EVALUATIVE CONDITIONING APPLICATIONS IN HEALTH PSYCHOLOGY: CHANGING ATTITUDES TOWARDS HEALTHY FOOD AND SMOKING

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Summary

• Description of evaluative conditioning and its role in dual-process theories

• Various approaches in evaluative conditioning

• The value of evaluative conditioning procedures in health context
  Two illustrative cases:
  • EC and healthy food
  • EC and smoking cessation / decreasing
Dual process theories

- Two psychological systems: deliberative (controlled) and impulsive (automatic)
- Precursors:
  - Petty and Cacioppo's Elaboration Likelihood Model (central vs. peripheral route)
  - Kahneman's styles of processing: system 2 (reasoning) and system 1 (intuition)
  - Strack and Deutsch’s two systems: reflexive and impulsive system
  - Gawronski and Bodenhausen's two systems: propositional and associative learning
  - Sun’s two types of learning: rule-based (explicit learning) and reinforcement (implicit / associative learning)
- E.g. Smoking is damaging for my health (explicit) but implicitly linked to pleasant activities
- E.g. Violence in pornography is a bad thing but implicitly linked to sexual arousal

Explicit evaluations
- Controlled
- Endorsed
- Propositional

Implicit evaluations
- Automatic
- Unendorsed
- Associative
Interventions to change explicit vs. implicit evaluations

- “Talk” / classical therapy
  Addresses explicit cognitions (e.g. aims to alter dysfunctional cognitions)

- Exposure therapy
  Aims to alter automatic reactions through repeated exposure (e.g. attentional bias modification, evaluative conditioning etc.)

*Enough literature support for an incremental gain in criterion (behavior) prediction when addressing both explicit and implicit psychological aspects*

Explicit cognitions / evaluations are measured using a classical approach (i.e. questionnaires etc.)
Implicit cognitions / evaluations are measured using indirect cognitive tasks (i.e. IAT etc.)
IAT – classic

Gay or bad

Straight or good

IAT – personalized

Gay or I don’t like

Straight or I like

Gay or I like

Straight or I don’t like

A categorization task (quicker when two similar concepts share the same response key than when they require a different response key) (response facilitation / interference)

Implicit Association Test – IAT (Greenwald et al., 1998)

EC and dual-process theories
People are inclined to unintentionally evaluate the target as having the same valence as the prime (misattribution).

People also misattribute semantic content (e.g. Semantic Misattribution Procedure – SMP, Sava et al., 2012)
An improvement in speed and/or accuracy to respond to the target stimulus when it is preceded by a similar valence prime stimulus relative to when it is preceded by a different valence prime stimulus.
Implicit evaluation / attitudes as an automatic process

- Unaware / unconscious
  (e.g. person’s attention is focused on something else, subliminal priming)
- Unintentional
  (e.g. a process that starts without intention)
- Uncontrollable
  (e.g. a process that can not be avoided despite warning)
- Efficient
  (e.g. requires few resources, fast)

An implicit evaluation requires the presence of at least one or more characteristics of an automatic process.
Evaluative conditioning (EC)

Evaluative conditioning is one way to alter implicit preferences and / or explicit ones.

A procedure to change people’s evaluations (preferences)
A form of conditioning that refers to changing preferences (likes and dislikes);

EC is a change in the valence of a stimulus that results from a previous pairing of the stimulus with another stimulus
(De Houwer, 2007; De Houwer, Thomas, & Baeyens, 2001; Gast, Gawronski, & De Houwer, 2012; Jones, Olson, & Fazio, 2010; Levey & Martin, 1975)
Evaluative conditioning

- Affects both explicit and implicit evaluations (e.g. Hoffman’s et al., 2010 meta-analysis found the following EC effects: self-report (k=214) $d=.52$, implicit (k=57) $d=.30$; IAT (k=21) $d=.40$.

- Evaluative learning is the process of
  - formation of likes and dislikes (if CS has a neutral valence)
  - change of likes and dislikes (if CS already has a given valence)

- Evaluative conditioning has been tested successfully on various applied fields (e.g. marketing, health, work and organizational psychology etc.)

- **Does EC depends on pairing knowledge?** This has positive effect, it explains 37% of variance in a meta-analysis (Hofmann et al., 2010) (Cause or facilitator?).
Contiguity Knowledge Test
Repeated experience of pairing (CS and US) → associations → Implicit attitudes (EC)

Knowledge about pairing (CS and US) → propositions → Explicit attitudes

“The prototypical case for implicit attitude changes resulting from changes in associative structure is evaluative conditioning” (Gawronski & Bodenhausen, 2006)
Possibly learned associations:

- CS-US-association or SS association
- CS-evaluation-association or SR
Repeated pairing of the same CS-US increases the chance that in the future the CS will activate the representation of the US in memory.

