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Response inhibition and IRAP performance: an exploratory study.

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Disclosures:

Miguel Rodríguez-Valverde, Mónica Hernández-López.

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- The IRAP is a computer-based reaction-time procedure for the measurement of brief, immediate relational responses.

- It requires that participants respond under time pressure to stimulus relations in a manner that is supposed to be either consistent or inconsistent with their learning history.

- The rationale is that participants will take longer to respond to inconsistent than to consistent trials.

D score= Latency Inconsistent – Latency Consistent

- Assumption: latency differences depend on the IRAP content. What about individual differences not having to do with the specific content of the IRAP?

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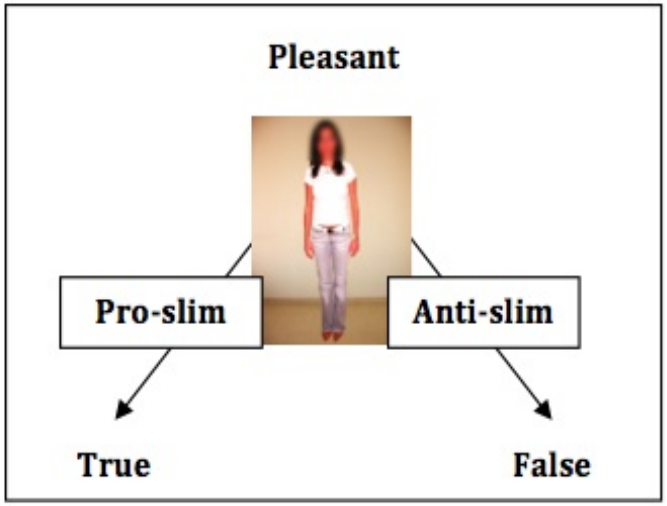
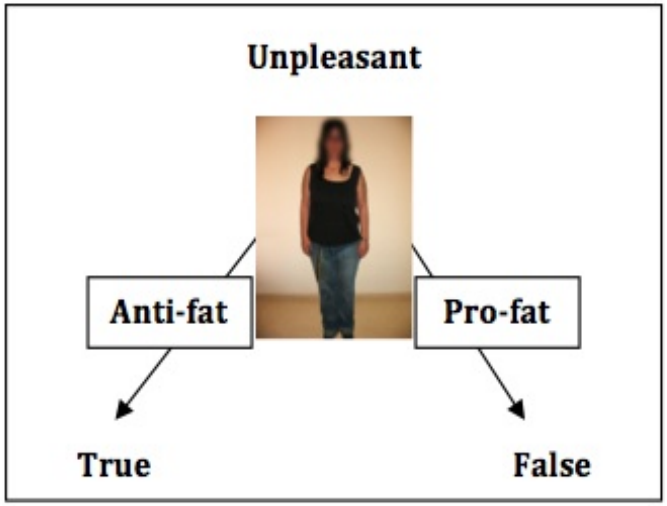
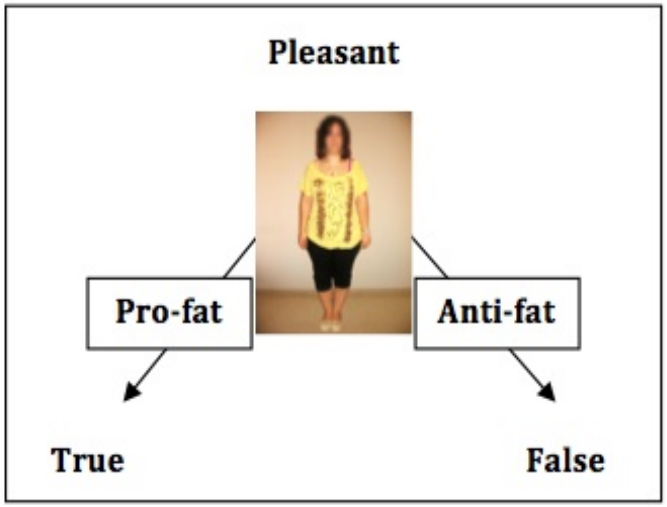
Pleasant-Slim trial type



