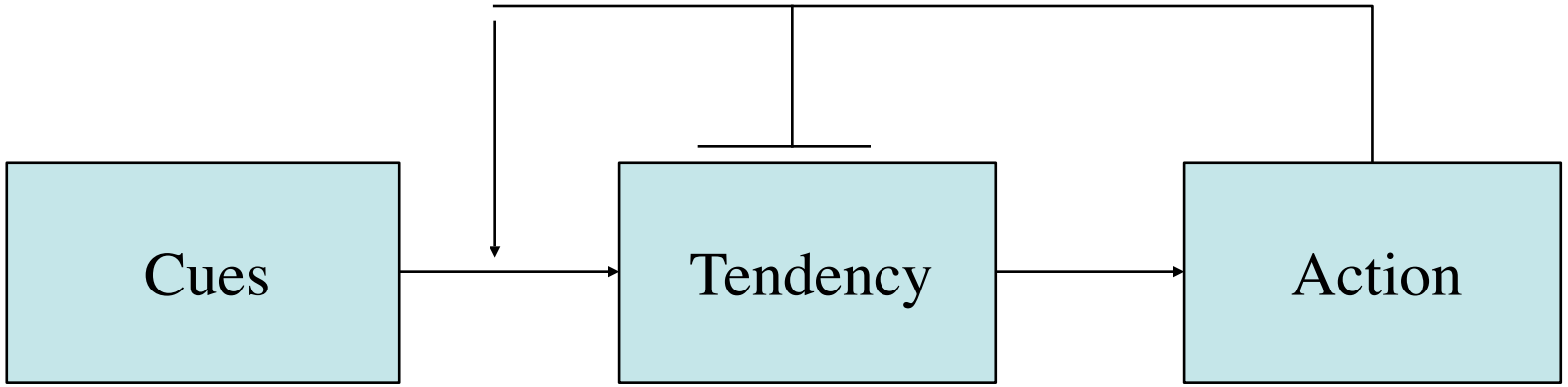
Personality as rates of change

- Growth rates, decay rates, inhibitory strengths
- Growth of tendency when stimulated
  - dTa = personality x situation
- Decay of Ta when ongoing
  - Adaptation rate?
- Strength of inhibitory processes

Revised Dynamics of Action: The CTA model

- Cues
- action Tendencies
- Actions
- Cues elicit action Tendencies
- Tendencies strengthen Actions
- Actions reduce Tendencies
- Decision rule is mutual inhibition
- see doa-cta.xls on class syllabus

