Virtual Reality in the Service of Social Neuroscience

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Motivation

• Elicitation of robust social motivations towards human agents, while preserving experimental control, is one of the central challenges in social neuroscience.

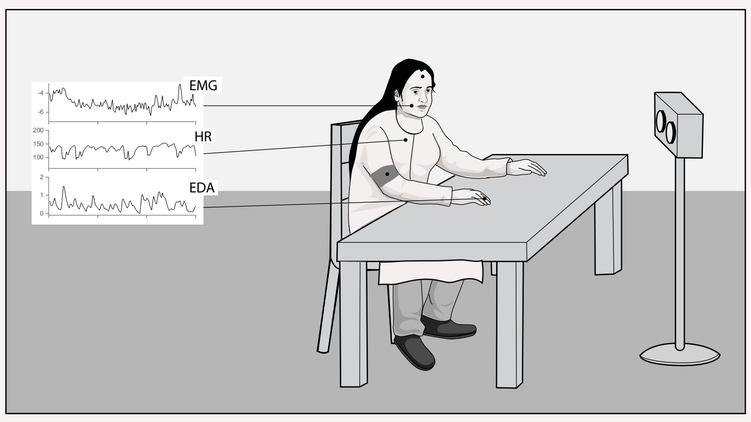
• Recent developments in the field of Virtual Reality (VR) hold potential to answer this challenge, by inducing an immersive experience in social environments characterized by a strong sense of social presence [1,2].

• The current study examined the capability of VR to evoke enhanced responses to social agents. Capitalizing on empathy eliciting paradigm[3], we measured subjective, physiological and facial responses towards a social agent in distress, who was presented either via VR or in a 2D video.

• Centrally, we assessed both self-oriented responses (i.e. distress, arousal) and other-oriented responses (i.e. care, physiological and facial synchrony)[4-7] and compared them between the VR and the 2D conditions.

