# Coming Full Circle With Reactions:

Toward an understanding of affective training reactions through the core affect circumplex
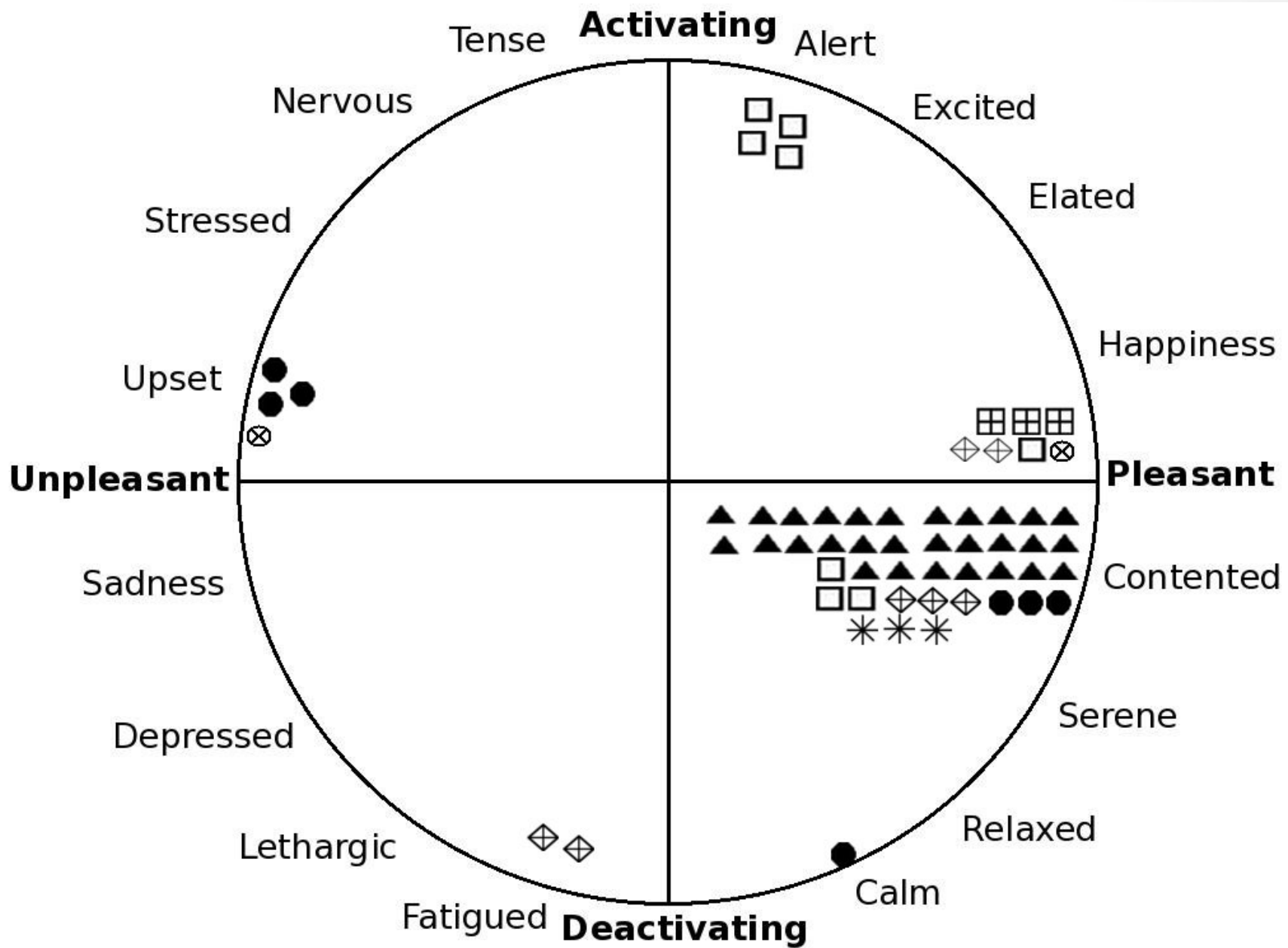
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Introduction

- Training reactions are common; agreement is not

- MA evidence for multidimensional *and* unidimensional conceptualizations (Alliger et al., 1997; Sitzmann et al., 2008)

