

What is Counterfactual Thinking?



- Mental simulation about how a past event might have been different
- “If only...” thoughts
- Extensive literature about Counterfactual Thinking

Why studying Counterfactual Thinking (CFT)?

CFT

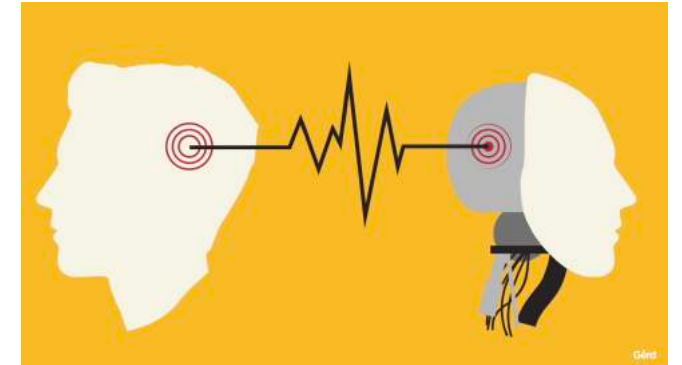
Causal / Responsibility attribution



Regret – Decision making



Human-Technology Interaction
(Explainable AI)

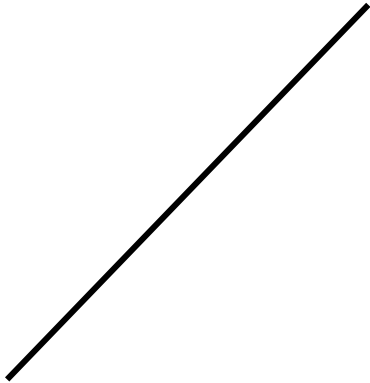


Three questions about CFT

CFT

Main Features

How do we classify
counterfactual thoughts?



Main Features – Direction



We imagine how things could have been better

UPWARD

- Induces negative affect, but might help to do better in the future
- More common than downward counterfactuals



We imagine how things could have been worse

DOWNWARD

- Induces positive affect, but might prevent future improvement
- Can be observed with low repeatability / low control

