FACULTY OF ECONOMICS AND BUSINESS ADMINISTRATION

# WORKSHOP ON THE USE OF 'IMPLICIT MEASURES' IN SOCIAL SCIENCES

Slabbinck & Spruyt / VUB WORKSHOP / DAY-1 (15-09-2023)

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# 0. INTRODUCTION

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# OVERVIEW

**DAY 1**

- Session 1: 10:00 – 12:00 What are implicit measures? Applications and taxonomy
- Session 2: 13:30 – 15:00 Additional selection criteria and software
- Session 3: 15:30 – 17:00 DIY: Design and implement your own study

**DAY 2**

- Session 1: 10:00 – 12:00 Data analysis, interpretation, and reliability
- Session 2: 13:30 – 15:00 DIY: Analysis of your own data set and reporting
- Session 3: 15:30 – 17:00 Speed date

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# 1. WHAT ARE IMPLICIT MEASURES?

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# TOUR DE TABLE & DISCUSSION

**Why (and when) do researchers use implicit measures?**

- Behavior is not only driven by carefully constructed opinions but also by **automatic** cognitive processes. Understanding and predicting behavior thus requires a valid instrument for registering these automatic product appraisals.

  ! Implicit = automatic
  ! Implicit ≠ unconscious
  ! Implicit ≠ “real”

- Classic self-report measures are prone to biases (e.g., cheating, impression management)

  ! Implicit ≠ free of bias

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# WHAT IS AN IMPLICIT MEASURE?

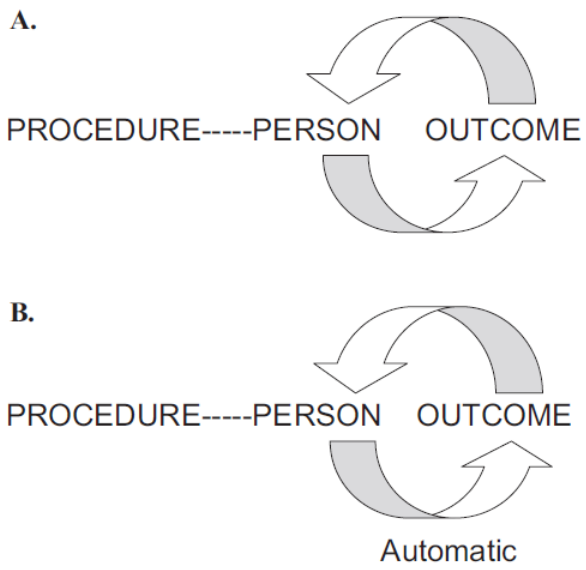


*Figure 1.* A schematic representation of the definition of (A) a measure and (B) an implicit measure.

De Houwer et al. (2009)

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# IMPLICATIONS FOR TEST DEVELOPMENT

- Demonstrate the **causal relationship** between variations in the to-be-measured attribute and the measurement outcome.
- Demonstrate that this causal relationship exists under **automaticity conditions**.
- Ideally, demonstrate why (i.e., via **what mechanism**) variations in the attribute cause variations in the measurement outcome.
- Each of these implications requires **experimental/empirical research**.

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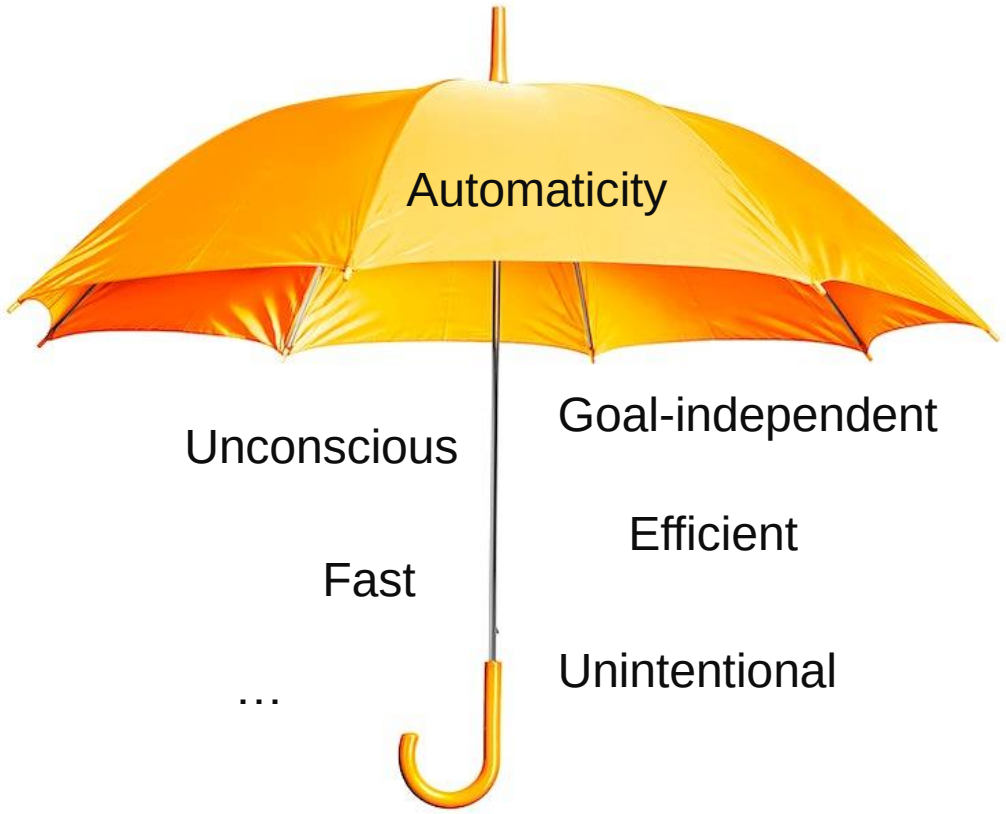
# AUTOMATICITY




Moors & De Houwer (2006)

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# SOME EXAMPLES

**Unintentional yet goal-dependent**

PROGRAM
SPEAKER
TUMOR
RACIST
PUPIL
SCREEN
RAPIST
WAR

Everaert et al. (2013)

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**Unintentional yet goal-dependent**

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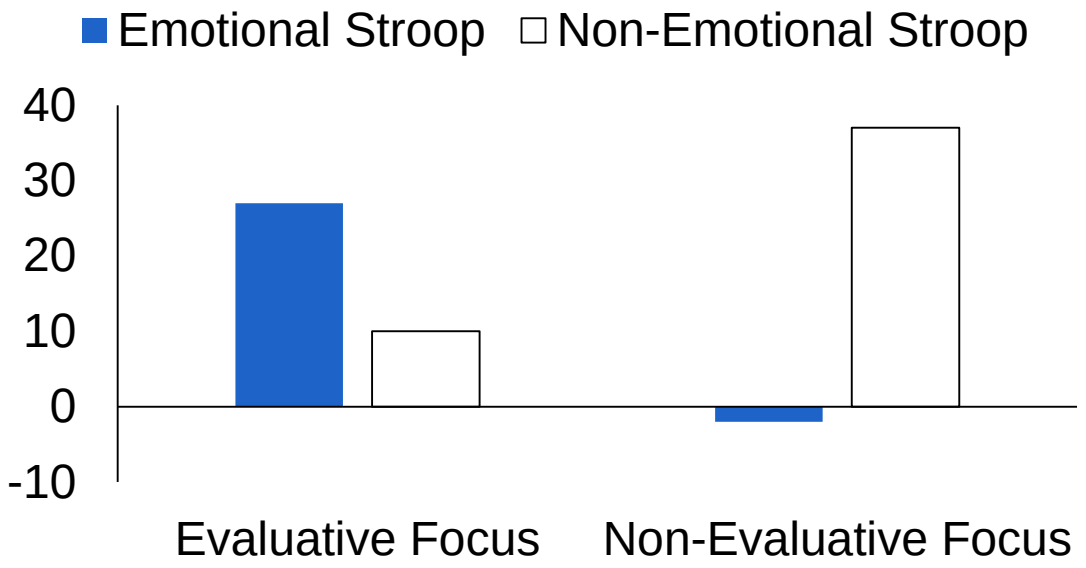