- Focus on *unidimensional* affective vs. utility

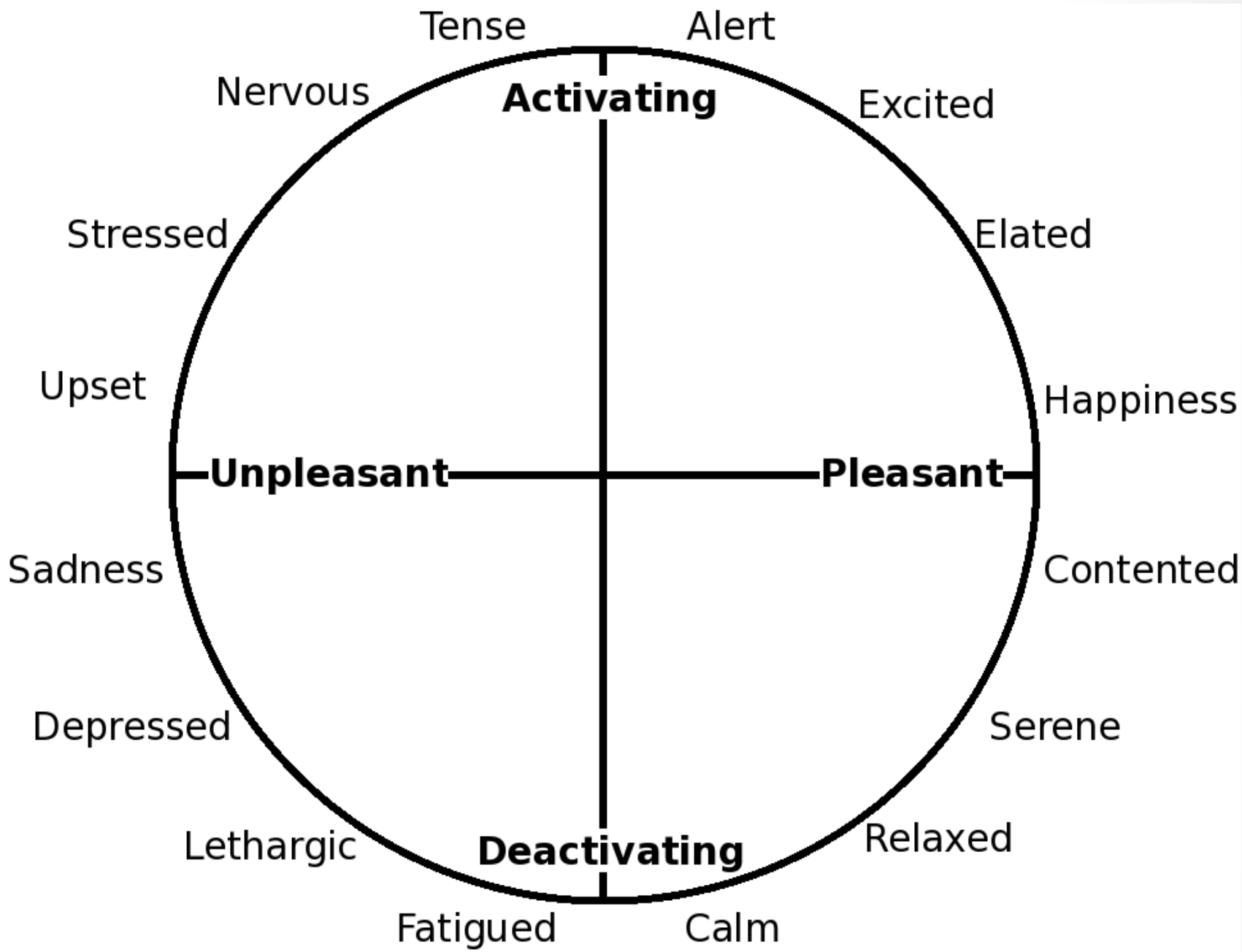- Problematic (George, 2011; Russell, 2003, Harmon-Jones et al., 2011)