Main Features – Structure



Change past event
by adding
something

ADDITIVE

- “Expansive” processing style
- Help with creative generation tasks

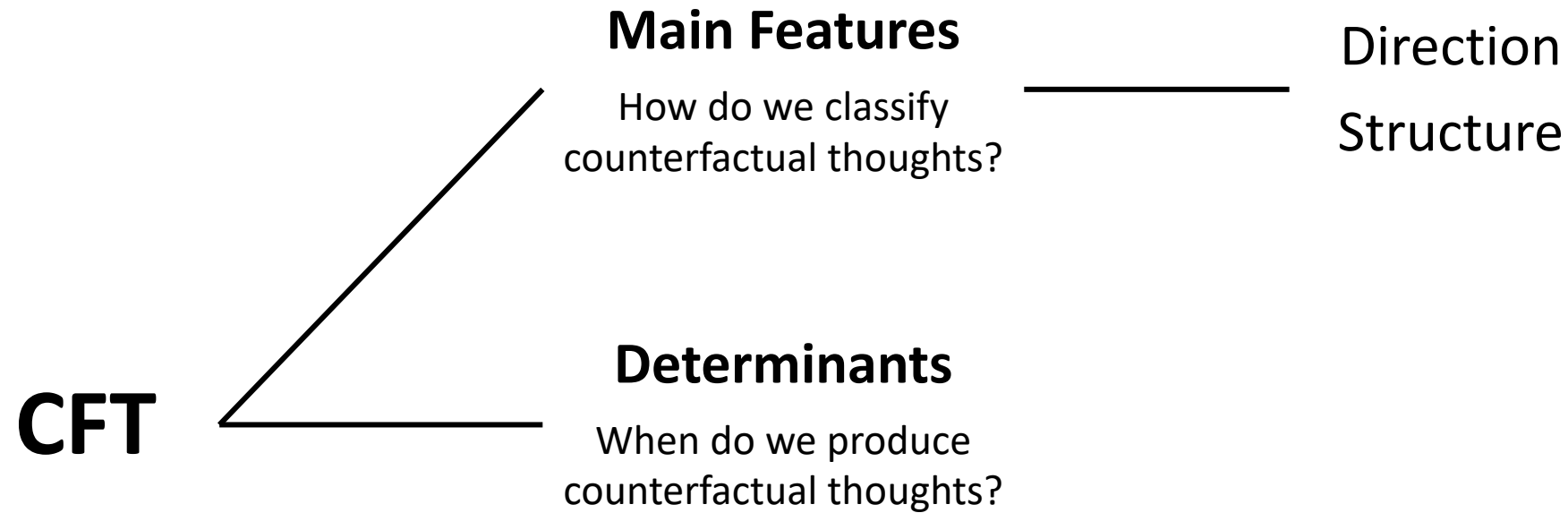


Change past event
by removing
something

SUBTRACTIVE

- “Relational” processing style
- Help with analytical tasks (like syllogisms)

Three questions about CFT



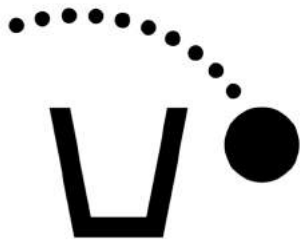
Determinants of Counterfactual Thinking



NEGATIVE AFFECT

Signal that a
problem is present

- Prompts comparison with a better alternative
- Strong antecedent of upward counterfactuals