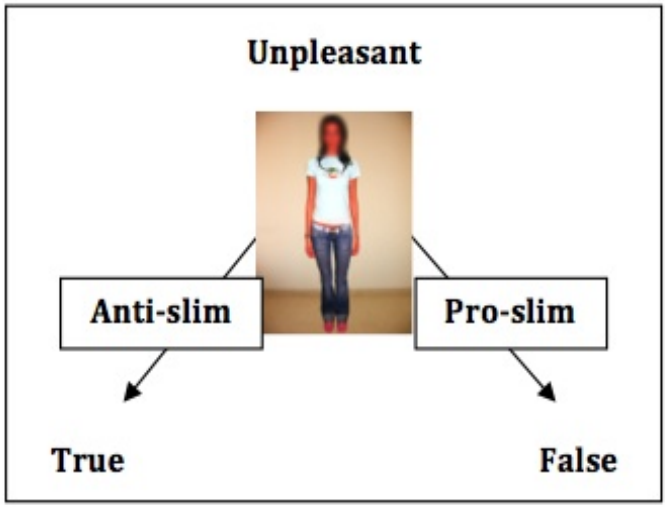
Unpleasant-Fat trial type



Pleasant-Fat trial type



Unpleasant-Slim trial type



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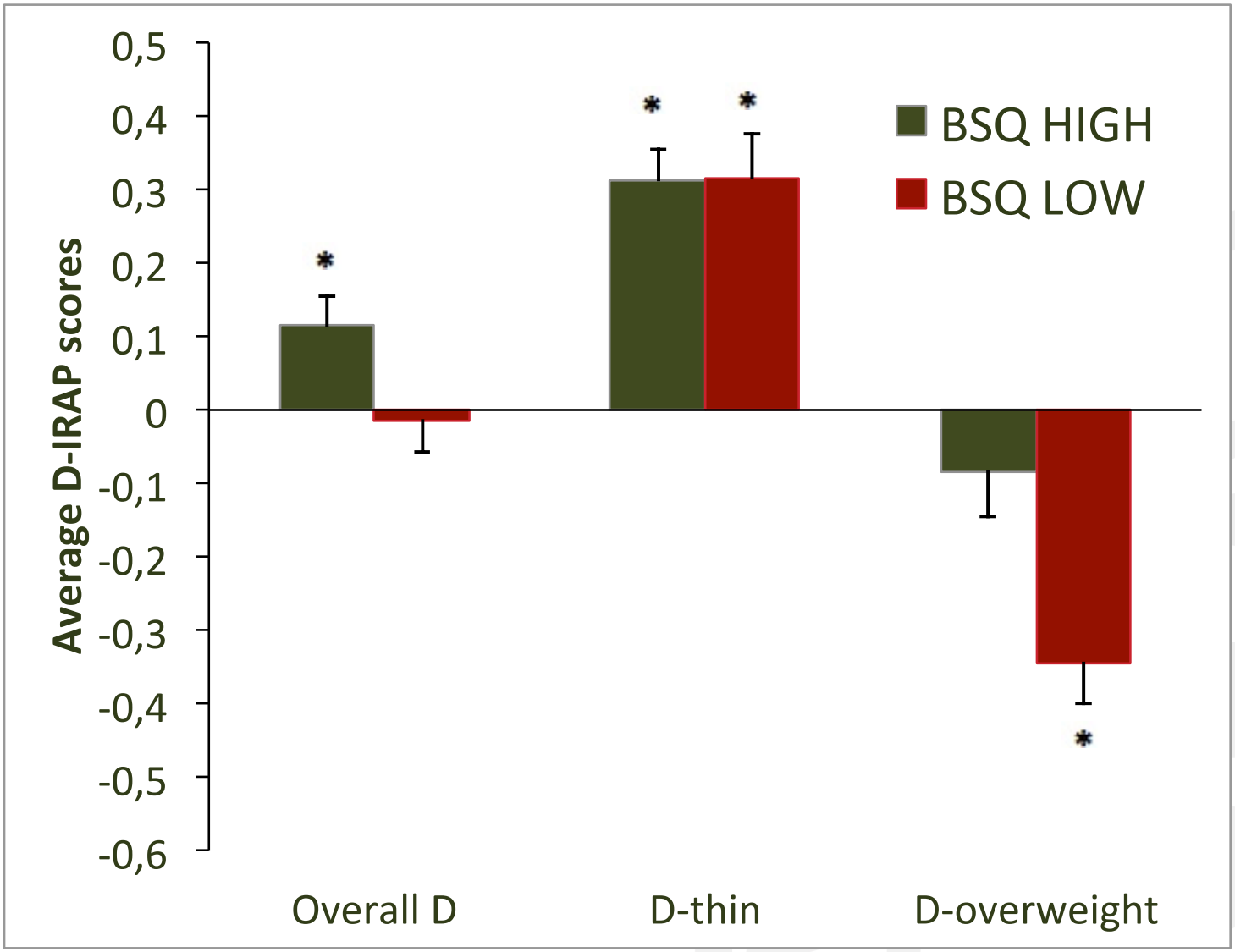
0,5
0,4
0,3
0,2
0,1
0
-0,1
-0,2
-0,3
-0,4
-0,5
-0,6
Average D-IRAP scores
BSQ HIGH
BSQ LOW
Overall D
D-thin
D-overweight

