

# HRV and perceived stress role in the persuasiveness of health communications

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## Keywords

HRV; perceived stress; persuasion; psychophysiology

## 1. Introduction

Health communications have the purpose to inform about health risks or more sustainable lifestyles. For that aim, persuasion is employed in the attempt to produce a change in a person's attitudes or behavior. Literature on persuasion has focused on various individual differences, however, the study about how differences in perceived stress moderate the processing of health communication is scarce [1]. Perceived stress is a subjective measure of the degree to which situations in one's life are considered stressful. People with high levels of stress seem to have difficulties processing threatening health information such as disease detection, contrary to communications that promote healthy behaviors [2].

In the last decades, the study of heart rate variability (HRV) has become of increasing interest because of its power to clarify the relationship between different psychological and physiological processes [3]. Previous research had reported the predictive value of HRV in aspects such as attentional control and emotional regulation. Higher levels of HRV are considered beneficial in mitigating problematic situations [4], while low HRV has been associated with impaired regulatory mechanisms, which in turn reduce the ability to cope with stressors.

Based on the above and through a within-subject design, the present study aimed to examine which of three persuasive strategies is perceived as more persuasive: Ethos (relies on the source's authority), Pathos (appeals to emotions), or Logos (alludes to the argument's logic). Also, we aimed to evaluate the predictive role of HRV and perceived stress in the perceived persuasiveness of messages about the limit of meat consumption

## 2. Method

. The sample was composed of 58 volunteers (mean age: 21.74; SD= 3.22). Participants were recruited with different bachelor's degrees at the University of Valencia (Spain). Participants completed a task with persuasive messages, which lasted between 15-18 minutes. Simultaneously, they had an electrocardiogram (ECG) device attached to record the HRV. After the task, participants answered the Perceived Stress Scale (PSS) [5].

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### 3. Results

For the persuasion task, results revealed a statistically significant difference between strategies ( $p < .001$ ). The Ethos strategy had a significantly higher score on the “how convincing” question ( $M = 3.0$ ,  $SD = .46$ ) than Pathos ( $p < .001$ ) and Logos ( $p < .001$ ), while there was no difference between Pathos ( $M = 2.7$ ,  $SD = .66$ ) and Logos ( $M = 2.6$ ,  $SD = .62$ ) ( $p = 0.952$ ).

For the HRV, results indicate the RMSSD was significantly different between the baseline condition and the three conditions of persuasive messages (all  $p < .001$ ), while there was no difference between baseline and startle tone ( $p = 1.0$ ). The HRV was lower during the persuasive messages condition, with no difference between the three strategies ( $p = 0.689$ ).

Lastly, PSS moderated the relationship between RMSSD and the Logos strategy assessment (i.e., the answer to ‘how convincing’ each message was considered) ( $p = .015$ ). A significant negative relationship between RMSSD and Logos strategy was found when subjects were high in PSS ( $p = 0.034$ ).

### 4. Conclusion

The Ethos strategy was assessed as the more convincing, presumably because the appeal to the credibility and expertise of the source makes it seem more reliable and convincing. As for the HRV, it was significantly different and lower during the persuasive messages than in the baseline condition, which indicates there was a higher physiological reactivity during persuasion. Perceived stress moderated the relationship between HRV and the Logos strategy assessment in a negative direction. High levels of PSS normally disrupt the processing of threatening health messages [2], but the Logos strategy had a more informative tone, which may have led to greater agreement and processing fluency. To conclude, our findings have important implications since people experiencing high levels of perceived stress are an important and large target in the health field. For this reason and according to our results, the construction of health messages for individuals with high levels of perceived stress should appeal to logic and have a more informative approach, rather than emotional (e.g., fear appeals) or authoritative frames.

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