

# The Economics of Mental Energy

Arie W. Kruglanski

University of Maryland

# The Energy Concept

- Fundamental to Natural Science
- Ubiquitous in Everyday Speak
- Neglected in Psychological Science

# Taking Mental Energy Seriously

- Freud's (1923) notion of *psychic energy*:
  - Fixed
  - fueling all mental activity (thought, imagination, memory)
  - Biologically based (libido)
- Our conception: Pool of Mental Energy (PME) = f(P,S)
  - P (genetics, development, aging)= Upper Bound on Momentary Energy
  - S (rest, nutrition, health, depletion)

# Microeconomic theory of demand:

- (a) Outlay willingness must (at least) match
- (b) the price

# Cognitive Energetics Theory (Psych. Rev. 2012): 1. *Activity INITIATION*

- Economics of Mental Activity: Mental Law of Demand
- “*For Mental/Behavioral Activity to be **INITIATED** : (Energetic) Outlay Willingness (OW) Must at least Match (Perceived Task Demands” (OW ≥ PTD)*

# Outlay Willingness (OW) is a multiplicative function of:

- (a) **Relative Goal Importance (RGI)** ( $RGI = GI/Other\ GIs$ )
- (b) **Pool of Mental Energy (PME)**
- (c) **Individual's energetic conservatism (EC)**  
(cognitive miserliness)

$$(OW) \sim RGI \times \boxed{PME} \times EC$$
$$\sim k \times \boxed{PME} \times l$$

- where  $k \sim f(RGI)$
- $1 > k > 0$
- and  $l \sim EC$
- $1 > l > 0$

# Two Implications

- **1. Interchangeability of ( $k \times \text{PME} \times I$ ), i.e., of goal importance, energy and conservatism**
- **The purchasing metaphor**
- **2. Proportionality**
- **$OW \geq \text{PTD}$**
- **Choice of tasks as function of OW**
- **Efficacy vs. Affordability**
- **Affordability defines upper bound on efficacy**



# Cognitive Energetics Theory (Psych. Rev. 2012):2. *Activity COMPLETION*

- “For Mental/Behavioral Activity to be (successfully) **COMPLETED** : (OW) must at least Match Objective Task Demands (OTD)
- **$OW \geq OTD$** ;

# Theoretical Scope

- All Instances of Goal Directed Thinking
- E.g., Impression Formation, Likelihood Estimation (Risk Assessment), Solving Math Problems, Reconstructive Memory

# Accounting for Prior Findings

- Interchangeability of RGI and PME : (Depletion Effects overcome by Increasing Task Importance) (Muraven and Slessareva, 2003)
- Proportionality of Mental Effort (OW) to Task Demands (Brehm & Self, 1989)
- Choice of Cognitive Strategy (Tasks) as Function of Potential Driving Force: Easy Strategy when RGI or PME is low, Effective Strategy when RGI or PME is high
- E.g. Proportionality of EC and Task Demands (Easy Tasks for Cognitive Misers) (Petty & Cacioppo, 1982)

# Wishful Thinking Phenomenon (Pervasive)

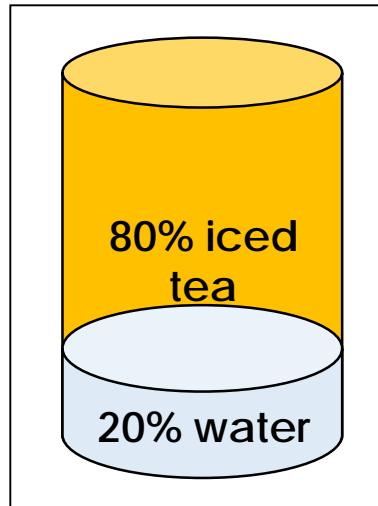
- Goal = Formation of Pleasing Judgment
- Requires Stimulus Ambiguity, No WT with “Reality Constraints”
- In CET, “Reality Constraints” = **PTD**
- Overcome with sufficient **OW** (RGI, PME)