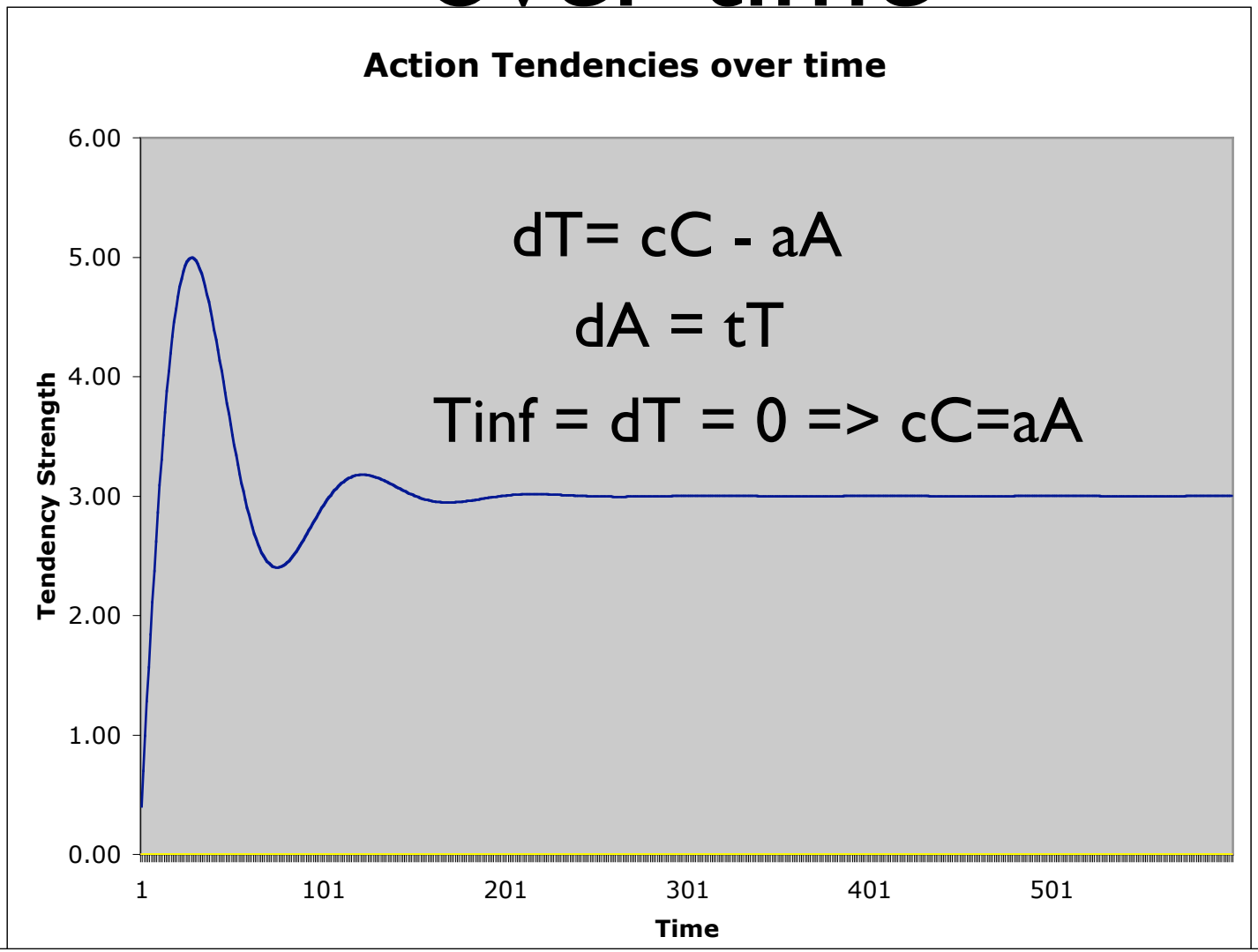
Cues, Tendencies, Action



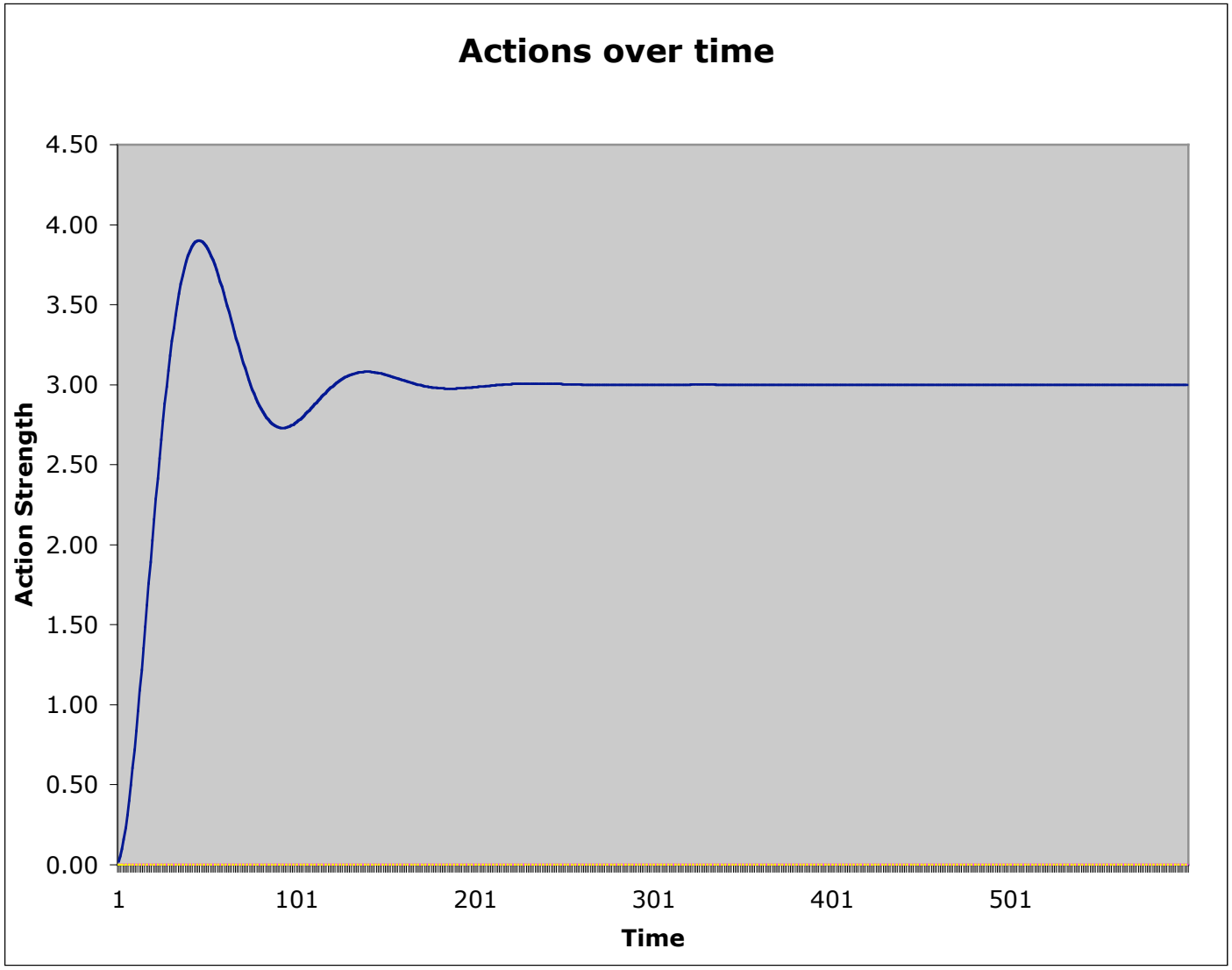
