Cognition and Emotion: Myths and Realities

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Prolegomenon

What is the relation between cognition and emotion?
Prolegomenon

Classical question

• Nature & Nurture
• Idealism & Realism
• Mind & Brain
• Generality & Specificity
• Universality & Individuality
• Consciousness & Unconsciousness
• etc.

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Open question

• Few publications combining the two concepts in their titles: 4% (PsycInfo, January 2011)
• Most of the time as cause or effect of 3rd phenomenon:
  – Impact of Gender on Cognition & Emotion
  – Impact of Cognition & Emotion on Music

• Very few empirical studies on the relation →
  Gap between words (theory) and acts (data)
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Open question
• Only one Journal: *Cognition & Emotion*
• No entry in the *International Encyclopedia of:*
  – *Psychology* (2003, 2nd ed.)
• Some books:

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Notable exception: Clinical

• When there is a problem!
• When cognitions are submerged by emotions (e.g. Learning difficulties)
• When emotions are inaccessible to cognitions (e.g. Psychotherapies)
**Prolegomenon**

There is *schism* between cognition & emotion!

- In Psychology (versus philosophy)
- At the empirical level (versus theoretical)
- When the situation is normal (versus dysfunctional)
- When the impact is positive (versus negative)

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**Overview**

- Reasons of the schism (8 myths)
- End of the schism
- Possible relations
- Conclusion
**Reasons of the Schism**

What are the reasons of the schism between Cognition & Emotion?

→ At least 8 reasons (myths)!

1. **Emotions = Too hot!**
   - Too close to the body!
   - Too close to our animal nature (anger, libido)!
   - Uncontrollable

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2. **Emotions = Too feminine (or childish)!**
   - Cognitive scientists are (too) often ♂
   - *Boys don’t cry! You cry like a girl!*
   - Other Italian examples!

3. **Emotions = Lower than cognition**
   - Plato → Emotions are inferior
   - Darwin → Emotions are a phylogenetic atavism
   - Freud → Emotions have to be controlled (Eros & Thanatos)

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Reasons of the Schism

4. Cognition & Emotion = Incompatible Systems
   – “The heart has its reasons that the reason does not know” (Pascal, 1670)
   – Cognition = Truth (Falseness), Binary (T versus F), Cognitive dissonance unacceptable, Not continuous, Controllable, Cold, etc.
   – Emotion = Pleasure (Displeasure), Mixed (Happy & Sad), Emotional dissonance acceptable, Continuous, Uncontrollable, Hot, etc.

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Reasons of the Schism

5. Emotions interfere with Cognition!
   – Emotion = Recognized but excluded from cognitive research
   – Emotion = Problem for the study of cognition
   – Emotion = Confounding variable to be
     • Neutralized by chance (frequent)
     • Control (seldom)

Neutralization or Control of Gender or Emotions? \(\rightarrow\) Paradox!

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Reasons of the Schism

6. Emotions = Too subjective!
   – Emotions ≠ Not an object for psychological sciences
   – Subjective emotional experiences cannot be observed from an external point of view (3rd person observation)
   – Subjective emotional measurement depends too much on introspection (1st person self-report)

7. Experimental method (in psychology) = Selection & Control of Variables
   – Impossible to examine everything at once
   – Difficult to devise studies that are both wide-ranging and in-depth at the same time
   – Manipulation of individuals’ emotion is difficult (experimentally & ethically)
**Reasons of the Schism**

8. Pragmatic of research → Specialization
   - It takes time to be a specialist: C & E versus either C or E
   - C & E → No recognition by neither cognitive nor affective scientists!
   - C & E → Criticized both by cognitive and affective scientists!

End of the Schism

60-70 = “Down fall of the behaviorist wall”
   → Methodological & Epistemological revolutions at the origin of the end of the schism

Four Revolutions at the origins of the opening of the black box!
- Cognitive revolution (Mind = Computer)
- Affective revolution (Mind = Heart)
- Meta-representation revolution (Mind = Reflexive)
- Neuroscience revolution (Mind = Brain)
End of the Schism

Revolutionary consequences
- **Subjective experiences** = Legitimate **Object**
  (versus only Environmental or Physiological Stimuli & Behavioral or Physiological Responses)
- **Emotions** = Legitimate **Object** (versus only Cognitions)
- **1st Person introspection** = Legitimate **Method** to investigate the mind (versus only 3rd person observation of S & R)
- **Brain** = Objet & Method to validate 1st person introspection of subjective experience (and vice versa = double testimony)
Cognition & Emotion Today

Methodological & Epistemological Revolutions → New space for the study of C & E
→ 4 Possible Answers

