

Perception of gesture dynamics in bodily emotion expression

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What makes bodily expressions emotionally salient?

Body movement (gait, dance, posture, everyday action) conveys reliable information about the emotional state of the expresser [1], which can be recognized by others [2]. Little is known on the function of **gesture** to express and perceive emotion.

Emotion is encoded in movement categories but also in dynamic qualities [1, 2]. Arousal is positively related to movement speed, acceleration and jerk, but no other indicators have been found for emotion dimensions or components [2].

At least three **functional dimensions** are relevant for emotion **expression** and experience: Arousal/activation, Valence/pleasantness, and Potency (power/control) [3, 4].

Research questions:

- Which spatiotemporal qualities of arm gestures convey emotion?
- How are these cues *subjectively represented in perception*?
- Are different cues related to different emotion dimensions?

Predictions: Major dimensions of emotion expression can be perceived and influence different perceived spatiotemporal qualities of arm gesture.

High arousal
Pleasant
High potency

gesture perception →

active, fast
fluent, located high in space
forceful, expansive

Perceptual rating of emotional expressions

Stimuli

Geneva Multimodal Emotion Portrayals corpus (GEMEP)[5]

12 emotions x 10 professional actors ($N = 120$ video clips)

Felt experience enactment of **social interaction** scenarios

Multimodal expression

face: blurred

voice: muted pseudo sentence

body: **co-speech gestures**

Raters

43 undergraduate students (10 males)



Design

Emotions grouped according to level of arousal (A), valence (V), and potency (P)

	Valence		
Potency high/low	Positive	Negative	
Arousal	High	Elated joy Amusement Pride	Hot anger Panic fear Despair
	Low	Pleasure Relief Interest	Cold anger Anxiety Sadness

Effects of A, V, P on ratings of

- arm movement
- emotion dimensions

ANOVA with A, V, P as within-subjects variables (2 levels for each scale)

Emotion dimensions

Gesture dynamics

Table 1. Interrater reliability of emotion scales

Scale	Verbal description	R_{SB}
Arousal	Physical excitement in response to the situation	0.98
Potency	Power/control over the situation	0.91
Valence	Pleasantness of emotional experience	0.89
Intensity	Impact of situation on person	0.97

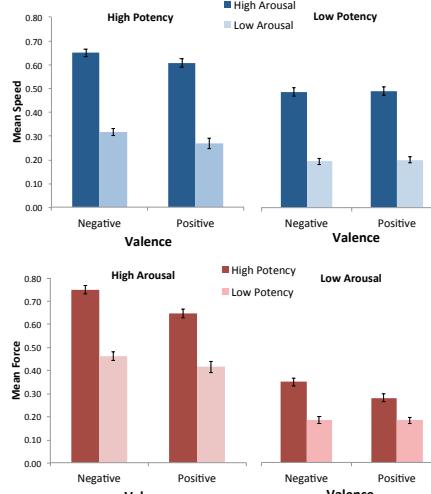
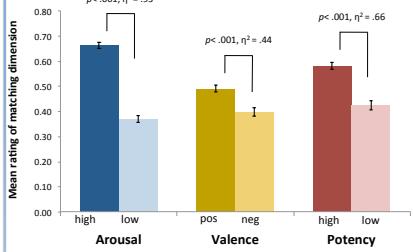
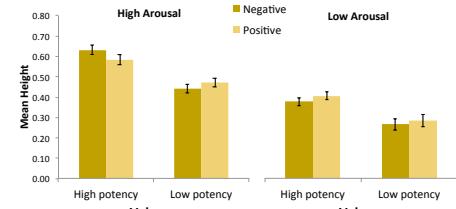


Table 2. Interrater reliability of movement scales

Scale	Verbal description and scale labels	R_{SB}
Amount	Amount of arm movement: active / passive	0.99
Speed	Speed by which the arms are moving: slow / fast	0.99
Force	Physical effort put in the arm movement: strong / weak	0.98
Size	Spatial extent or span of arm movement: compact / expansive	0.98
Fluency	Smoothness of speed changes: abrupt / fluent	0.94
Height	Vertical location of the arms: low / high	0.96



Conclusions

- Both emotion dimensions and gesture dynamics can be reliably perceived
- Arousal and potency strongly affect all perceived spatiotemporal qualities of gesture
- Arousal boosts the effects of potency on gesture perception

- Valence has a subtle effect gesture that is difficult to disentangle from the effects of arousal and potency
- **Gesture is an integrated part of nonverbal emotion communication, not only serving cognitive-linguistic but also affective-expressive functions**