- Nicholson et al. (2014) explored the role of attentional control on IRAP performance. Self-reported ability to inhibit prepotent responses (response inhibition) and focus attention on the task was the best predictor of IRAP accuracy.
- Response inhibition is a hallmark of executive control. Suppression of no-longer required or inappropriate actions, which supports flexible and goal-directed behavior in ever-changing environments (Verbruggen & Logan, 2009).
- Demands on response inhibition should be higher during inconsistent trials (requirement of a motor response that is not in coordination with the BIRR).
- Are individual differences in response inhibition a potential source of variance in the IRAP (irrespective of IRAP content)?

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Method

- Participants: 93 degree and masters students (70% female). M_{age}= 25 (22-27).
- Materials:

Attentional Control Scale (Derryberry and Reed, 2002)

- Self-report measure of attentional control.
  - Factor I: Focusing. Factor II: Shifting.

Implicit Relational Assessment Procedure

- Measure of brief, immediate, relational responses.

STOP-IT (Verbruggen, Logan, & Stevens, 2008):

- Computerized version of the STOP-signal task (Lappin & Ericksen, 1966; Logan & Cowan, 1984).
- Specific experimental measure of response inhibition.

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Method

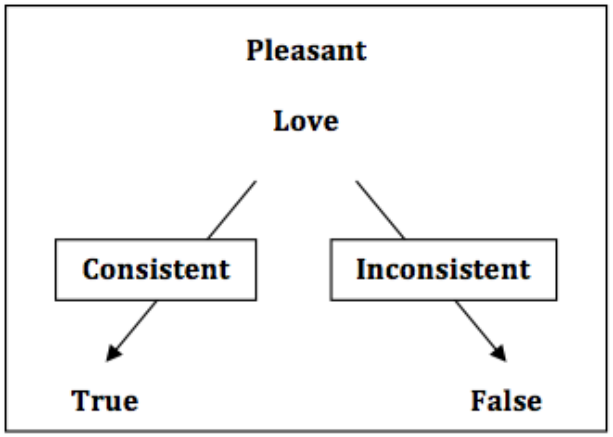
Attentional Control Scale (Derryberry and Reed, 2002)

- 20 items.
  - Factor I: Focusing/Inhibition
    - "My concentration is good, even if there is music in the room around me"
    - "When I am working hard on something, I still get distracted by events around me"
  - Factor II: Shifting
    - "I can quickly switch from one task to another"
    - "I have trouble carrying on two conversations at once"