Everaert et al. (2013)

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# SOME EXAMPLES

**Validation of The Implicit Attribute Classification Task (IMPACT, Altenburg & Spruyt, 2022)**


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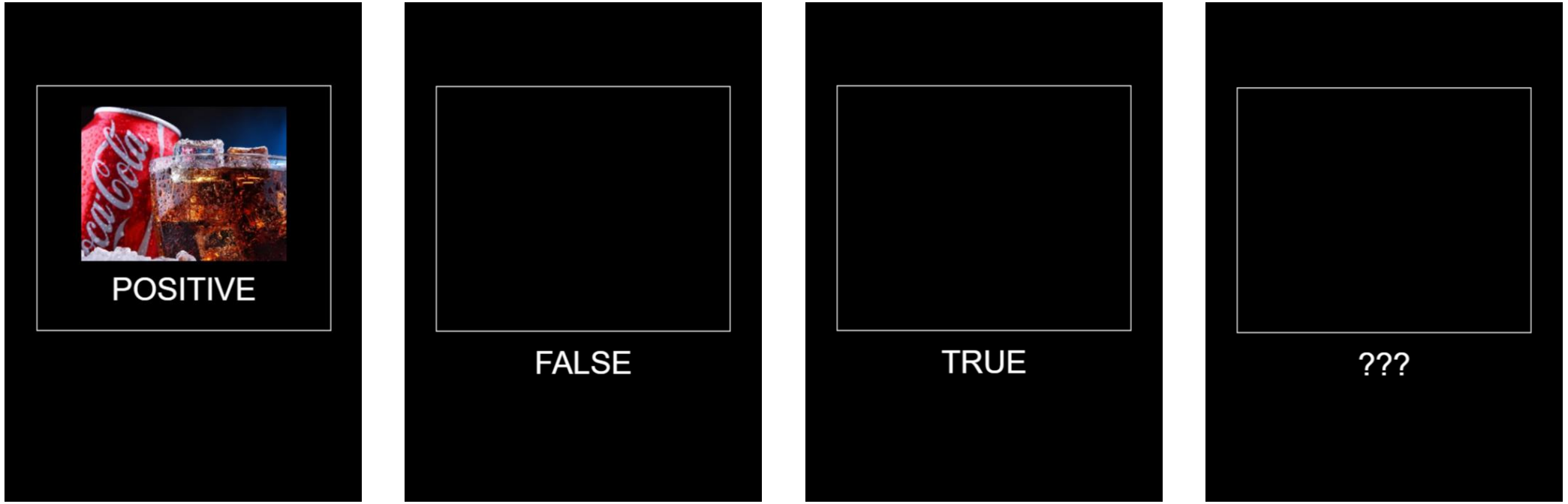


SOA (ms):
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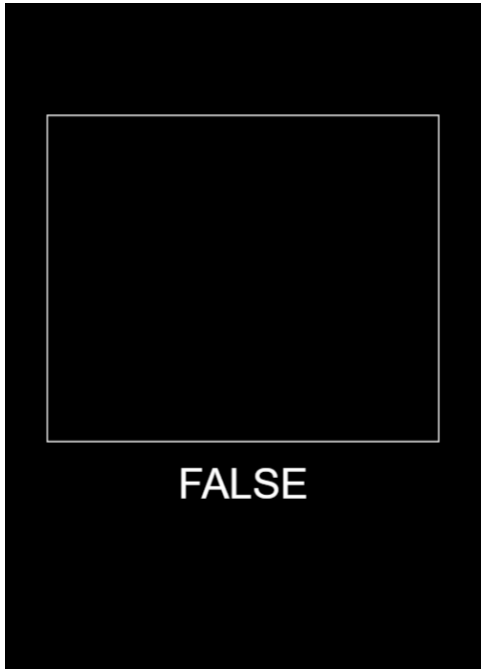


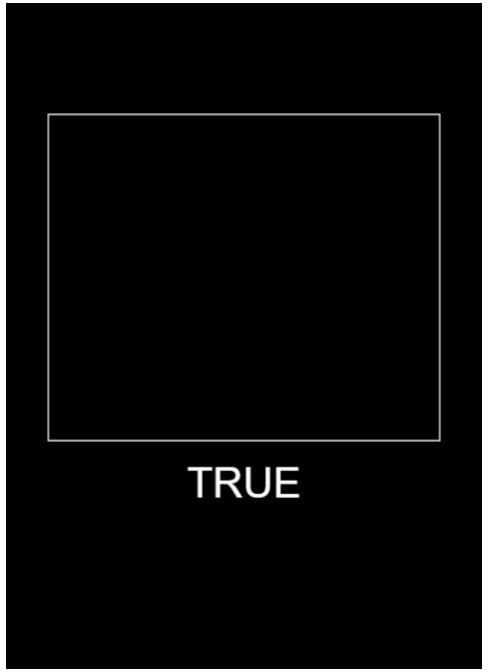


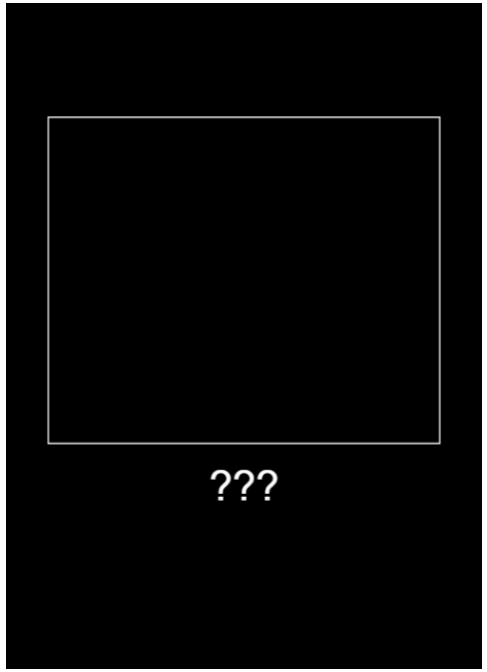


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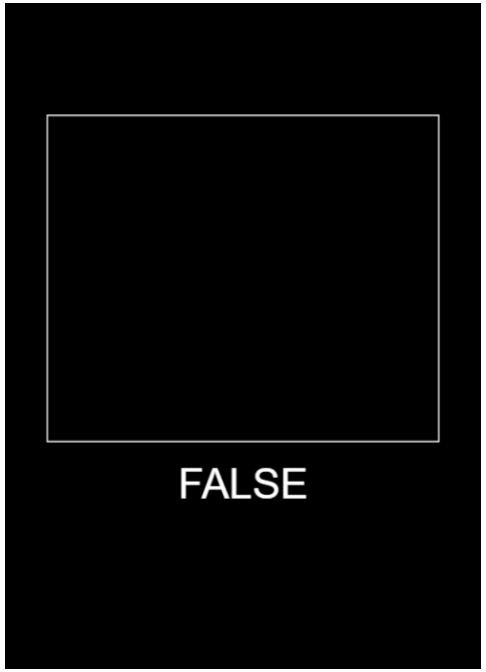



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# IMPLICATIONS FOR TEST SELECTION

- Just as the use of an implicit measure must be well justified, it is important to think carefully about which implicit measure is most suitable to answer a specific research question.


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# STRUCTURAL INGREDIENTS

- Most implicit measures capitalize on well-known (and well-documented) compatibility effects.
- Several criteria relevant for test selection are intrinsically linked to the nature of these compatibility effects.
- Implicit measures that look very different at the surface can capitalize on the same underlying processes.
- Accordingly, it is important to understand the structural makeup of different implicit measures.

