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A new paradigm to elicit strong positive emotions

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Synopsis
In laboratory settings, generating strong positive emotions using videos is difficult. Research demonstrates that faces and names of loved ones trigger strong emotions. We tested a video paradigm on 23 participants, involving two four-minute videos: one of their loved one and another of someone else's loved one, along with two validated videos (neutral, and high arousal high valence). We compared responses to the participant's loved one video (LOV) against the others, and a low valence stressor (Sing-a-song

stress test (SSST)), noting physiological differences. The own LOV induced higher nose temperature, heart rate, and electrodermal activity, alongside greater self-reported valence and arousal, compared to other videos. The SSST raised heart rate and electrodermal activity, and arousal, but didn't affect nose temperature, with low valence reported. This study shows our positive stimulus effectively elicits strong positive emotions, proposing nose temperature as a new valence measure.

Background

Eliciting emotions in a laboratory environment is difficult, especially when it concerns strong positive emotions. Over the last few decades, affect-eliciting videos to evoke both positive and negative emotions have been used in the study of emotions. However, consistently, and reliably eliciting strong positive emotions using film clips is challenging. A meta-analysis examining the effectiveness of films to induce positive and negative emotional states found a larger effect size for levels of reported arousal and affective valence in videos designed to evoke negative emotions (such as fear and disgust) than videos designed to induce positive emotions (Fernandez-Aguila, 2019). We developed a paradigm to systematically produce video stimuli designed to induce strong positive emotion in a controlled manner.

Previous research has found that presenting faces and names of loved ones not only elicits stronger subjective reports of positive feelings when compared to control faces and names, but is also associated with stronger physiological responses including the biphasic decelerative-accelerative heart rate (HR) response, increases in skin conductance and zygomaticus muscle activity, and decreases in the corrugator muscle activity (Guerra, 2010, Guerra, 2011, Lucas, 2019). In our paradigm, we exploit this personal aspect, and examine physiological and subjective responses to our video stimuli as well as towards video stimuli that have been used to elicit emotion before.

Methods

Participants

A total of 23 participants (14 female, age range 22-78) took part in the study. The study was approved by the TNO Institutional Review Board (number 2022-012).

Creating Loving Videos

Participants recruited for the study provided us with the name and information of a loved one to contact for a Zoom interview. An experimental lead contacted the loved one, explained the purpose of the experiment (making a video to elicit strong positive emotions), and scheduled a zoom meeting to make the video.

During this recorded zoom meeting, the participant's loved one was asked the following questions:

- What do you admire most in (participant's name)?
- What is your fondest memory with (participant's name)?
- If you were to plan the perfect day with (participant's name) to make (him/her) happy, please describe to me what you would do together?
- What is the impact (participant's name) has had on your life?
- What is something you want to say to (participant's name)?

The number of questions asked varied depending on the content and length of the loved one's answers. If needed, the experimental lead edited the video down to four minutes.

Other stimuli, design and procedure

Participants viewed the video of their own loved one, a randomly chosen video of another loved one, and two four-minute videos validated to be perceived as neutral and high valence (Maffei). The order of videos was presented in counterbalanced order across participants. After watching the videos, participants performed the sing-a-song stress test (Brouwer and Hogervorst, 2014). The SSST consists of three neutral time intervals (a neutral sentence followed by a 60s countdown interval) and a stressful interval (the instruction to sing a song aloud after the interval had elapsed, followed by a 60s countdown interval). This paradigm is known to elicit strong physiological and self-reported responses. Participants' HR (HR from ECG), phasic electrodermal activity (EDA) and facial skin temperature (infrared camera) were recorded throughout. After the presentation of each stimulus, they rated their level of arousal and valence using the Self-Assessment Manikin (SAM).

Results

Analyses of the HR, electrodermal activity, and skin temperature indicate that differences between responses to the own and other's loved one video are stronger than between the positive and neutral traditional videos. In fact, no clear difference was seen between the two types of traditional videos and the other's loved one video, while HR was around 5bpm higher for the own loved one video compared to all other movies during the first 40 seconds, phasic EDA quickly rose and stayed around 3.5 μSiemens higher, and nose temperature increased by .7 °C. Furthermore, self-reported valence and arousal, as measured by the SAM, were both higher than in the other videos. When contrasting the effects of the loved one video with the SSST, it was found that the SSST did not affect nose temperature but significantly increased HR and EDA. Self-reports indicated that the video featuring one's own loved one received the highest valence ratings, while the SSST received the lowest, yet both stimuli were rated equally high in terms of arousal.

