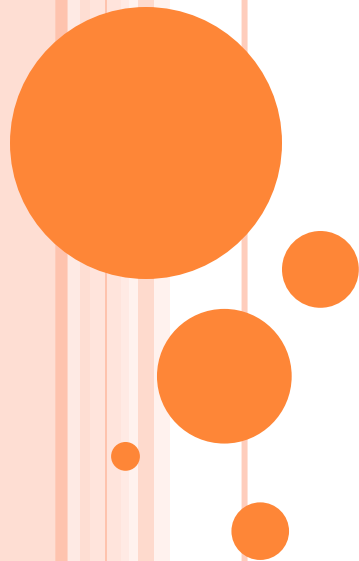# FRAMING MENTAL DISORDERS

23 August 2012
CTF 2012
Heinrich-Heine-Universität Düsseldorf

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Outline

1. Project outline
2. The DSM-IV definition of delusions
3. A Frame analysis of delusions
4. Framing neuropsychological explanations of delusions
5. Conclusions

1. PROJECT OUTLINE

➢ Frame analysis of mental disorders

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➢ Frame analysis of mental disorders

"… frames provide the fundamental representation of knowledge in human cognition" (Barsalou 1992, 21).

Two research directions:

1. Descriptive psychological thesis: mental representations are "cognitive" frames. Cognition represents and operates by means of frames and frame based mental simulations.

2. Methodological thesis : "explicit" frames should be used in order to represent explicitly the structure of our scientific knowledge, i.e. psychological, psychiatric, neuroscientific knowledge.

4

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1. PROJECT OUTLINE

➢ Frame analysis of mental disorders

➢ What are frames? Barsalou (1992)
- Recursive attribute-value structures
  - Superordinate category concepts are individuated by their relations to subordinate attribute concepts.
  - Values are subordinate concepts of attributes concepts.
- Frames might represent further relations:
  - Structural invariants: systematic relations between attributes
  - Attribute constraints: systematic relations between attributes values

1. Project Outline

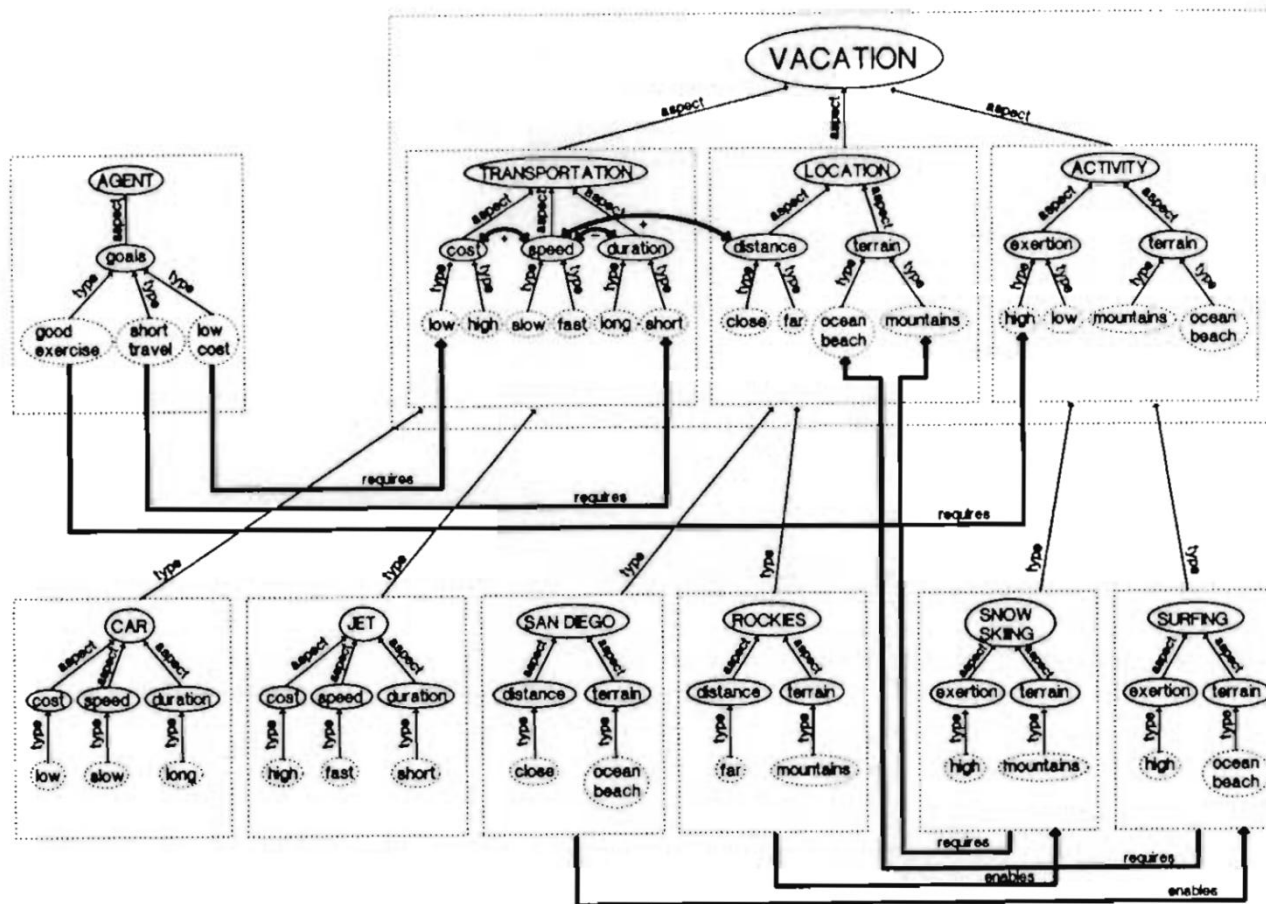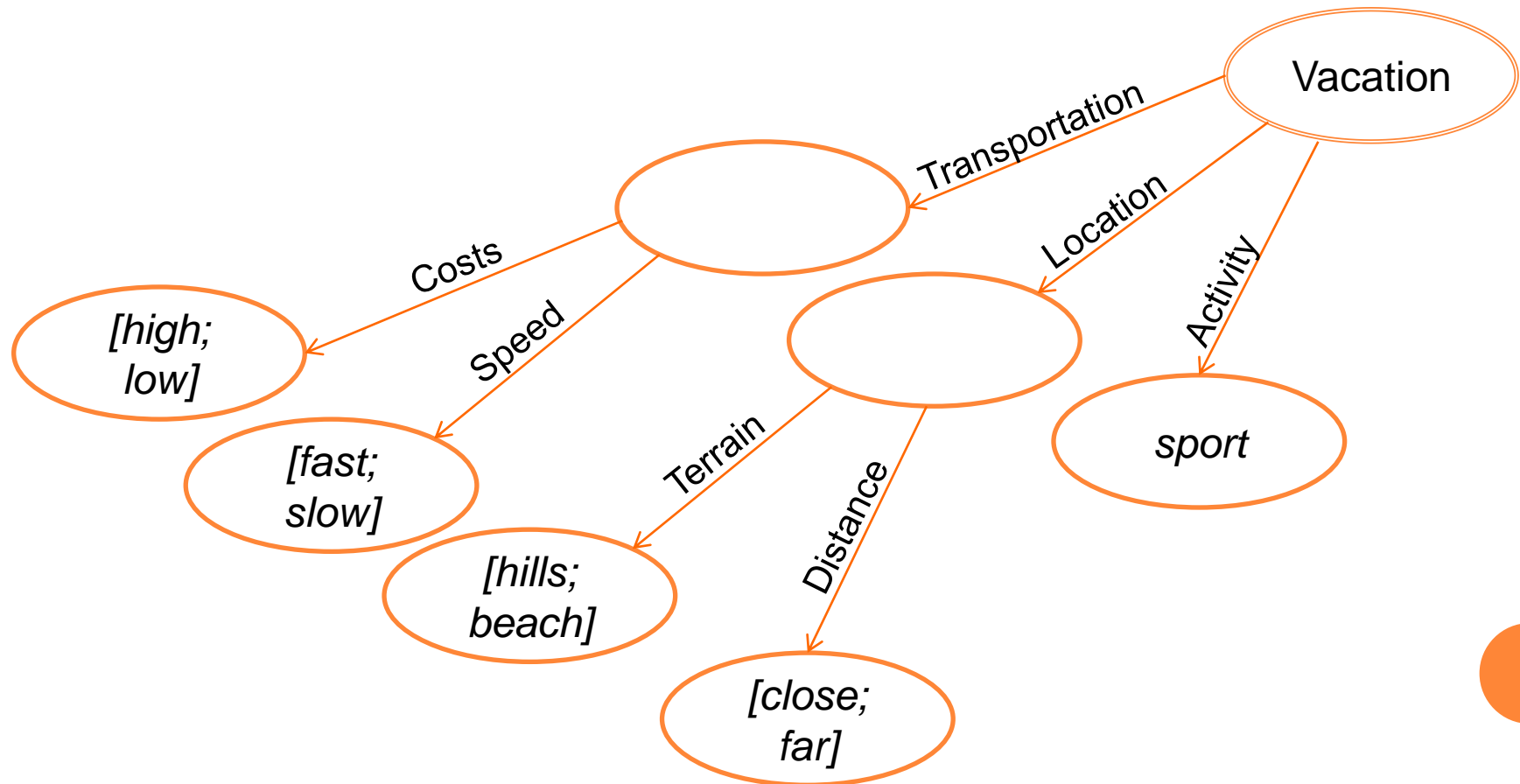➢ Example of a frame for 'vacation' (Barsalou 1992)