# STRUCTURAL INGREDIENTS

**Irrelevant Stimulus – Response Compatibility effects (I-SRC)**


Spruyt & De Houwer (2017)

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# STRUCTURAL INGREDIENTS

**Irrelevant Stimulus – Response Compatibility effects (I-SRC)**

**Question:**

Can you think of a Simon task that (in principle) allows you to capture implicit attitudes towards 2 contrasting racial categories?

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# STRUCTURAL INGREDIENTS

**Irrelevant Stimulus – Response Compatibility effects (I-SRC)**

“POSITIVE”

“NEGATIVE”

“NEGATIVE”

“POSITIVE”

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# STRUCTURAL INGREDIENTS

**Relevant Stimulus – Response Compatibility effects (R-SRC)**




| | | | | |
|---|---|---|---|---|
| **Block 1:** | “POSITIVE” | “POSITIVE” | “NEGATIVE” | “NEGATIVE” |
| **Block 2:** | “NEGATIVE” | “NEGATIVE” | “POSITIVE” | “POSITIVE” |

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# STRUCTURAL INGREDIENTS

**Stimulus – Stimulus Compatibility effects (SSC)**

| Classic Stroop | Response | I-SRC | SSC |
|---|---|---|---|
| YELLOW | yellow | compatible | compatible |
| RED | red | compatible | compatible |
| BLUE | blue | compatible | compatible |
| GREEN | green | compatible | compatible |
| BLUE | yellow | incompatible | incompatible |
| RED | blue | incompatible | incompatible |
| GREEN | red | incompatible | incompatible |
| YELLOW | green | incompatible | incompatible |

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# STRUCTURAL INGREDIENTS

**Stimulus – Stimulus Compatibility effects (SSC)**

| Adapted Stroop | Response | I-SRC | SSC |
|---|---|---|---|
| *YELLOW* | italic | NA | compatible |
| RED | regular | NA | compatible |
| *BLUE* | italic | NA | compatible |
| GREEN | regular | NA | compatible |
| BLUE | regular | NA | incompatible |
| *RED* | italic | NA | incompatible |
| GREEN | regular | NA | incompatible |
| *YELLOW* | italic | NA | incompatible |

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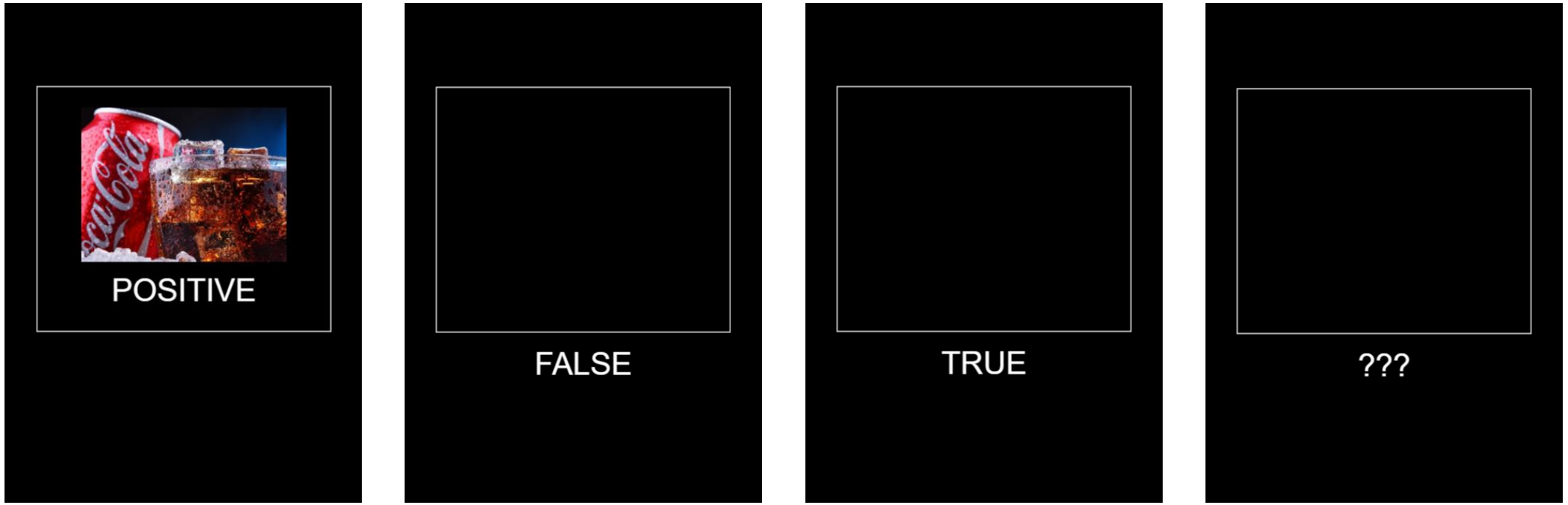
# STRUCTURAL INGREDIENTS

**Response – Response Compatibility effects (RRC)**




Altenburg & Spruyt (2022)

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# STRUCTURAL INGREDIENTS

**Structure-related selection criteria**

| | |
|---|---|
| Versatility | R-SRC < I-SRC < SSC = RRC |
| Reliability | SSC < I-SRC < R-SRC = RRC$^{?}$ |
| Ease of completion | RRC < R-SRC < I-SRC = SSC |

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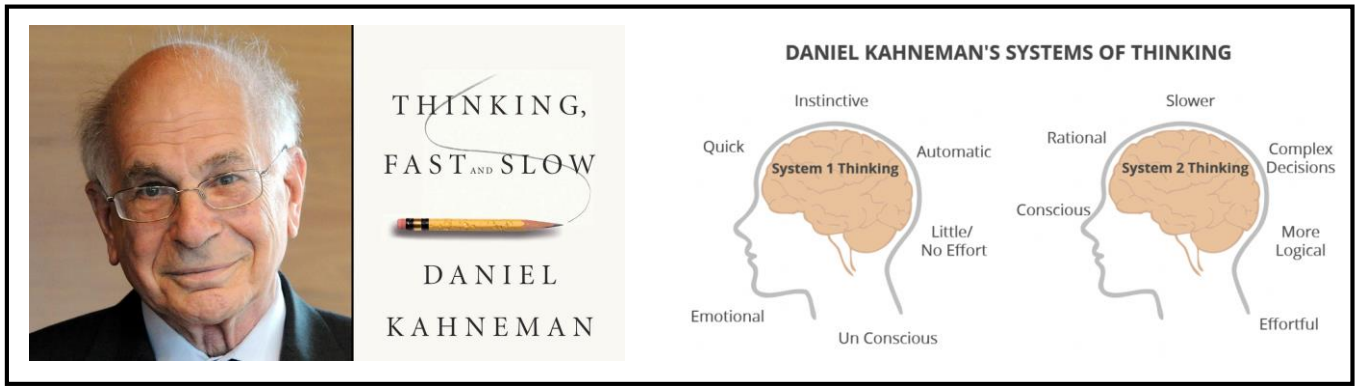
# COMMON MISTAKES

- Failing to adopt a decompositional view on automaticity.
- Failing to specify in what way a measure qualifies as implicit.
- Failing to select the appropriate implicit measure given a research question (and justify why).
- Failing to separate levels of analysis: mapping the quality of a given process onto the automaticity conditions under which this process can operate (e.g., “if a process is automatic, it must be associative”).