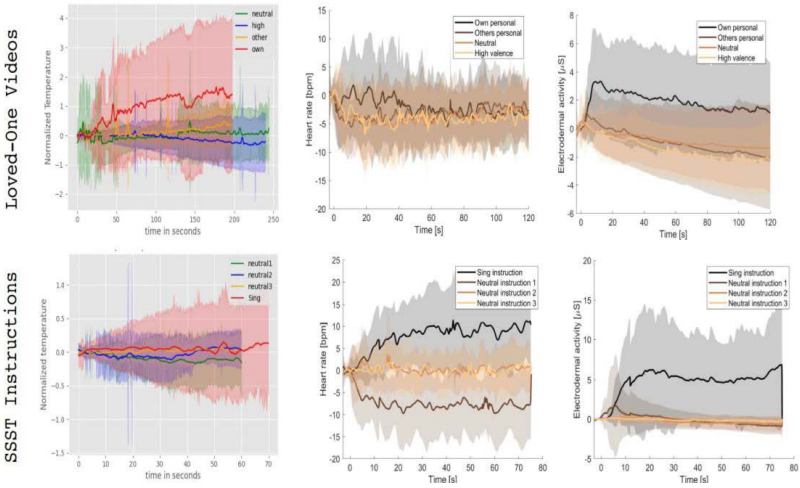

FIGURE 1
Physiological Responses- Loved-One Video vs. Sing-a-Song-Stress Test

Discussion

Our findings indicate that the videos developed within our paradigm evoke positive emotions, more so than standardized video clips and other's loved one videos, thereby affirming the capability of controlled positive stimuli in laboratory environments to elicit strong responses. When comparing the impact of the video featuring one's own loved one with that of the SSST, a highly arousing yet low-valence stressor, distinctive physiological patterns emerged. These results suggest that the physiological effects induced by the video featuring one's own loved one, characterized by high valence and arousal, may not solely be attributed to arousal, as evidenced by the divergent patterns observed with the SSST, which elicits low valence but high arousal. Notably, nose temperature may be indicative of positive valence which is consistent with previous research (Salazar-López, 2015).

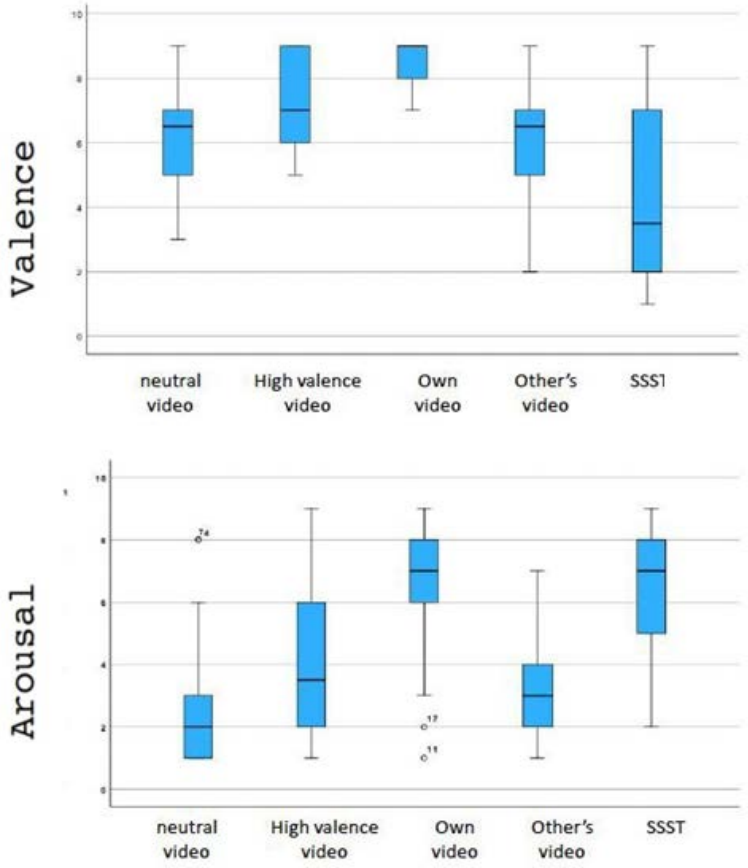

FIGURE 2
Self-Assessment Manikin- Valence & Arousal

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