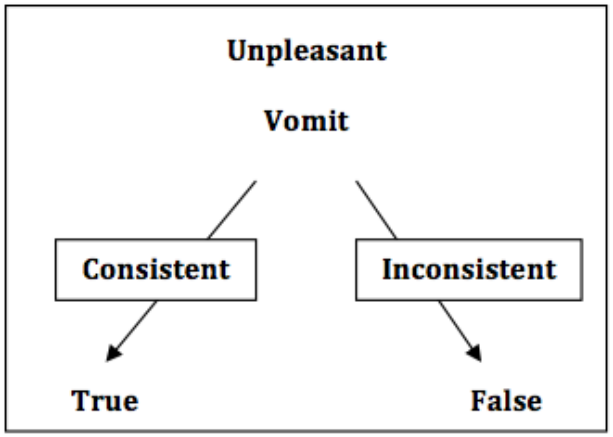
Method

IRAP (Barnes-Holmes et al., 2006)

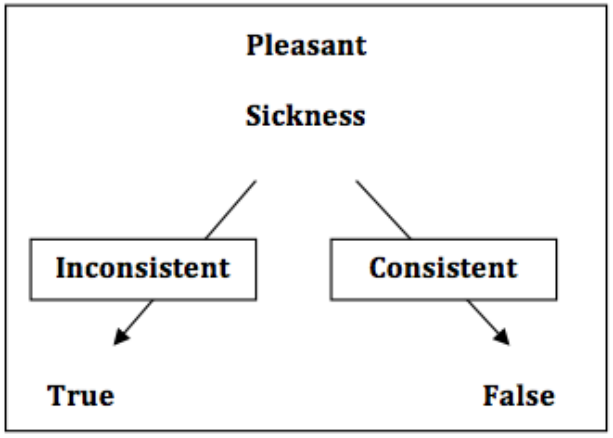
Pleasant-Positive trial type



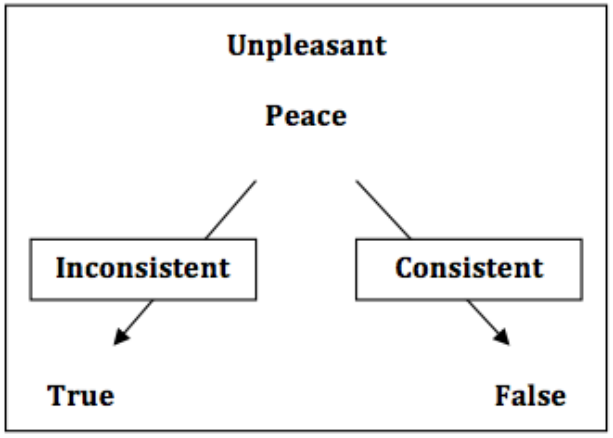
Unpleasant-Negative trial type



Pleasant-Negative trial type



Unpleasant-Positive trial type



Max. 6 pairs of practice blocks, (80% correct, 2000 ms latency).

Three pairs of test blocks.

Pleasant	Unpleasant
Love	Vomit
Freedom	Death
Peace	Murder
Hug	Filth
Joy	Sickness
Health	Abuse

Method

STOP-IT: STOP-signal task (Verbruggen, Logan & Stevens, 2008)

- Computer-based choice reaction-time task where participants are instructed to respond as fast as possible to a visual stimulus unless an auditory signal is presented after a variable delay.
- Primary RT task:

- On 25% of trials, an auditory signal after the visual stimulus indicates participants not to respond on that specific trial (variable stimulus-signal delay).

Method

STOP-IT: STOP-signal task (Verbruggen, Logan & Stevens, 2008)