# Tea Tasting Study: Relative Goal Importance Affords (WT) Bias

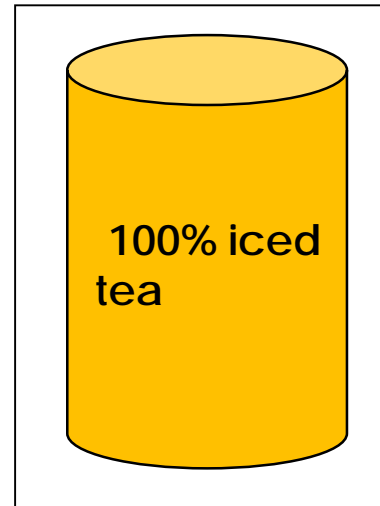
- Participants choose between two brands of tea which is tastier, “everyday smooth tea”, or “nutrition essential tea.”
- In one condition, the two teas were essentially identical in taste (high stimulus ambiguity condition, low “reality constraints”)
- In another condition (low ambiguity, high “constraints”), the “nutrition essential” was substantially diluted (20% water was added)
- Cross cutting the stimulus ambiguity manipulation, half the participants were primed with health goal (via a scrambled sentence technique), the other half were not

# Information Clarity Manipulation

– through Dilution of the Iced Tea

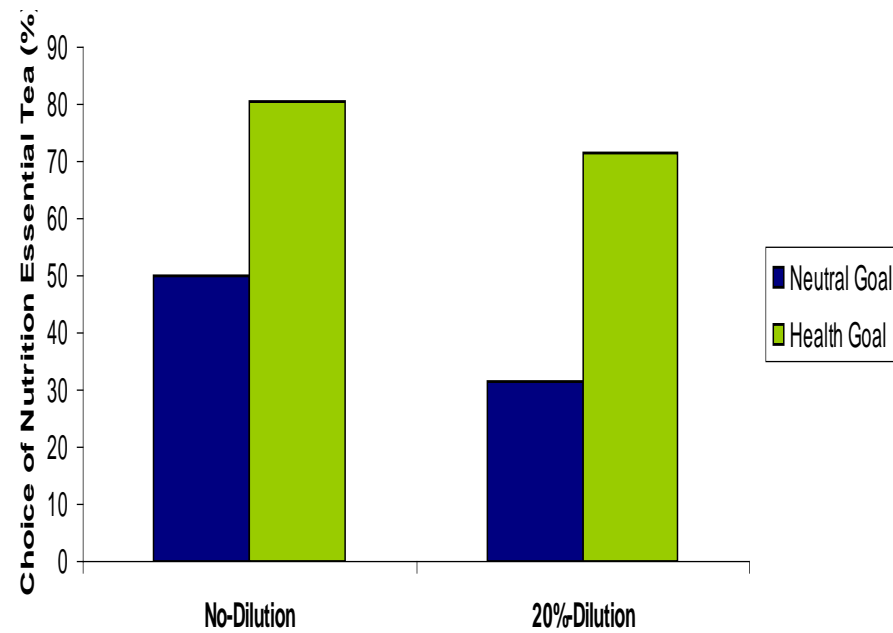


**Diluted Iced Tea**



**Non-Diluted Iced Tea**

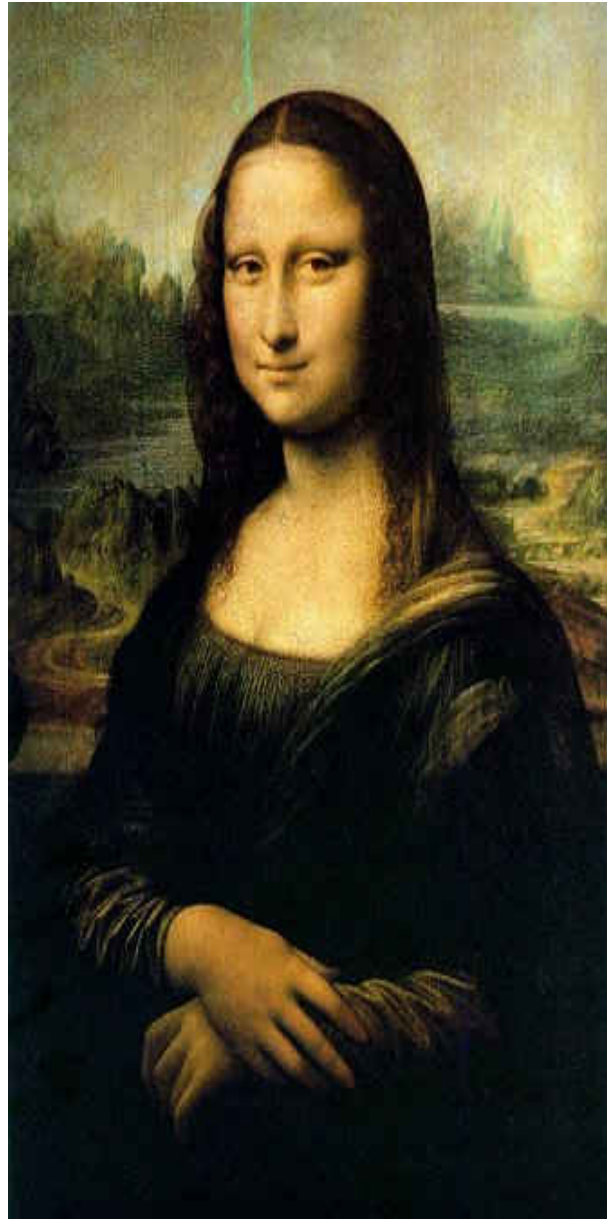
# Results



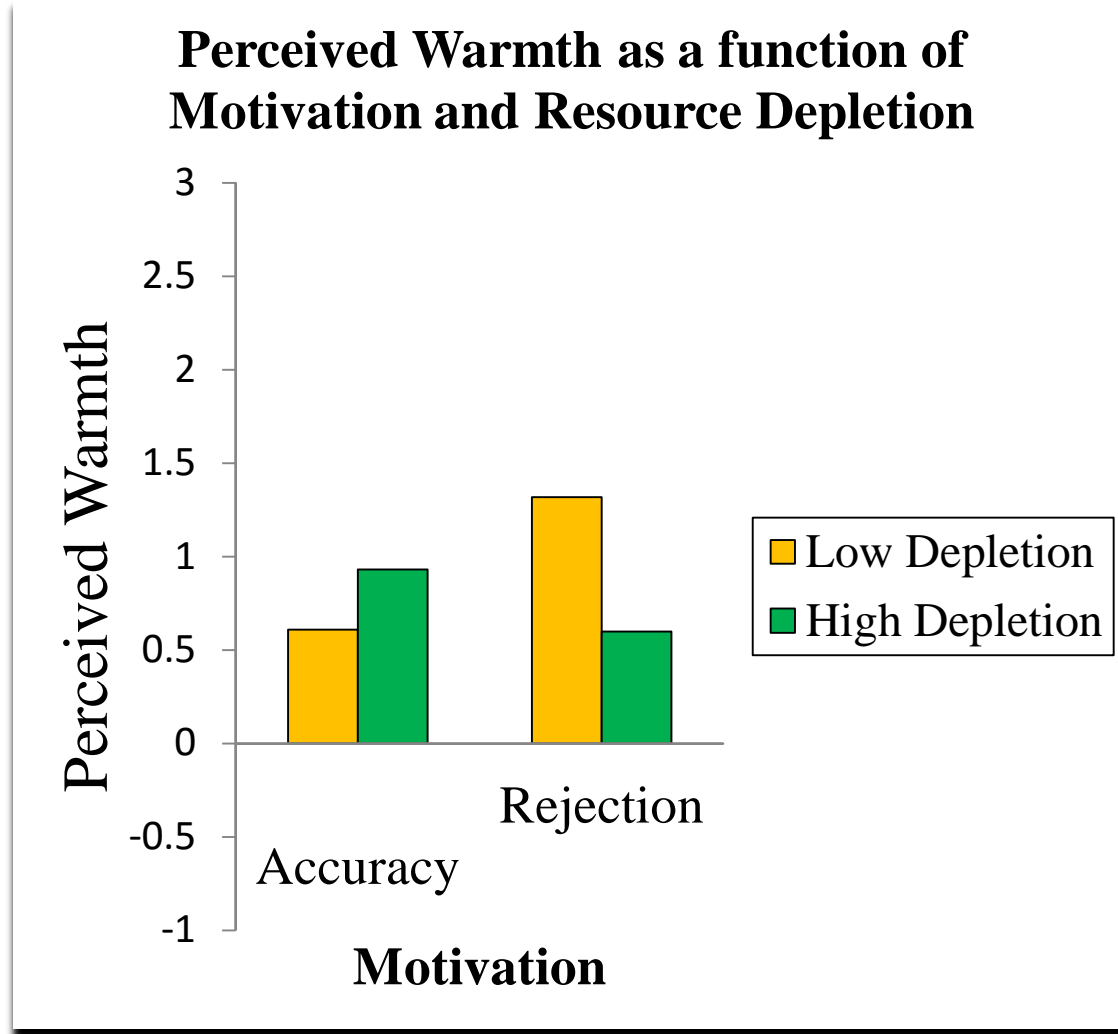
# Mona Lisa Study: Pool of Mental Resources Used to Afford (WT) Bias