$dT = cC - aA$

$dA = tT - iA$

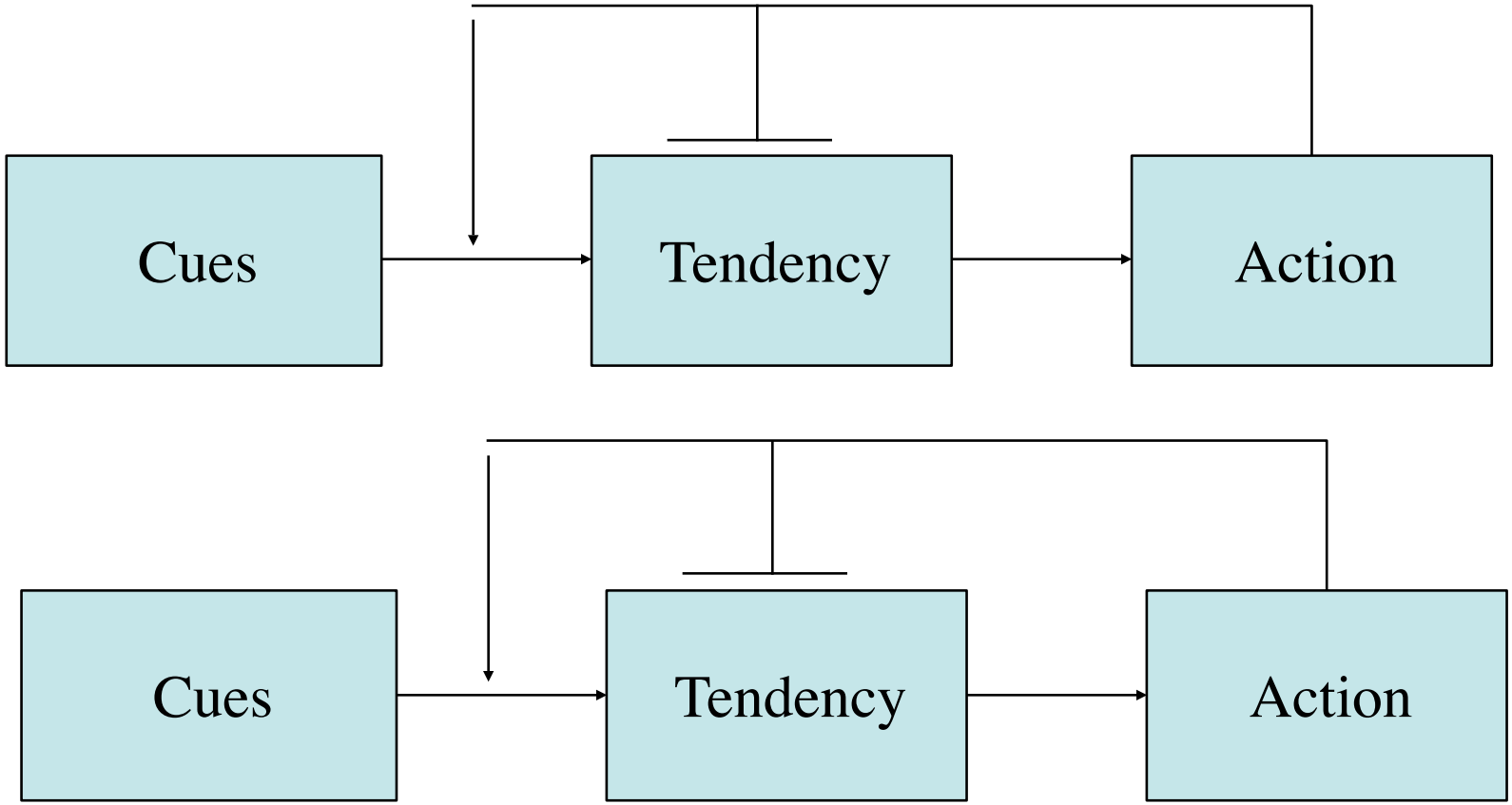
