Workshop: Conscious Reason: Exploring the Rational Role of Cognitive Phenomenology

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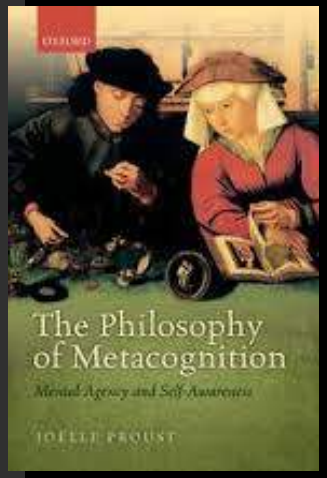
What cognitive phenomenology does and does not do for rationality in epistemic decision-making

Joëlle Proust
http://joelleproust.org



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Outline

1. Introduction: sketch of the CP & R problem space
2. The functions of CP in mental actions
3. From CP functions to rational guidance: pros and cons
4. Critical cognitive phenomenology
5. Conclusion

1 - The CP & R problem space

Defining cognitive phenomenology

- **Phenomenology** of a set of dispositions to A-ing = Df the type of conscious experience that is elicited when dispositions to A-ing are exercized (eg. Visual vs haptic phenomenology)
- **Cognitive phenomenology** = Df the conscious experience that is **specifically** elicited when agents are "thinking", i.e. when they are engaged in first-order mental activities such as perceiving, remembering, reasoning, planning and communicating.

Examples of cognitive phenomenology

- Hearing one's thoughts in internal speech, knowing what one thinks about
- Seeming to understand a sentence
- Finding a distinction clear/obscure
- Finding a proposal coherent/incoherent, relevant/irrelevant
- Finding a cognitive task demanding/easy.
- Having the impression of having sufficiently studied a given item.
- Having a name on the tip of one's tongue.

More contentious examples of cognitive phenomenology

- Concept-specific nonverbal phenomenology (for example: the content-specific phenomenology of the concept of "virtue")

- The specific phenomenology for beliefs, desires, hopes, etc.

Rationality is essentially connected to decisions to act

- Instrumental rationality: disposition to adopt means appropriate to one's ends.
  - Applies to all forms of actions

- Epistemic rationality: disposition to conform one's cognitive decisions to requirements such as coherence, evidentiality, relevance, accuracy.
  - Applies to cognitive actions as well as to long-term planned actions

Rational decisions involve trade-off

- Herbert Simon on Bounded Rationality (1957)
  - Cognitive capabilities are not unlimited.
  - Optimizing decision needs to be sometimes replaced by satisficing

    Aspiration levels in decision making are dynamically adjusted to the situation

    Stopping rules in the decision process must be enforced.
- Evolutionary theories of emotion have defended the rationality of emotional actions

  De Sousa (1979), Damasio (1994)
- Ecological rationality: match between mind and environment

  Gigerenzer (2004)

Epistemic success & the rational trade-off

- Df: Epistemic success is the general condition of correction of cognitive actions
- These conditions depend on the type of cognitive action performed:
  - Judging: accuracy
  - Perceptual discrimination: validity
  - Memory retrieval: accuracy or exhaustivity
  - Reasoning: coherence, relevance
- a context requirement: adjust your chances of epistemic success to a given cognitive task in a given context!

3 types of rational trade-offs cognitive resources/reliability of action (Proust, 2014)

- Impulsive action for unexpected emergencies (based on innate reactive feelings)
- Habitual action for recurrent contexts (based on the reactive fluency of acquired routines)
- Strategic action for new future goals (concept-based planning, with subgoals served by acquired reactive feelings)

Method for addressing the CP & R issue

Two steps are needed

1. **Identify the functional relations between cognitive phenomenology and cognitive actions**
2. **Examine the rational contribution of cognitive phenomenology in this light**

2 - Does CP contribute to rationality in epistemic decision-making?