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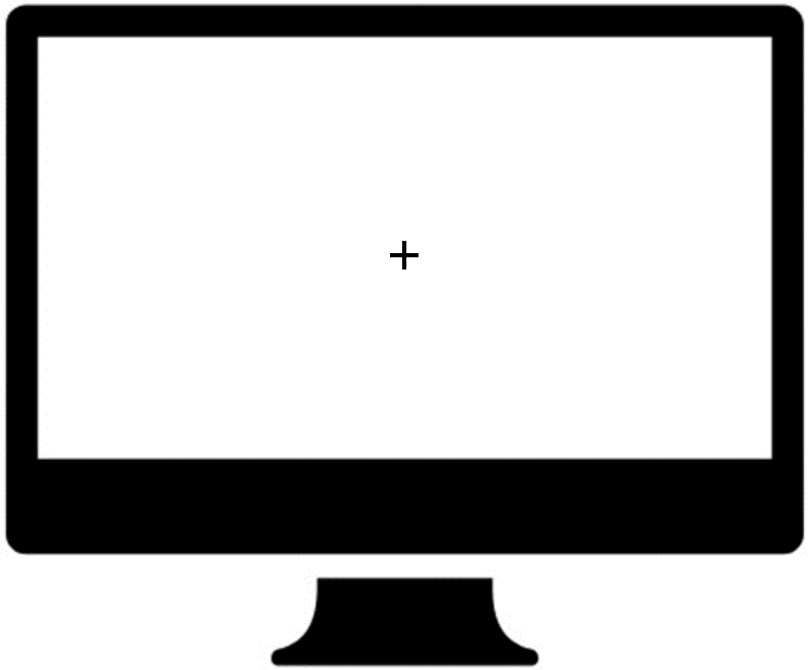
# COMMON MISTAKES

**The Relational Simon Task**



Spruyt & De Houwer (2017)

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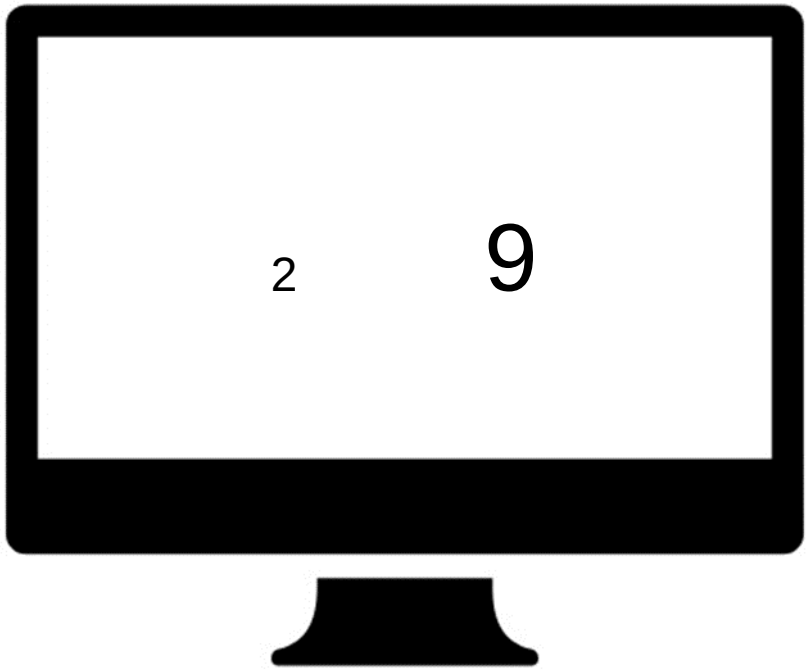


Spruyt & De Houwer (2017)

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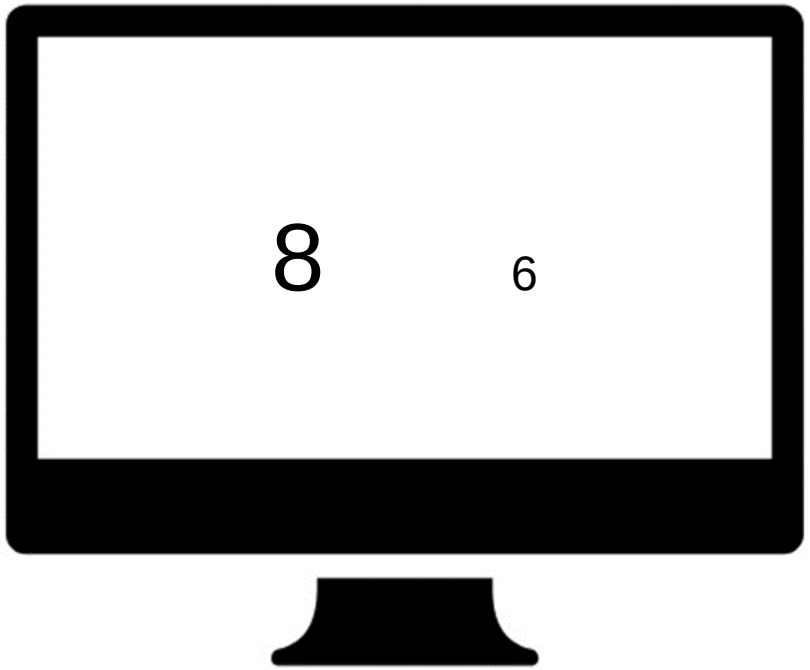


Spruyt & De Houwer (2017)

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Spruyt & De Houwer (2017)

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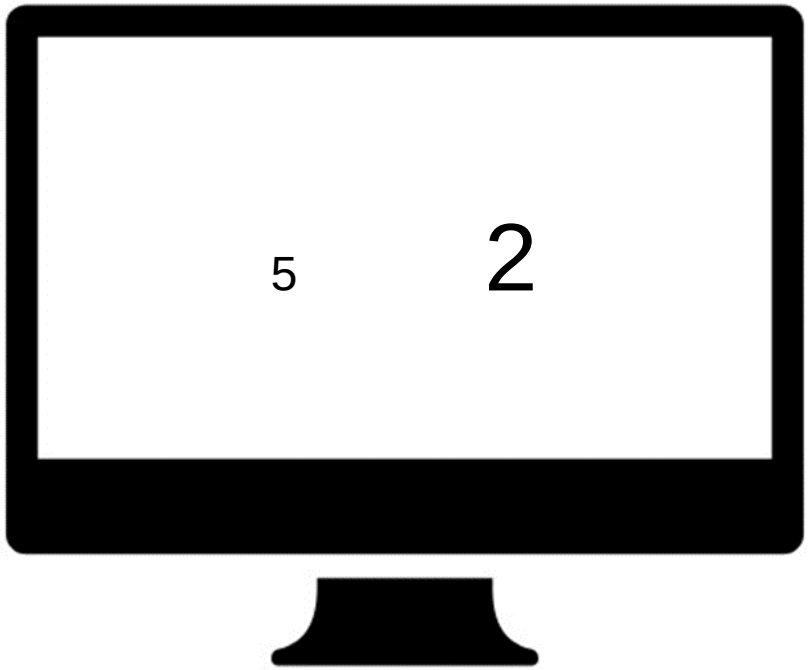


Spruyt & De Houwer (2017)

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# COMMON MISTAKES

**The Relational Simon Task**


Spruyt & De Houwer (2017)

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# COMMON MISTAKES

- Failing to adopt a decompositional view on automaticity.
- Failing to specify in what way a measure qualifies as implicit.
- Failing to select the appropriate implicit measures given a research question (and justify why).
- Mapping the quality of a given process onto the automaticity conditions under which this process can operate (e.g., “if a process is automatic, it must be associative”).
- Failing to recognize that beliefs can operate under automaticity conditions (cf. PEP, RRT, IRAP).
- Failure to recognize that significant procedural differences between implicit measures can go hand in hand with major structural similarities ... and vice versa.