- Participant judge the extent to which the Mona Lisa is smiling and friendly
- Half participants are subliminally primed with rejection prime inducing an acceptance/inclusion goal to perceive others as smiling and friendly, half are exposed to an accuracy prime
- Cross cutting this manipulation — a manipulation of resources via cognitive load (rehearsing a 9 digit number)





# Results



Motivation\*Resource Depletion:  $F(1, 57) = 5.79, p < .05$

# Resources as Means That Serves Dominant Motivation (RGI)

- When Biasing Motivation is Dominant
- And Reaching Biased Judgments is Easy, (**low PTD**)
- Biased judgments will be made regardless of resources
- When Reaching Biased Judgments is Difficult (high **PTD**)
- Biased Judgments will be made only in presence of resources

# When Accuracy Motivation is Dominant, and

- Reaching Unbiased Judgment is Easy (**low PTD**)
- Unbiased judgment will be made regardless of PME
- When Reaching Unbiased Judgment is Difficult (**high PTD**)
- Unbiased Judgment Will be More Pronounced Under High versus Low PME

# Livingstone (2002): Biological Mechanisms of Perception

- Mona Lisa smile best seen via peripheral vision
- When looking at eyes: More smiling
- When looking at mouth: Less Smiling
- Glitters on Mouth: Difficult to Bias Toward Smile
- Glitters on Eyes: Easy to Bias Toward Smile
- Design: 2 (Rejection Prime, Accuracy Prime) x 2 (Load, No Load) x (Difficult to Bias, Easy to Bias)