1. No Causal Relation
2. Cognition as a Cause of Emotion (C → E)
3. Emotion as a Cause of Cognition (E → C)
4. …

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No Causal Relation

- Some emotional reactions can take place without cognitive treatment (LeDoux, Damasio, Zajonc, Cosmides & Toby):
  - When (automatic) emotional reaction takes place within few milliseconds (< 100)
  - When the stimulus is ontogenetically (familiar) or phylogenetically (naturally) known

Then direct connection (low road) between:
  - Thalamus (emotional stimulus) and
  - Amygdala (emotional response)

Without involvement of Cortex (Cognition)

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**No Causal Relation**

- When learning a new emotional response to a new stimulus then indirect connection and consciousness (*high road*) between:
  - Thalamus (emotional stimulus) & Amygdala (emotional response) via
  - (sensory) Cortex (Cognition)

Until the reaction is completely automatic (LeDoux)

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**No Causal Relation**

**Conceptual & empirical asymmetry:**
- Numerous studies trying to demonstrate the existence of emotions without cognitions (Neo-Jamesian, Zajonc, Damasio, etc.)
- No studies trying to demonstrate that cognition can take place without emotions (impossible to think or demonstrate)!

**Conceptual confusion:**
- Emotions can take place without cognitions (demonstrated) ≠ Cognition never cause emotion (and vice versa)!
- Consciousness & Cognition (Zajonc; Li et al. versus Lazarus; Pessoa et al.)
Cognition as Cause

• \(\rightarrow 70-80\): Causal explanation of Emotion = Conflict between 2 (causal) Theories
  – James-Lange (centrifugal / bottom-up) theory: We are (subjectively) sad because we (our body) cry
  – Canon (centripetal / top-down) theory: We (our body) cry because we are (subjectively) sad

• Today the conflict is alive: Neo-Jamesian “Markers theory” (Damasio), “Facial feedback hypothesis” (McIntosh), etc.

• Correlation between Emotion & Body is not the same for (Cacioppo, Ekman, Fridja, etc.):
  – Positive or Negative emotions
  – Mild or Intense emotions

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Cognition as Cause

• \(70-80 \rightarrow\): In addition to the Body, Cognition can also explain Emotions (Neo-Cannonian)

• Cognitive evaluation (appraisal) of internal & external stimuli is one of the causes of emotions (Schachter & Singer, Lazarus, Scherer) \(\rightarrow\) Several empirical evidences!

• Schacter & Singer
  – Injection of adrenaline (heart rate +)
  – Two Groups of people (“effect” & “no effect”)
  – Only “no effect” reported emotional reactions
  – Matching the emotions of a 3\(^{rd}\) person

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Cognition as Cause

• More or less conscious or unconscious cognitive appraisals have often an impact (e.g. Davidson et al., Lewis et al., for reviews):
  – on emotional valence & arousal
  – Prior (antecedent) & during (modulator) the emotional experience

• Scherer (Component Process Model):
  – A stimulus that is evaluated as pleasant and acceptable will commonly result in happiness.
  – A sudden, unpredictable, unpleasant and uncontrollable stimulus will often result in fear or anger

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Cognition as Cause

• Psychotherapies (cognitive, psychoanalytical, family, humanistic) try to change…
  – People’s “cognitive” representations (evaluations)
  – People’s “cognitive” strategies to deal with emotions (Defense mechanisms, emotion regulation, etc.)!

• Cognitive therapy (Beck):
  – Anxiety & Depression are often related to incorrect cognitive evaluations
  – A modification of these cognitive evaluations has a positive impact on Depression & Anxiety

How to stop being sad, angry, scared?

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Cognition as Cause

Children’s (cognitive) emotion understanding has an impact on their Psychological Well-Being (e.g. Harris, Saarni, Denham)

Nielsen et al. (2006):
• N = 97
• 10 years, 50% ♀, SES=Middle, Denmark
• Beck & TEC

Kristófersdóttir et al. (2007):
• Similar results with adolescent girls (N=30)

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Cognition as Cause

• Conceptual asymmetry:
  – Numerous research on the negative impact of emotions at school (E- → C-)
  – Almost no research on the positive impact of school achievement on emotions (C+ → E+)

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Emotion as Cause

Emotions have an impact direct & indirect on cognition. They activate & inhibit cognition (energizer & compass).