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# 2. THE CLASSICS

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# CLASSIC/PROMISING IMPLICIT MEASURES

**Overview**

- Evaluative Priming Paradigm (EPP)
- Affect Misattribution Procedure (AMP)
- Implicit Association Task (IAT)
- Propositional Evaluation Paradigm (PEP)

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# THE EVALUATIVE PRIMING PARADIGM

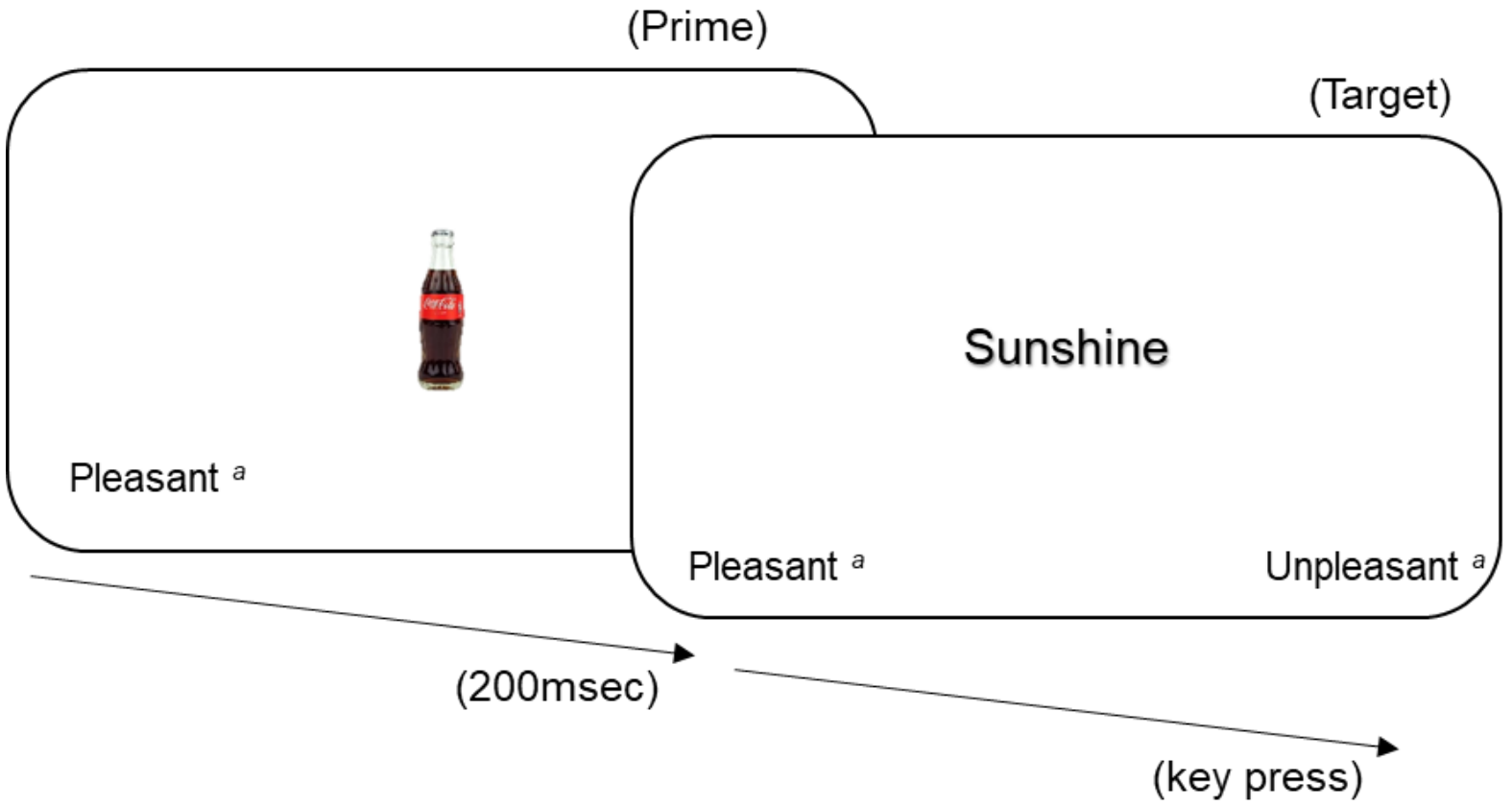
**Sequential priming**

- A prime stimulus is presented before a target stimulus. Participants are required to categorize the target stimulus according to specific instructions.
- Primes and targets are related on some trials (i.e., congruent trials) but not on others (i.e., incongruent trials).
- Manipulating of the conditions under which the sequential priming effect replicates (e.g., high cognitive load, fatigue, with(out) time pressure, …) provides insights into the conditions under which specific stimulus attributes (a) can be processed and (b) affect downstream cognitive processes

**The evaluative priming paradigm (EPP)**

- Developed by Fazio, Sanbonmatsu, Powell, & Kardes (1986) and became popular when used to assess individual differences (Fazio et al., 1995).
- Sequential priming task, designed to tap into individual differences in implicit evaluative processes (Fazio et al., 1986, 1995)

# THE EVALUATIVE PRIMING PARADIGM




Stimuli: Primes - pictures of Coca Cola or Pepsi Cola; Targets - pleasant or unpleasant words.
[a] Response instructions are optional.

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# THE EVALUATIVE PRIMING PARADIGM

**Measure**

- Accuracy and response latency as proxy of underlying implicit process

**Underlying assumption**

- The valence of a prime affects speed and accuracy of categorization of the target.
- Stroop-like response interference contribute the EPP effect

**Example**

- If responses to positive targets are faster when preceded by Coca Cola pictures, compared to Pepsi Cola pictures, participants may have ‘an implicit attitude’ toward Coca Cola that is more positive than towards Pepsi Cola.

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# THE EVALUATIVE PRIMING PARADIGM

**Food for thought**

- I have two prime categories (McDo and KFC) and two target categories (Pleasant and Unpleasant words). I construct two different implicit measures.
- My first implicit measure is based on the performance on the ‘McDo & positive words’ trials and the ‘McDo & negative words’ trials (IM = ‘McDo & positive words’ - ‘McDo & negative words’).
- My second measure is based on all trials (IM = ‘McDo & positive words’ + ‘KFC & negative words’ - ‘McDo & negative words’ – ‘KFC & Positive words’).
- **Does this matter, and what’s is the difference between both measures?**

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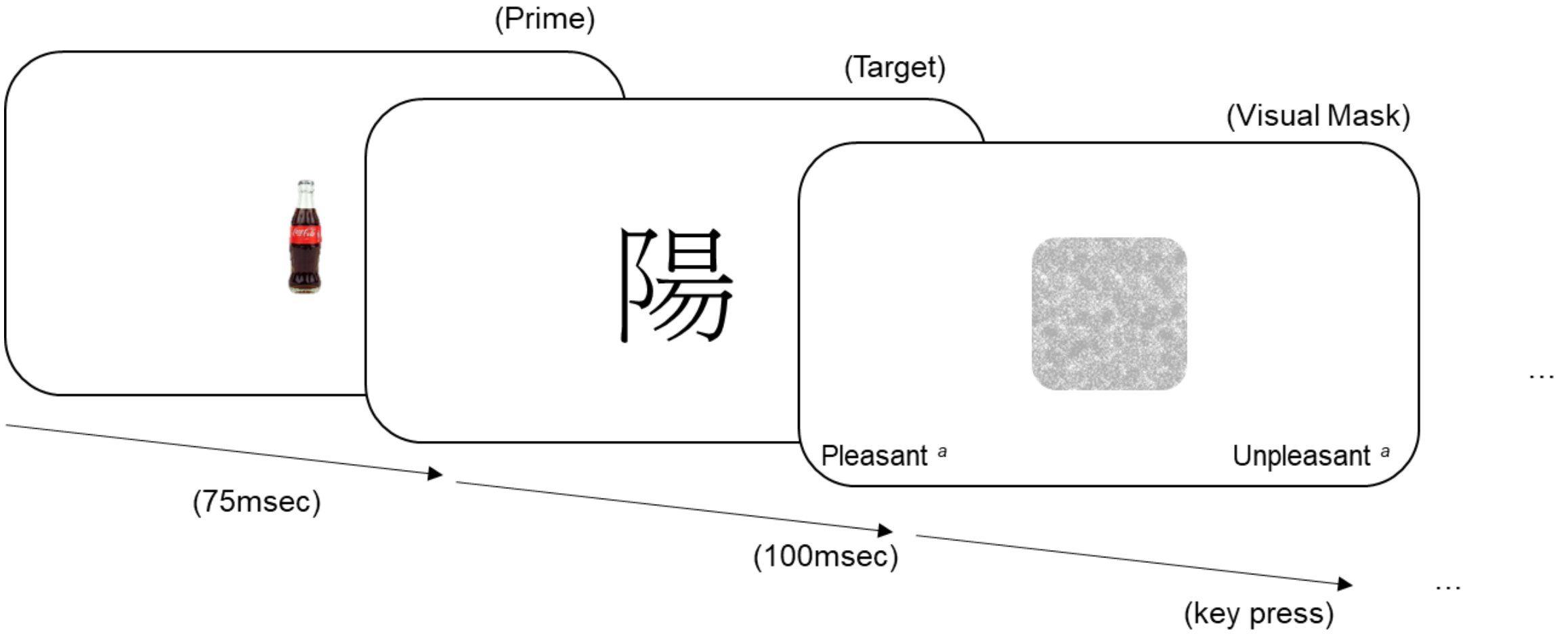
# THE AFFECT MISATTRIBUTION PROCEDURE