A single action tendency over time



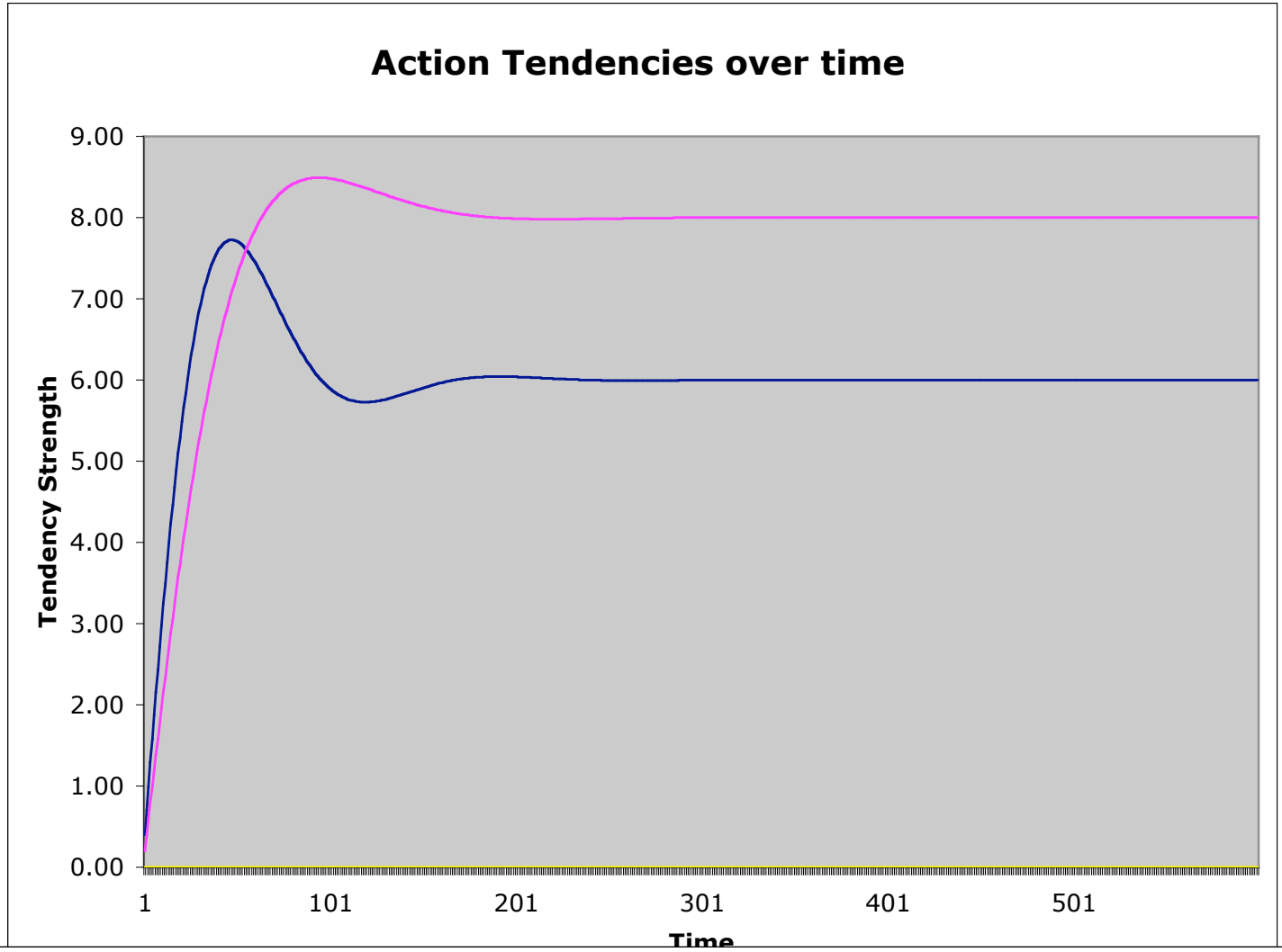
An action over time



