

# Emotion Group Algorithms (Webb Framework)

Notation (all factors  $\in [0,1]$  unless noted):

V = attachment power | SC = source confidence | Acc = acceptance W<sub>p</sub> = perspective weight ( $\approx 1$  internal,  $< 1$  external)

T = elapsed time |  $\kappa$ , k = scale & decay constants

[x]<sub>+</sub> = max(x,0) | EP, P  $\in [-1,1]$  (expectation, perception)

$\Delta \tanh = \tanh(\kappa \cdot \dots)$  squashes to (-1,1).

Each formula returns a signed score; |score| maps to 5 severity tiers.

## Happiness

$$H = \tanh(\kappa_H \cdot V \cdot SC \cdot Acc \cdot W_p \cdot (P - EP) \cdot e^{-\kappa_H T})$$

Positive when perception meets/exceeds expectation. More weight if attachment is central, source is trusted, acceptance is high, and time is recent.

|H| band | Happiness severity label | |-----|-----| | 0 – 0.20 | **Satisfied** | | 0.20 – 0.40 | **Pleased** | | 0.40 – 0.60 | **Happy** | | 0.60 – 0.80 | **Elated** | | 0.80 – 1.00 | **Ecstatic** |

(If  $H < 0$ , you'd mirror into the sadness-family tiers—e.g.,

Disappointed → Hurt → Sad → Grief → Despair—using the same break-points.)

## Sadness

$$S = -\tanh(\kappa_S \cdot V \cdot SC \cdot Acc \cdot W_p \cdot (EP - P)_+ \cdot e^{-\kappa_S T})$$

Trigger is unmet expectation that has been accepted. Magnitude follows same gates; sign is negative.

|H| band | Sadness-severity label | |-----|-----| | 0 – 0.20 | **Disappointed** | | 0.20 – 0.40 | **Hurt** | | 0.40 – 0.60 | **Sad** | | 0.60 – 0.80 | **Grief** | | 0.80 – 1.00 | **Despair** |

So: compute H; if it's negative, take |H| and classify with the table above to report the specific level of sadness.

## Fear

$$F = \tanh(\kappa_F \cdot V \cdot SC \cdot (1 - Acc) \cdot W_p \cdot (EP - P)_+ \cdot e^{-\kappa_F T_{now}})$$

Pending devaluation not yet accepted, source seen as credible, threat perceived as imminent.

|F| band | Label | |-----|-----| | 0 – 0.20 | **Concerned** | | 0.20 – 0.40 | **Cautious** | | 0.40 – 0.60 | **Afraid** | | 0.60 – 0.80 | **Horror / Fright** | | 0.80 – 1.00 | **Panic** |

*F downward; you then relabel the same score with the **worry** family tiers instead of fear.*

## Worry

$$W = \tanh(\kappa_W \cdot V \cdot SC \cdot (1 - Acc) \cdot W_p \cdot (EP - P)_{+} \cdot e^{\chi_{-k_W T_{future}}})$$

Same variables as fear but T refers to a future resolution → fear of what may happen.

0-0.2 **Distressed**, 0.2-0.4 **Nervous**, 0.4-0.6 **Worried**, 0.6-0.8 **Distraught**, 0.8-1 **Dread**

## Anger

$$A = \tanh(\kappa_A \cdot V \cdot SC \cdot (1 - Acc) \cdot W_{ext} \cdot (EP - P)_{+} \cdot e^{\chi_{-k_A T}})$$

External agent is blamed for attacking the attachment;  $W_{ext} < 1$  models external perspective.

0-0.2 **Annoyed**, 0.2-0.4 **Frustrated**, 0.4-0.6 **Angry**, 0.6-0.8 **Fury**, 0.8-1 **Rage**

## Disgust

$$Dg = \tanh(\kappa_D \cdot V_{obj} \cdot SC \cdot (1 - Acc) \cdot [-Val_{obj}]_{+})$$

Rejection of an object or act perceived as contamination; negativity of object valence drives response.

0-0.2 **Reticent**, 0.2-0.4 **Distaste**, 0.4-0.6 **Disgusted**, 0.6-0.8 **Repulsed**, 0.8-1 **Revulsion/Sick**

## Positive Anticipation

$PA = \tanh(\kappa_{PA} \cdot V \cdot SC \cdot Acc \cdot W_p \cdot (P_{future} - EP)_{+} \cdot e^{\chi_{-k_{PA} T_{future}}})$  Eager hope for a favourable outcome still in the future.

0-0.2 **Mild Anticipation**, 0.2-0.4 **Anticipation 2**, 0.4-0.6 **Anticipation**, 0.6-0.8 **Edge of Seat**, 0.8-1 **On Bated Breath**

## Negative Anticipation

$NA = -\tanh(\kappa_{NA} \cdot V \cdot SC \cdot (1 - Acc) \cdot W_p \cdot (EP - P_{future})_{+} \cdot e^{\chi_{-k_{NA} T_{future}}})$   
Dread of an unfavourable future outcome; mirrors positive anticipation.

0-0.2 **NA1**, 0.2-0.4 **NA2**, 0.4-0.6 **NA3**, 0.6-0.8 **NA4**, 0.8-1 **NA5**

## Regret

$R = -\tanh(\kappa_R \cdot V \cdot SC \cdot Acc \cdot W_p \cdot (EP - Outcome)_{+} \cdot e^{\chi_{-k_R T}})$  Accepted realisation that one's past action/outcome fell short of expectation.

0-0.2 **Mild Regret**, 0.2-0.4 **Regret 2**, 0.4-0.6 **Regret**, 0.6-0.8 **Lament**, 0.8-1 **Deplore**

## Pride

$$Pr = \tanh(\kappa_{Pr} \cdot V \cdot SC \cdot Acc \cdot W_{ext} \cdot (P_{social} - EP_{social})_+ \cdot e^{\lambda(-k_{Pr} T)})$$

Positive valuation increase reflected from others; external perspective boosts self-worth.

0-0.2 **Pride 1**, 0.2-0.4 **Pride 2**, 0.4-0.6 **Pride 3**, 0.6-0.8 **Pride 4**, 0.8-1 **Pride 5**

## Shame

$$Sh = -\tanh(\kappa_{Sh} \cdot V \cdot SC \cdot Acc \cdot W_{ext} \cdot (EP_{social} - P_{social})_+ \cdot e^{\lambda(-k_{Sh} T)})$$

Accepted negative valuation reflected from others; internalises social devaluation.

0-0.2 **Contrite**, 0.2-0.4 **Sorry**, 0.4-0.6 **Shame**, 0.6-0.8 **Shame 4**, 0.8-1 **Remorse**