- Adaptation of Murphy and Zajonc's sequential priming paradigm (1993): emotional faces as primes, followed by Chinese characters as targets.

# THE AFFECT MISATTRIBUTION PROCEDURE




Stimuli: Primes - pictures of Coca Cola or Pepsi Cola; Targets – Chinese Pictographs. Response instructions are optional.

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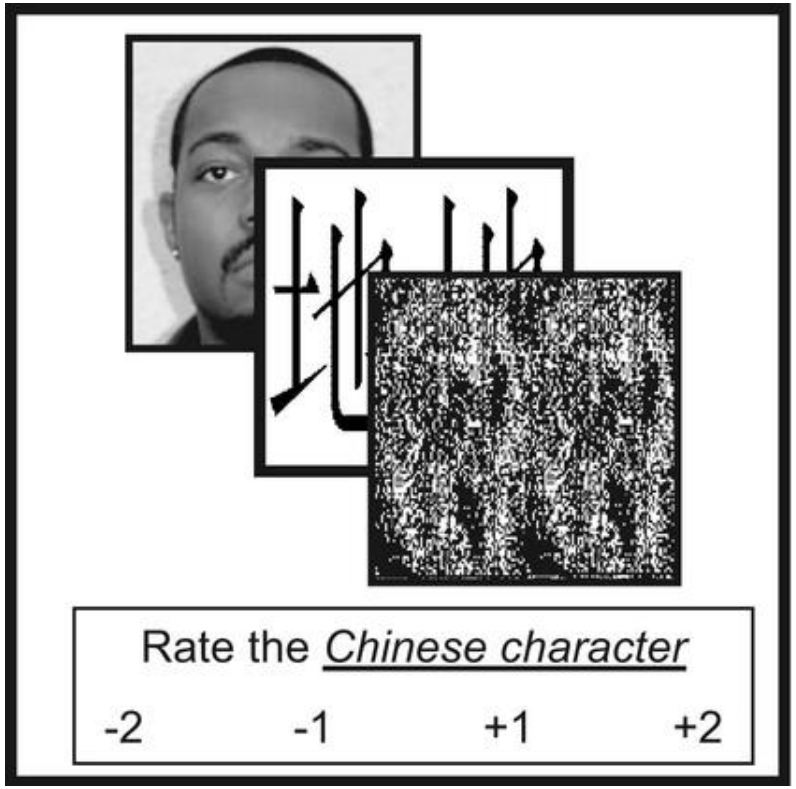
# THE AFFECT MISATTRIBUTION PROCEDURE

- Likert scales in stead of binary responses
- Many types of primes
- Absolute and relative measures




Picture copied from: Payne, B. K., Burkley, M. A., & Stokes, M. B. (2008). Why do implicit and explicit attitude tests diverge? The role of structural fit. *Journal of personality and social psychology*, *94*(1), 16.

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# THE AFFECT MISATTRIBUTION PROCEDURE

**Measure**

- Proportion of pleasant versus unpleasant judgements of targets given a specific prime/prime category as proxy of underlying implicit process (implicit attitude towards the prime/prime category).

**Underlying assumption**

- The affect elicited by the primes is (mistakenly) used to evaluate the (neutral) Chinese ideographs (but see Hughes et al., 2021).

**Example**

- If the proportion of positive responses following a Coca Cola prime is larger than 0, a participant is assumed to have a positive (implicit) attitude towards Coca Cola.
- If the proportion of positive responses following Coca Cola prime is larger than the proportion of positive responses following Pepsi Cola prime, a participant is assumed to prefer Coca-Cola over Pepsi Cola.

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# THE AFFECT MISATTRIBUTION PROCEDURE

**Food for thought**

- Compare the structural make-up of the AMP and the EPP.
- What are the main differences?
- Which one is less complex, both from a procedural and a UX point of view?

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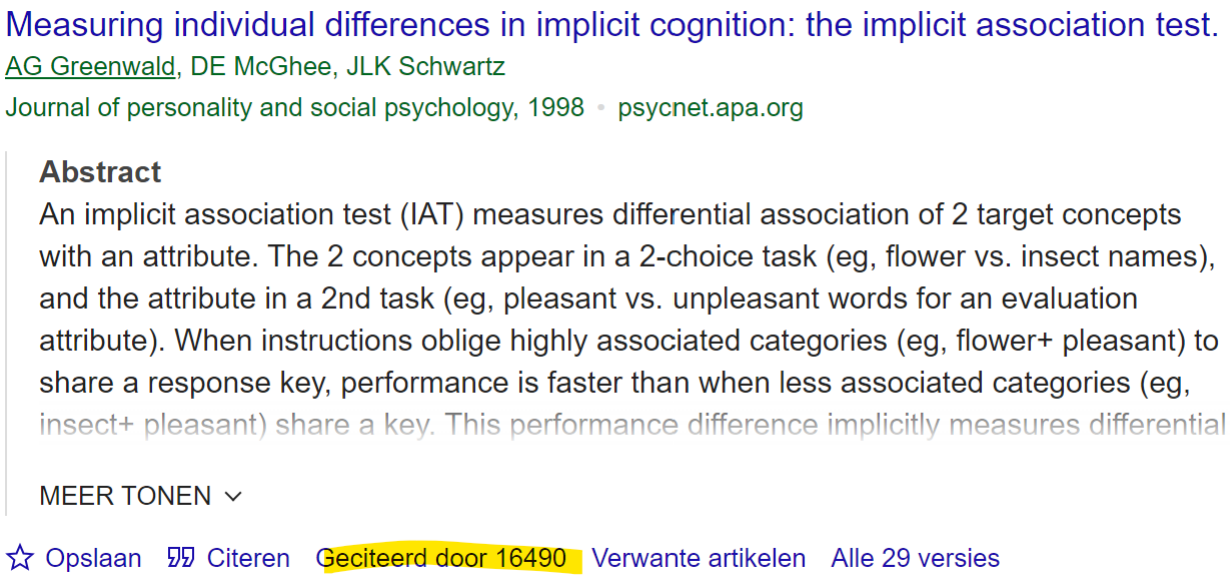
# THE IMPLICIT ASSOCIATION TEST

- The most popular response latency based implicit measure.
- Developed by Greenwald, McGhee, & Schwartz (1998).
- Intensively used, heavily debated.