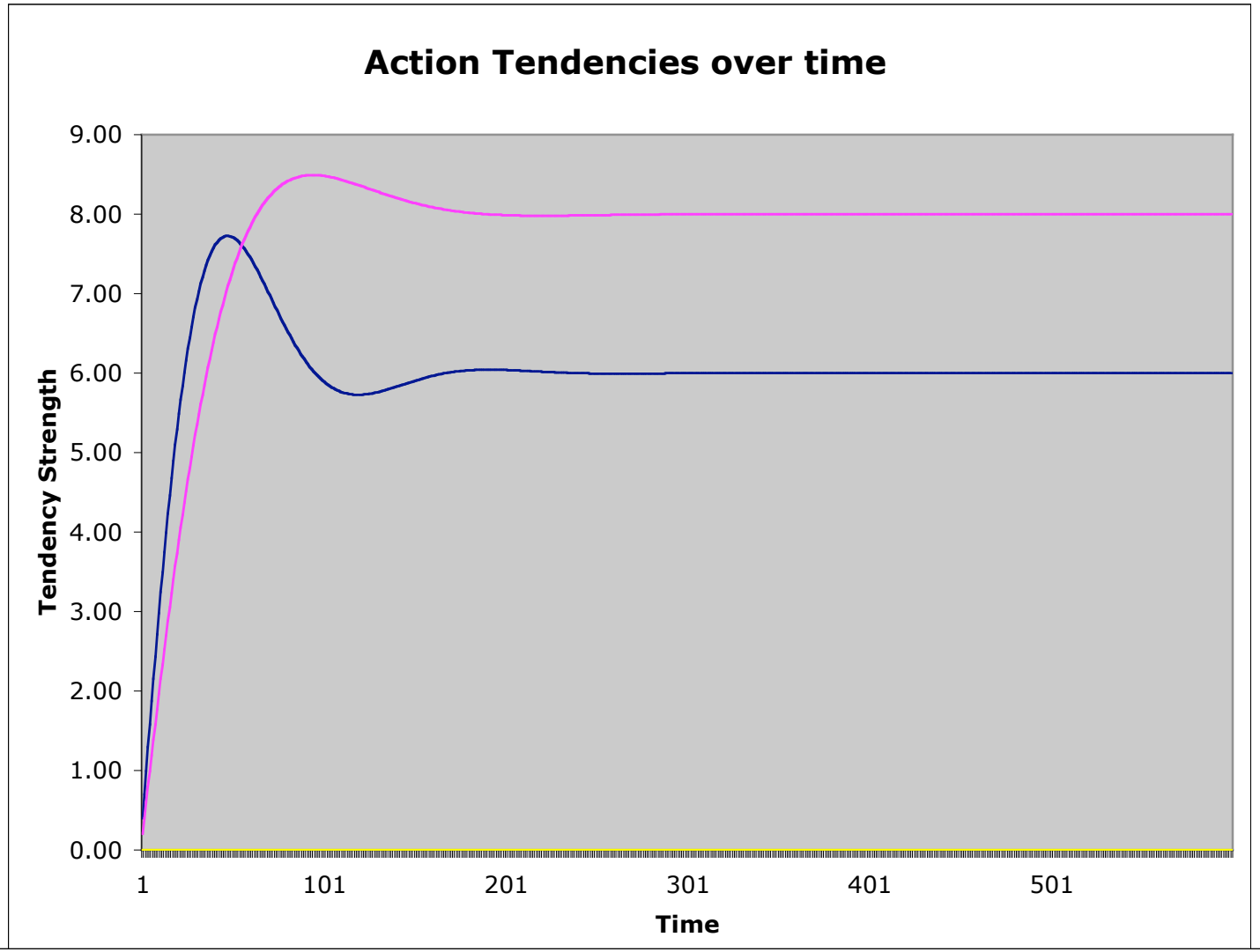
Cues, Tendencies, Action
Compatible actions