FIG. 1.7. Examples of attribute constraints, value constraints, contextual constraints, and optimizations in a frame for *vacation*.
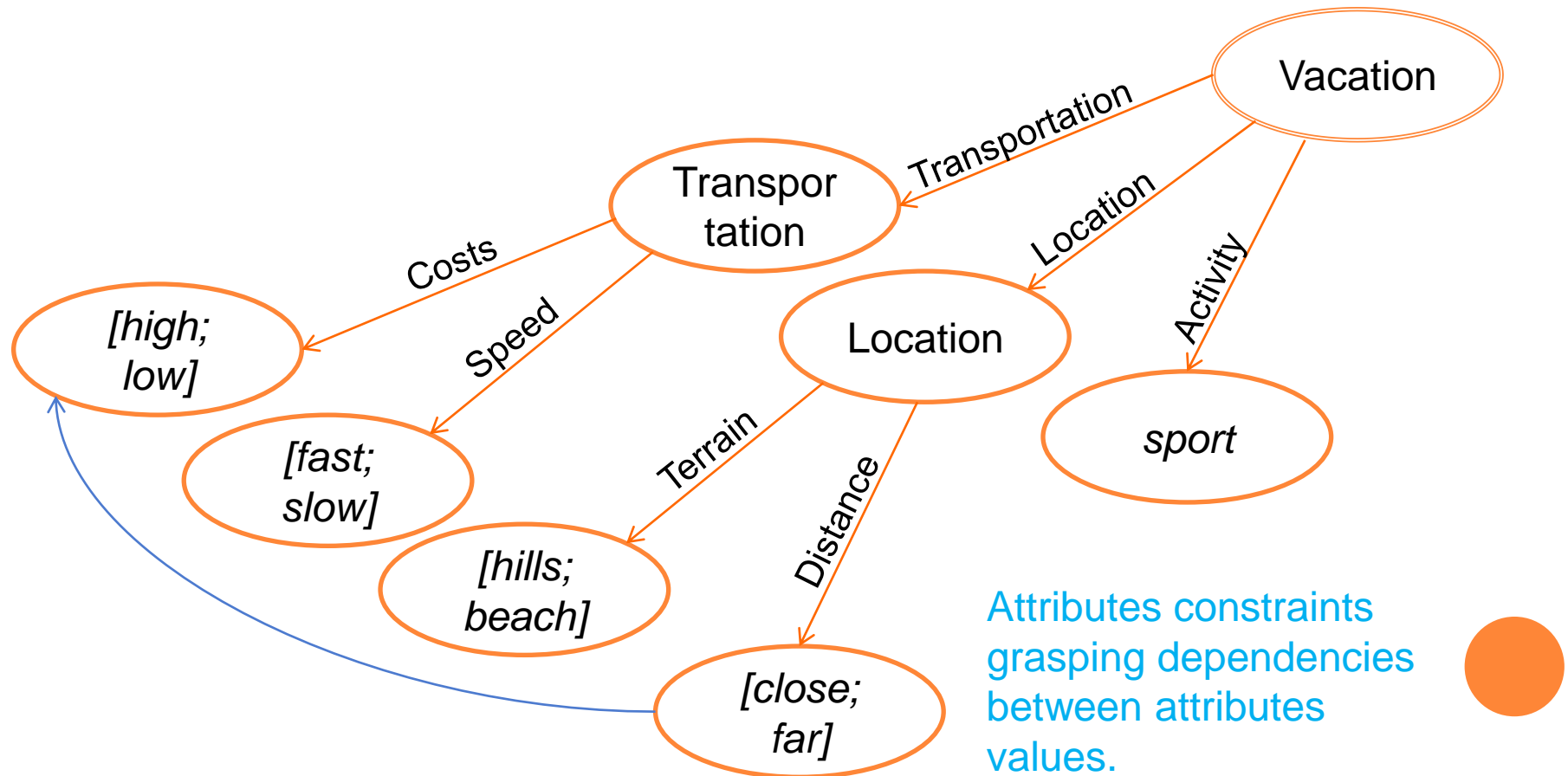
1. PROJECT OUTLINE

➢ Frame as directed graphs (Petersen 2007)

1. PROJECT OUTLINE

➢ Frame as directed graphs (Petersen 2007)

Attributes constraints grasping dependencies between attributes values.

1. PROJECT OUTLINE

➤ Frame analysis of mental disorders

➤ Complexity of clinical phenomena
  ➤ Multiple cognitive, behavioral, neuropsychological, (…), dimensions of mental disorders.

➤ Heterogeneity of clinical phenomena
  ➤ Disjunctive character of diagnosis criteria.

➤ Heterogeneity of classification criteria
  ➤ Categorical and dimensional systems of classification.

1. Project Outline

➤ Frame analysis of the classification of mental disorders

➤ Complexity of clinical phenomena

➤ Heterogeneity of clinical phenomena

➤ Heterogeneity of classification criteria

➤ Focus on one key concept: 'delusion'.

2. THE DSM-IV DEFINITION OF DELUSIONS

A delusion is "*a false belief based on incorrect inference about external reality that is firmly sustained despite what almost everyone else believes and despite what constitutes incontrovertible and obvious proof or evidence to the contrary*"(APA 2000: 821).
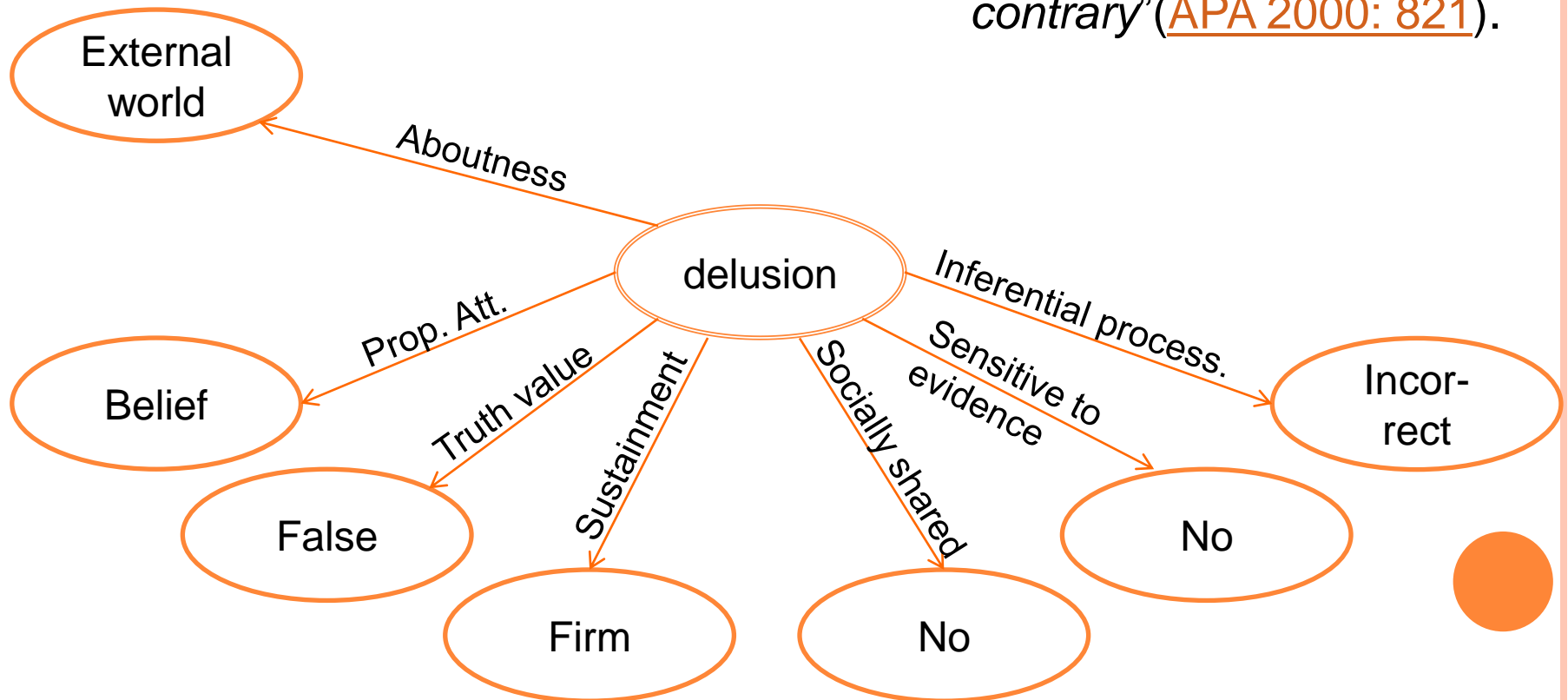
2. The DSM-IV Definition of Delusions

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External world

delusion

Aboutness

Prop. Att.

Belief

Truth value

False

Sustainment

Firm

Socially shared

No

Sensitive to evidence

No

Inferential process.

Incor-rect

2. THE DSM-IV DEFINITION OF DELUSIONS

➤ Delusions are *symptoms* of several mental disorders:

  ➤ Schizophrenia

  ➤ Schizophreniform disorders

  ➤ Schizoaffective disorders

  ➤ Alzheimer dementia

  ➤ Mood disorders

  ➤ Huntigton's disease

  ➤ Parkinson's disease

  ➤ Multiple sclerosis

  ➤ Traumatic brain injuries

  ➤ Substance-induced disorders

  ➤ Delusional disorders

  ➤ …

2. THE DSM-IV DEFINITION OF DELUSIONS

➢ Delusions are *symptoms* of several mental disorders
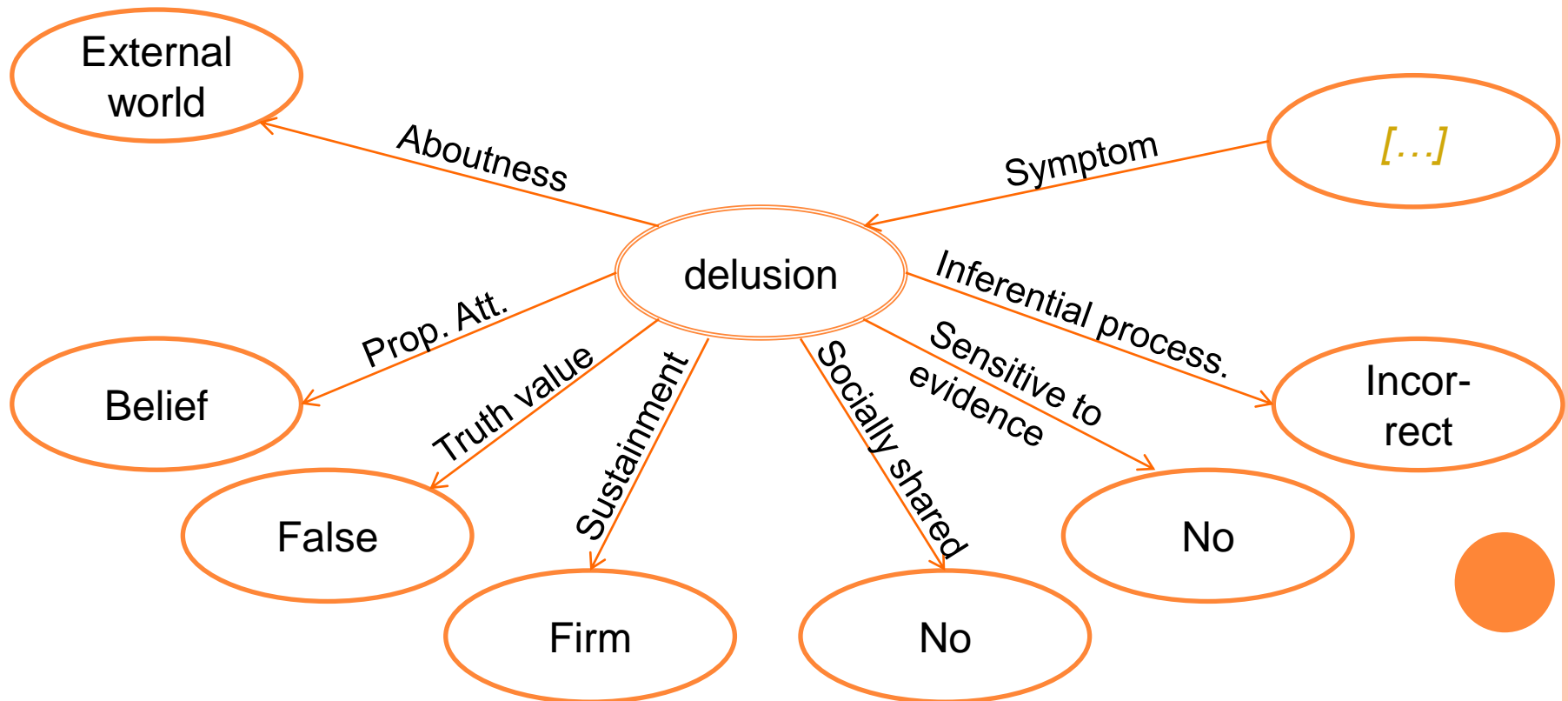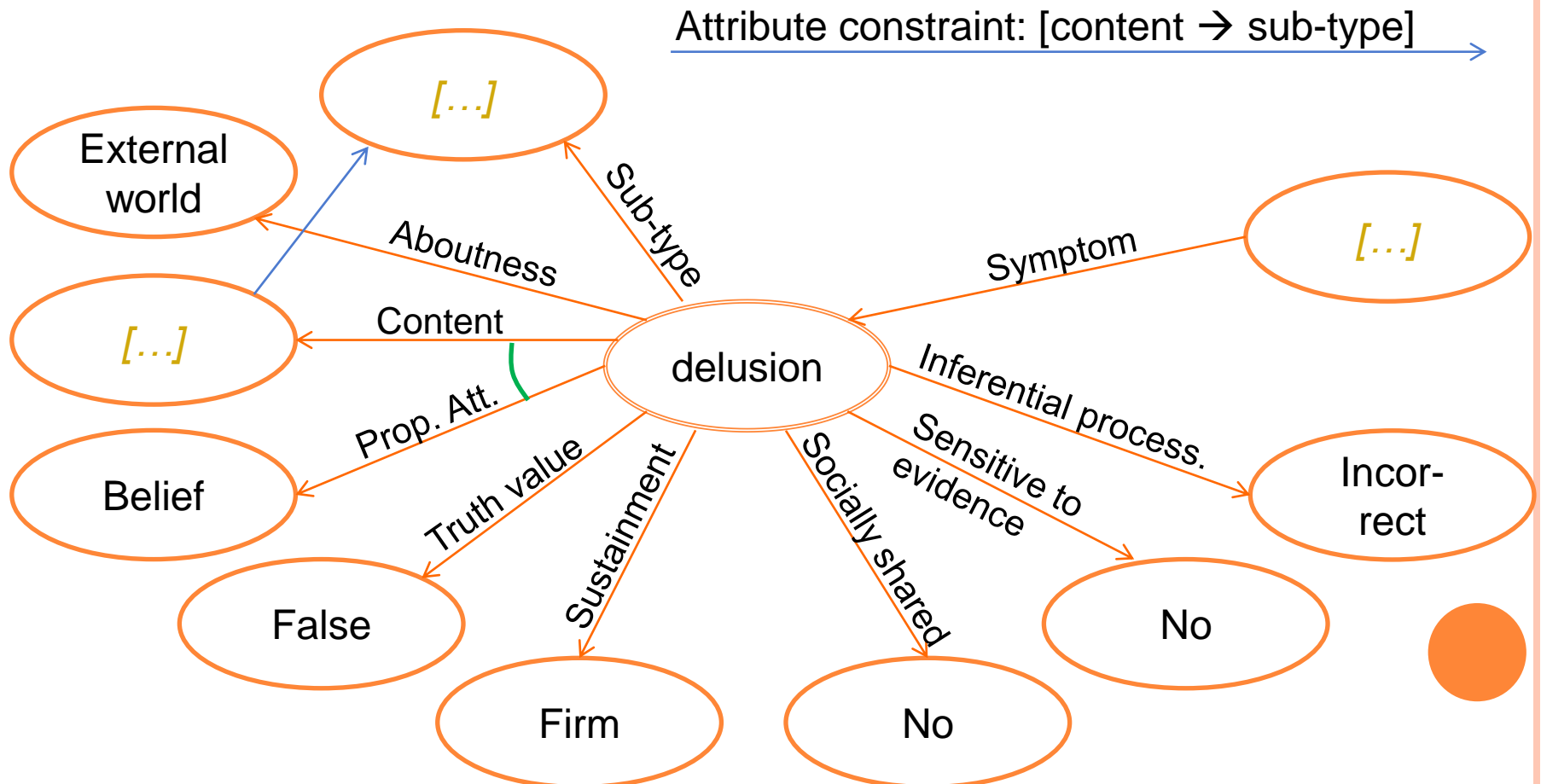
2. THE DSM-IV DEFINITION OF DELUSIONS

Delusions are classified depending on their *content*:

➢ "My closest relative has been replaced by an imposter" (*Capgras delusion*).

➢ "I am followed around by people who are known to me but who are unrecognizable because they are in disguise" (Fregoli delusion)

➢ "I am dead" (*Cotard delusion*).

➢ "The person I see in the mirror is not really me" (*mirrored self-identification*).

➢ "A person I knew who died is nevertheless in the hospital ward today" (*reduplicative paramnesia*).

➢ "This arm is not mine; it is yours. You have three arms" (*somatoparaphrenia*).

➢ "Someone else is able to control my actions" (*delusion of alien control*).

➢ "Someone else's thoughts are being inserted into my mind" (*delusion of thought insertion*).

➢ But also *persecution*, *grandiosity*, *jealousy*, *erotomania*, etc.

2. The DSM-IV Definition of Delusions

➤ *Delusions are classified according to their content.*

Attribute constraint: [content → sub-type]
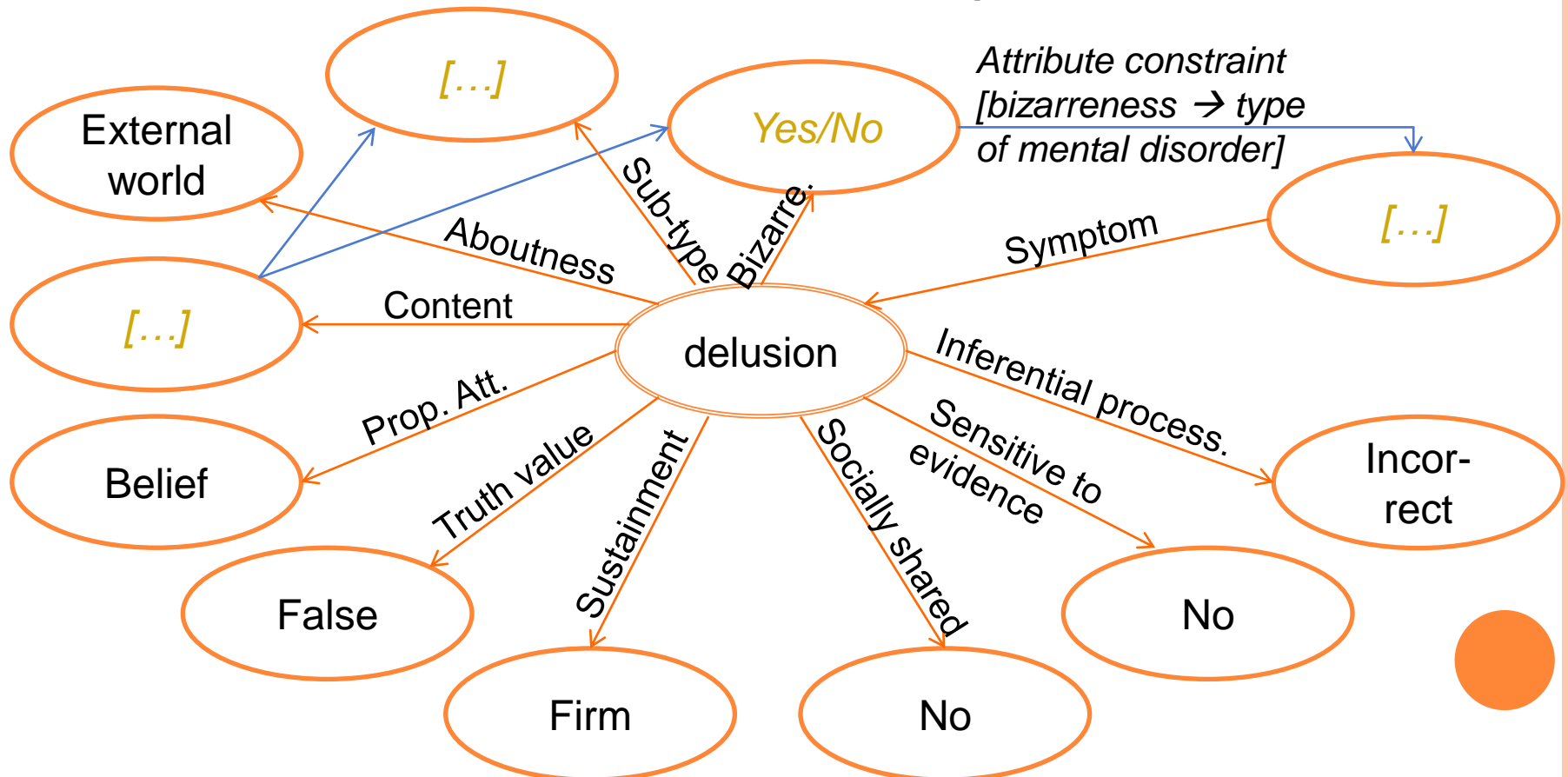
2. THE DSM-IV DEFINITION OF DELUSIONS

Bizarre vs Non-Bizarre Delusions:

➢ "Delusions are deemed bizarre if they are clearly implausible and not understandable and do not derive from ordinary life experiences…

➢ An example of a bizarre delusion is a person's belief that a stranger has removed his or her internal organs and has replaced them with someone else's organs without leaving any wounds or scars…

➢ An example of a non-bizarre delusion is a person's false belief that he or she is under surveillance by the police.