- As motivational factor: Research of success (pleasure, happiness, pride, etc.) & Avoidance of failure (displeasure, fear, guilt, shame, etc)
- As structural factor: Emotions in the individual (mood) or the situation have an impact on cognitive treatment (level and type of treatments)

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Emotion as Cause

• Behaviorism (Pavlov, Watson, Skinner, etc.)
  – Without emotion no conditionings (classical & operant)
  – Our emotional reaction to a stimulus (more or less conditioned) determines our (cognitive) response to this stimulus

• Piaget
  – Emotions can either speed up or slow down cognitive development
  – However, emotions are subordinate to the cognitive schemes of assimilation

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Emotion as Cause

• Freud
  – The drive coming from the “Emotional” Id (Eros/Libido & Thanatos/Aggression) …
  – … gives energy and orients the functioning and development of the “Cognitive” Self (activation & inhibition) …
  – … in collaboration with the “Cognitive” Super-ego (expression & repression)

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Emotion as Cause

• Yerkes & Dodson
  – An appropriate level of **emotional arousal** (not too high nor low) is needed to achieve an optimal level of cognition.
  – The higher the **difficulty of the task** the lower the level of emotional arousal to achieve an optimal level of cognition!

• Miller
  – The closer the (cognitive) **goal achievement** the higher the **emotional conflict** between pleasure – approach (e.g. pride) & displeasure – avoidance (e.g. fear)

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Impact on Perception

Bendixen et al. (2005):
• N = 43
• 23 years, 67% ♂, Denmark
• Beck:
  – 40% non-depressed (0-6)
  – 60% mildly dep. (7-29)
• Baron-Cohen & Emotional Thermometer

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Perception of Anger & Sadness in Sad faces by Group

- No Depression
- Low Depression

- Anger
- Sadness
**Emotion as Cause**

**Impact on Memory:**
- Positive bias in Normal people (in Neutral mood) & Negative bias in Clinical people (Depressed & Anxious)
- Normal people in Sad mood recall more Negative info.
- The recall of a list of Neutral words is facilitated if the typical person is in a Sad mood both when trying to Encode and to Recall this same list
- The recall of traumatic autobiographical events is facilitated when we are already in a negative mood.
- The recall of such events, in turn, may reinforce our negative mood, thus starting a vicious cycle (recognized by many schools of psychotherapy)

- **What about flashbulb memories (911 - 2001), 911 – 1973? Italy?**

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**Emotion as Cause**

**Impact on Attention:**
- Anxious people pay more attention to negative information (e.g. word, picture, faces) (than normal people)
- Depressed people tend to have a more internal locus of control to explain their failures and more external locus to explain their successes (than normal people)

**“Vicious circle”**
- Between Anxiety / Depression & Memory / Attention (negative bias)
- Many therapies tries to improve the patients’ capacity to control (or break?) this vicious circle

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Emotion as Cause

Impact on “Creativity”
• Projective tests (CAT – Rorschach) are based on the assumption that emotion play an important role in the construction of new information, interpretation of reality, especially when reality is ambiguous
• Inkblots could be interpreted as a loving mother, a threatening father, a lost child, an unfaithful partner, etc.

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Emotion as Cause

Impact on Intelligence:
• Inducing a positive mood in children increases IQ (WISC)
• Anxiety (when too high) may have a negative impact on children’s school achievement. It may block their metacognition for example in mathematics
• Children in secure emotional attachment relationships with their mothers display a higher level of social cognition than unsecure (⇒ school achievement)
• Emotionally secure children are more independent and critical when they have to evaluate what other people (mother versus stranger) are saying about ambiguous objects than unsecure

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Emotion as Cause

**Impact text comprehension**
Cuisinier et al. (2010):
- N = 220
- 11 years, 51% ♀, France, SES= Middle
- Text comprehension
  - Negative (sad, fear)
  - Positive (happy, joy)
- Questions (Kintsch):
  - Without inferences (surface)
  - With inferences (deep)

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**Conclusion**

1. **Relativity of the dualism between Cognition & Emotion!**
   - **Cognitions** (appraisal, understanding) have (often but not always) an impact (activation & inhibition, direct & indirect) before and during emotional experiences (arousal & valence)!
   - **Emotions** (motivation & structural factors) have (often but not always) an impact (activation & inhibition, direct & indirect) on cognitions (type and level of treatments).
   - “Vicious circle” versus “Positive impact” (of negative emotions on cognitions)

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2. Circular relationship between Cognition & Emotion (versus linear)

- The direction of causation depends:
  - **Timing** of the “Pause” in the Flow of (Cognitive & Emotional) Experiences (Chicken & Egg)!
  - **Individual ≠** (Age, Personality, Family, etc.)
  - **Situational ≠** (Emotional versus Cognitive Goals, etc.)

- Could the absence of circularity between Cognition and Emotion be dysfunctional (pathological) for the individual?

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**Conclusion**

*Downfall of the Dualism does not imply Monism between Cognition & Emotion!*
Additional References


? or !

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Thank You!