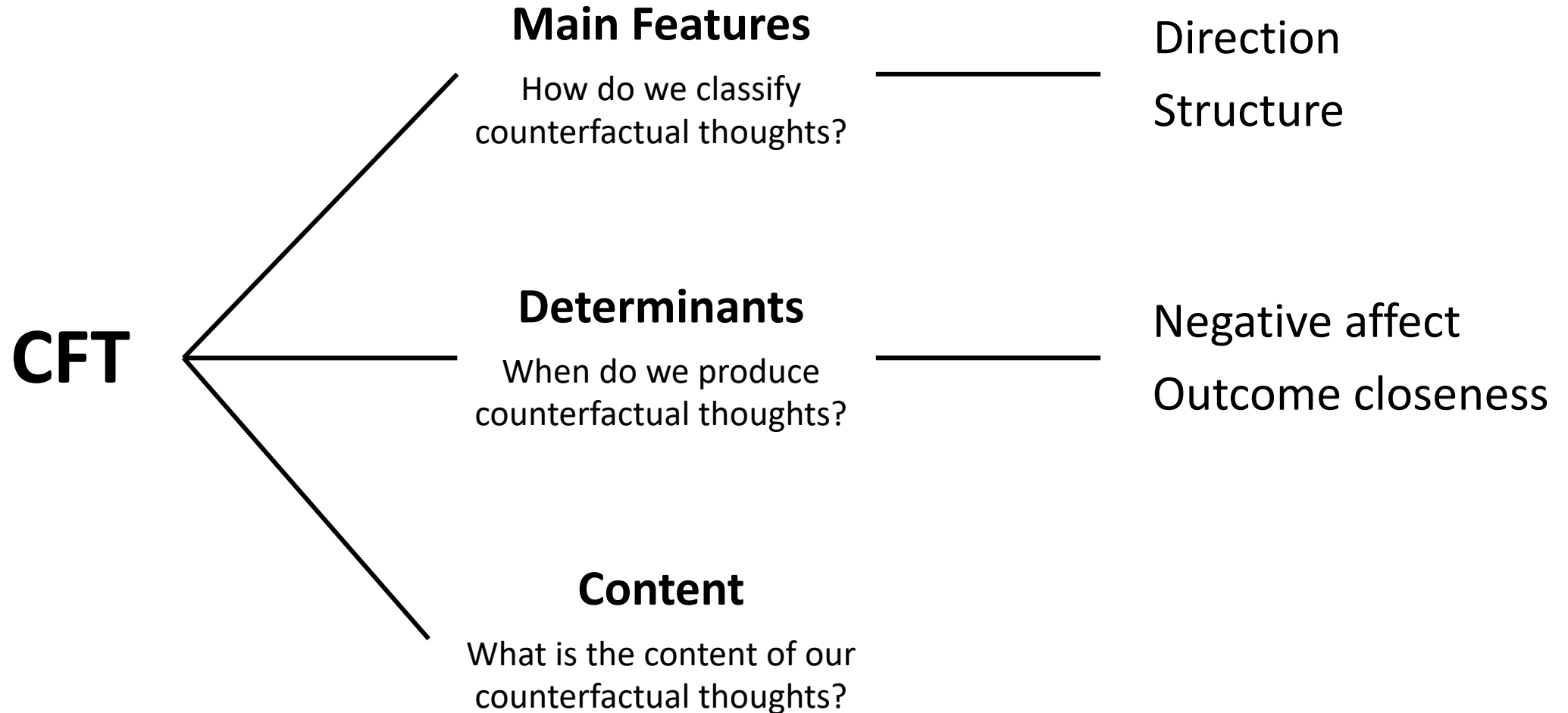


OUTCOME CLOSENESS

High perceived
possibility that an
alternative outcome
could have happened
(positive or negative)

- Temporal, physical, numerical
- Nearly avoided negative outcomes might prompt downward counterfactuals

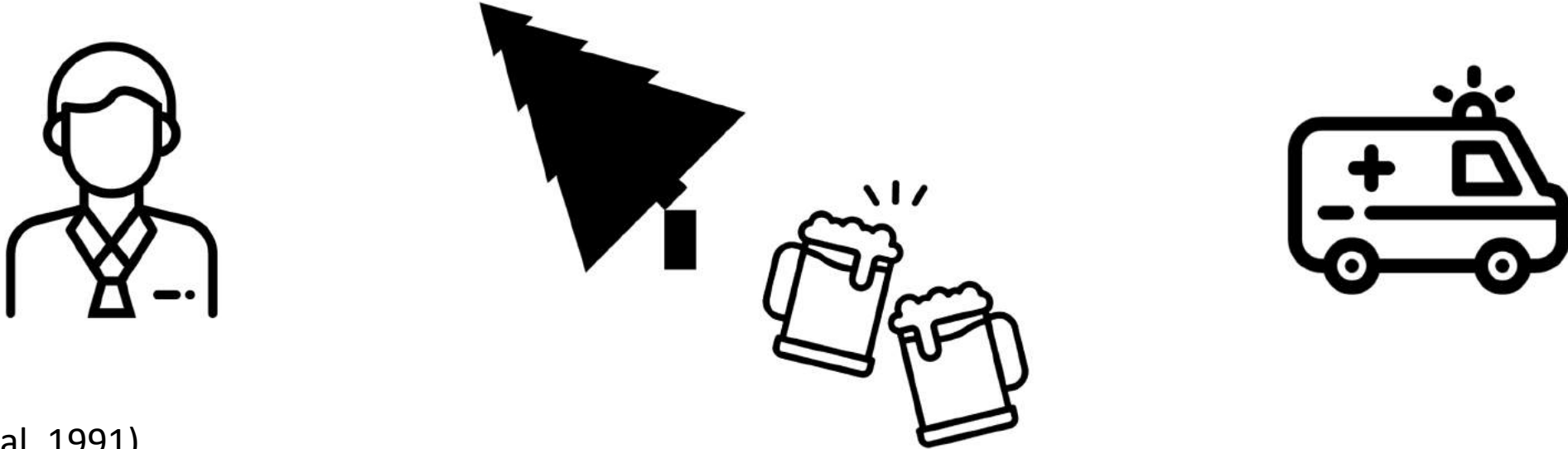
Three questions about CFT



Content of Counterfactual Thinking

- Potentially infinite number of possible counterfactuals
- But people show consistent patterns in the content of their counterfactuals
- Four Fault Lines of Reality

Fault Lines – Controllability Effect



(Giroto et al, 1991)

Controllability Effect

When we generate a counterfactual, we tend to mutate controllable rather than uncontrollable elements of the past event

Fault Lines of Reality

Exceptionality effect (Kahneman & Tversky, 1982a)

When we generate a counterfactual, we tend to mutate out-of-the-ordinary rather than normal elements of the past event