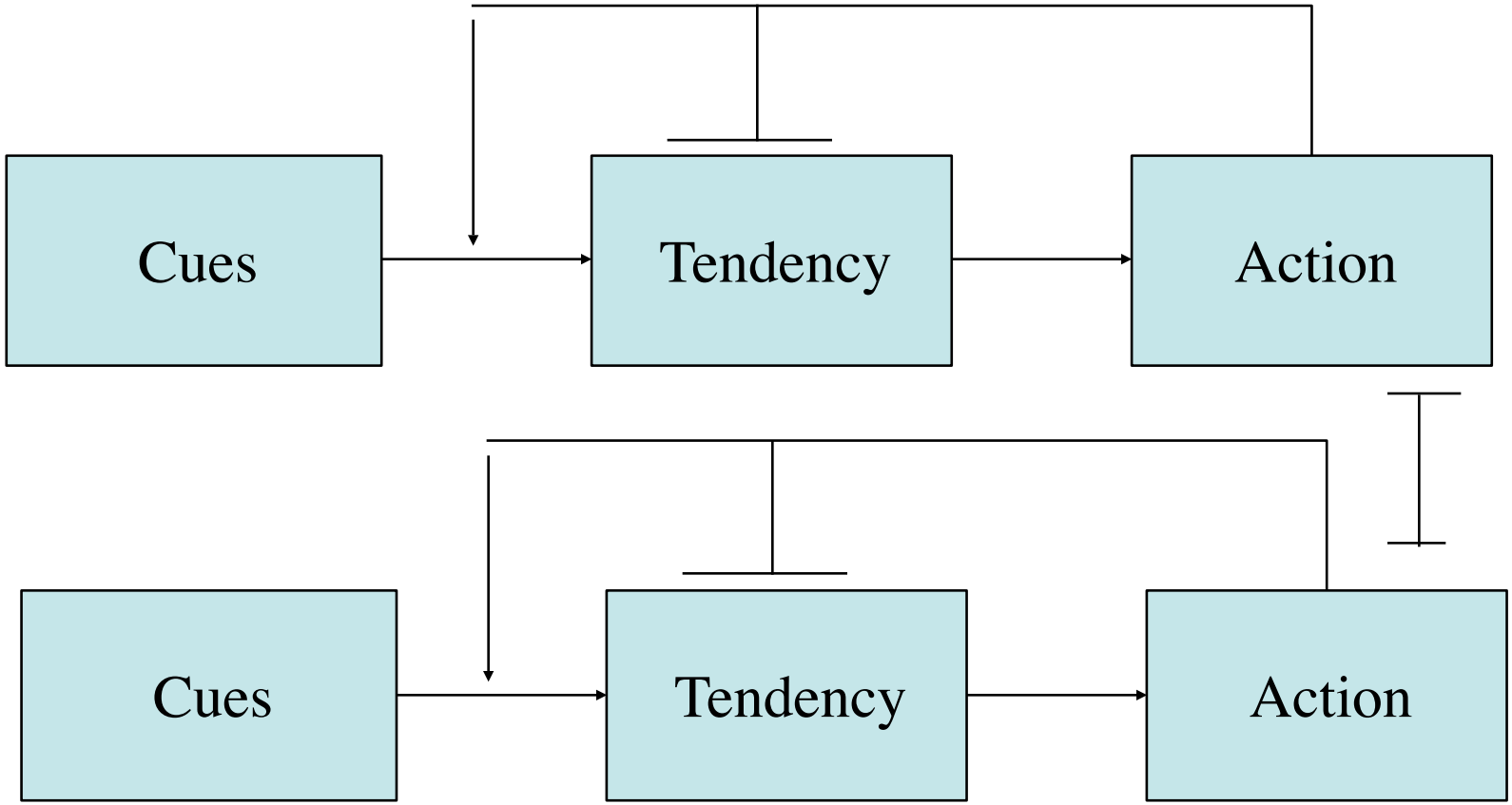
Two compatible action tendencies over time



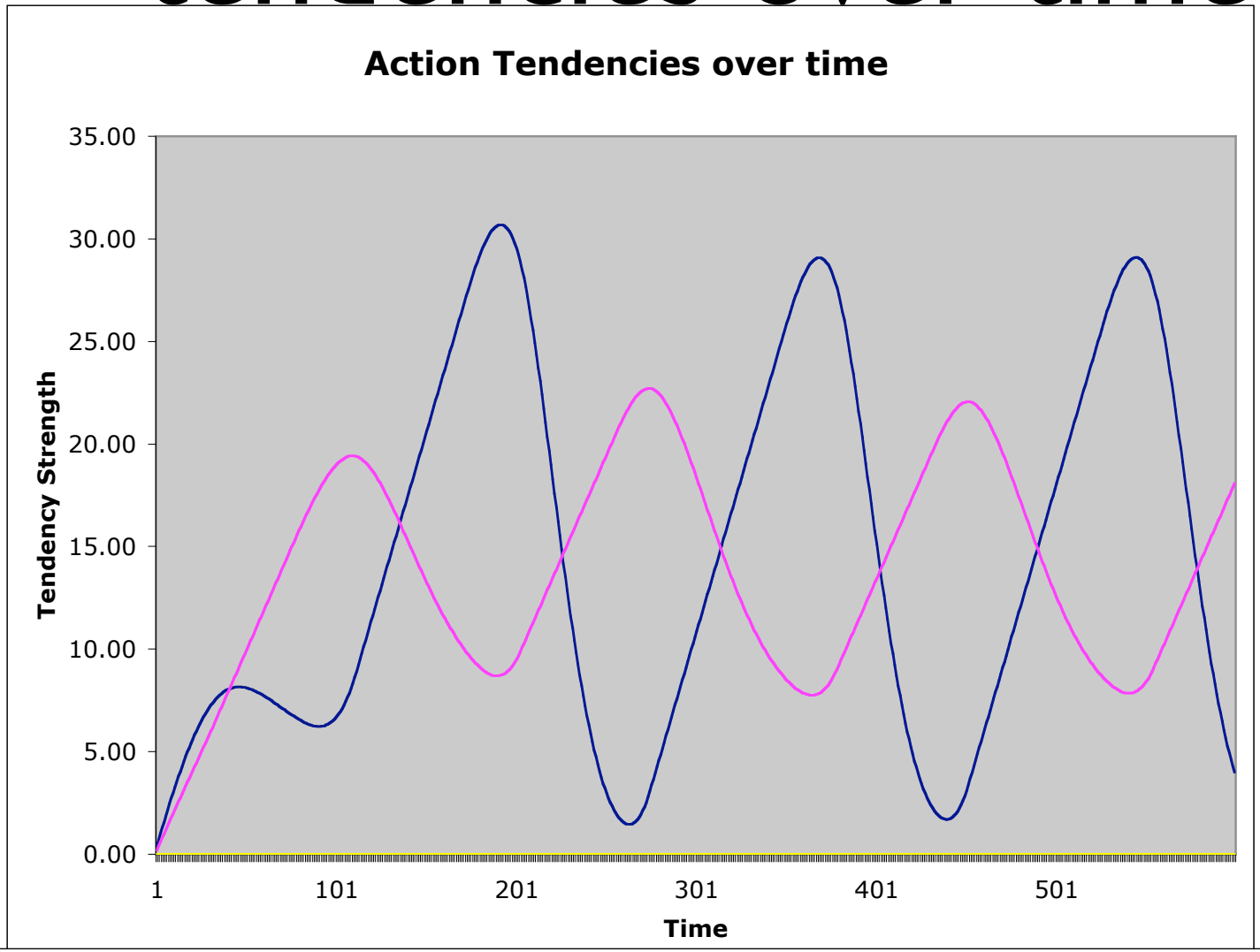
Two compatible action tendencies over time