Step one: functions of CP

Step 1: Hypothesis

- **Cognitive phenomenology is either goal-dependent or activity-dependent.**
- **Goal-dependent phenomenology has *an indexing function* (maintains a task in memory through a sensory icon) → CP1**
- **Activity-dependent phenomenology has *an evaluative function* ('presentifies' likely progress to goal) → CP2**

CP1

Goal selection and maintenance: CP1

- Phenomenological content of CP1 demonstratively indexes the current task, here: the cognitive goal currently pursued.
- **An auditory verbal experience may index a thought content, a question, a response, or a command (I am hungry)**
- **Similarly for visual, visuo-motor or proprioceptive cognitive imagery**

CP1

Vehicle → task

- phonological-auditory experiences,
- visual imagery
- proprioceptive imagery
- Visuo-motor imagery

Enabling function
Selection and control of:

- Conceptual reasoning tasks, including planning
- Mathematical tasks, spatial reasoning
- Meditation
- Sport training, drawing

Cognitive Phenomenological experiences of type 1 (CP1)

- Hearing one's thoughts in internal speech,
- Maintaining an image in working memory

enhances **rational control** in making the activity accessible to

- strategic considerations
- inhibition or revision
- Report and justification of one's own decision

➢ crucial for planning

Co-indexing

- Two CP1 experiences can be simultaneously generated to further stabilize a given cognitive goal, enhance learning or reasoning:

- E.g.: Educational practices combining **speech** and **writing**, or **speech** and **drawing**, or **speech** and **modeling a movement.**

- This possibility indicates that verbal and perceptual imagery can serve the **same cognitive end of concept acquisition (no resulting division of attention)**

In summary:

- **CP1 serves an enabling function in rational decision making.**
- **It has a direct function from the viewpoint of self-awareness, communication, and justification**
  - **It allows agents to be aware of their cognitive goals and share them with others**
- **CP1 has no direct epistemic function, because CP1 does not allow agents to determine how they reason in order to reach their goal.**

CP2

CP2: Activity dependent phenomenal experiences

- **These experiences are elicited as a result of on-going cognitive activity**
- **Their function is to monitor the activity in order to evaluate whether or not it develops as it should.**
- **Normative evaluation of activity is determined by the type of cognitive goal that has been selected.**

Cognitive Phenomenological experiences of type 2 (CP2) are **noetic feelings**

- Finding a cognitive task demanding/easy.
- Having a word on the tip of the tongue
- Feeling of knowing the answer to a question
- Seeming to understand a sentence
- Finding a distinction clear/obscure
- Finding a proposal coherent/incoherent, relevant/irrelevant
- Having the impression of having sufficiently studied a given item.

Prediction of epistemic success (effort & persistence regulation, including stopping rule)

- Retrospective evaluation of epistemic value, based on the specific normative goal of the cognitive action.

Cognitive action	Predictive evaluation	Retrodictive evaluation	Norm
Trying to associate perceptual input with stored knowledge	Feeling of Familiarity	Feeling of confidence	Validity
Trying to remember	Feeling of Knowing	Feeling of confidence	Accurate or exhaustive retrieval
Deliberating about P	Cognitive ease vs effortfulness, feeling of ability	Feeling of being right or wrong, feeling of competence	Truth of judgment
Trying to use the correct word	Tip of the tongue		Correct retrieval
Planning, justifying	Cognitive ease or effortfulness, feeling of ability	Feeling of Coherence; relevance, exhaustiveness	Coherence, Relevance Exhaustiveness

3 –From CP function to rational guidance

Step 2: CP & rationality

Based on step 1, a plausible hypothesis:

Our two classes of cognitive experiences target distinct levels in (bounded) rationality:

- CP1: Select and maintain active an epistemic goal
- CP2: subjectively monitor the rational trade-off **between resources and correct outcome**

Type 2 CP

"Noetic feelings" seem to have a **direct epistemic function**:

1. They seem to be about a first-order cognitive content.
2. They predict (or retrospectively evaluate) success or failure with a given gradient of **valence and intensity.**
3. They **immediately and directly motivate** epistemic decision making:
   - may elicit (in humans) judgments like "this seems right"; "this idea is incoherent", etc.
   - May lead to new cognitive actions or to stop trying to perform a specific action.

