26 What causes emotional change?

Monitoring emotion in experimental settings and daily life

Abstract

Our emotions are influenced by changes in both our internal states and external environment including interactions with others. In this study, we aimed to investigate how emotional responses change through social interaction in the experimental setting, and to develop a new framework for monitoring the internal change of emotional states in daily life. The findings of two experiments measuring autonomic responses during interaction suggested that negative emotions and positive emotions are transmitted differently through interaction. The interpersonal dynamics of emotional change found here will help us to understand larger group phenomena such as crowd joy or panic. Furthermore, for the purpose of logging internal states which dynamically change through daily life, we developed a new self-tracking method using exclamations or onomatopoeias (e.g., "NIKONIKO", "SHOBON"). This kind of framework will contribute to creating the system that support our wellbeing.
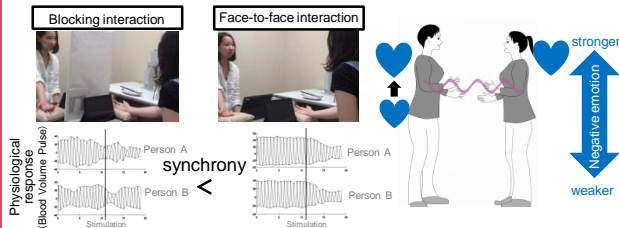
Emotional change through social interaction in the experimental setting
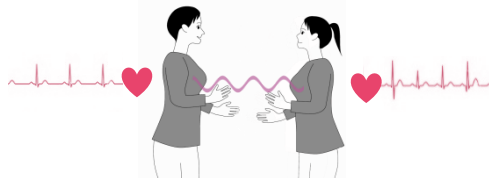
Experiment 1
Negative emotion
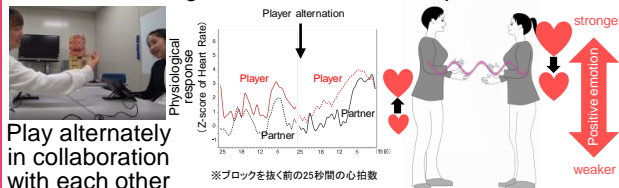Sharing pain by simultaneously stimulation of thermal stimulus

Participants with weaker reactions elevated their physiological reactivity in response to their partner's reactions during face-to-face interaction, but not vice versa.

Blocking interaction | Face-to-face interaction

synchrony

Physiological response (Blood Volume Pulse)
Person A / Person B
Stimulation

stronger / weaker
Negative emotion

Experiment 2
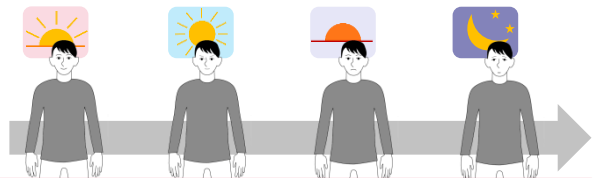### Positive emotion
Sharing excitement during collaborative block game

Participants changed their physiological reactivity in response to their partner's reactions, whether their reaction is stronger or weaker than their partner.

Play alternately in collaboration with each other

Player alternation
Physiological response (Z-score of Heart Rate)
Player / Partner
※ブロックを抜く前の25秒間の心拍数

stronger / weaker
Positive emotion

A new self-tracking system for monitoring emotion in daily life

Commonly used method
Numerical rating for each adjective expressing emotion

Happy 0 : not at all ～ 10 : very much
Sad   0 : not at all ～ 10 : very much

- High cognitive load (difficult to answer intuitively)
- Unsuited to capture physical emotional experience
- Hesitate to answer honestly (esp. negative emotions)

The method we propose
Reporting emotional states using exclamations and onomatopoeias

We propose a new self-tracking method using emotional expression words (exclamations, onomatopoeias) which are suitable to express physical emotional experience.
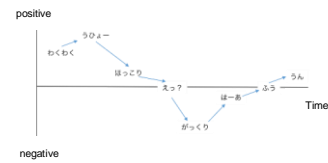
Words were mapped to emotion type and strength using a large-scale survey (N=14,000) to enable such word-based emotion assessments.

ex.)	Happiness	Sadness	Anticipation	Surprise	Anger	Fear	Disgust	Accept
strong	うひょー	がっくり	ぴりぴり	えー	いらいら	びくびく	げっ	うっとり
weak	にこにこ	しゅん	そわそわ	どきっ	かちん	ぞくっ	うわぁ	うん

References

[1] A. Murata, H. Nishida, K. Watanabe, and T. Kameda. "Convergence of physiological responses to pain during face-to-face interaction," *Scientific Reports,* 10（1）, 1-10. 2020.

[2] 村田 藍子・熊野 史朗・渡邊 淳司. "協力場面における対人インタラクションの当事者評価と客観評価," *電子情報通信学会技術研究報告*, vol. 118, No. 487, pp.111-114, 2019.

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