Core Affect Theory
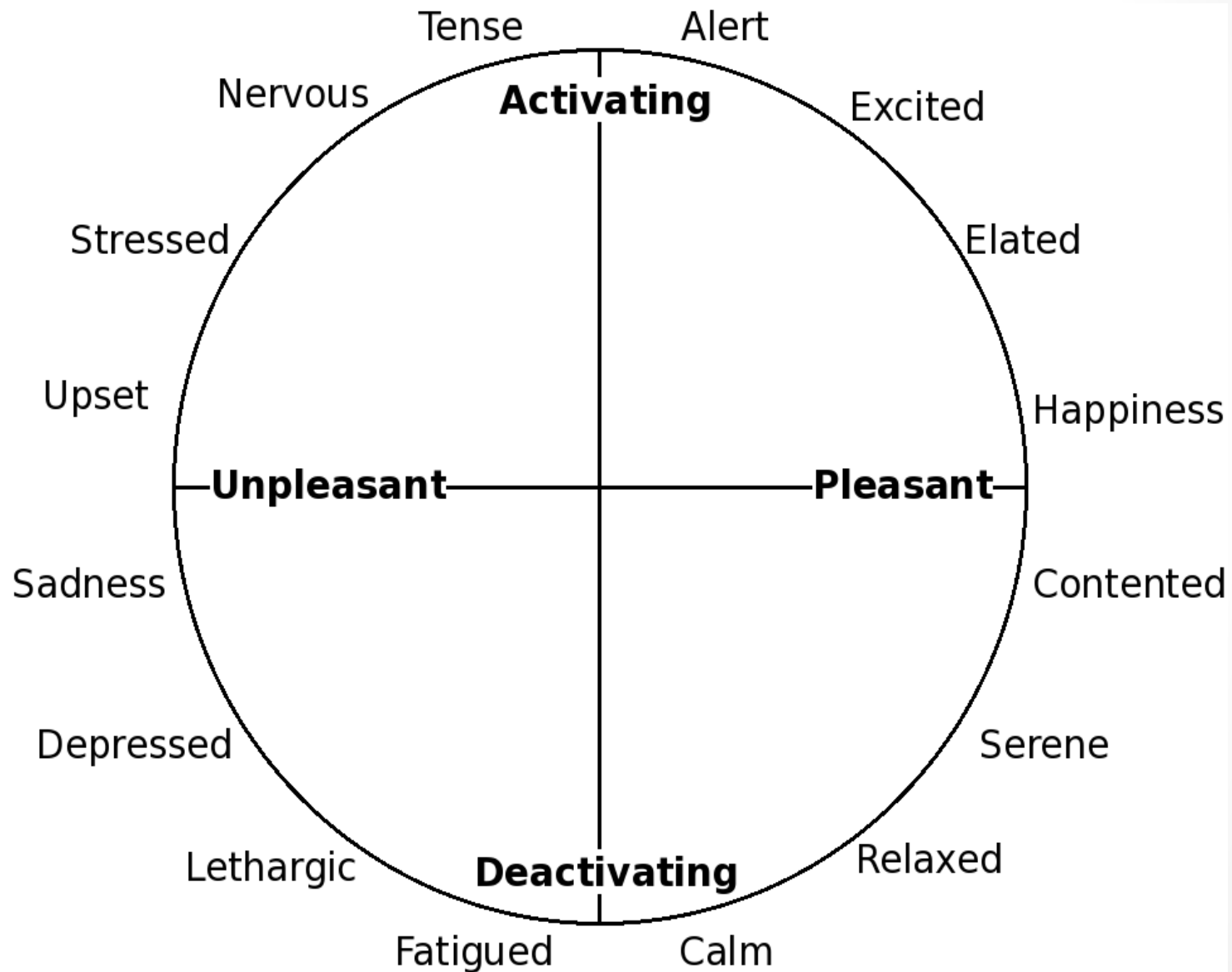
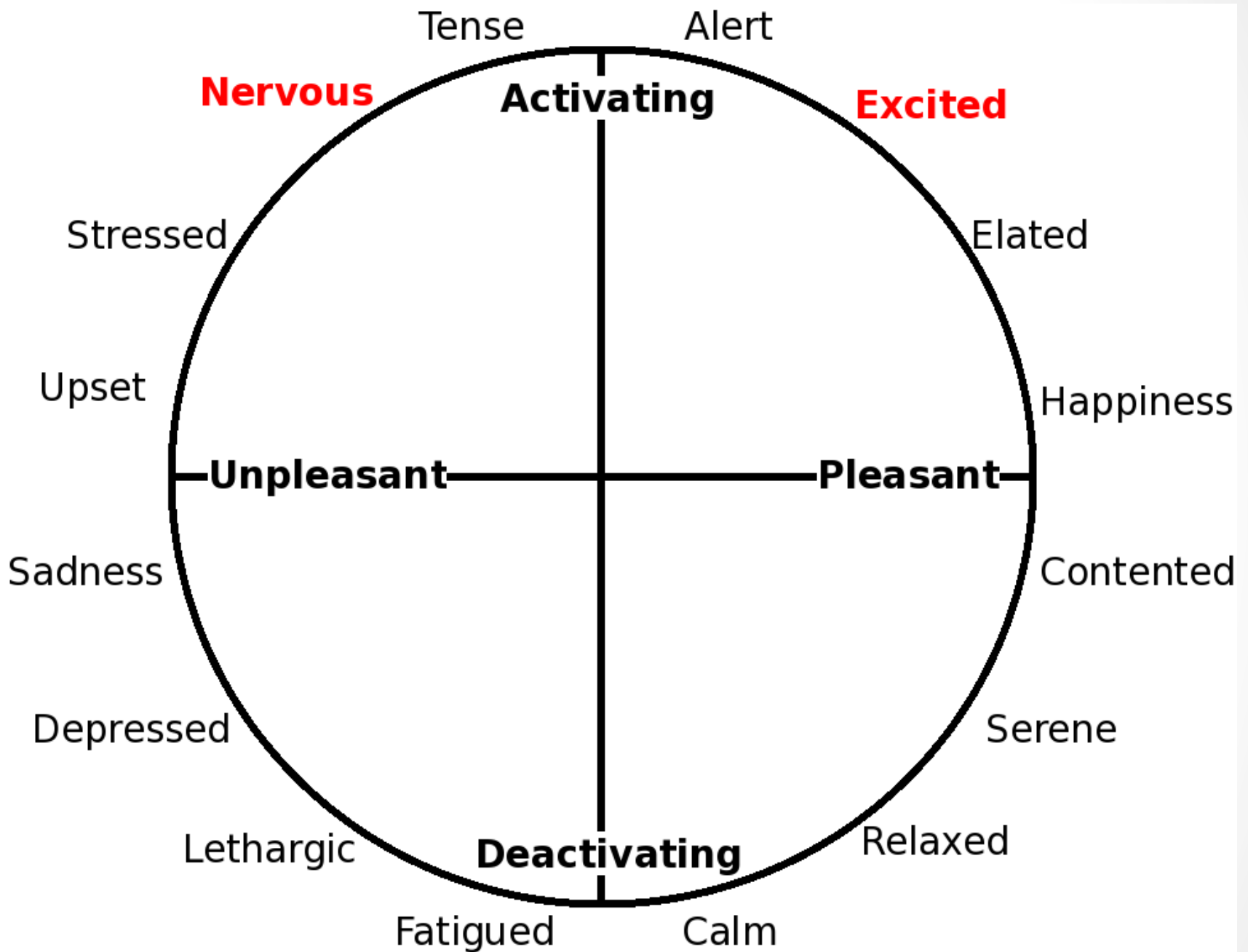# Goals of The Current Paper