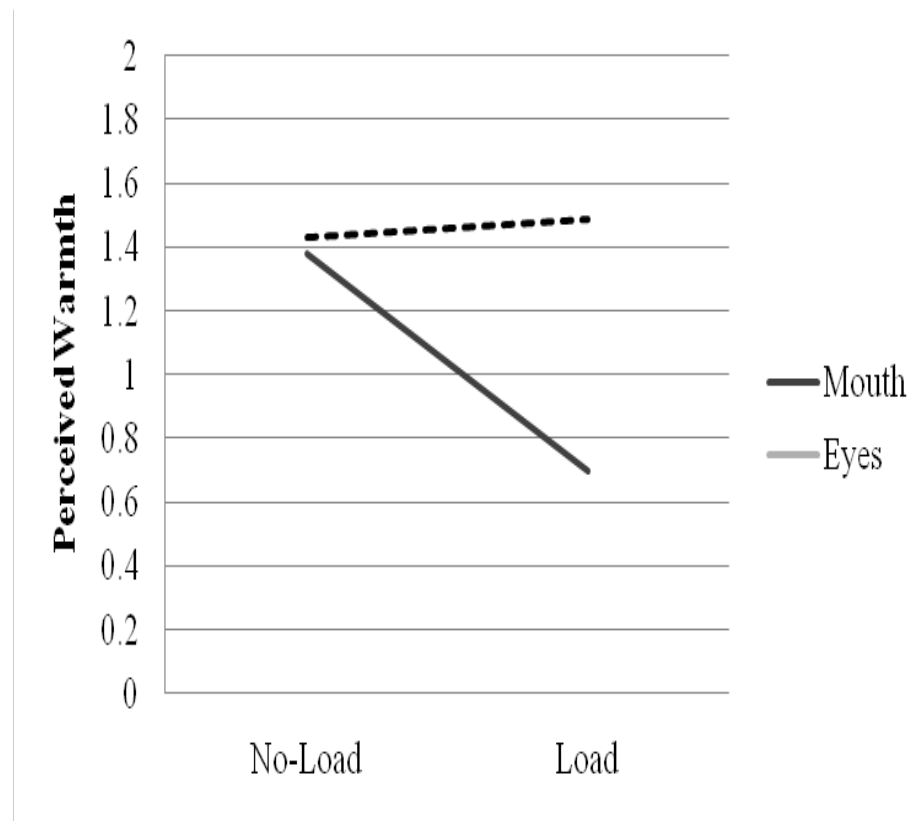
**Contin  
ue**



Contin  
ue

# Results

## Perception of Warmth under directional motivation

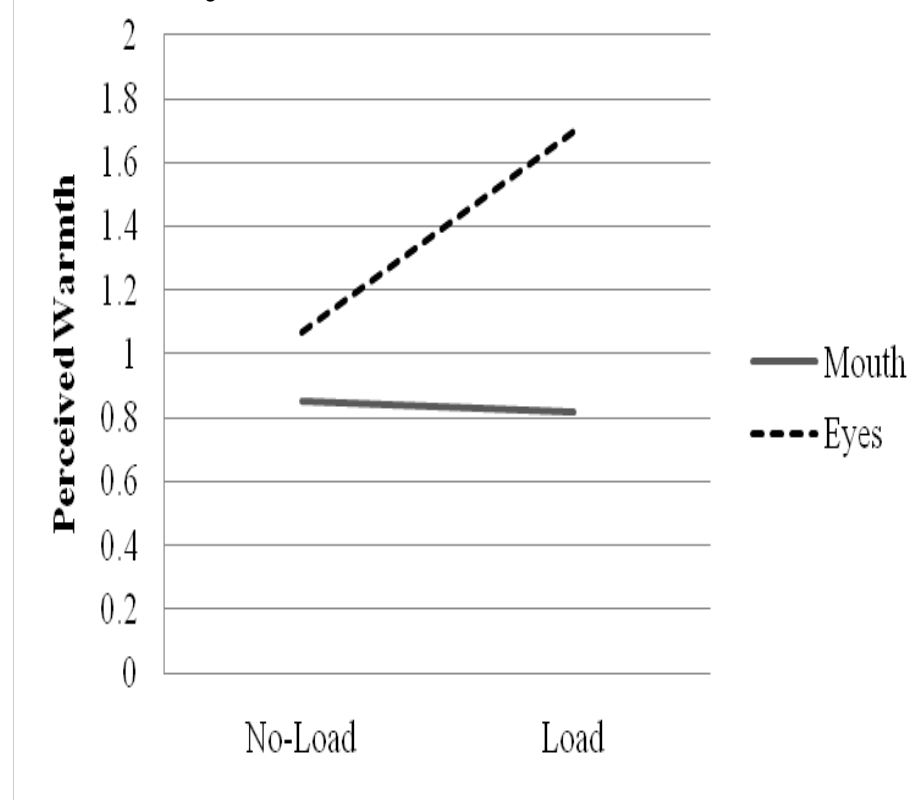


*ANOVA: Two- way interaction  $F(1, 103) = 4.55, p = .03$*



# Results

## Perception of Warmth under accuracy motivation



*ANOVA: Two- way interaction  $F(1, 103) = 4.29, p = .04$*

**“Retrieval induced Forgetting” (RIF): *Remembering can Cause Forgetting***  
(Anderson, Bjork & Bjork, 1994)

**The mere act of recalling desired items from memory induces memory impairment of related competing items**

# The RIF Paradigm

- Strengthen the association of a given instance of a category (say **tennis** as instance of SPORT)
- Observe decline in recall of alternative instances (e.g. **basketball**) when asked to name SPORTS, i.e. **retrieval induced forgetting**
- Thus far considered a purely cognitive phenomenon
- But memory is reconstructive, a kind of judgment
- CET should apply