Measuring individual differences in implicit cognition: the implicit association test.
AG Greenwald, DE McGhee, JLK Schwartz
Journal of personality and social psychology, 1998 • psycnet.apa.org

**Abstract**
An implicit association test (IAT) measures differential association of 2 target concepts with an attribute. The 2 concepts appear in a 2-choice task (eg, flower vs. insect names), and the attribute in a 2nd task (eg, pleasant vs. unpleasant words for an evaluation attribute). When instructions oblige highly associated categories (eg, flower+ pleasant) to share a response key, performance is faster than when less associated categories (eg, insect+ pleasant) share a key. This performance difference implicitly measures differential

MEER TONEN

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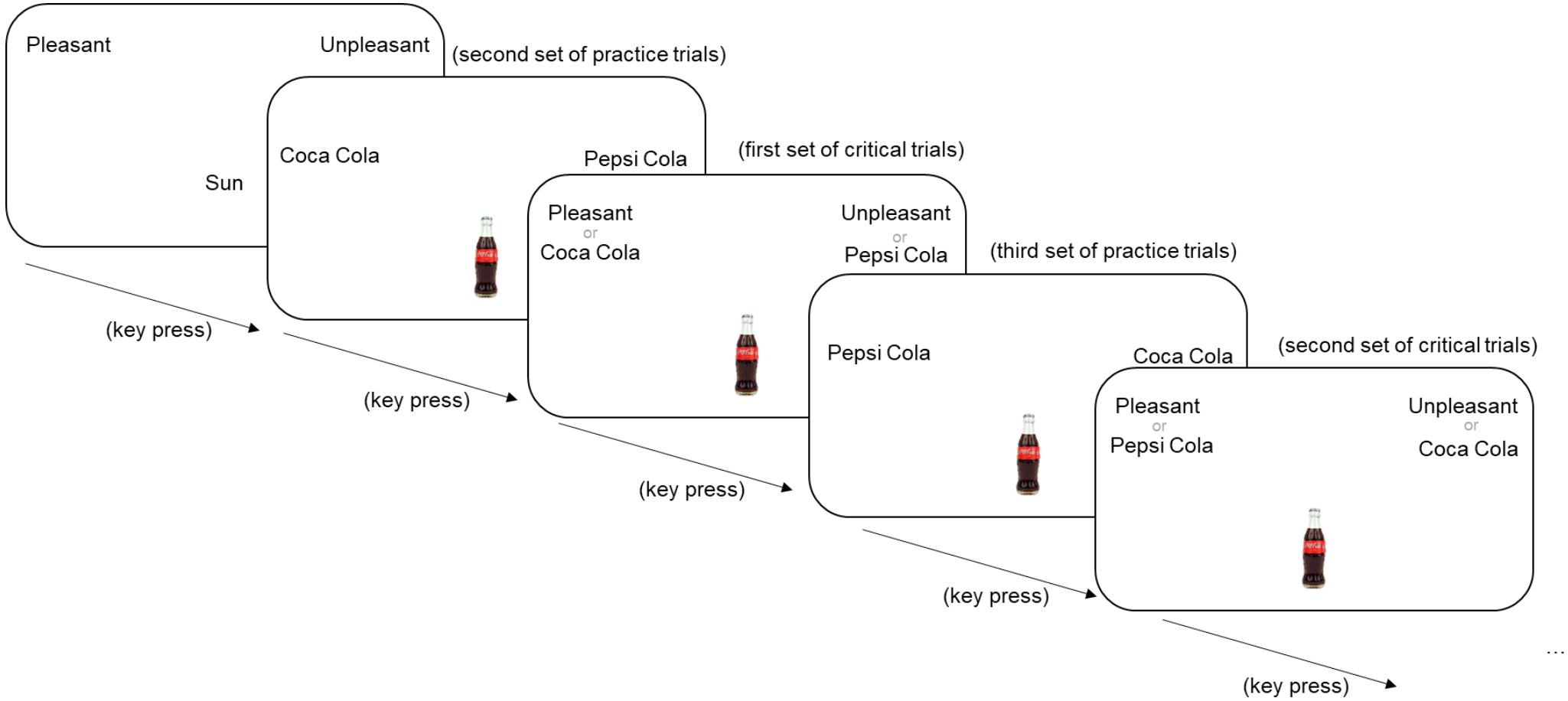
# THE IMPLICIT ASSOCIATION TEST




Stimuli (bottom center of screen): pleasant or unpleasant words in first set of practice trials, pictures of Coca Cola or Pepsi Cola in second and forth sets of practice trials, and combinations of pleasant words, unpleasant words, pictures of Coca Cola and pictures of Pepsi Cola in critical trials.

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# THE IMPLICIT ASSOCIATION TEST

| Critique | Solution | References |
|---|---|---|
| Too long | The Brief Implicit Association Test | Sriram et al. (2009). The brief implicit association test. *Experimental psychology*, *56*, 283-294. |
| Unspecified / too vague / normative | The personalized IAT | Olson et al. (2004). Reducing the influence of extra-personal associations on the Implicit Association Test: personalizing the IAT. *Journal of personality and social psychology*, *86*, 653. |
| Procedural bias (e.g., block order effects) | The recoding free IAT | Rothermund et al. (2009). Minimizing the influence of recoding in the implicit association test: The recoding-free implicit association test (IAT-RF). *Quarterly Journal of Experimental Psychology*, *62*, 84-98. |
| Only relative measures | The single category IAT | Karpinski, A., & Steinman, R. B. (2006). The single category implicit association test as a measure of implicit social cognition. *Journal of personality and social psychology*, *91*, 16. |
| Limited to 1 appraisal dimension | IMPACT | Altenburg, D., & Spruyt, A. (2022). Predicting meat consumption from concurrent, automatic appraisals: Introducing nuance to product appraisals. *Appetite, 170,* 105847. |

# THE IMPLICIT ASSOCIATION TEST

**Measure**

- Task performance (i.e., response latency and categorization accuracy) in the first critical task is compared to task performance in the second critical task

**Underlying assumption**

- Categorization performance in critical trials is a function of the degree of association in memory between stimulus categories assigned to the same key.

**Example**

- If task performance is better (i.e., faster response latencies and fewer errors) when pictures related to Coca Cola and pleasant words share the same response key as compared to when pictures related to Coca Cola and unpleasant words share the same response key, it is assumed that a participant prefers Coca-Cola over Pepsi-Cola.

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# PROPOSITIONAL EVALUATION PARADIGM

**Recent finding**

- The realm of automatic cognitive processing extends to complex, propositional information (cf. above).

**This insight has a huge impact on the interpretation of implicit measures**

- Classic/association-based interpretation: The Coca Cola vs. Pepsi Cola IAT score reflects the association strength between Coca Cola and pleasant/unpleasant relative to Pepsi Cola.
- Propositional interpretation: Different (implicit) belief/propositions may underly the same association.
- For example, Coca Cola may be associated with good because …
  - … “my kids like Coca Cola (but I don’t)
  - … “it would be nice to like Coca Cola (so that I can enjoy Coca Cola together with my kids”

**Conclusion**

- Another class of implicit measures is needed to capture implicit propositional beliefs.

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# PROPOSITIONAL EVALUATION PARADIGM

**Basic approach**

- An adaptation of the sequential priming paradigm, developped by Müller and Rothermund (2019).

**Primes**

- Complete sentences (e.g., “I like Coca Cola”), rather than single words or pictures, presented in a in a word-by-word fashion.

**Targets**

- Three target stimuli: “True”, “False”, and “?? True of False ??” (cf. the IMPACT).
- Two tasks, in a random intermixed order:
    - If the target stimulus is “True” or “False”, press “E” for “False” and “I” for “True”
    - If the target stimulus is “?? True of False ??”: Evaluate of the truth value of the statements (e.g., press “E” if you belief the statement is false and press “I” if you belief the statement is true).