➢ … If the delusions are judged to be bizarre, only this single symptom is needed to satisfy Criterion A for Schizophrenia" (APA 2000, p. 299)
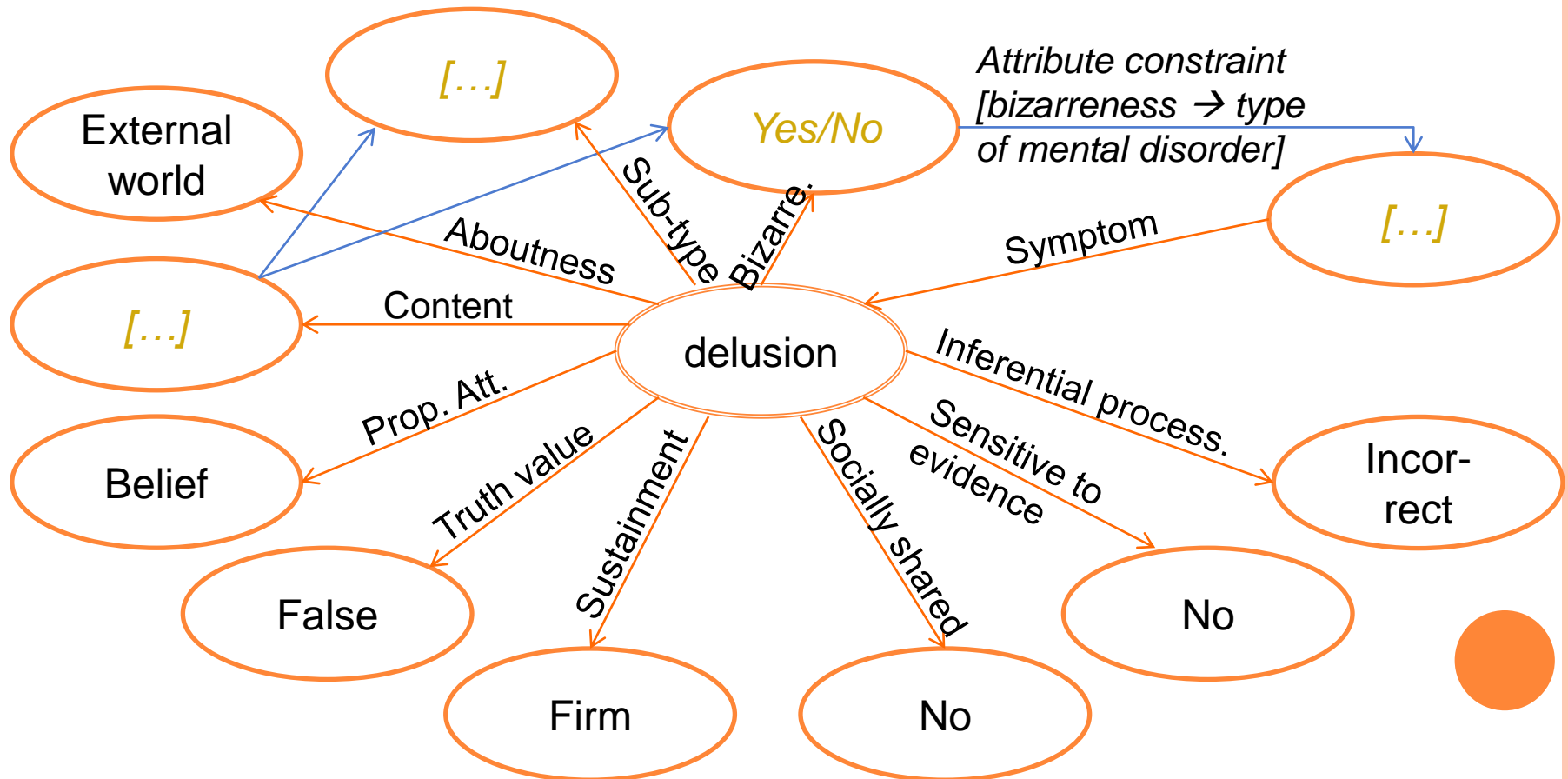
2. THE DSM-IV DEFINITION OF DELUSIONS

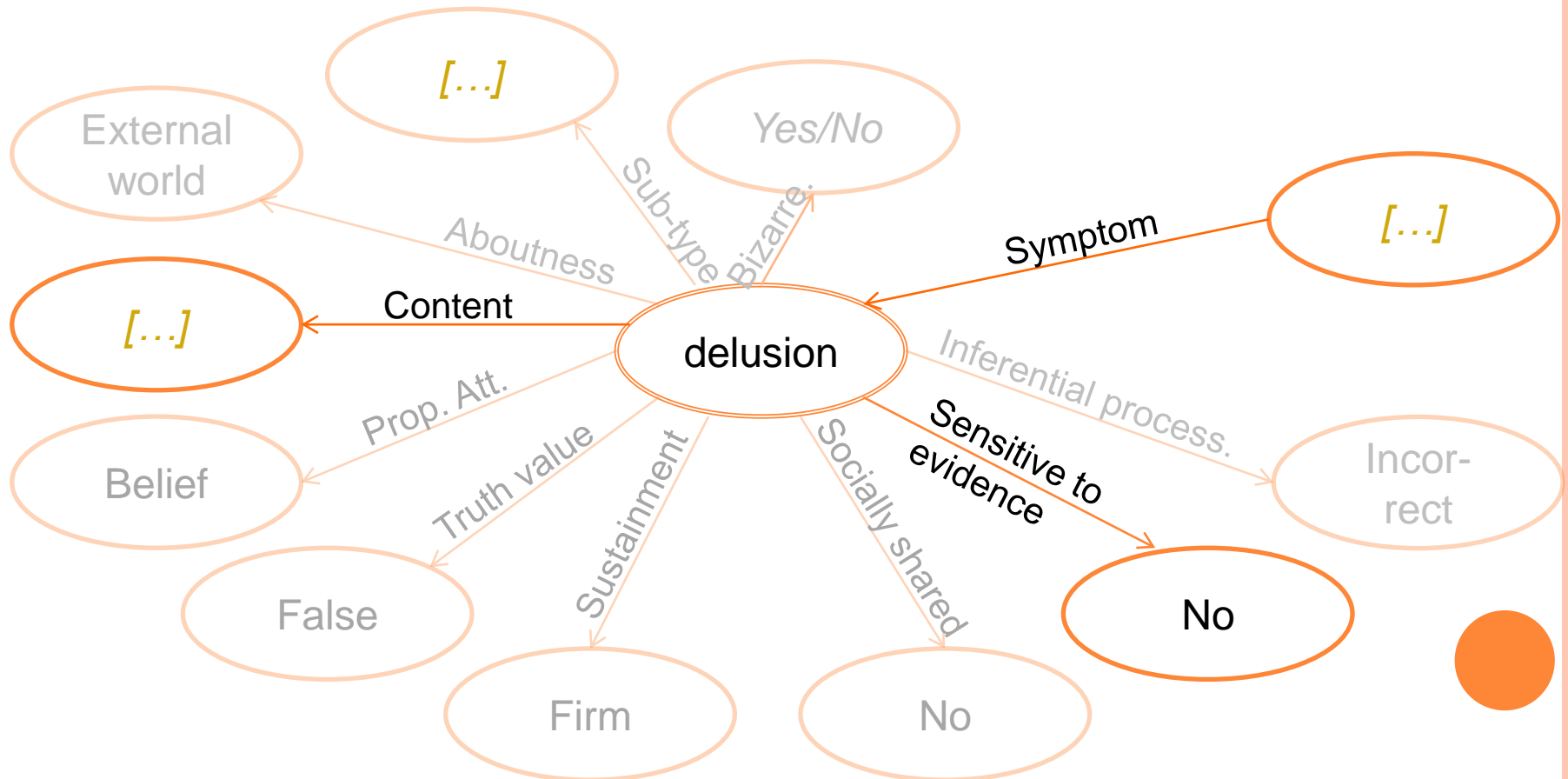> Depending on content, delusions might be said "bizarre", which impacts on the diagnosis.

3. FRAME ANALYSIS OF DELUSIONS

External world

[…]

Yes/No

Attribute constraint [bizarreness → type of mental disorder]

[…]

Aboutness

Sub-type

Bizarre.

Symptom

Content

[…]

delusion

Inferential process.

Prop. Att.

Sensitive to evidence

Belief

Truth value

Sustainment

Socially shared
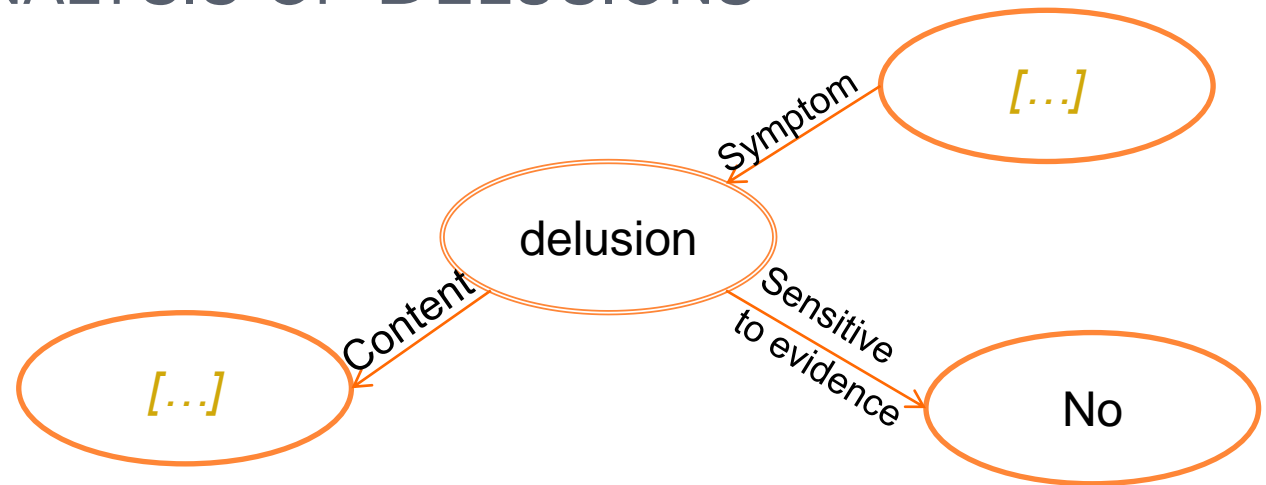
Incor-rect

False

Firm

No

No

3. Frame Analysis of Delusions

➢ DSM-IV definition: theoretically inadequate elements

3. Frame Analysis of Delusions

> Delusions are contentful conceptual mental representations, that are insensitive to counter-evidence and thus immune to revision.
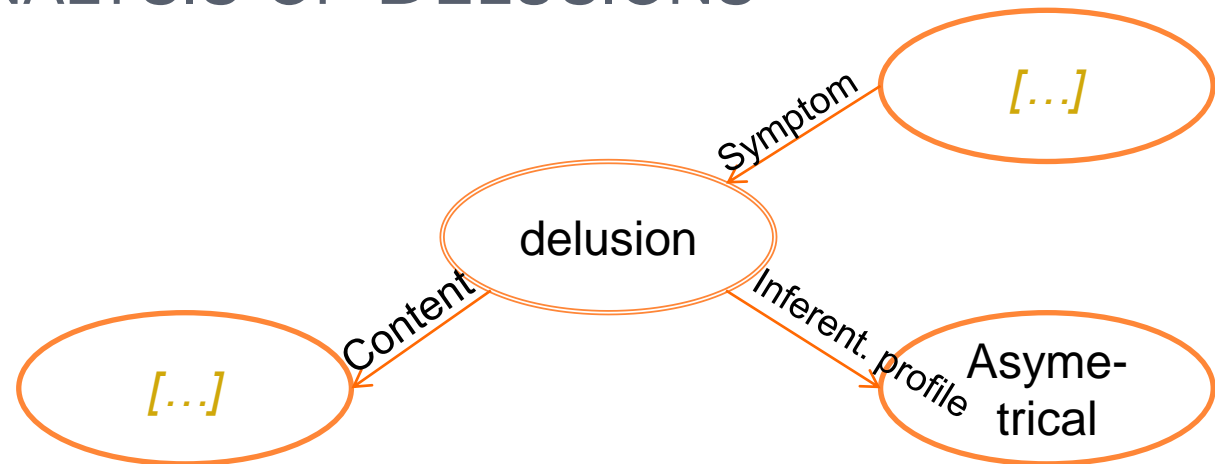
3. FRAME ANALYSIS OF DELUSIONS

