A Randomized, Controlled Trial to Test Behavior Change Techniques to Improve Low Intensity Physical Activity in Older Adults

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Abstract : Physical activity guidelines focus on increasing moderate-intensity activity for older adults, but adherence to recommendations remains low. This is despite the fact that scientific evidence supports that any increase in physical activity is positively correlated with health benefits. Behavior change techniques (BCTs) have demonstrated effectiveness in reducing sedentary behavior and promoting physical activity. This pilot study uses a Personalized Trials (N-of-1) design to evaluate the efficacy of using four BCTs to promote an increase in low-intensity physical activity (2,000 steps of walking per day) in adults aged 45-75 years old. The 4 BCTs tested were goal setting, action planning, feedback, and self-monitoring. BCTs were tested in random order and delivered by text message prompts requiring participant engagement. The study recruited health system employees in the target age range, without mobility restrictions and demonstrating interest in increasing their daily activity by a minimum of 2,000 steps per day for a minimum of five days per week. Participants were sent a Fitbit® fitness tracker with an established study account and password. Participants were recommended to wear the Fitbit device 24/7 but were required to wear it for a minimum of ten hours per day. Baseline physical activity was measured by Fitbit for two weeks. In the 8-week intervention phase of the study, participants received each of the four BCTs, in random order, for a two-week period. Text message prompts were delivered daily each morning at a consistent time. All prompts required participant engagement to acknowledge receipt of the BCT message. Engagement is dependent upon the BCT message and may have included recording that a detailed plan for walking has been made or confirmed a daily step goal (action planning, goal setting). Additionally, participants may have been directed to a study dashboard to view their step counts or compare themselves to their baseline average step count (self-monitoring, feedback). At the end of each two-week testing interval, participants were asked to complete the Self-Efficacy for Walking Scale (SEW_Dur), a validated measure that assesses the participant's confidence in walking incremental distances, and a survey measuring their satisfaction with the individual BCT that they tested. At the end of their trial, participants received a personalized summary of their step data in response to each individual BCT. The analysis will examine the novel individual-level heterogeneity of treatment effect made possible by N-of-1 design and pool results across participants to efficiently estimate the overall efficacy of the selected behavioral change techniques in increasing low-intensity walking by 2,000 steps, five days per week. Self-efficacy will be explored as the likely mechanism of action prompting behavior change. This study will inform the providers and demonstrate the feasibility of an N-of-1 study design to effectively promote physical activity as a component of healthy aging.