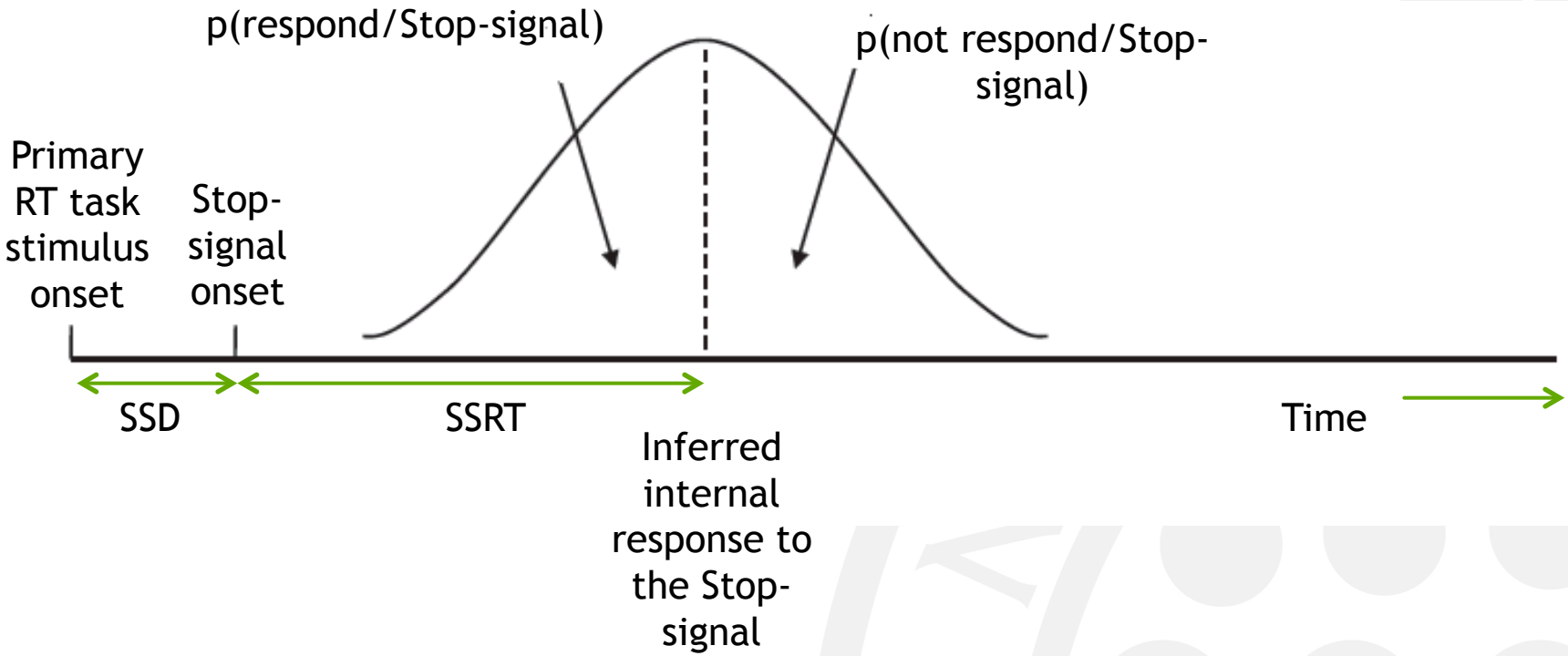


Illustration of the probabilities of responding/no responding upon Stop-signal presentation given the distribution of no-signal reaction times (primary task RT), the stop-signal delay (SSD), and the stop-signal reaction time (SSRT) (adapted from Verbruggen et al., 2008, p. 480).