- ➢ Delusions are contentful conceptual mental representations, that are insensitive to counter-evidence and thus immune to revision.
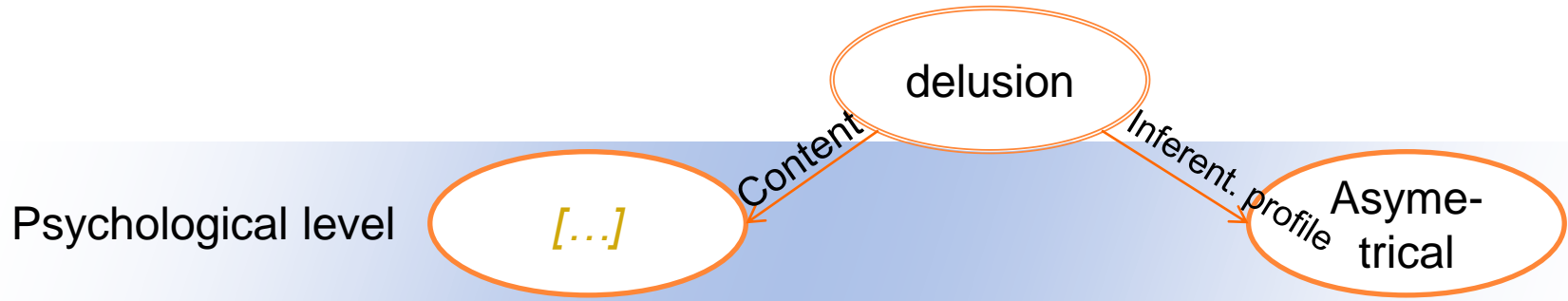
- ➢ Delusions have an asymmetric inferential profile: they might impact on the rest of the system of mental properties, whereas this does not hold the other way round.

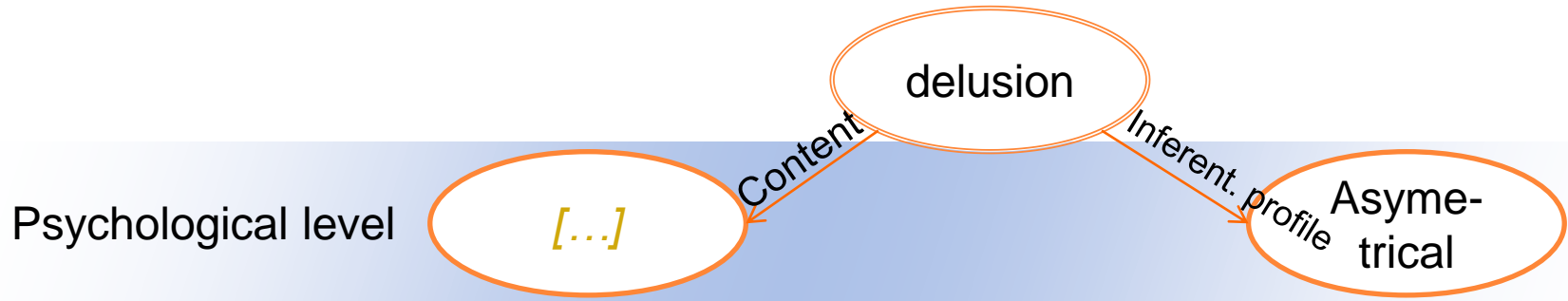# 4. Framing Neuropsychological Explanations of Delusions

delusion

Content

Inferent. profile

Psychological level

[…]

Asyme-trical

➢ Psychological definition: *delusions are contentful conceptual mental representations that have an asymmetrical inferential profile.*

4. FRAMING NEUROPSYCHOLOGICAL EXPLANATIONS OF DELUSIONS

delusion

Content

Inferent. profile

Psychological level

[…]

Asyme-trical

➤ Psychological definition: *delusions are contentful conceptual mental representations that have an asymmetrical inferential profile*.

➤ Neuropsychological accounts aims to provide reductive explanations of theses features of delusions.

➤ How to integrate neuropsychological reductive explanations?
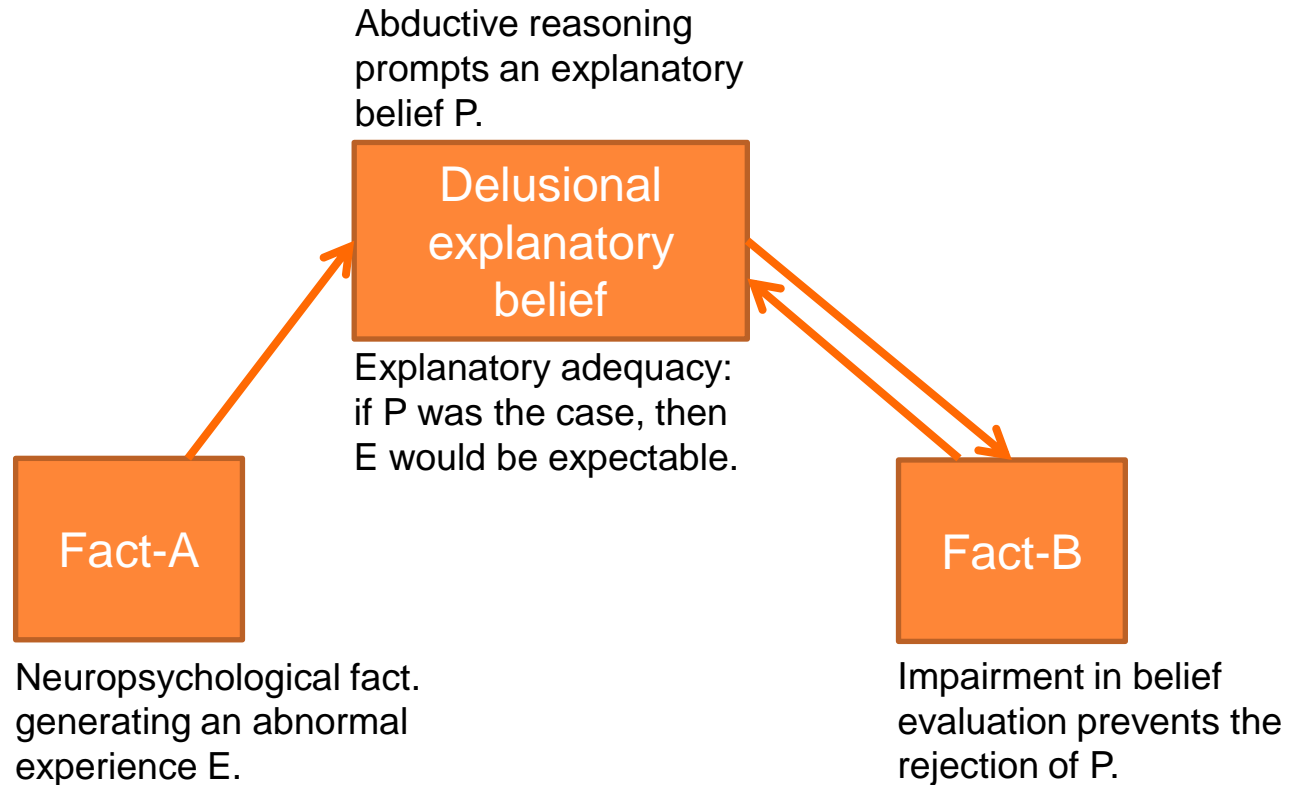
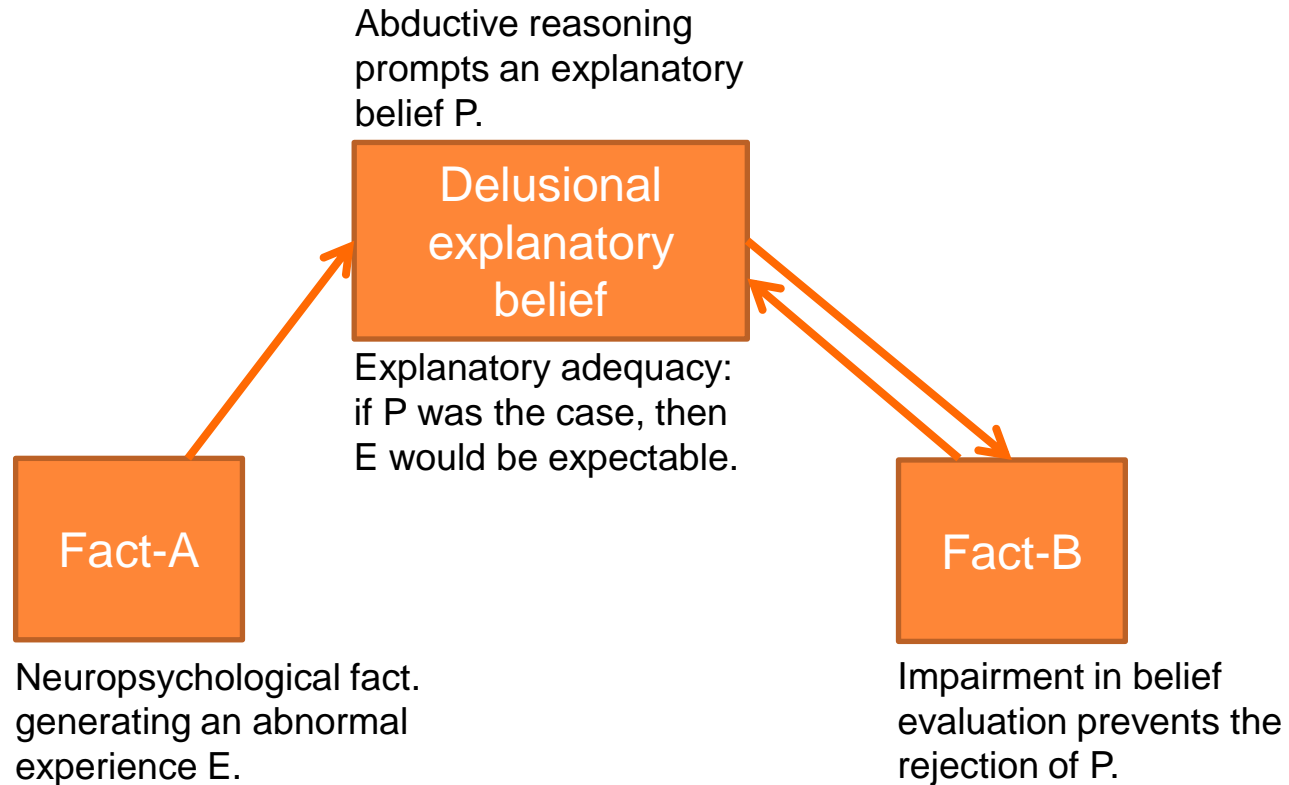# 4. FRAMING NEUROPSYCHOLOGICAL EXPLANATIONS OF DELUSIONS

According to the Two-Factor Account (TFA; Coltheart 2007, 2011), delusions occur as a result of the conjunction of two factors, which respectively explain:

a)   Why delusions are tokened?

b)   Why delusions are not rejected in reasons of their inconsistency with the other mental properties of the deluded patient?

