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### Editorial

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Editorial: Methods and Applications in Emotion Science

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Emotion science is associated with a broad spectrum of methods and applications (deGelder, 2017). The aim of this special topic was to bring together some of the innovative approaches and applications of our current understanding in the field. This collection reflects the interdisciplinary reach of this area of research in psychology.

At the forefront of methods and applications is the use of cognitive reappraisal and its effect on emotion processing (Gross & Thompson, 2014). Shigematsu and Kobayashi; “Relationship Between Emotion Regulation Strategies and Total Conviction in Promoting Behavior Change” address the context in which cognitive reappraisal is presented and how it might effect emotion regulation. They utilised a cold pressor task which was presented in the context of “total conviction” encouraging cognitive reappraisal of the task to a positive outcome, i.e. that the task would lead to an improvement in health. Whilst they did not find conviction to be a significant predictor of reappraisal it was non the less a novel approach to addressing the role of re-evaluation in cognitive appraisal.

Similarly cognitive reappraisal plays an important role in reducing possible harm from negative emotions (Dryman & Heimberg, 2018). As one of basic human emotions, sadness is characterized by an evolutionary response to loss or when a goal is not achieved. Persistent sadness has the potential to develop into a psychiatric disorder, which makes the regulation of sadness instrumental in avoiding such a negative outcome (e.g. Zilverstand et al., 2017). Yan et al. found that down-regulation reappraisal significantly reduced subjective feelings of sadness, but expressive suppression did not. Moreover, they used event-related potentials to reveal that reappraisal (300 -1500 ms after image onset) and expressive suppression (300–600 ms) significantly weakened the late positive potential (LPP) induced by sadness. This suggests

down-regulation reappraisal is a more effective strategy in regulating sadness relative to expressive suppression.

The assessment of emotion processing in the context of “culture free” brief psychiatric tools is addressed by Ali et al. Based on the tripartite model of psychopathology, the Depression, Anxiety, and Stress Scale-8 (DASS-8) described by their contribution showed excellent psychometric properties, invariant at the configural and metric levels across all countries included in its development. They demonstrated the DASS-8 can be successfully used as an initial screen for depression and anxiety disorders in English-speaking and African cultures.

Social networking has changed the way in which people conduct relationships. It has also contributed to the development of new methods for investigating behavior (Cheng et al., 2019). Ricciardi, Kornienko and Garner in their manuscript “The Role of Cognitive Emotion Regulation for Making and Keeping Friend and Conflict Networks” used social network analysis theory to investigate how dynamic social relationships are influenced by emotion regulation. Importantly bringing together a new perspective, network science theory and social network analysis to understand emotion regulation in complex social settings.

As a reflection of the diversity of work in this special topic, Kutsuzawa in their manuscript “Age Differences in the Interpretation of Facial Emojis: Classification on the Arousal-Valence Space” investigated the significance of the use emojis representing emotional expression of faces across a range of age groups. Using a categorization in a valence/arousal space there were similar clusters around 6 emotional expressions for all age groups. Interestingly however negative emotional expression led to greater arousal in middle aged adults compared to younger adults.

Significant development in applications of emotion science shows us that emotion plays an important role in business decision-making activities (Shrestha et al., 2019). Lu et al. used VOSviewer software with bibliometric analysis method to comprehensively organize the emotional research literature in the field of entrepreneurship. They found that the current research hotspots can be divided into five categories: emotions and entrepreneurship among college students, family emotions and entrepreneurship, the role of emotions in successful entrepreneurship, emotions in the context of entrepreneurial failure, and entrepreneurial passion. This work provides a foundation for developing new applications of emotion science in every day life.

Emotion recognition enables affective brain computer interface (aBCI) to accurately perceive the affective states of brains (Shanechi, 2019). A tool that has had significant impact on this area of research is EEG-based aBCI. It has developed into a widely used application for affective decoding including machine learning and deep learning. Based on AConvNet, Liang et al. proposed a novel nuclear norm regularized deep neural network framework (NRDNN) that can learn the high-level representations of EEG signals across the brain. NRDNN is able to capture the structural information among different brain regions in EEG decoding and improve interpretation of affective EEG classification performance.

In another AI application exploring how humanoid robots and androids exhibit human-like emotional appearances (see Stock-Homburg, 2022 for a review). Sato et al. developed an android head called Nikola as a tool for testing live face-to-face emotional interactions. “Nikola” produced single facial actions centred on prototypical facial expressions for six basic emotions as well as dynamic facial expressions for those emotions at four different speeds. Tools like Nikola have important applications for use in psychological experiments examining face-to-face emotional interactions with high ecological validity and control. They have the

potential to transmit emotional messages to humans, which may be useful in a wide range of applied situations, e.g., elder care, behavioural interventions, customer service.

In Sum, this collection of manuscripts represents the highly interdisciplinary nature of the current state of methods and applications in emotion science.

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## **AUTHOR CONTRIBUTIONS**

LJT and WZ Contributed equally to the writing of this editorial.

## **CONFLICT of INTEREST**

The authors declared no potential conflict of interest.

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