In support of (1) [aboutness]

→There is no direct, generic cognitive experience of believing (desiring, hoping, etc.); there is a cognitive experience of being certain that a given belief is true, or that it is coherent, or that it is plausible.

→how do you know, then, that this experience is about the **belief that P**?

→Two informational sources:

1. CP1, the indexing of current task in which you assess whether P.
2. The associative binding between indexing and output

In support of (2) [evaluation] Relation of CP2 to attitude awareness

- Noetic feelings are specialized in sensing reliability of a given cognitive action (e.g. trying to remember).
- **Cognitive actions are finer grained than attitudes**, because they respond to the specific contextual demands of evaluation and to the corresponding informational source of reliability.
- A feeling of uncertainty about whether P is associated with **the underlying attitude of belief** being currently under evaluation.
- More generally CP2 **is associated with attitudes through their associated norms of evaluation**.

In support of (2) [evaluation] Relation of CP2 to attitude awareness

CP2 provides normative evaluations that correspond to the conditions of satisfaction of the ongoing cognitive action performed: e.g.

- Before a perceptual discrimination: a feeling of being able to perform it correctly or not
- Before a memory retrieval: a different feeling for knowing accurately or knowing exhaustively

In support of (3) [guidance]
CP 2 implements the rational trade-off for cognitive success

- ✓ With minimal effort, CP2 adds crucial on-line information for optimal decision making about likely feasibility or correction.
- ✓ in contrast to what can be done on the basis of conceptual inferences alone, CP2 fulfills a context requirement: it enhances one's chances of epistemic success in a given cognitive task & context, by guiding proper strategy selection and epistemic decision.

An alternative hypothesis

Alternatively, noetic feelings may be seen as having, strictly speaking, NO **epistemic function**:

1. They are associated with a first-order cognitive content, but are not directly generated by semantic considerations
   - Although they seem "to be about" first-order cognitive contents, they do not metarepresent them (monkeys have feelings of knowing)
   - even when they target concepts (e.g., understanding), noetic feelings do not depend on conscious evaluative beliefs or attitude concepts to be formed.

Alternatively, noetic feelings may be seen as having, strictly speaking, no **epistemic function**:

2. They predict (or retrospectively evaluate) success or failure with a given gradient of valence and intensity, but do so even in the absence of the relevant normative concepts (truth, plausibility, etc.)
→ homeostatic or regulatory prediction, but not normative evaluation.

3. They **immediately and directly motivate** epistemic decision making: but they do so because fluency is more economical and swift, not because it is truth conducive

. All these studies suggest also that feelings of familiarity are relatively insensitive to the source and the kind of fluency m

Noetic Illusions

- Easily created by interpreting feelings of fluency outside the scope of their cue validity:

Example: perceptual fluency is used in forming:

- Feelings of familiarity in the absence of prior experience (Jacoby & Whitehouse, 1989)
- Feelings of knowing in the absence of knowledge (Reber & Schwarz, 1999, Koriat, 1993) .

→ feelings based on fluency are relatively insensitive to the source and the kind of fluency manipulated

Strategy selection based on fluency gradient

- Fluency motivates associative forms of problem solving, i.e. heuristics
- Disfluency (and its associated feedback, like frowning) leads participants to adopt a more systematic processing strategy. (Oppenheimer, 2008).

- Hence aversive epistemic feelings tend to promote conceptual reasoning

Overview of CP and rationality

Our two hypotheses might make sense in their own domain:

- Survival issues recommend to trust one's own CP
- Epistemic issues engaging critical and systematic thinking consider CP as a preliminary type of rational motivation, to be kept by bit and bridle

Overview of CP and rationality

There is more to be said, however, than amicably divorcing CP from systematic forms of rational thinking.