1. Show that a circumplex represents affective training reactions with two superordinate dimensions of activation and valence

2. Show that differences along each dimension distinctly influence relationships with learning outcomes
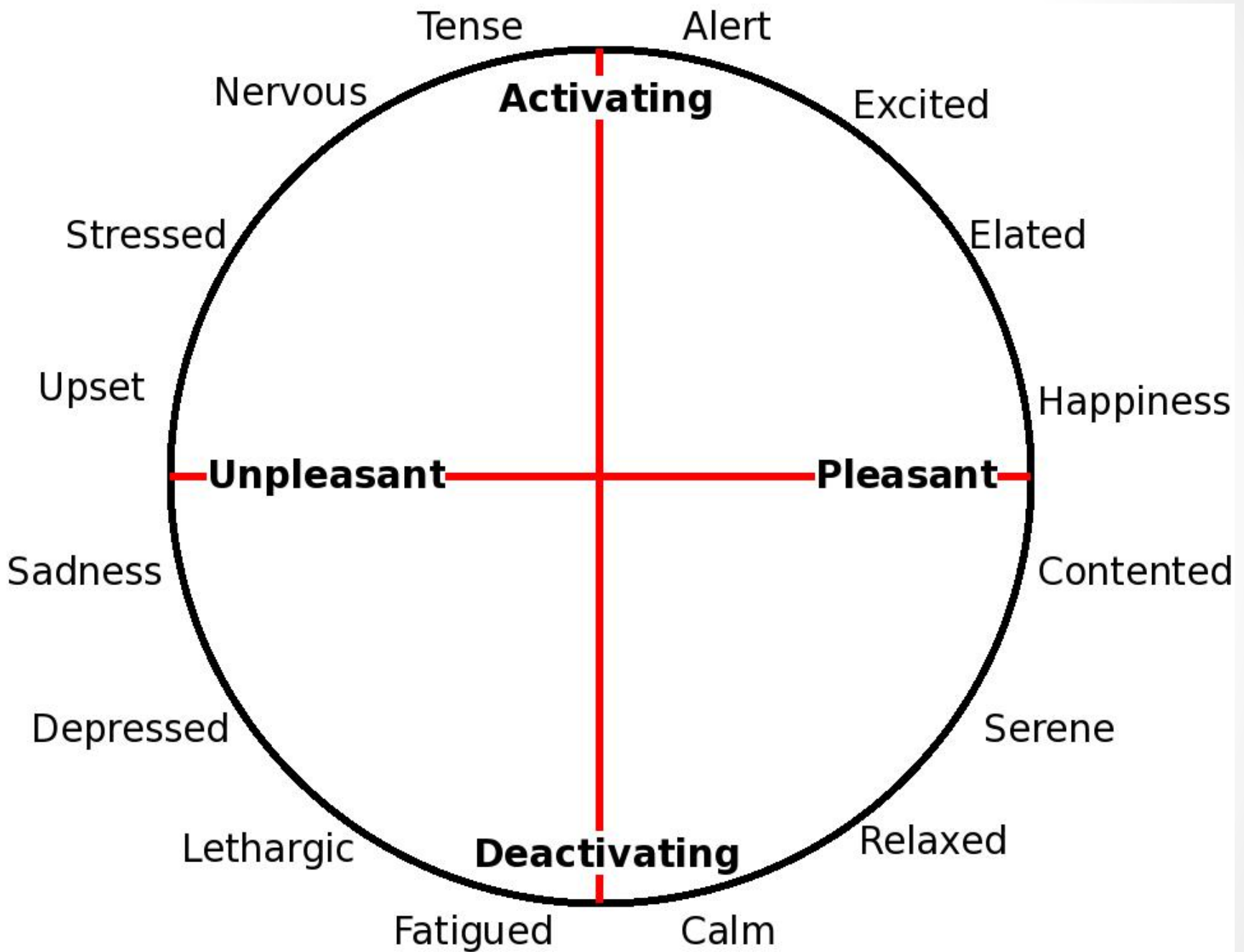
Affective Reactions