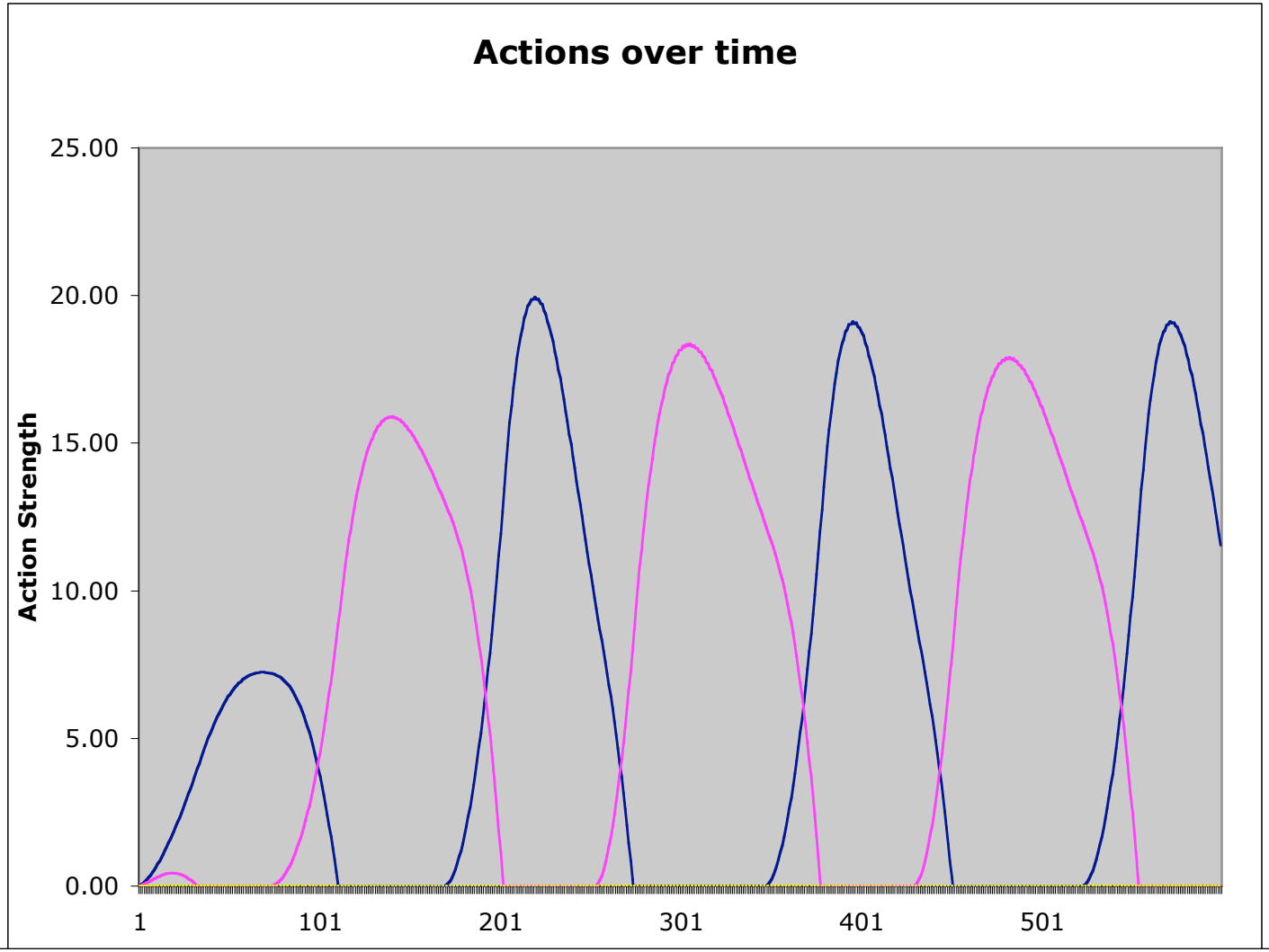
Cues, Tendencies, Action
Incompatible actions