# STUDY

## Procedure

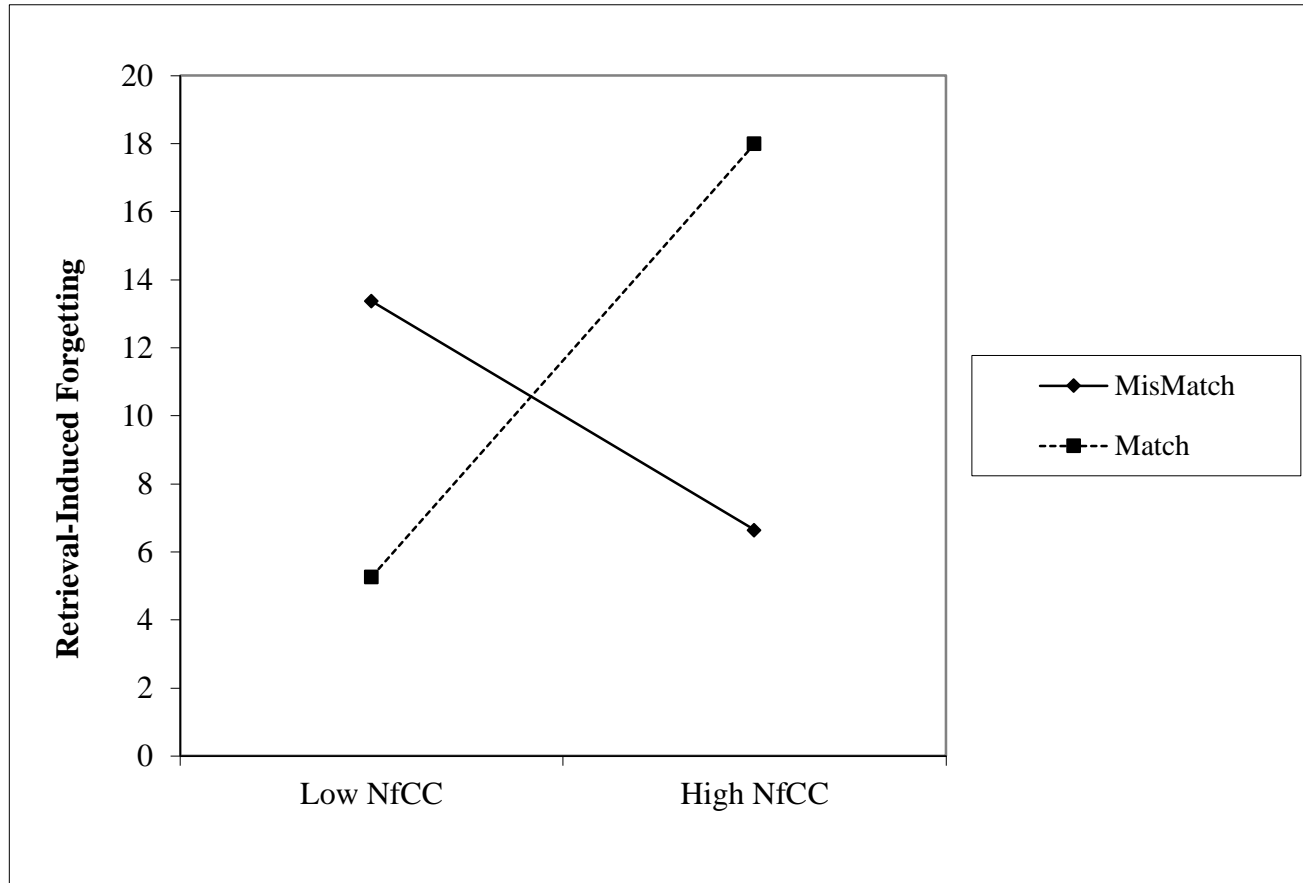
- Circadian Rhythms Scale (median splitted): **RESOURCE POOL (PME)**

### Circadian Match vs. Circadian Mismatch:

- Circadian Match: “morning type” participants doing the experiment during the morning; and the “evening type” participants during the evening;
- Circadian Mismatch: “morning” subjects perform the task in the evening and “evening” subjects doing so in the morning;
- Retrieval-practice Paradigm
- Need for Cognitive Closure (NfCC): **GOAL IMPORTANCE**

# RESULTS

*Retrieval-Induced Forgetting as a function of Circadian Match and Need for Cognitive Closure*



# Conclusions

- Mental energy matters
- Testimony to People's Energetic Rationality
- Apportioning of Energy According to Requirements, Benefits and Inclinations
- Integrates Findings from Across Multiple Domains of Psychology, affords new insights into multiple phenomena
- Applied importance: cognitive jdm phenomena depend on energy
- Aging, illness, exhaustion