H1: Core affective training reactions are multidimensional and are represented by a superordinate circumplex structure.
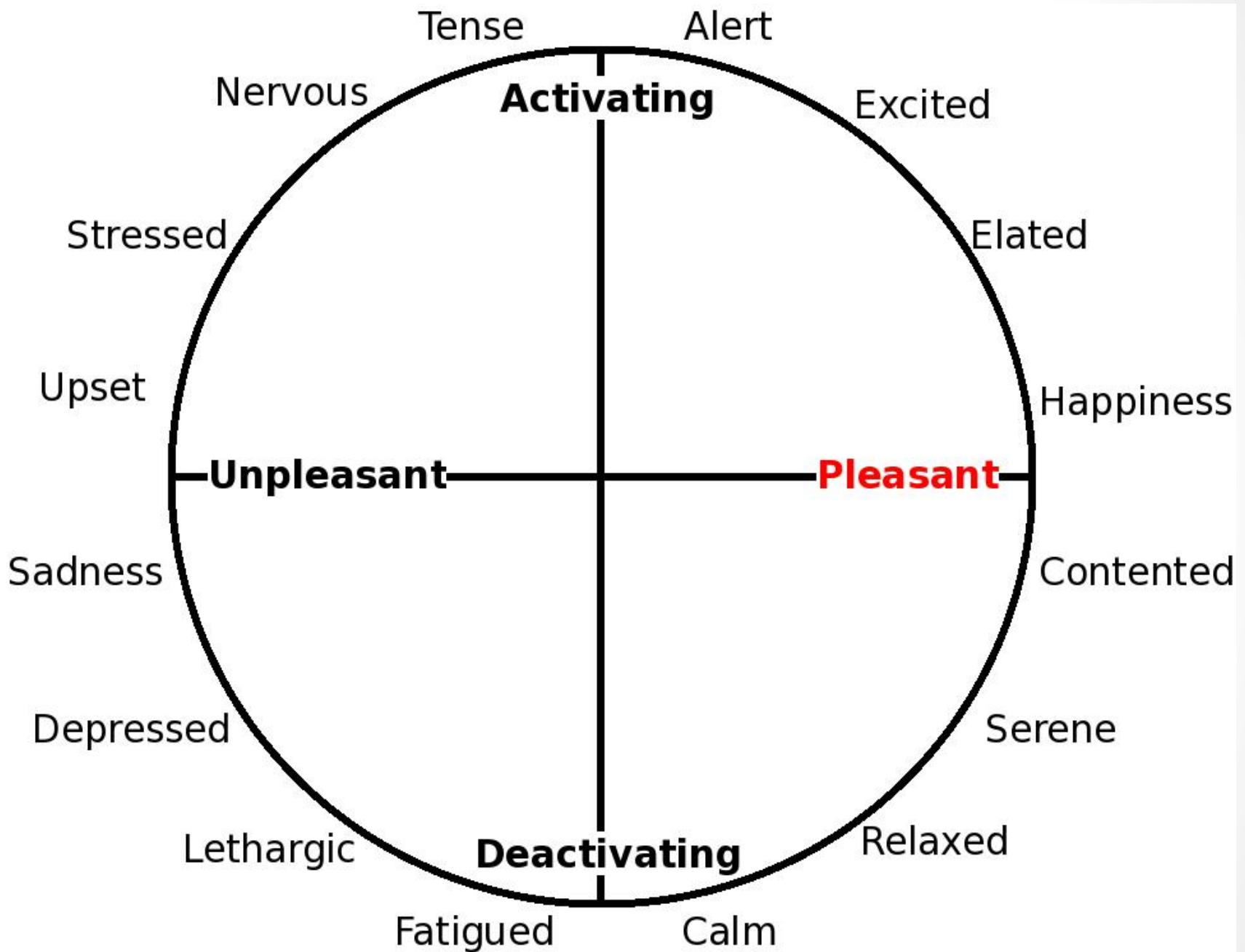
Reactions and Affective Learning