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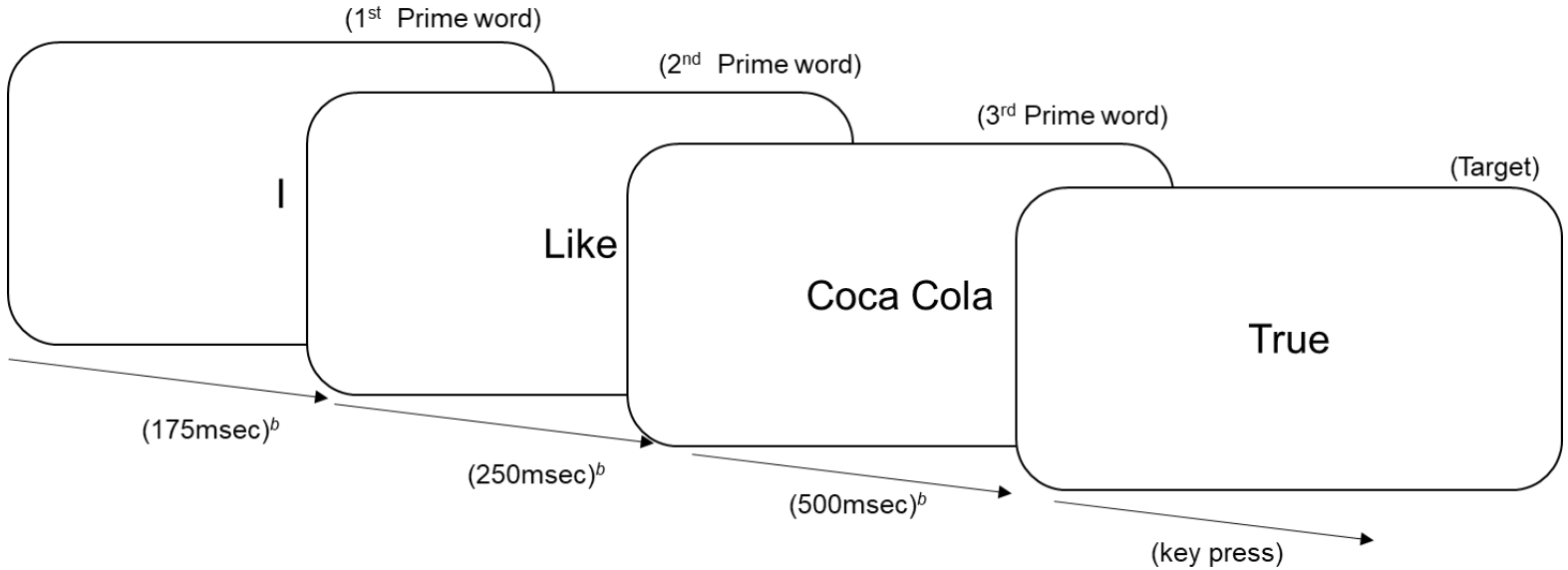
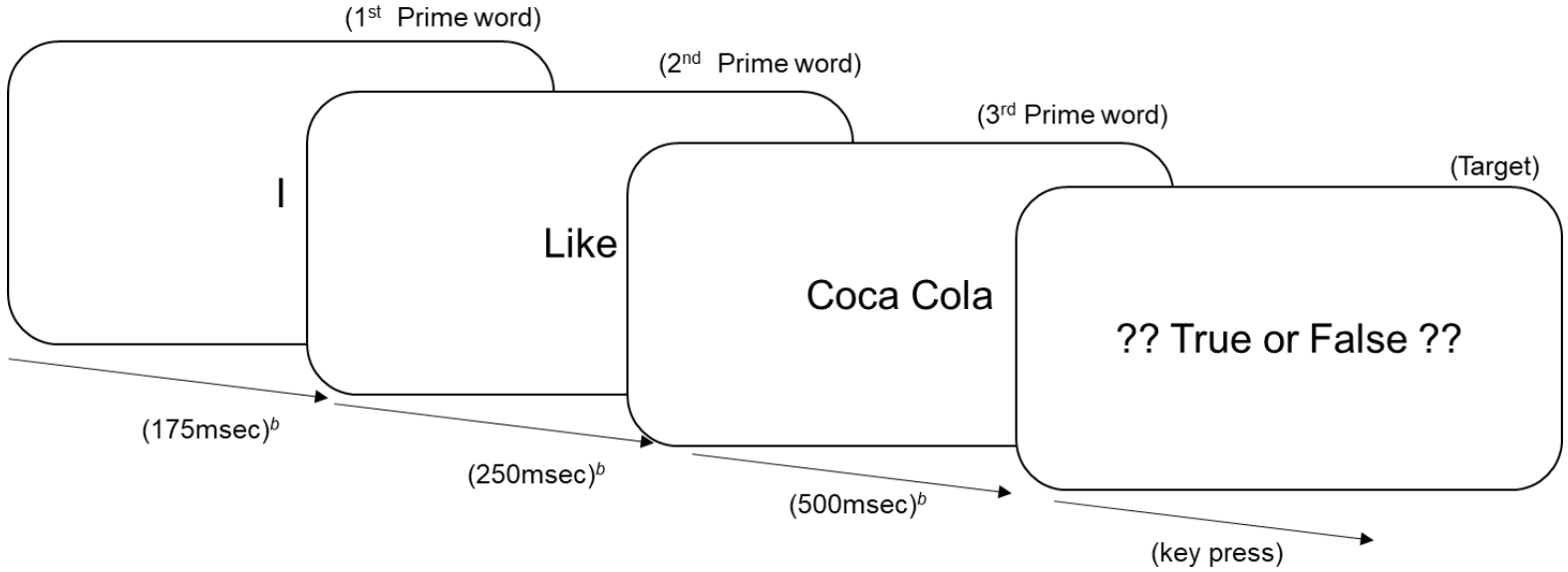
# PROPOSITIONAL EVALUATION PARADIGM




**Measurement trial**




**Catch trial**

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# PROPOSITIONAL EVALUATION PARADIGM

**Measure**

- On some (measurement) trials, the truth value of the primes matches the truth value implied by the target stimuli (i.e., compatible trials) whereas on other (measurement) trials, the truth value of the primes and the truth value implied by the targets mismatches (i.e., incompatible trials).
- Task performance (i.e., response latency and categorization accuracy) is superior on compatible (measurement) trials as compared to incompatible (measurement) trials.
- Catch trials are only used to ensure that participants read/process the statements.

**Underlying assumption**

- The automatic truth validation of the primes results in a pre-activation of a corresponding response.

**Example**

- A preference for Coca Cola over Pepsi Cola would be inferred if performance is superior when positive (negative) statements related to Coca Cola precede the task cue ‘True’ (‘False’) as compared to when positive (negative) statements related to Pepsi Cola precede the task cue ‘True’ (‘False’).

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# FUNCTIONAL MAPPING APPROACH

- The utility of an implicit measure depends on the degree of overlap between the operating conditions of the behavior one seeks to study and the operating conditions of the (presumed) processes at play in that implicit measure.

- Consequently, it makes little sense to proclaim a specific implicit measure as the most appropriate instrument in general terms.

- Instead, for each research question, a careful examination is needed of the exact set of automaticity conditions that must be realized to allow for a meaningful evaluation of one's research questions.

# FUNCTIONAL MAPPING APPROACH

**Exercise 1:**

- In what way(s) does the EPP qualify as implicit?
- What type of research would be needed to establish the automaticity of the EPP effect?

**Exercises 2:**

- In what way(s) does the IAT qualify as implicit?
- What type of research would be needed to establish the automaticity of the IAT effect?

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