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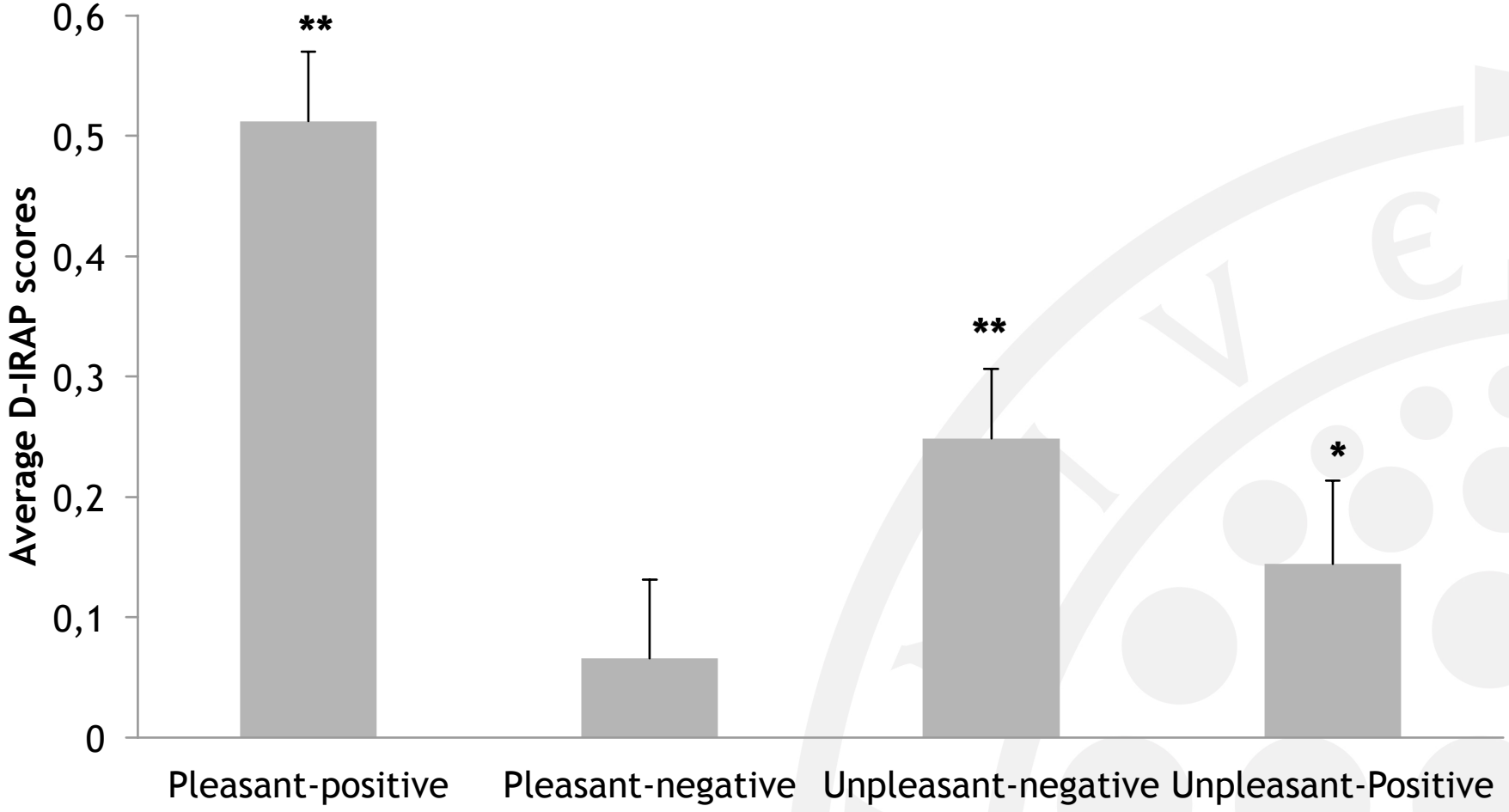
Procedure

Step 1	• Participant recruitment
Step 2	• Information and consent
Step 3	• Attentional Control Scale
Step 4	• IRAP (N=54)
Step 5	• STOP-signal task (N=46)

Results

IRAP: overall D=.24; $t(53)=6.449$; $p<.01$



* $p<0.05$
** $p<0.01$

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Results

STOP-signal task

- Mean SSRT=230.66 ms (*SD*=35.82)
- Mean SSD=415.72 ms (*SD*=140.58)

Correlational analysis

- Stop-signal measures (SSD and SSRT) do not correlate with anything.
- Overall D - percentage correct inconsistent test trials: r=-0.283; p=0.038.
- ACS_{total}-practice blocks to criteria: r=-0.226; *p*=0.03
- $ACS_{shifting}$-practice blocks to criteria: r=-0.255; *p*=0.014
- $ACS_{shifting}$-$D_{unpleasant\text{-}positive}$: r=-0.274; p=0.045

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Discussion

- Apparently, response inhibition does not affect IRAP performance when D scores are taken as the metric.
- IRAP would be resistant to potentially contaminating individual differences in response inhibition.
- Attrition rates were very high. Perhaps the IRAP was so demanding in terms of response inhibition that only participants very good at this ability passed the task.
- Self-reported attentional control does not seem to have an influence on IRAP performance either.

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