H2: Highly pleasant affective reactions (e.g., satisfaction, enjoyment) will be significantly related to attitudes towards the training content
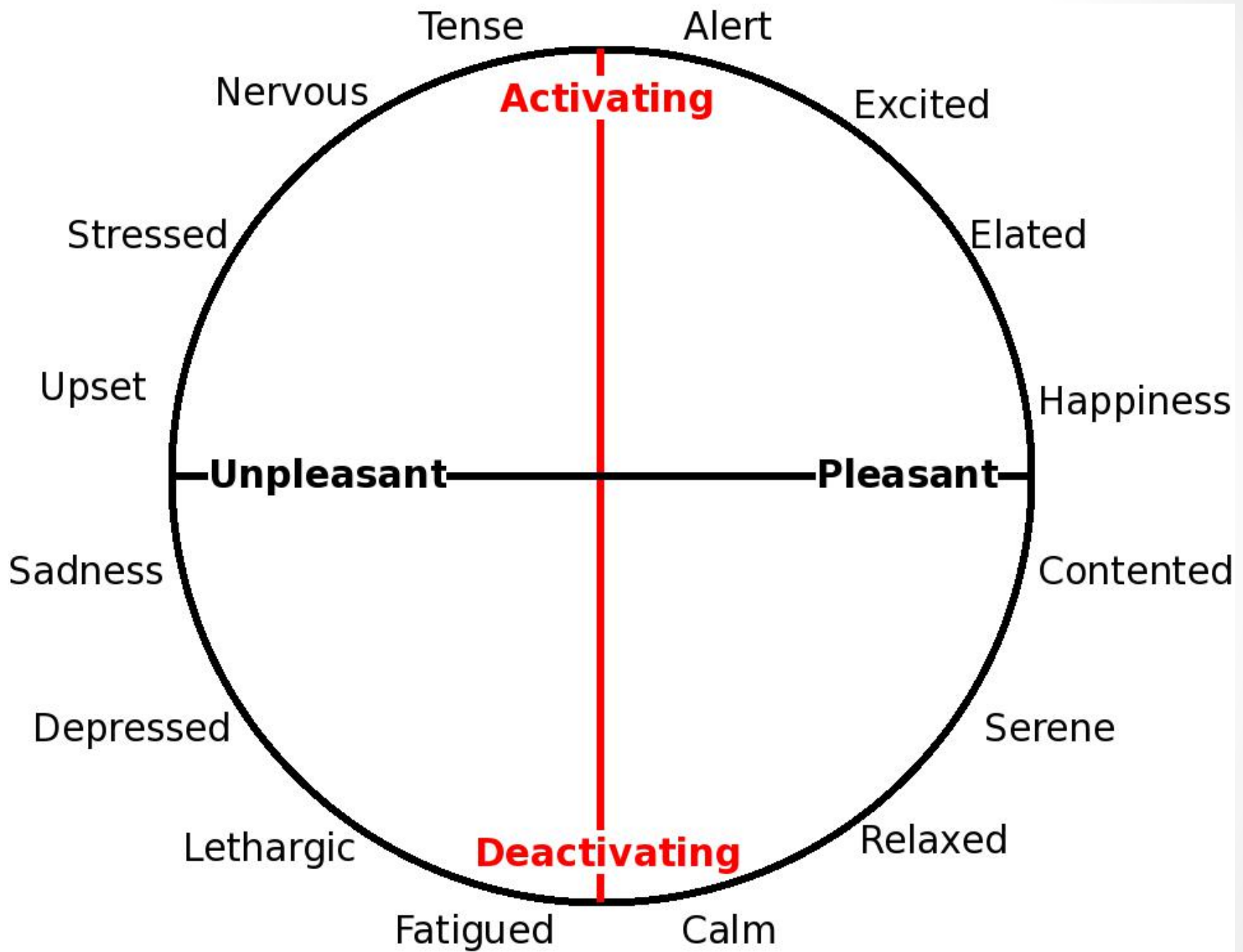
Reactions and Cognitive Learning

H3:(a) highly activating unpleasant and (b) highly deactivating pleasant affective reactions will be significantly related to cognitive learning

Method

Participants

- Participants (*N*=325) from Amazon's Mechanical Turk
- Age: 22-25 (31%) or 18-21 (27%)
- Male (65%)
- Asian, Pacific Islander, or Indian subcontinent (67%)
- Employed full or part-time (67%)

Design &Procedure

- Two part, online study
- Creating Microsoft Excel Charts
- Pre-survey with prior Excel experience
- Complete training
- Post-survey with training reactions and learning outcomes

Learning Measures

- Attitudes towards Excel: 4 items (α = .86), "Life is easier and faster with Microsoft Excel."(Harrison & Rainer, 1992)

- *Cognitive learning*: 6 item declarative knowledge test

  - Difficulty: .12 – .75, .56 average

  - CFA in M*plus* 6 using WLS: $\chi^2(9)$ =18.46, *p*=.02, CFI=.96, TLI=.94, RMSEA=.06, WRMR=.90

Measures - Reactions

- Initial pool: 92 items

- Rated for clarity and classified onto core affect circumplex ($\alpha=.74$; $N=5$)

- CFA on remaining items
  - Acceptable fit for 14 distinct scales forming the perimeter of core affect circumplex

  - SB- χ^2 (1224) = 1934.583; RMSEA 90% interval = .037–.044, point estimate = .041; CFI=.95; TLI=.94; SRMR=.05.