Two incompatible action tendencies over time



Two incompatible actions over time



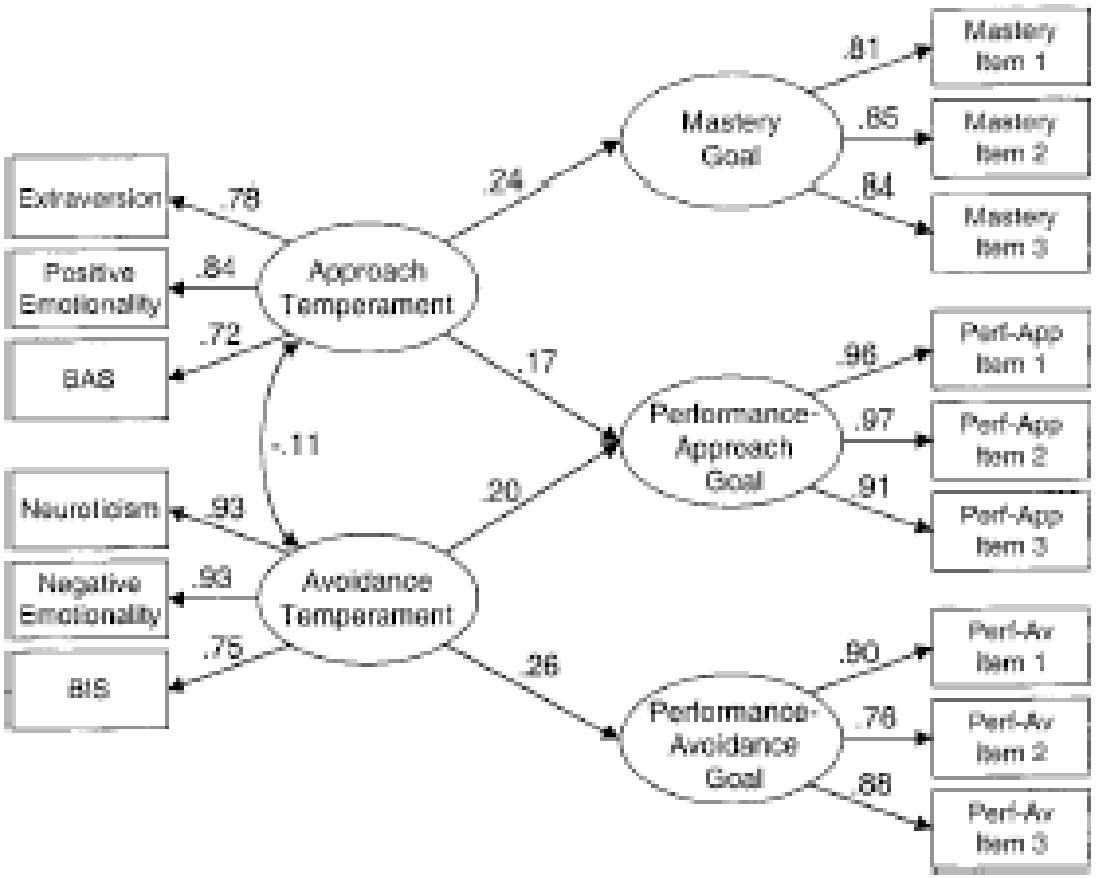
Computer simulations as formal theory

- 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

Extensions of Achievement motivation to school achievement

- Initial N-ach work in 1950s-1960s.
- Dynamics of action, 1970s-1980s
- Rediscovery of achievement theory in terms of goal settings, interpretations of task outcomes
  - Dweck
  - Elliot and Thrash

Elliot and Thrash, 2002



Achievement Motivation and the ABCDs

- Achievement as positive Affect upon success
- Achievement as approach Behavior
- Achievement motivation as Cognitive appraisals of task difficulty
- Achievement motivation as Goal setting