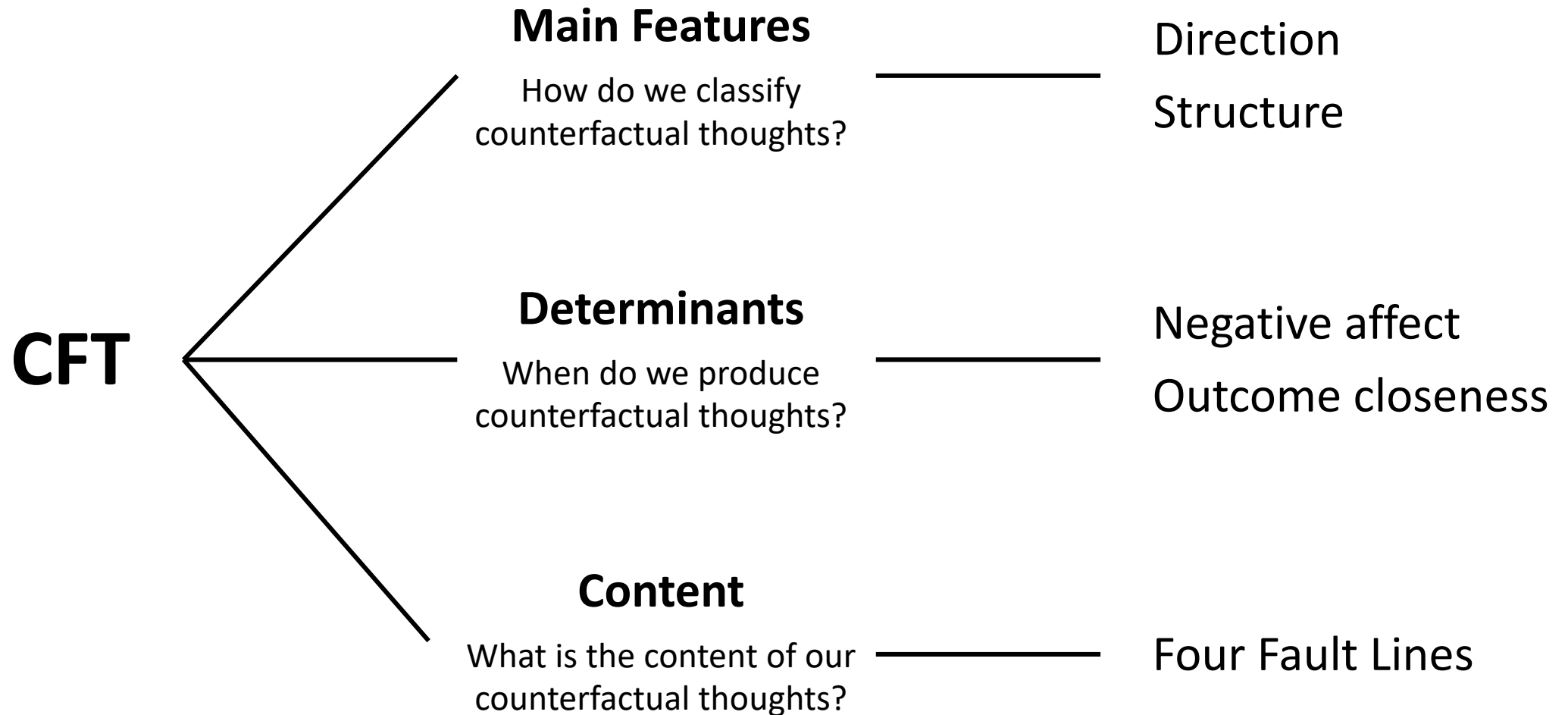
Action effect (Kahneman & Tversky, 1982b)

When we generate a counterfactual, we tend to mutate an action rather than an inaction

Temporal order effect (Miller & Gunasegaram, 1990)

When we generate a counterfactual, we tend to mutate the most recent rather than earlier elements of the past event

Three questions about CFT



Functions of Counterfactual Thinking

Why do we engage in Counterfactual Thinking?