Analyses

- H1: Michael Browne's (1992) circulant matrix, nonmetric multidimensional scaling (NMDS)

- H2, 3a, 3b: Multiple regression and relative weights analysis

  - Followed by simple linear OLS to determine if sign of relationship is consistent with theory

Results

Hypothesis 1

- NMDS showed two superordinate dimensions of activation and valence (Stress 1=.03)
- Correlation matrix followed ascertainable unfolding pattern with largest correlations directly off the main diagonal
- Affective training reactions are characterized by a circumplex

Hypothesis 2

- Omnibus: $F(14, 309) = 11.48$; $R^2 = .34**$
- Relative weights for enjoyment, satisfaction, and calm were significantly different from zero
- Simple OLS: enjoyment, $\beta = .43$; satisfaction, $\beta = .45$; calm, $\beta = .38$
- Highly pleasant affective reactions positively relate attitudes towards the training content

Hypothesis 3

- Omnibus: $F_{(14, 309)} = 7.15$; $R^2 = .25$**

Hypothesis 3a

- Relative weights for tension and anxiety were significantly different from zero
- Simple OLS: tension, $\beta = -.30$; anxiety, $\beta = -.32$

Hypothesis 3b

- Relative weights for calm and serenity were significantly different from zero
- Simple OLS: calm, $\beta = .27$; serenity, $\beta = .29$

Recap

A circular model of emotions (circumplex model) with four axes:

Activating (top) — **Deactivating** (bottom)

Unpleasant (left) — **Pleasant** (right)

Upper-left quadrant (Activating / Unpleasant):
- Tension
- Anxiety
- Stress
- Upset

Upper-right quadrant (Activating / Pleasant):
- Engagement
- Excitement
- Happiness
- Enjoyment

Lower-left quadrant (Deactivating / Unpleasant):
- Scorn
- Detachment
- Boredom

Lower-right quadrant (Deactivating / Pleasant):
- Satisfaction
- Calm
- Serenity
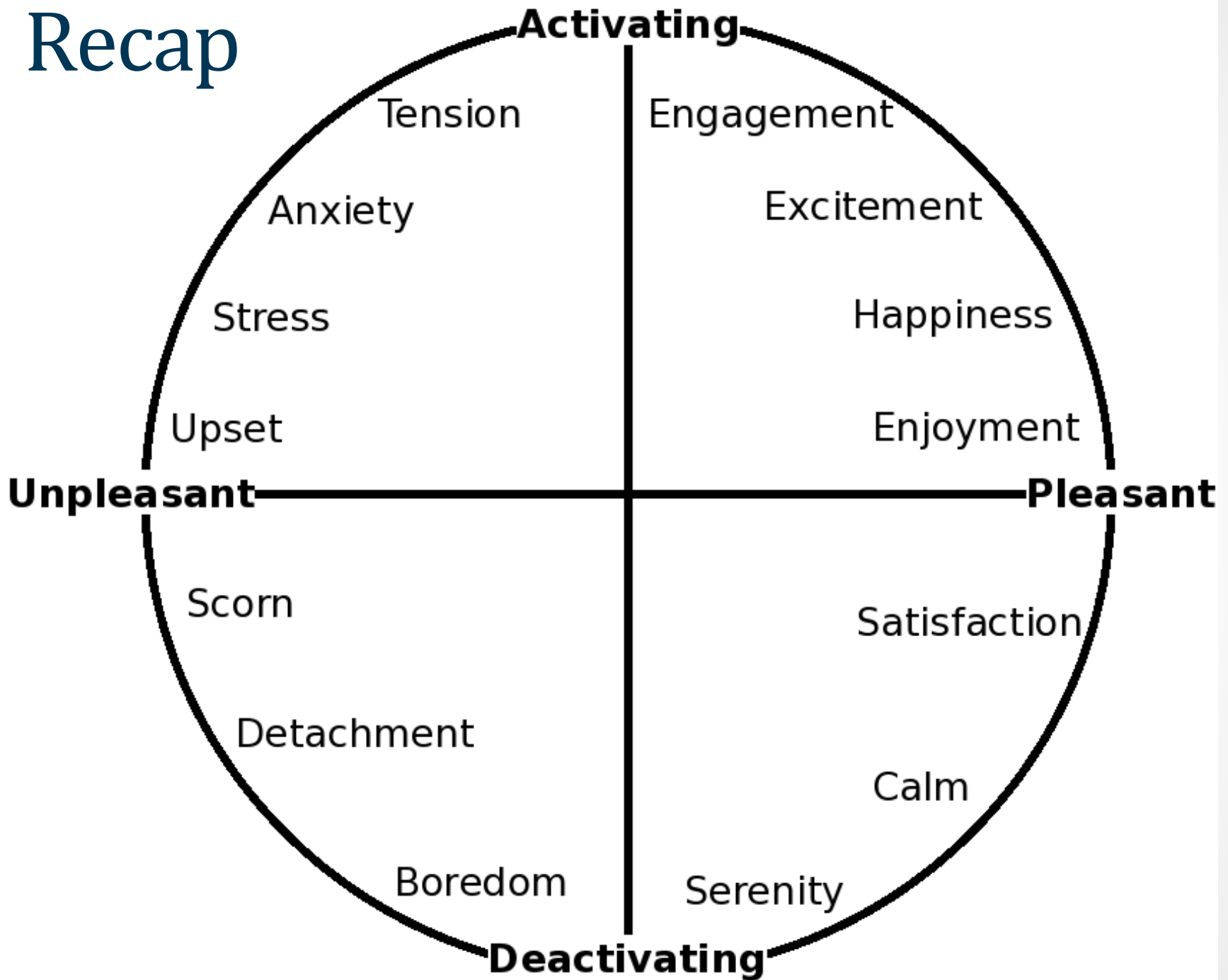
Discussion