✓ “What fires together, wires together”  
Hebb, *The Organization of Behavior* (1949)

Simultaneous presentations of CS with (preferably various) US of the same valence is the best solution required for S – R.

✓ Affect *diffuses* and becomes attached to totally unrelated stimuli (misattributing affect)
Illustrations of several EC paradigms

1. Self-referencing applied for the enhancement of healthy food attractiveness
   - Healthy food images (CS) will be associated with the “Self” by being categorized with the same key as self-related words (US+) and unhealthy food items will be associated with “Others”.

2. Picture-picture & Picture-word simultaneous paradigm - applied for increasing the reluctance towards smoking
   - Pictorial smoking cues (CS) with pictorial negative cues (US)
   - Pictorial smoking cues (CS) with lexical negative cues (US)

3. Picture – picture embedded US in CS
Categorization task

Apasati tasta 'D' pentru

Altii sau
Mancare nesanatoasa

Apasati tasta 'L' pentru

Self or healthy food sau Eu
Mancare sanatoasa

Others or unhealthy food
Apasati tastă 'D' pentru altii

Altii

sau

Mancare nesanatoasa

Apasati tastă 'L' pentru eu

Eu

sau

Self or healthy food

Mancare sanatoasa
Apasati tasta 'D' pentru

Altii sau
Mancare nesanatoasa

others or unhealthy food

Apasati tasta 'L' pentru

Eu sau
Mancare sanatoasa

self or healthy food
Apasati tasta 'D' pentru

Altii
sau
Mancare nesanatoasa

Others or unhealthy food

Apasati tasta 'L' pentru

Self or healthy food
sau
Mancare sanatoasa

Al meu
Apasati tasta 'D' pentru

Altii
sau
Mancare nesanatoasa

Others or unhealthy food

Apasati tasta 'L' pentru

Eu
sau
Mancare sanatoasa

Self or healthy food
Apasati tasta 'D' pentru

Altii

sau

Others or unhealthy food

Mancare nesanatoasa

Apasati tasta 'L' pentru

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   • Pictorial smoking cues (CS) with pictorial negative cues (US)
   • Pictorial smoking cues (CS) with lexical negative cues (US)

3. Picture – picture embedded US in CS
Task: Assess the valence of the picture with orange frame, and press SPACE bar if it is positive, or don’t press any key if it is negative. Trial duration: 1500ms
If participant doesn`t press any key, after 1500 ms, a green ‘o’ appears on the screen for 500ms
Task: Assess the valence of the picture with orange frame, and press SPACE bar if it is positive, or don’t press any key if it is negative. Trial duration: 1500ms
If the participant presses any key, a red X appears on the screen for 500ms
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   • Pictorial smoking cues (CS) with lexical negative cues (US)

3. Picture – picture embedded US in CS
Task: Assess the valence of the word, and press SPACE bar if it is positive, or don`t press any key if it is negative. Trial duration: 1500ms
If participant doesn`t press any key, after 1500 ms, a green ‘o’ appears on the screen for 500ms
**Task:** Assess the valence of the word, and press SPACE bar if it is positive, or don`t press any key if it is negative. Trial duration: 1500ms
If the participant presses “Space” bar, a green O appears on the screen for 500ms.
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tumoare
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Summary

✓ Description of evaluative conditioning and its role in dual-process theories

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• Applied values of evaluative conditioning procedures in health context
  Two illustrative cases:
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Food choice between implicit and explicit preferences

• Richetin, Peugini, Prestwich, & O’Gorman (2007) showed the **incremental capacity of implicit attitudes (IAT)** in predicting **food choice** behavior over explicit attitudes (additive relation).

• In addition, in an one-year longitudinal study Nederkoorn, Houben, Hofmann, Roefs, & Jansen (2010) found out that participants with **strong implicit preferences for snack foods** and low inhibitory capacity gained the most **weight**.

• Moreover, Houben, Roefs, & Jansen (2012) revealed that **restrained eaters** (people with chronic limitation of food intake) have **stronger implicit preferences for high-caloric food and also palatable food** compared to unrestrained eaters.

**CONCLUSION:** a need to alter implicit attitudes towards food (more positive view on healthy food / negative view on unhealthy but highly palatable food)
Evaluative Conditioning was used for changing implicit food attitudes and food choice

- Hollands, Prestwich, & Marteu (2011) used aversive images as US and unhealthy snacks as CS.
  - The intervention significantly decreased implicit preference for snacks relative to fruits in those individuals that had a stronger or moderate preference for snacks over fruits at baseline, but not for those with a weaker initial preference for snacks. The intervention had no effect on explicit attitudes.
  - Moreover, participants that received the intervention, chose fruits over snacks (at the end of the study) more often than participants in the control condition.
- However, Ayres, Conner, Prestwich, & Smith (2012) revealed that palatability is a superior food choice predictor to implicit and explicit attitudes (it is also an aspect that should be altered).
An undergoing study (Sava, Rusu, Richetin, Perugini)

Building on previous findings we aim at answering several questions:

• Could SR be an efficient mean to enhance attitudes and palatability towards healthy food?
• Could a multi-session SR intervention augment the conditioning effect?