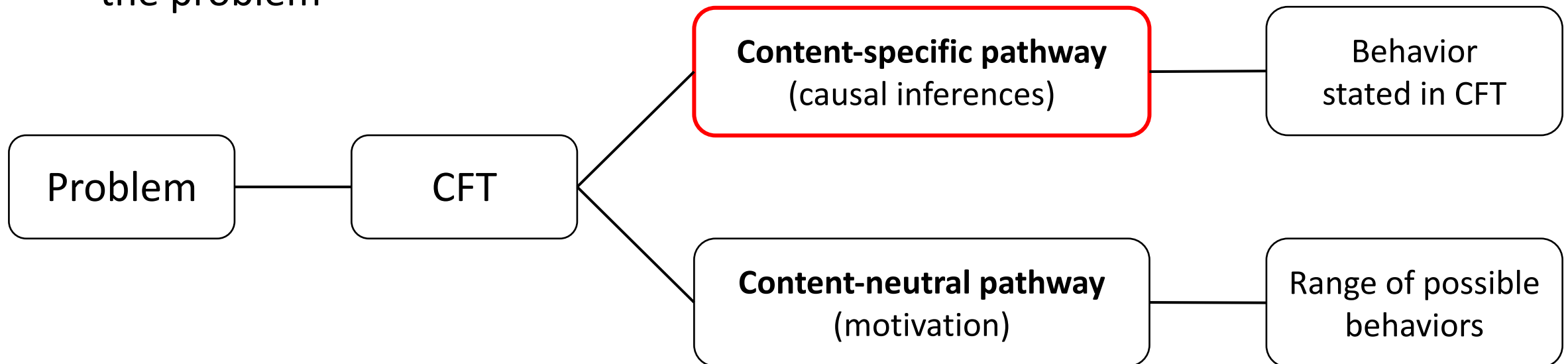
Let's consider the evidence up to this point:

- 1) Counterfactuals often generated in presence of **negative affect**
- 2) Majority of counterfactuals are **upward**
- 3) We are more likely to focus on **controllable** rather than uncontrollable elements in our counterfactuals

Functions of Counterfactual Thinking

Functional Theory of Counterfactual Thinking (Epstude & Roese, 2008)

- After a negative event, counterfactuals are generated to prepare ourselves and do better in a future similar event (**preparatory function**)
- Activated when a problem is detected, favoring behaviors that should correct the problem

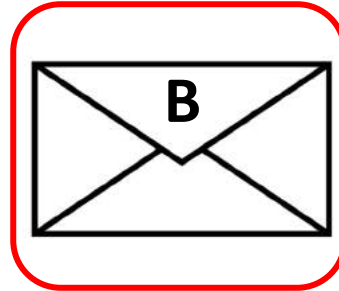
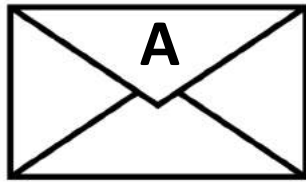


Problem with Functional Theory

- Controllability effect is crucial for Functional Theory
- Previous studies only used scenarios, assuming that counterfactuals by readers and actors would have been the same
- Do actors produce controllable counterfactuals as well?

Actor-Reader Effect

READERS



Read story about
envelopes game

Solve mentally in 30 sec
to win a prize

“Things would have
better if only...”

ACTORS



48x39

Actually play the
envelopes game

Fail to solve the problem

Actor-Reader Effect

Discrepancy between counterfactuals by readers and actors:

- **Readers** produced majority of **controllable** counterfactuals (“If only she had chosen the other envelope”)
- **Actors** produced a majority of **uncontrollable** counterfactuals (“If only I could have used paper and pencil”)

Result replicated in many other studies

This finding questions the robustness of Functional Theory:
uncontrollable counterfactuals have little preparatory value

Functions of Counterfactual Thinking

Preparatory function

- Counterfactuals are used to prepare and do better in a future similar event
- Might be less central than previously thought

Explanatory function

- Counterfactuals to better understand a past event, for example by increasing perceived coherence between its elements
- Justification of past events / Excuse-making and self-handicapping

Consolatory function

- Carried out by downward counterfactuals
- Common with low repeatability or low perceived control → Improve mood, beneficial for mental health

Suggested readings

- Byrne, R. M. J. (2016). Counterfactual thought. *Annual Review of Psychology*, 67, 135–157. <https://doi.org/10.1146/annurev-psych-122414-033249>
- Roese, N. J. (1997). Counterfactual thinking. *Psychological Bulletin*, 121(1), 133–148. <https://doi.org/10.1037/0033-2909.121.1.133>

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- Miller, D. T., & Gunasegaram, S. (1990). Temporal Order and the Perceived Mutability of Events: Implications for Blame Assignment. *Journal of Personality and Social Psychology*, 59(6), 1111–1118. <https://doi.org/10.1037/0022-3514.59.6.1111>