Theoretical Implications

- Affective training reactions relate to both affective and cognitive learning outcomes
- Different portions of the core affect circumplex may be more important for different motivational mechanisms
  - Highly deactivating and pleasant may be important learning motivation
  - Highly pleasant and neutral activation may be important for transfer motivation

Practical Implications

- Low satisfaction may be an artifact of unpleasant core affective reactions
  - Important for directing interventions
- Affective reactions may serve as proxy for rapid training evaluation

Limitations & Future Research

- Focused on affective and cognitive
  - Future research should examine skill

- Cross sectional
  - Affective events theory
  - Future research should use longitudinal and within persons designs

Thank you for your time!

Questions?

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Suggested citation:
Howardson, G. N., & Behrend, T. S. (2012). *Coming full circle with reactions: Toward an understanding of affective training reactions through the core affect circumplex*. Manuscript submitted for publication.

Appendix

Table 1

Final Core Affective Reactions Items with Loadings and Internal Consistency Reliabilities

Construct	λ	α
Pleasant Affective Reactions		
Activating Reactions		
Engagement		.89
This training was fascinating.	.89	
This training was engaging.	.75	
This training captivated me.	.84	
I found myself absorbed in this training.	.82	
Excitement		.93
The training program was exciting.	.89	
I'm enthusiastic about this training.	.88	
This training was energizing.	.90	
This training was stimulating.	.85	
Happiness		.90
This training made me happy.	.83	
I'm glad I took this training.	.81	
This training was a great opportunity.	.78	
The training program was inspiring.	.87	
This training was interesting.	.81	
Enjoyment		.88
This training was fun.	.84	
I really enjoyed this training.	.96	
Deactivating Reactions		
Satisfaction		.87
I am very pleased with this training.	.93	
I am satisfied with this training.	.83	
Calm		.82
I felt calm and collected during this training.	.84	
My training environment was conducive to learning.	.86	
Serenity		.88
I was able to hold my composure during this training.	.81	
This training was completely manageable.	.89	
This training was harmless.	.83	

Table 1 (*continued*)

Construct	λ	α
Unpleasant Affective Reactions		
Activating Reactions		
Tension		.92
This training made me feel tense.	.91	
I was restless during this training.	.87	
I was on edge during this training.	.90	
Anxiety		.93
I felt anxious during this training.	.79	
I felt uneasy during the training.	.93	
I was nervous during this training.	.94	
I was worried that I wouldn't be able to complete this training.	.84	
Stress		.95
This training was frustrating.	.95	
This training was irritating.	.93	
This training made me feel angry.	.92	
Upset		.93
I left this training upset.	.94	
This training bothered me.	.88	
I felt uncomfortable during this training.	.90	
Deactivating Reactions		
Scorn		.92
I could have been doing better things with my time than completing this training.	.88	
This training program was useless.	.84	
This training taught me nothing.	.82	
This training was a waste of time.	.90	
Detachment		.92
I found myself doing other things during this training.	.94	
My mind wandered during this training.	.91	
Boredom		.92
The training program was boring.	.94	
This training was dull.	.95	
This training got old extremely fast.	.81	

Note. All items were 5-point, Likert-type scales ranging from *Strongly Disagree–Strongly Agree*. α = Cronbach's alpha. λ = item loadings.