• **Participants until now:** 81 undergraduate students from the Faculty of Psychology ($M_{age} = 22; SD = 1.16$); 86% female participants. Only participants with explicit neutral or positive view on unhealthy food are included.

• **Design:** We developed a RCT with two arms. One group (intervention) received three sessions of SR designed for enhancing healthy food attractiveness and the other one (control) received a placebo procedure (healthy food is 50% linked to self or to others categories).

• **Procedure:** Three-sessions, with 2-3 days between-session periodicity.
An undergoing study (Sava, Rusu, Richetin, Perugini)

- **Materials:**
  - Evaluative conditioning procedure - Self-Referencing using healthy food products as CS and the ‘Self’ as US (in contrast to unhealthy products and ‘Others’).

<table>
<thead>
<tr>
<th>Apasati tasta 'D' pentru</th>
<th>Apasati tasta 'L' pentru</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altii</td>
<td>Eu</td>
</tr>
<tr>
<td>sau</td>
<td>sau</td>
</tr>
<tr>
<td>Mancare nesanatoasa</td>
<td>Mancare sanatoasa</td>
</tr>
</tbody>
</table>

**OUTPUTS**
- Explicit attitudes and palatability – 4 semantic differentials each, on 7-point scales.
- Implicit attitudes – IAT (Greenwald et al., 1998).
An undergoing study (Sava, Rusu, Richetin, Perugini)

• Main results: EC vs. placebo

No significant difference between two groups on implicit attitudes
  Marginal significant difference in the expected direction on explicit attitudes
  Significant results in the expected direction for palatability

• At the end of Session 1:
  • $F(1, 76) = 3.05$, $p = .085$

• At the end of Session 3:
  • $F(1, 76) = 5.98$, $p = .017$
Smoking reduction through an EC intervention that alter implicit preferences for smoking (Măgurean, Constantin, Sava, submitted)

- No previous study focused on EC effect on smoking cessation or reduction, but there are some positive findings in case of another addictive health problem – alcohol (Houben, Havermans, and Wiers, 2010)

- Dual process theories provides good reasons to expect ambivalent attitudes towards smoking

Aim of the study:
- Could EC be an efficient mean to decrease explicit and implicit attitudes towards smoking?
- Do implicit and explicit attitudes mediate the relationship between the EC and smoking behavior?

**Participants**: 55 undergraduate smokers with at least an average level of tobacco dependency: 29 received negative EC (90% CS – smoking-related pictures were paired with negative US) and 26 received positive US (90% CS – smoking-related pictures were paired with negative US).

**Outputs**:
- Implicit attitudes towards smoking (AMP) and explicit attitudes (scale rating)
- Self-reported behavior: number of cigarettes consumed in the last 24 hours
Main results

Atitudini implicite (AMP) Implicit attitudes

Atitudini explicite Explicit attitudes

0.42*

-0.52*

Condiționarea afectivă a fumatului
0=pozitivă // 1=negativă

0.22

EC negative – coded 1

0.28

Numărul de țigări fumate în 24 de ore de la condiționare

Self-reported smoking behavior

*p<.05; +p=.06 N= 55;
Positive EC (n=26),
Negative EC (n=29)
### Testing alternative mediation paths

<table>
<thead>
<tr>
<th>The mediation path</th>
<th>Indirect effect</th>
<th>Standard error</th>
<th>Lower limit</th>
<th>Upper limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC $\rightarrow$ Implicit attitude $\rightarrow$ Number of cigarettes</td>
<td>-.03</td>
<td>.10</td>
<td>-.31</td>
<td>.15</td>
</tr>
<tr>
<td><strong>EC $\rightarrow$ Implicit attitude $\rightarrow$ Explicit attitudes - Number of cigarettes</strong></td>
<td><strong>-.07</strong></td>
<td><strong>.06</strong></td>
<td><strong>-.29</strong></td>
<td><strong>-.001</strong></td>
</tr>
<tr>
<td>EC $\rightarrow$ Explicit attitude $\rightarrow$ Number of cigarettes</td>
<td>.07</td>
<td>.11</td>
<td>-.07</td>
<td>.40</td>
</tr>
</tbody>
</table>
Tentative conclusions

• Among the first empirical attempts to study the impact of EC on two health-related issues.

• The EC impacts every day behaviors, indirectly, by changing preferences (likes and dislikes) related to the target object (e.g. palatability of the unhealthy food; implicit attitudes towards smoking).

• The EC effect is stronger for individuals with baseline evaluations that are not affected by floor ceiling effect (in case of negative attitudes towards unhealthy food or towards smoking), and for individuals who score higher at contingency awareness (who recognized correctly the CS-US pairs).
Thank you for your attention!