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Component Network Meta-Analysis Case Study: Behavioural interventions for smoking cessation

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Cochrane Database of Systematic Reviews | Review - Overview

Behavioural interventions for smoking cessation: an overview and network meta-analysis

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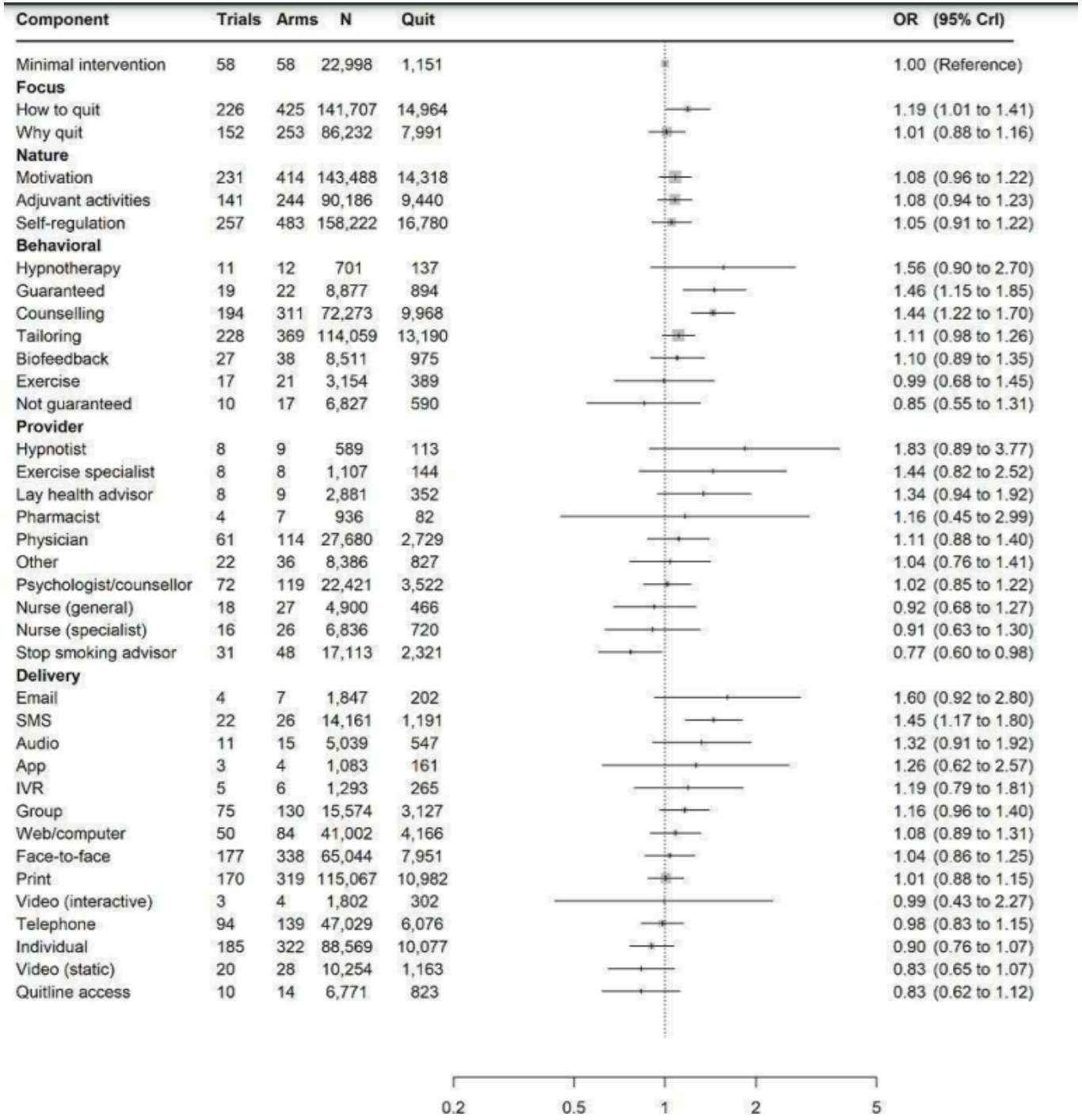
- Objective: conduct a component network meta-analysis to determine how modes of delivery; person delivering the intervention; and the nature, focus, and intensity of behavioural interventions for smoking cessation influence the likelihood of achieving abstinence six months after attempting to stop smoking; and whether the effects of behavioural interventions depend upon other characteristics, including population, setting, and the provision of pharmacotherapy.
- Suzanne Freeman and I provided support via CRSU

METHODS

- Primary Study Identification: Previous Cochrane Reviews of behavioural interventions (including all non-pharmacological interventions, e.g. counselling, exercise, hypnotherapy, self-help materials) for smoking cessation
- Identified randomised controlled trials of behavioural interventions for smoking cessation compared with other behavioural interventions or no intervention for smoking cessation.
  - Studies had to include adult smokers and measure smoking abstinence at six months or longer
- Component network meta-analysis (CNMA), examining the effects of 38 different components compared to minimal intervention.
  - Components included behavioural and motivational elements, intervention providers, delivery modes, nature, focus, and intensity of the behavioural intervention.
  - Added covariates to evaluate the influence of population characteristics, provision of pharmacotherapy, and intervention intensity on the component effects.

Results

- Included 33 Cochrane reviews:
  - From which 312 randomised controlled trials, representing 250,563 participants and 845 distinct study arms, met the criteria for inclusion in the component network meta-analysis.
  - This represented 437 different combinations of components(!)



Results:

Summary forest plot showing effect estimates for each component as related to smoking cessation

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Discussion

- Analysis aims to answer very relevant clinical questions
  - i.e. which components work? And, which work best?
- Not an easy piece of work, but scope for detailed modelling of data:
  - Covariates to consider (intensity, pharmacotherapy, etc)
  - Are all effects additive? (include interactions in the models)
  - Variable study quality (high risk of bias excluded in sensitivity analysis)
  - Outlier data points
- Component definitions (subjective / lack of reported information)
- Unclear how to assess publication bias
- Further work: Identifying promising combinations of components

Figure 7. Contour plot of leverage showing individual arm contributions to residual deviance. Each point is an individual study arm. Red: study at high risk of bias; yellow: study at unclear risk of bias; green: study at low risk of bias. DIC: Deviance Information Criterion.