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4. FRAMING NEUROPSYCHOLOGICAL EXPLANATIONS OF DELUSIONS

Abductive reasoning prompts an explanatory belief P.

Delusional explanatory belief

Explanatory adequacy: if P was the case, then E would be expectable.

Fact-A

Neuropsychological fact. generating an abnormal experience E.

Fact-B

Impairment in belief evaluation prevents the rejection of P.

4. FRAMING NEUROPSYCHOLOGICAL EXPLANATIONS OF DELUSIONS

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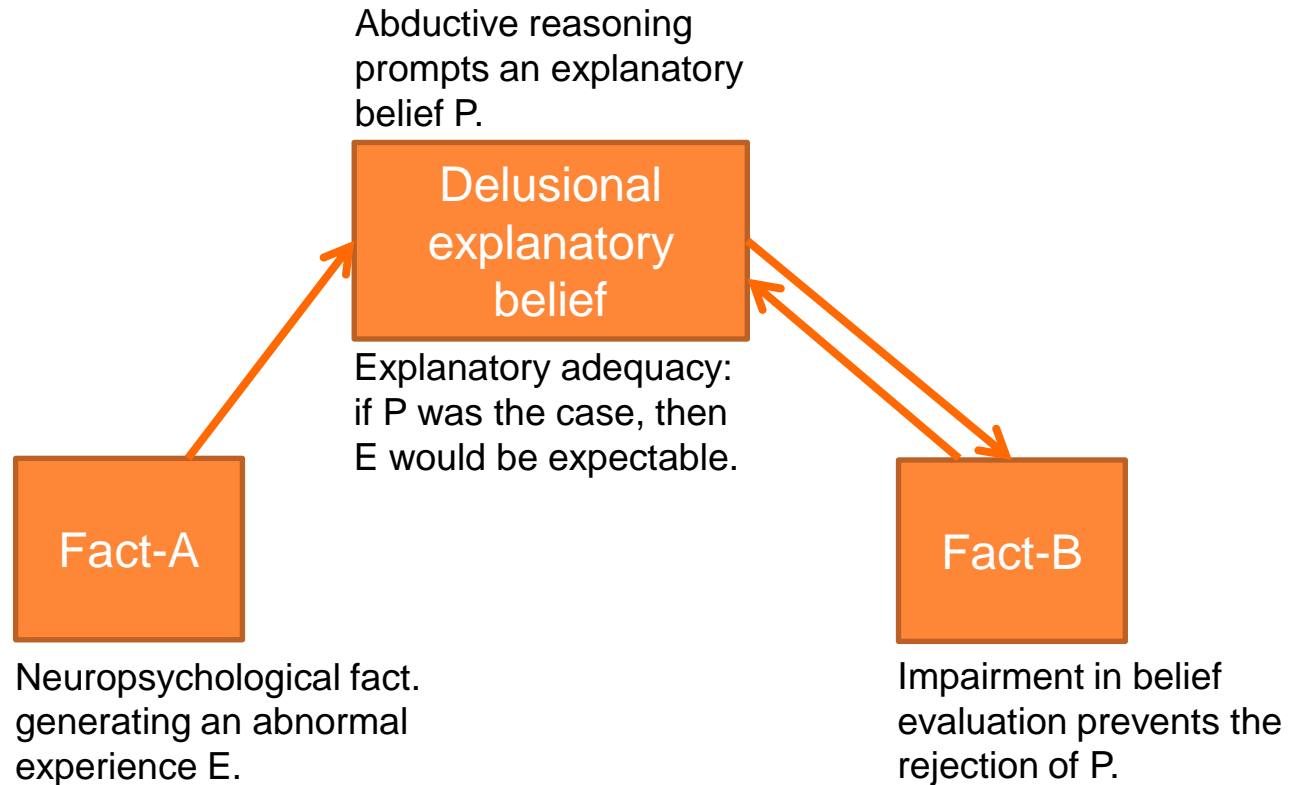Impairment in belief evaluation prevents the rejection of P.

Capgras Delusion

Reduced autonomic response to familiar faces.

Right prefrontal impairment.

4. Framing Neuropsychological Explanations of Delusions

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Fregoli Delusion

Enhanced autonomic response to faces.

Right prefrontal impairment.
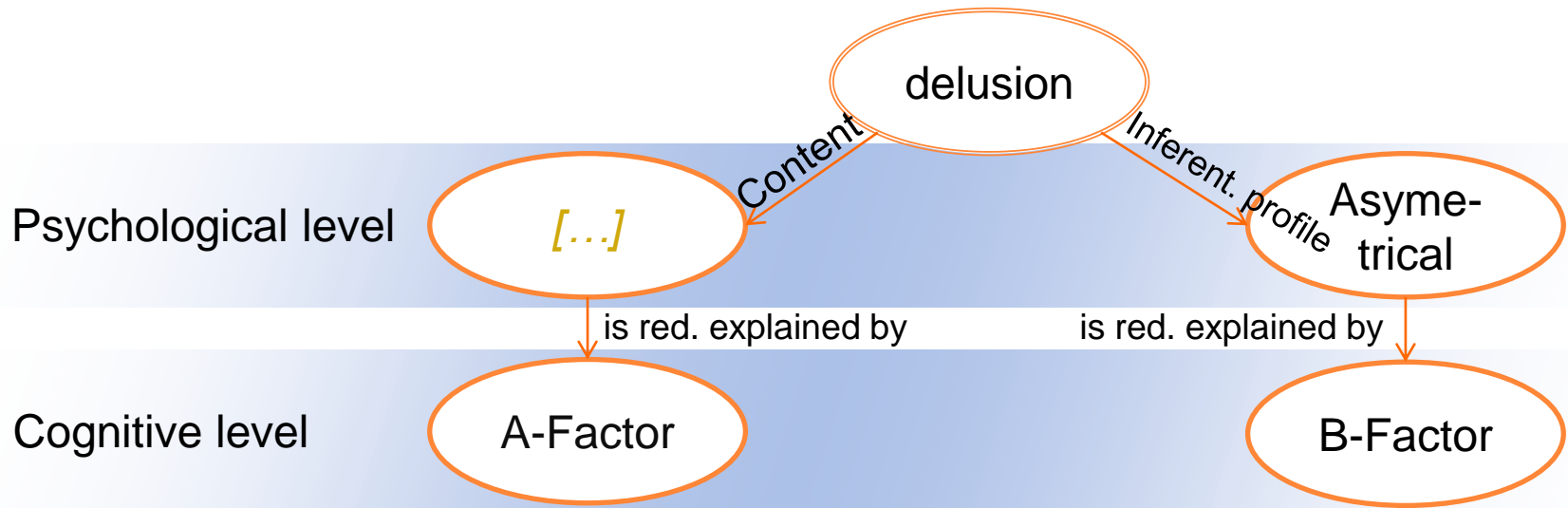
4. Framing Neuropsychological Explanations of Delusions

TFA on several famous delusions:

| Delusion type	Factor A	Factor B
Capgras	Reduced auto resp. to familiar faces	RPF Def.
Fregoli	Enhanced autonomic resp. to faces	RPF Def.
Cotard	Abolished autonomic responses	RPF Def.
MSMI	Mirror agnosia *or face agnosia*	RPF Def.
Somatopara.	Paralysis of a limb	RPF Def.
Alien Control	Disrupted self-monitoring	RPF Def.

(Coltheart, Langdon and McKay (2011), *Delusional belief.* Annual Review of Psychology, pp. 271-298)
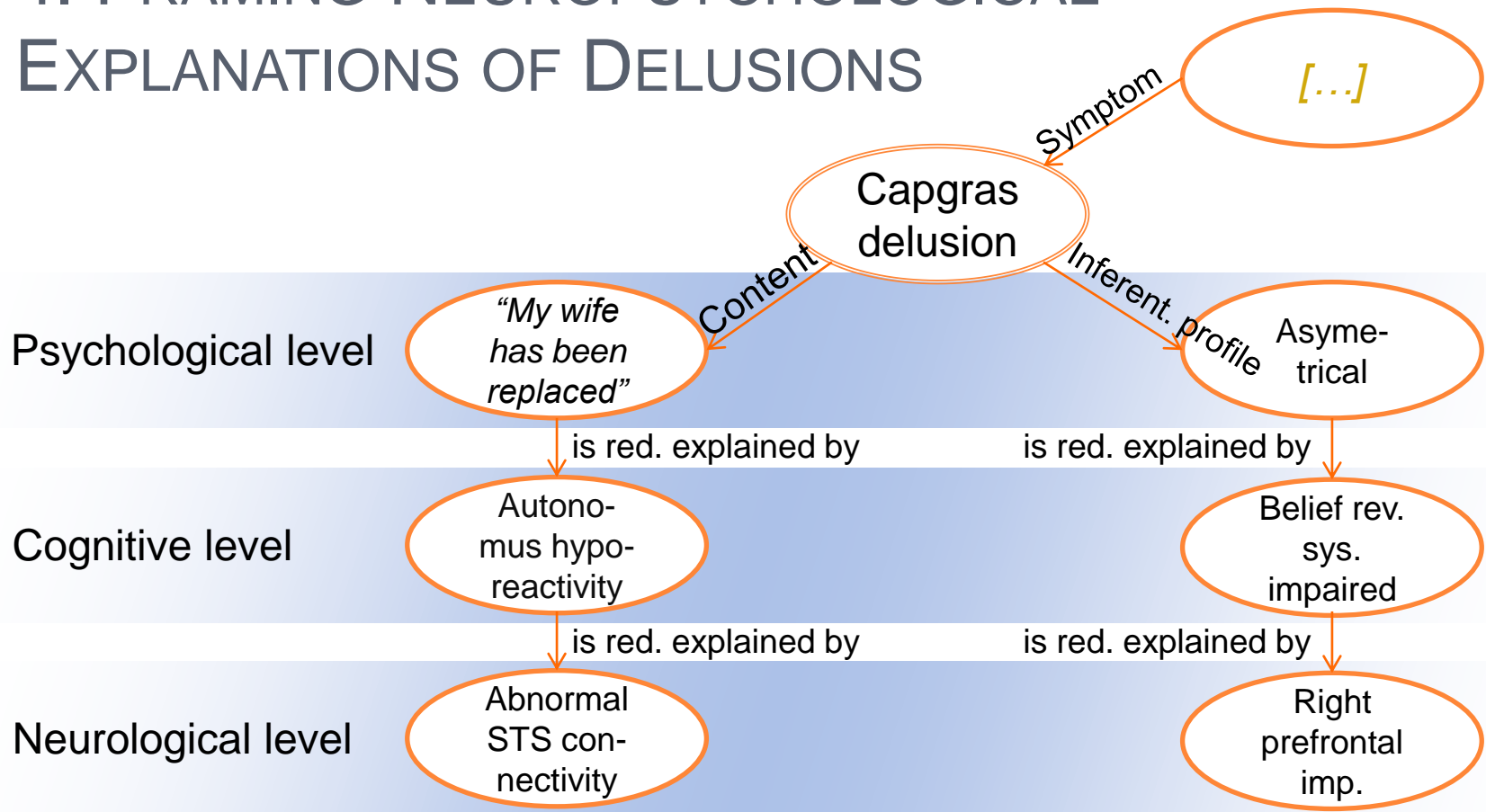
4. Framing Neuropsychological Explanations of Delusions

