

# The Coherence Model of Preference and Belief Formation



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# Rationality vs. Culture in Modeling Action: The Bogus vs. The Ineffable

## Conventional Rational Choice Model:

Thin rationality assumptions:

individual maximizes preferences based upon beliefs beliefs consistent with classic logic and probability theory

preferences have property of strict order, i.e. completeness, asymmetry (or irreflexivity and acyclicity), and transitivity

Thick rationality assumptions:

egoistic, materialist, isomorphic, static preferences

beliefs based solely upon observation and inference



# Rationality vs. Culture in Modeling Action: The Bogus vs. The Ineffable

## **Conventional cultural approach:**

no unifying set of deductive assumptions – instead, broad principles and tendencies:

preferences and beliefs differ between individuals and groups

group influences preferences and beliefs to its members

feedback loop from individual and collective actions back to culture

widespread reliance on indirect measurement to determine preferences and beliefs

disagreement over general dimensions of culture



## Relative Strengths of each Approach

### **Conventional Rationality-based approach:**

single model generalizable to multiple, even novel contexts

theories can be cumulated into larger whole

tends to produce falsifiable predictions (though often anomalous)

### **Conventional Culture-based approach:**

sensitive to social differences and personal development

deeper and more nuanced depiction of social process

avoids predictive anomalies (because it avoids prediction)

# The Methodologies of The Culture and the Rationality Approaches



## METHODOLOGIES

	<b>Culture</b>	<b>Rationality</b>
<b>Expression</b>	narrative	formal, algorithmic
<b>Purpose</b>	understanding	prediction
<b>Scope</b>	idiographic	nomothetic
<b>Discipline</b>	humanities	natural sciences

“Economic” vs. “Sociological” approach?

# How Culture and Rationality Play Themselves out in Contemporary Social Theory



## SOCIAL THEORY PARADIGMS

	<b>Culture</b>	<b>Rationality</b>
<b>"Old"</b>	symbolic interactionism	exchange theory
	structural-functionalism	conflict theory
	classical modernization	dependency theory
<b>"New"</b>	identity studies	rational choice theory
	new institutionalism	new political economy
	postmodern theory	evolutionary theory



## Main Steps and Hurdles to Integration

- specifying dimensions of culture in general fashion
- retaining simplicity and analytical tractability
- formalizing in way that is compatible with choice-theoretic models of action across full-range of environments
- modeling cultural change algorithmically
- combining generality and predictive determinacy

Conventional cultural typologies, e.g. (modern vs. traditional, Hofstede and “comparative capitalisms”) tend to focus on first two points but do not provide general implication for behavior.



## Main Motivations behind Coherence Model

General, determinate theory depends on keeping assumptions of purposive, intentional behavior

Conventional assumptions about preferences and beliefs in rational choice model suffer from inaccuracy and occasional indeterminacy.

Attempts to address this by introducing ad hoc assumptions about culture (= non-conventional preferences and beliefs) removes generality and creates accusations that assumptions are customized to fit specific phenomenon being “predicted”.

Need a general, endogenous model of preference and belief change.

c.f. Chai, *Choosing and Identity* (2001).



## Concepts Used in Conventional and Coherence Models

Expected Utility: subjective probability-weighted utility associated with a particular action across all possible states of the world

Regret: difference between maximal utility possible in a particular state of the environment and the utility provided by a chosen action

Expected Regret: subjective probability-weighted regret

Cumulative Expected Regret: expected regret across a chain of actions, e.g. a life plan

Coherence: expected regret of zero



## Standard Expected Utility Setup

**Actions in Choice Set:**  $A = \{a_1 \dots a_n\}$

**States of Nature:**  $S = \{s_1 \dots s_k\}$

**Utility Function:**  $U(a,s), a \in A, s \in S$

**Subjective Probabilities:**  $0 \leq p(s) \leq 1:$

$$\sum_{s \in S} p(s) = 1$$

**Expected Utility**  $V(a,s) = E(U(a,s)) =$

$$\sum_S p(s) U(a,s)$$

# Concepts and Assumptions of Coherence Model



## PREFERENCE AND BELIEF ASSUMPTIONS OF MODEL

- Meta-optimization
- Environment constrains Beliefs
- No “Yogic Utility”

Parametric form, but not parametric values, determined by exposure to social communication

Forms considered in order of message prevalence of communications describing such forms, but parameter weightings can be accepted or rejected.

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# Determination of Expected Regret

State-specific Optimal Action:

$$a^*(s) = \operatorname{argmax}_{s \in S} u(s, a)$$

$$\forall s \in S: \exists a^* \in A \text{ s.t. } V(a^*, s) \geq V(a, s), \forall a \in A$$

Expected Regret

$$d(a) = \sum_s p(s) (U(s, a^*(s)) - U(s, a))$$

Actors adjust preferences (U) and beliefs (p) under constraints in order to minimize expected regret



## Intuitions behind Model

actors are engaged in a collective process of constructing their own identities

this process is aimed at creating an individual and collective sense of self that is both positive and consistent

preferences and beliefs are not mere precursors to action, but there is a mutually causative relationship between these entities



## Example Proposition about Preference Change

**Proposition:** An individual can reduce expected regret for a past or intended action by raising the utility coefficient of a variable that is believed to be positively linked causally to the action.

$$d_{new}(a) =$$

$$\sum_s p(s) \min (U(s, a^*(s)) - U(s, a) - \Delta U(a), 0)$$



## Some non-intuitive implications of coherence model. . .

Means will become ends (functional autonomy of motives) iff there exists there exists perception of some state of environment where alternative actions superior

Sour grapes / forbidden fruit effect caused by actions that are perceived to preserve / alter the status quo more than alternatives

Wishful / unwishful thinking strongest when an individual adopts actions that are subject to more / less variation in comparison to alternatives

Effects depend on and magnify in proportion to subjective probability and extent to which chosen action will be suboptimal



## Some implications linking structure to culture

Mutual altruism will be generated in groups engaging in repeated collective action, particularly where public goods are generated more reliably than private goods

Materialistic culture will be generated by clearly defined structures of mobility in which the relative returns to vocational choices is not circumstance-dependent

Explicit ideologies will be adopted by groups whose members face incoherence with regards to a similar set of action choices.

# Some Implications of the Coherence Model and Rational Choice for Ethnic Boundaries



- Boundaries of conflict will be based on ascriptive criteria that surround rather than cross-cut existing primary group boundaries, e.g. language, religion, race, or region of birth, or a combination of those attributes.
- A share of power resources in the main arena of social interaction that are close to a minimum winning coalition will increase a boundary's selection potential, as will similarity of structural economic and political position by individuals within a boundary.
- Collective action within a particular set of boundaries will cause them to become “sticky” due to commitment/
- Once collective action with boundaries has occurred, new boundaries will more readily encompass or subdivide than cross-cut them.  
c.f. Chai 1996, 2005.