Neural mechanisms of emotion regulation moderate the predictive value of affect- and valuation-related brain responses to persuasive messages

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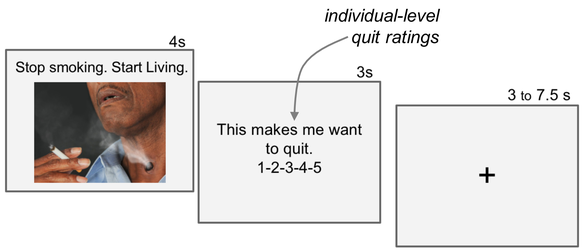
Emotionally evocative messages can be an effective way to change behavior[1], but the neural mechanisms that translate messages into effects on individuals and populations are not fully understood[2,3].

Q1 Do **amygdala** responses (associated with affective arousal) to emotionally evocative health messages predict the individual- and population-level effects of those messages?

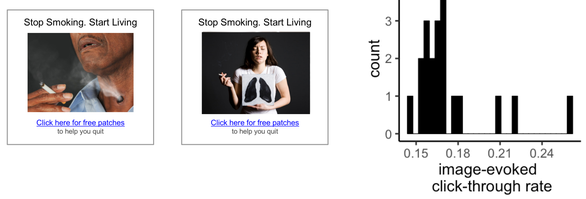
Q2 Is the relationship between **amygdala** activity and message effects mediated by **vmPFC** activity (associated with valuation)?

Q3 Is this predictive pathway moderated when people show brain activity associated with **emotion regulation**?



fMRI anti-smoking messages task

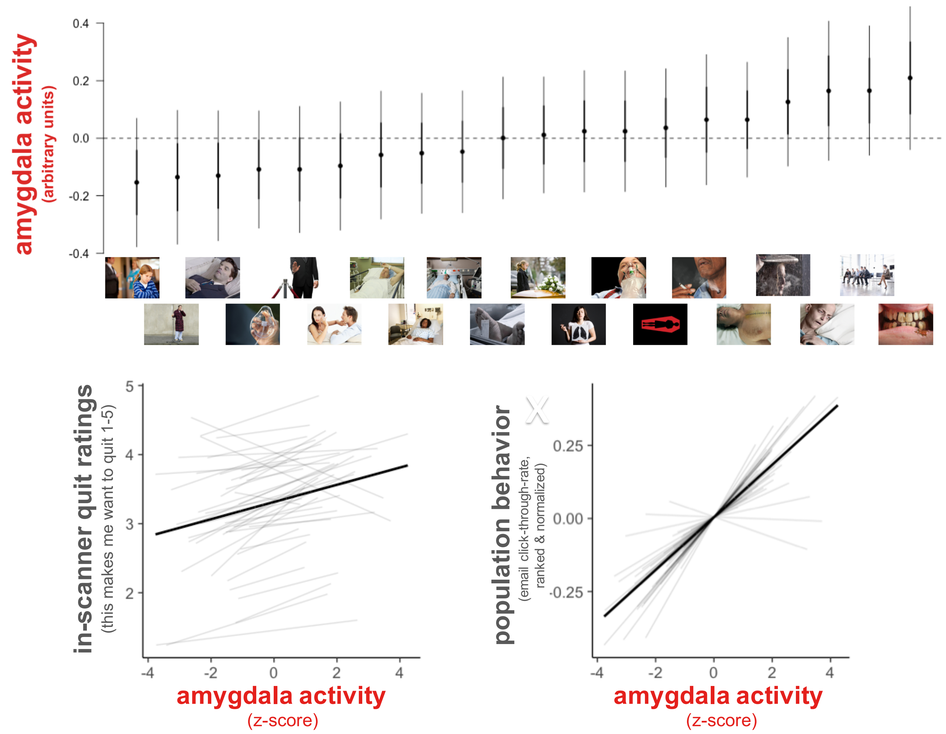
46 adult smokers
28 M, 18 F; mean age 32;
5 cigarettes/day for 30 days, 12 months smoking
20 aversive anti-smoking images