4 – "Critical" Cognitive phenomenology

Metacognitive learning and recalibration

Common assumptions: CP, as a feeling,

1. has no structure (Jackendoff, 1987)
2. is inflexibly reactive ("system 1")
3. does not change with exposure to specific environmental and task demands.
4. cannot be trained

➢ These assumptions are ungrounded.

Noetic feelings have structure

Noetic feelings are recalibrated based on observed prediction errors (Pieschl, 2009, Loussouarn, Gabriel & Proust, 2011)

- Calibration refers to the degree to which metacognitive evaluations can on average correctly predict or retrodict cognitive performance across a set of trials.
- Recalibration consists in automatically and selectively modifying the threshold for confidence level in a given type of task.

Noetic feelings have structure

Indexing an epistemic goal through a given vehicle may also be revised

For example, a given sentence in internal speech may be used to index a more specific goal as a function of new demands (for example: the bat and ball problem)

Flexible changes in task indexing have been experimentally tested (Schwarz, 2011)

Noetic feelings have structure

- *What people conclude from a given feeling depends on the epistemic question on which they bring it to bear; hence, inferences from feelings are context sensitive and malleable.*

  - Schwarz, N. (2011). Feelings-as-information theory. *Handbook of theories of social psychology*, *1*, 289-308.
  - See also Proust (2014, 2015).

If Noetic feelings have structure

It follows that

1. They are not produced in an inflexible way
2. They are sensitive to specific environmental and task demands.
3. **They can be trained in new practices**

Cultural Engineering

- How to confer automaticity to cognitive behaviors that normally require strategic resources?
- By creating **Critical feelings** ie by developing habits that will create a second nature (an entirely spontaneous but refined epistemic sensitivity.

- Reber (2013)
-

Critical feelings = strategically induced feelings

- **Confucius** (551-479 BC) designed a moral training based on the critical use of fluency meant to allow trainees to acquire "a second nature" as moral agents.

- Effortless cognitive actions can be attained through a strategic training designed to turn controlled ways of thinking into habits

Reber & Slingerland (2011)
Shiffrin & Schneider (1977).

The scope of critical feelings

In contemporary education, text repetition and rehearsal of

- mathematical rules
- scientific algorithms
- Logical inferences eg: modus tollens
- Basic axioms of Probability theory

have three roles

- Epistemic: Instantiate a costly epistemic norm, such as truth by the mere sensitivity to a norm of fluency
- Affective: turn their mastery into a pleasurable habit.
- Instrumental: Make them easily accessible and even implicit preconditions in planning strategic actions such as reasoning and problem solving.

Conclusion

CP and rationality

Cognitive phenomenology and rationality

- Noetic feelings cannot be wrong, because they do not have a propositional format and do not assert anything.
- However, they can be appropriate to a situation or not as a function of the success of the cognitive action that they contribute to select:
- For example, searching longer, asking information, opting out.
- More importantly, noetic feelings can orient thinking to promising avenues.

CP has three functions mediating rational decision-making

INDEXING

- Internal speech,imagery: this phenomenology indexes current task for working memory purposes
- this phenomenology serves a **[procedural semantic]** function by individuating the context in which an affordance is sensed.

EVALUATING

- Noetic feelings: this phenomenology **[reliably]** evaluates task progress and likely success.

MOTIVATING TO ACT

- Feelings secure the **[coherence]** between evaluation and action

Fusion of feelings

- Conscious feelings adjudicate at a low cost between conflicting opportunities (such as a food affordance and predation danger, politeness and accuracy)
- Similarly for CP: a cognitive evaluation can be combined with a reward prediction on the basis of their respective weighted gradients of valence and intensity
- Even opposite reactive feelings can be swiftly and automatically integrated into a unique and motivating decision.
- Conscious feelings, including CP2, provide **a common currency of the decisional mind:** Sugrue et al. (2005).


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