Cardiovascular and Cardiorespiratory Interactions – From Physiological Mechanisms to Clinical Applications
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Entropy-Based Indices in the Analysis of Age-Related Changes in Heart Rate–Blood Pressure Coupling

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Our research focuses on exploring the potential of entropy-based indices for the analysis of cardiovascular interactions. As a first step, we investigate whether these measures can capture age-related differences in heart rate-blood pressure coupling. ECG and continuous non-invasive blood pressure recordings from the PhysioNet Autonomic Aging database were analysed for two groups of healthy participants aged 25-29 and 50-54 years. After signal-quality assessment and preprocessing, 10-minute segments were used to derive RR intervals and corresponding systolic blood pressure values, which were then transformed into ordinal patterns. Classical heart rate variability measures were used as a reference, while mutual information (MI) and transcript mutual information (TMI) were explored to characterize dependence and directional information exchange between RR and blood pressure series. Preliminary results indicate lower heart rate variability in the older group, together with weaker short-delay RR-BP dependence and a lower BP-to-RR directional TMI value. These findings motivate further investigation of the physiological interpretation and robustness of entropy-based measures of cardiovascular coupling.