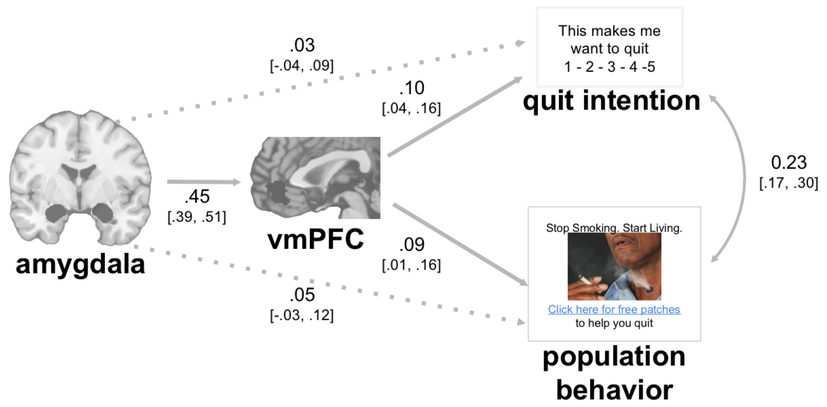
population-level email campaign

400 000 emails sent
20 aversive anti-smoking images
emails targeted likely smokers

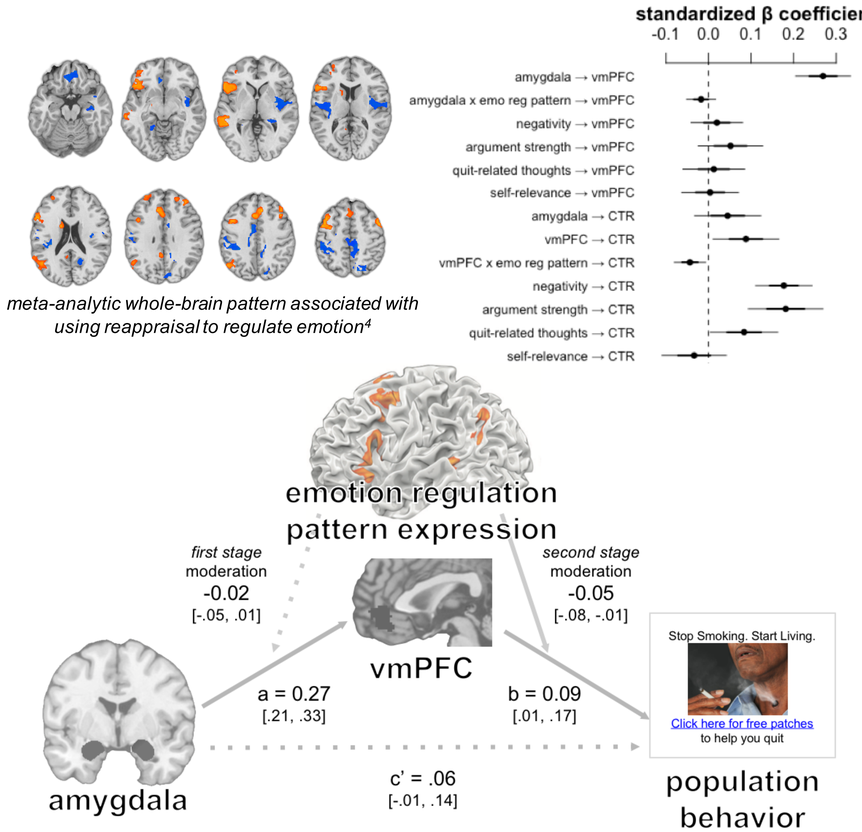
Q1 amygdala responses (associated with affective arousal) predicted effects of anti-smoking messages in individual smokers and a state-wide email campaign



Q2 vmPFC responses (associated with stimulus valuation) mediated the relationships between amygdala responses and message effects



Q3 the amygdala → vmPFC → population effects pathway was moderated by expression of a brain pattern associated with emotion regulation



Affect-related brain responses within the amygdala predicted effects of anti-smoking messages in individual smokers and in a population-level email campaign (**Q1**). These relationships between amygdala activity and message effects were mediated by valuation-related responses in vmPFC **(Q2)**, and expression of a meta-analytically defined brain pattern associated with emotion regulation moderated this pathway (**Q3**). These results suggest that neural mechanisms of emotion regulation can shape the extent to which affect- and valuation-related brain responses track with the success of persuasive messages.

[1] Tannenbaum et al. 2015 *Psych Bull.* [2] Falk & Scholz 2017 *Annu Rev Psych* [3] Falk et al. 2016 *SCAN* [4] Buhle et al., 2014 *Cereb Cortex*

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