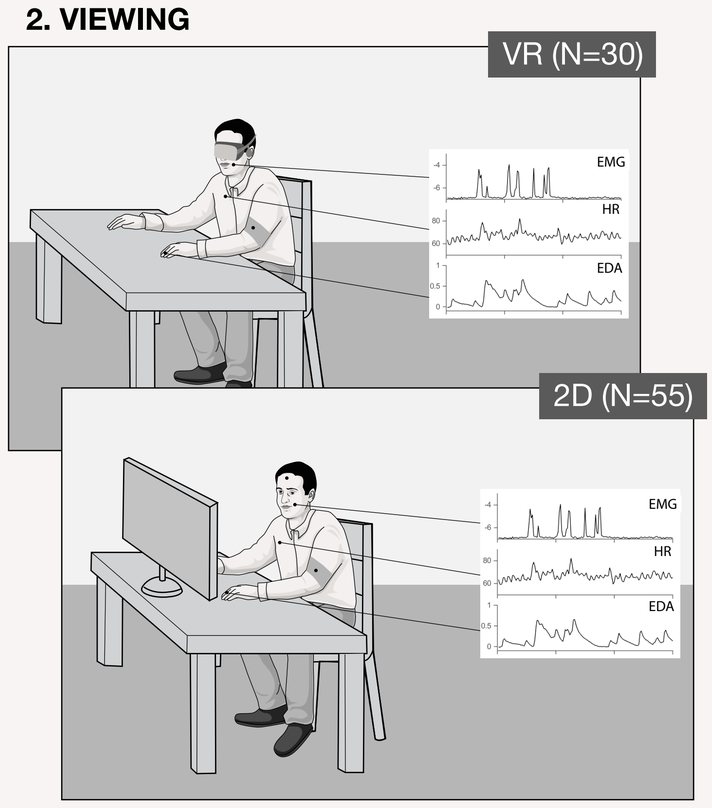
Experimental Paradigm and Measures

1. RECORDING



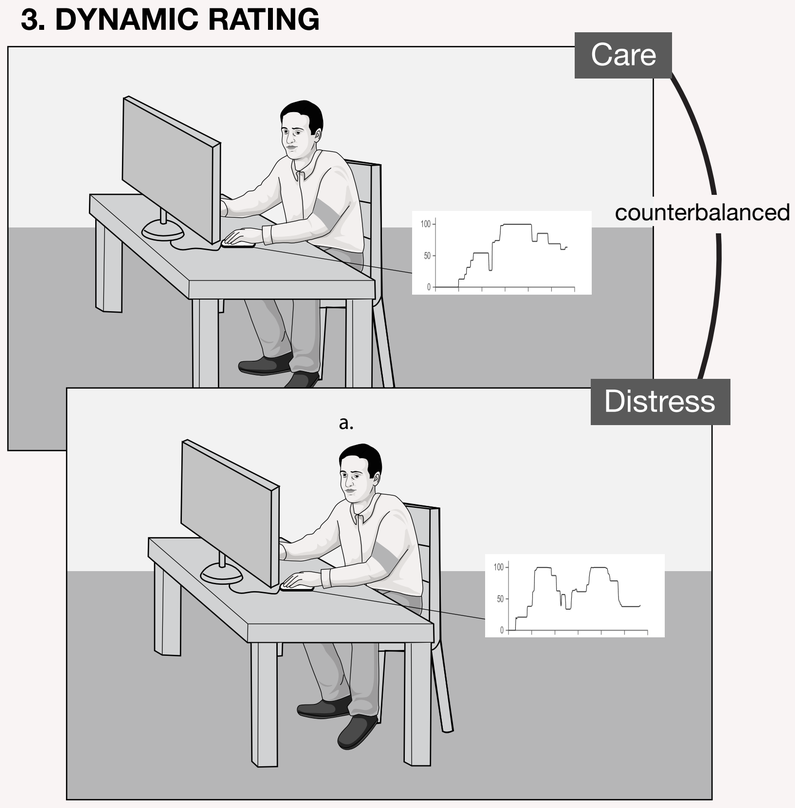
Immersive 360º Video recording of a female protagonist, combined with time-locked physiological responses.
Resulting Stimulus:
• Empty room scene (30 sec);
• Introduction (120 sec);
• Painful autobiographical story (366 sec)

2. VIEWING



Participants' autonomic and facial responses were recorded, while they viewed the video either in a VR or in a 2D condition. Following the viewing they reported on their feelings.

3. DYNAMIC RATING



Participants re-watched the movie in 2D, while rating moment-by-moment changes in their feelings of 1) care and 2) distress

PHYSIOLOGICAL MEASURES (1KHz, Biopac)
Autonomic Nervous System: Electrocardiogram (ECG), vElectrodermal Activity (EDA), Respiration
Facial Electromyography: Corrugator supercilii , Zygomaticus major

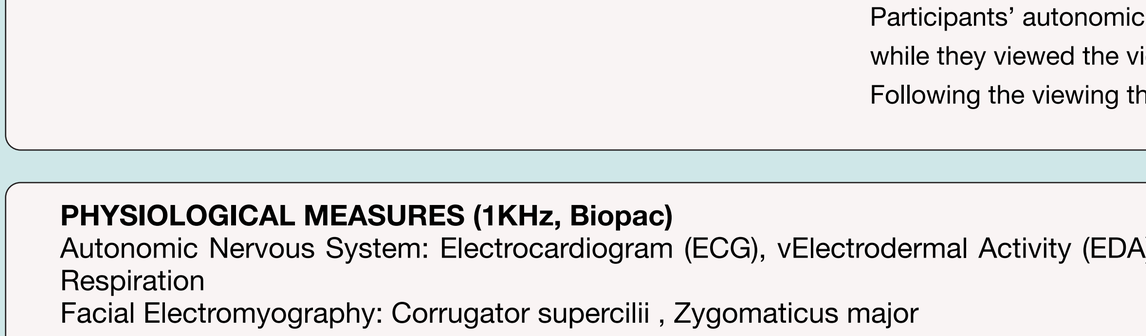
DERIVED MEASURES
• *ANS/EMG reactivity* during neutral and emotional parts (HR, phasic EDA, HRV)
• *ANS/EMG synchronization* with the social agent (HR, EDA, EMG)

SUBJECTIVE MEASURES:
Social presence (i.e. was looking at me/talking to me/present in the room)

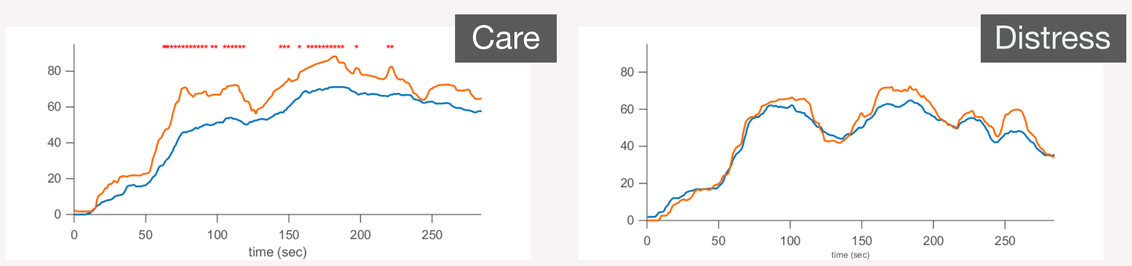
Care (i.e. care, affection, concern, desire to comfort)
Distress (i.e. discomfort, lack of silence)

Affiliation (i.e. knowing better, meeting in the future)

Results: Self-Reports



Results: Dynamic Ratings



Conclusions

• Immersive 360º Video VR induces enhanced experience of **social presence**.

• Immersive 360º Video VR augments feelings of **care** and **affiliation** towards a social agent in distress but doesn't affect negative self-distress.

• Feelings of care and affiliation are distinctively linked with social motivation. As such, VR technologies provide **a unique opportunity to evoke the motivational component of social interactions** in the laboratory conditions.

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