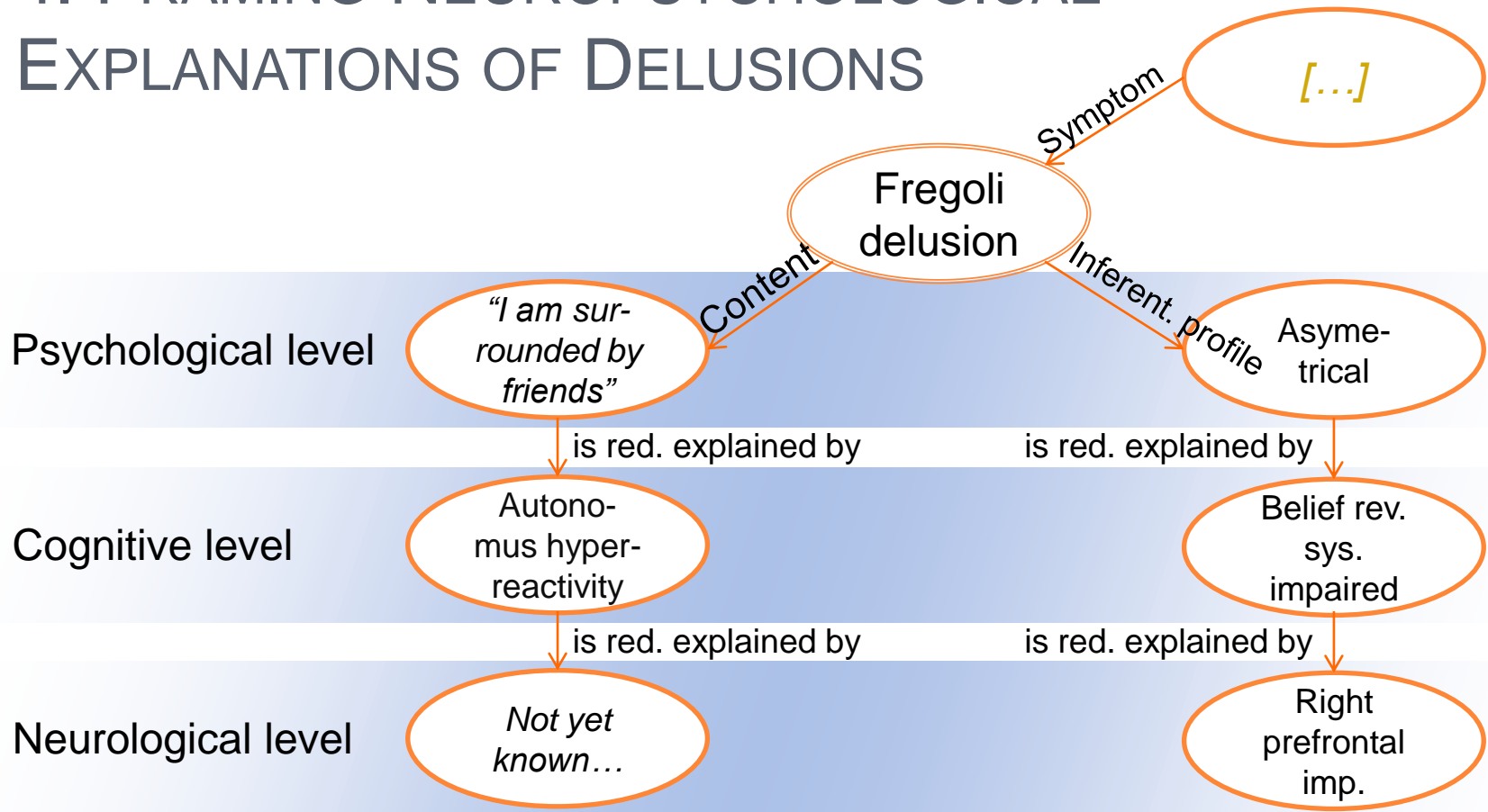# 4. FRAMING NEUROPSYCHOLOGICAL EXPLANATIONS OF DELUSIONS
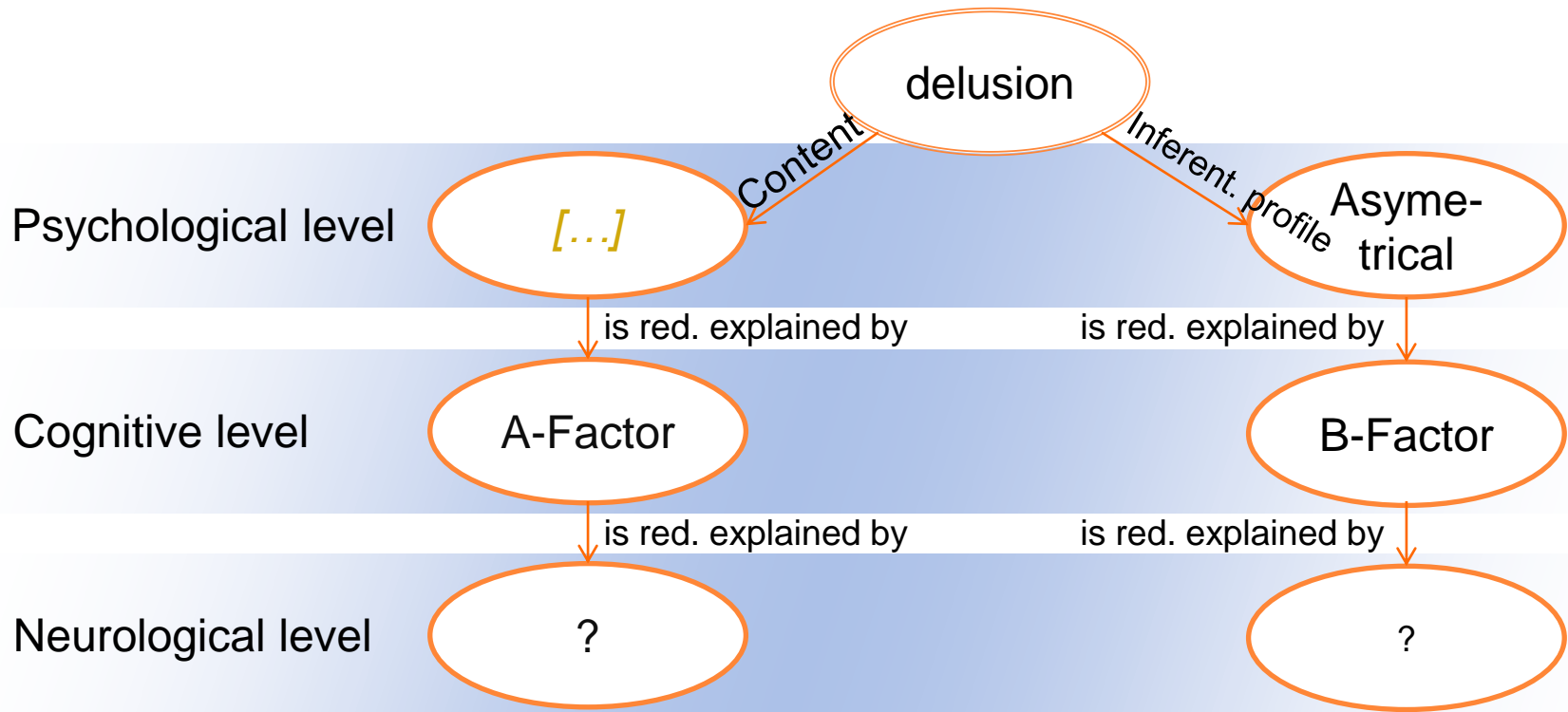
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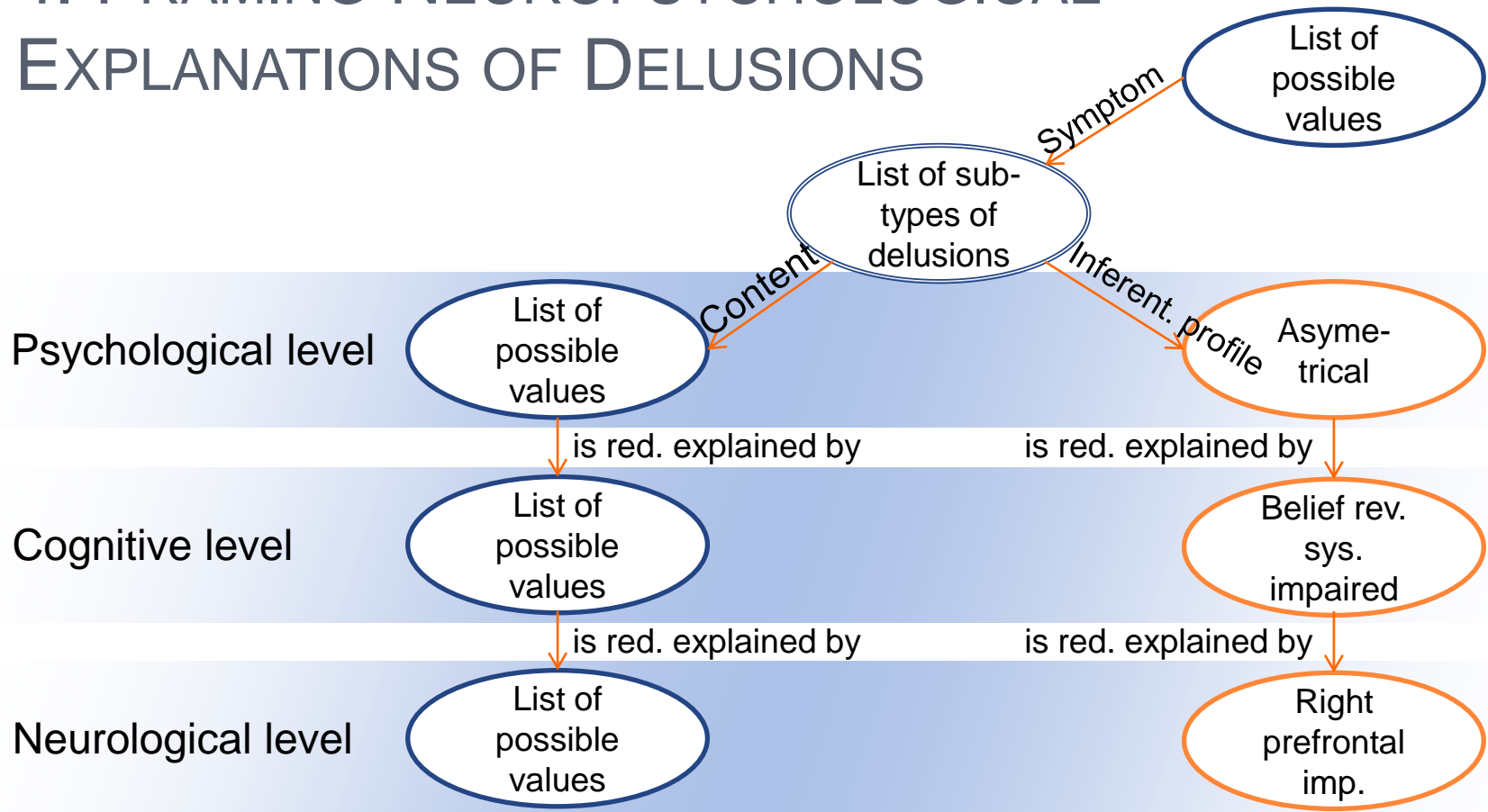

