CIRC 2024–2025 Symposium Series

Leveraging Social Media in Tobacco Regulatory Science: Implications and Opportunities for Public Health

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The use of tobacco products, particularly among middle and high school students, is high, with 22.3% reporting ever using tobacco products in 2023. Tobacco product promotion on social media is widespread and contributes to this high usage. We used natural language processing techniques to analyze public perceptions and discussions about various tobacco products and the impact of tobacco regulatory policies on user attitudes and behaviors. We also examined tobacco marketing strategies on social media platforms like Twitter, Reddit, Instagram, TikTok, and YouTube. By utilizing deep learning models and large language models like ChatGPT, we identified execution features from social media posts associated with high user engagement. Our study findings provide essential information for tobacco regulations and prevention campaigns to design effective messages that communicate the health risks of tobacco product use across various multimedia platforms.

Synthesizing Stimuli to Differentiate Neural Predictions from Competing Encoding Models

David Skrill, Department of Biostatistics and Computational Biology

Adjudicating between competing scientific hypotheses is fundamental to scientific progress. In sensory neuroscience, hypotheses often manifest as “encoding models,” which map stimuli to neural responses. Despite advances in building encoding models that predict neural responses to complex, real-world stimuli like speech and music, a significant challenge remains: features of natural stimuli are often highly correlated, leading distinct computational models to make similar neural predictions and complicating model differentiation. To address this problem, we developed a method for synthesizing “controversial” stimuli that elicit distinct predictions from two encoding models of the neural response. Specifically, we optimize a set of sounds so that the predictions generated by the models are uncorrelated. Because the models make different predictions for these stimuli, the actual neural response can help determine which model is more accurate. Importantly, we show that it is possible to synthesize stimuli that are “universally” controversial in that they make distinct predictions for every fMRI voxel in a sensory region across multiple subjects.

Friday, September 20, 2024 | 11:30 AM – 1:00 PM | Wegmans 1400

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