Title: Iterative optimization and decision-making using the multiphase optimization strategy (MOST) to optimize an online behavioral intervention

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Background: MOST is an engineering-inspired framework for the development, optimization, and evaluation of multicomponent behavioral interventions. Optimization trials are randomized experiments designed to assess the effect of individual components, alone or in combination, on the desired outcome. When conducted in succession, optimization trials offer opportunities for data-driven decision making to refine content.

Objective: To demonstrate an iterative approach to optimization and decision-making using an applied example of an online intervention to address the intersection of alcohol and sexual risk behaviors among first year college students.

Methods: Two sequential optimization trials using a 2^5 factorial experimental design were conducted to identify candidate intervention components (i.e., descriptive norms, injunctive norms, expectancies, perceived benefits of protective behavioral strategies, and self-efficacy to use strategies) most effective at changing sexual behaviors within the context of alcohol use. Decisions informing content revision were driven by quantitative findings and feedback from participants. Findings of both optimization trials were used to identify the optimized intervention.

Results: Both optimization trials indicated only two components produced the desired outcome ($p < .05$), even after revisions. The optimized intervention evaluated in the RCT is therefore not only effective, but also efficient, economical, and scalable.

Conclusion: Without optimization interventions may include inactive components. When possible, an iterative approach to optimization and data-driven decision-making in the MOST framework maximizes the potential public health impact of an optimized intervention.