➢ A Frame for the Capgras delusion

4. Framing Neuropsychological Explanations of Delusions

Psychological level

Cognitive level

Neurological level

Fregoli delusion

Symptom — [...]

Content — "I am surrounded by friends"

Inferent. profile — Asymetrical

is red. explained by → Autonomus hyper-reactivity

is red. explained by → Belief rev. sys. impaired

is red. explained by → Not yet known…

is red. explained by → Right prefrontal imp.

➢ A Frame for the Fregoli delusion

4. Framing Neuropsychological Explanations of Delusions

List of possible values

Symptom

List of sub-types of delusions

Content

Inferent. profile

Psychological level — List of possible values | Asyme-trical

is red. explained by   is red. explained by

Cognitive level — List of possible values | Belief rev. sys. impaired

is red. explained by   is red. explained by

Neurological level — List of possible values | Right prefrontal imp.

➢ The variability of delusions might be represented by means of integrating *possible* values in a generalized frame for the concept of 'delusion'.
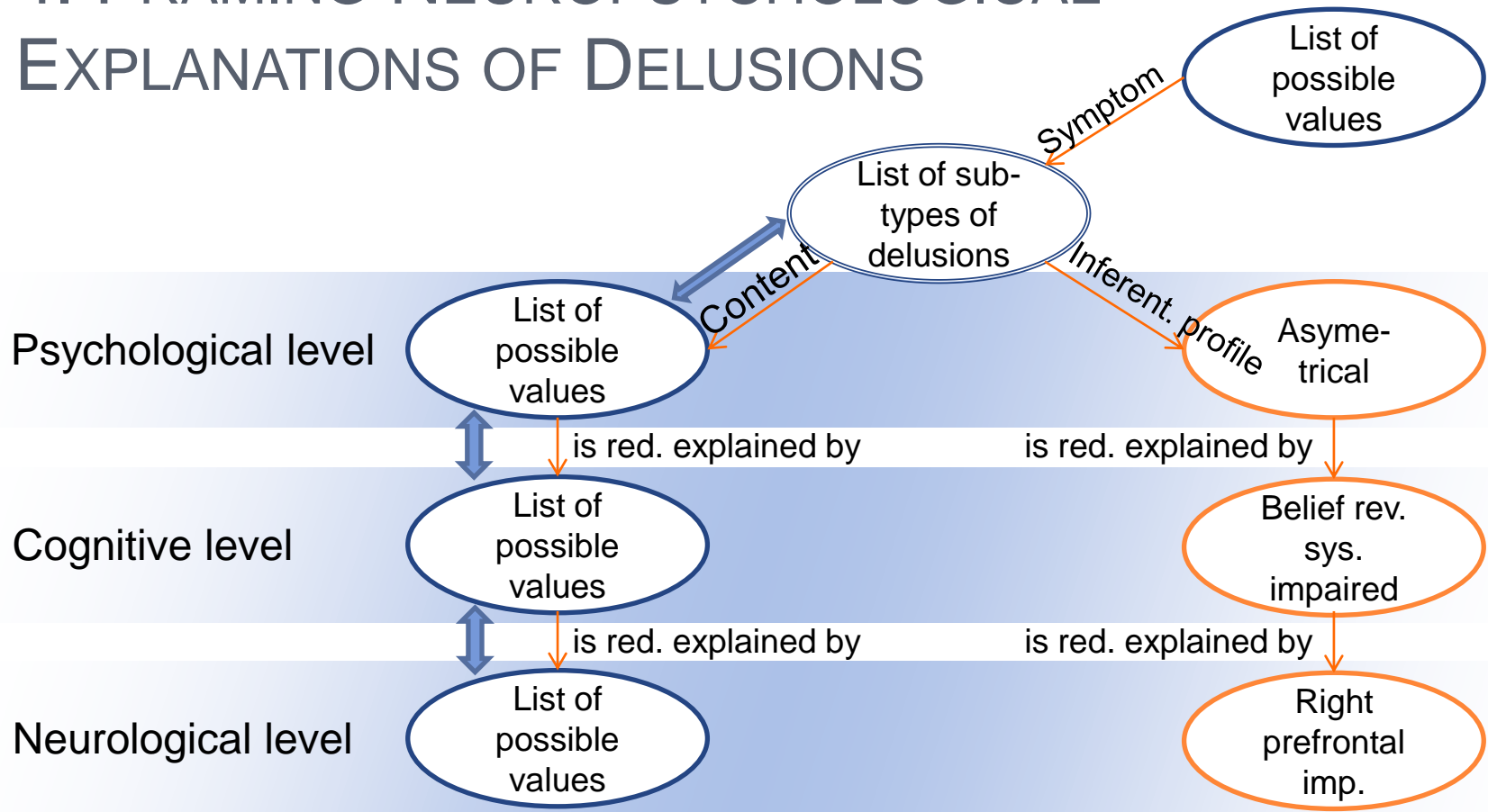
4. Framing Neuropsychological Explanations of Delusions
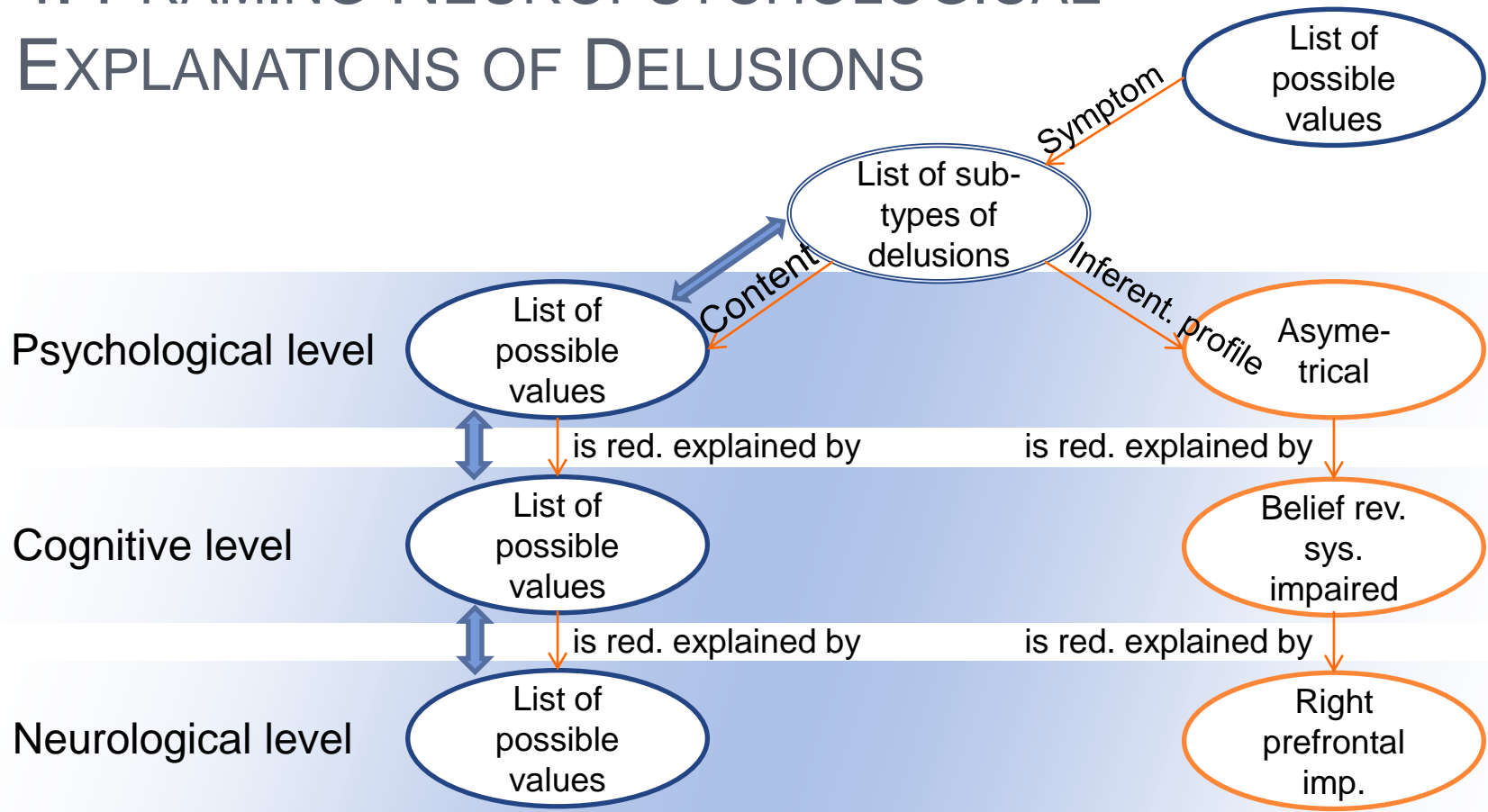
➢ Attribute constraints enable to represent different (types of) dependencies between the values of the attributes.

# 4. FRAMING NEUROPSYCHOLOGICAL EXPLANATIONS OF DELUSIONS

> Example of attribute constraints:
> "if the value of central node is [capgras], then the value of the attribute [content] fall under the description [a close relative as been replaced]".

5. Conclusive Remarks

- The complexity and the heterogeneity of mental disorders impose to work on simple cases.

- Frames enable to represent accurately key concepts of psychiatry.

- Integrating possible values allows to represent the variability of psychiatric symptoms.

- Dependencies between values might be represented using attribute constraints.
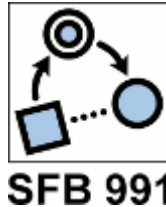
Thank you for your attention!

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