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Targeting Smoking Cessation and Weight Loss Simultaneously: An Acceptance and Commitment Therapy (ACT) Approach

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Introduction

Smoking and obesity are the first and second leading causes of preventable deaths in the United States (U.S.) [1]. With approximately 20% [2,3] of adults smoking and 36% and 34% of adults meeting criteria for overweight and obesity, smoking and excess weight (i.e., overweight and obesity) are among the most pressing health issues in the U.S. [4,5]. Along with premature death and disability, smoking and excess weight are associated with increased risk for acute medical events including myocardial infarction (MI) and cerebrovascular accident (CVA) as well as chronic disease including several cancers, cardiovascular disease (CVD), hypertension, hyperlipidemia and type 2 diabetes mellitus (T2DM). Beyond mortality and morbidity, the short- and long-term effects of smoking and excess weight have staggering economic consequences. For example, the direct cost of smoking and obesity on the healthcare system is $190 and $193 billion per year, respectively, with obesity recently passing smoking as the greatest expense [6]. Furthermore, the combined cost of smoking and excess weight on the public and private sectors is remarkable, comprising more than 30% of total healthcare costs and hundreds of billions in lost productivity annually [7,8]. Overall, both smoking and excess weight are harmful patterns of consumptive behavior that persist despite serious physical, medical and economic consequences.

Standard intervention for smoking cessation and weight loss is either behavioral, pharmacological or a combination of both [9,10]. Interventions not uncommon for smoking cessation include quitting "cold turkey" and computer-tailored interventions (i.e., behavioral), the use of Varenicline or nicotine replacement therapy (NRT) such as the patch or lozenges (i.e., pharmacological) or some combination. Similarly, interventions not uncommon for weight loss include caloric restriction and increased physical activity (i.e., behavioral), the use of weight loss pills or other dietary supplements to suppress appetite and/or inhibit the absorption of fat during digestion (i.e., pharmacological) or some combination. Although there is some disagreement in the field [11], combining behavioral and pharmacological intervention has generally lead to improved treatment outcomes for both smoking cessation and weight loss [12,13]. In fact, the combination appears to be the best approach to treating both tobacco dependence and obesity [14,15].

Research further suggests that previous attempts to intervene on both smoking cessation and weight loss simultaneously have generally been unsuccessful [16] and that weight gain is one of the biggest concerns for smokers when considering quitting or remaining quit [17-19]. A notable limitation of previous research efforts is that interventions often combined separate behavioral and pharmacological interventions into a combined intervention without first having established the theoretical basis for the combination. As such, although adding behavioral and pharmacological interventions that have demonstrated efficacy for either smoking cessation or weight loss as separate behaviors may have slightly increased smoking cessation and weight loss outcomes in recent years, there seems to be a ceiling effect. That is, despite advances in both behavioral and pharmacological interventions, smoking cessation rates have reached an asymptote [20] and rates of excess weight continue to increase with obesity more than doubling in the past twenty years [21]. Moving beyond the current state of the field will require a theoretically based intervention that simultaneously targets smoking cessation and weight loss.

Acceptance and Commitment Therapy (ACT) is an intervention that has proven efficacy for both smoking cessation and weight loss [22-25]. ACT is a behavioral intervention that demonstrates how experiential avoidance, the tendency to avoid difficult thoughts or feelings, is the mechanism of action that triggers unhealthy forms of behavioral avoidance such as smoking and excess weight [26-28]. Although experiential avoidance is not unique to ACT intervention, ACT does provide a theoretical framework and common clinical pathway for smoking cessation and weight loss intervention [29-31]. Specifically, both smoking and excess weight are conceptualized as forms of experiential avoidance. It follows that helping overweight smokers learn to tolerate and accept difficult thoughts and feelings (i.e., distress tolerance), without allowing those difficult thoughts and feelings to trigger unhealthy forms of behavioral avoidance (i.e., smoking, eating), will increase their acceptance-based responding and help them abstain from smoking and behaviors that contribute to excess weight. Experiential avoidance, distress tolerance and acceptance-based responding are key aspects of ACT intervention and differentiate it from traditional cognitive-behavioral therapy (CBT) or other forms of intervention (i.e., hypnotherapy). While ACT has demonstrated efficacy for smoking and weight loss as separate behaviors [32,33], to date, there are no studies on ACT intervention that simultaneously targets smoking cessation and weight loss. Furthermore, despite encouraging data on the combination of ACT and NRT to promote smoking cessation [34,35], there are no studies that combine ACT and NRT to promote smoking cessation while targeting another behavioral risk. Ultimately, removing weight concerns as an obstacle to smoking cessation will increase the likelihood of smokers quitting and staying quit, in addition to the advantages of weight loss and maintaining a healthy weight.

The paucity of research on simultaneous intervention for multiple health behavior risks is not unique to ACT. In fact, only recently

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has research started to investigate the efficacy and effectiveness of behavioral interventions designed to simultaneously change two or more health risks [36,37]. Toward that end, using stage-based, interactive and computer-tailored interventions (CTIs) from the Trans theoretical Model (TTM), Paiva et al. [38] recently defined coaction as the extent to which change on one behavior is associated with change on a second behavior at the same follow-up time point. Investigating smoking, diet, and several other behavioral risks, they found individuals in the treatment condition who progressed to healthy criterion on one behavior were more likely to progress to criterion on a second behavior compared to those participants in the same treatment condition who did not move to healthy criterion on the first behavior. Similarly, investigating differences between treatment and control proportions between paired action and singular action at 24-month follow-up across 12 behavior pairs (including energy balance, addictive, and appearance-related behaviors), Yin et al. [39] found CTIs consistently produced more paired action across behavior pairs than singular action and that paired action contributed substantially more to the treatment-related outcomes than singular action. Since then, investigating multiple health behavior change targeting smoking cessation, healthy diet, and sunscreen protection, Spas et al. [40] found that participants in both the treatment and the assessment-only control condition were more likely to progress to healthy criterion on a second behavior given the participant progressed to criterion on the first behavior compared to participants in the same treatment condition who did not progress to healthy criterion on the first behavior. These data are important because they are among the first findings on multiple health behavior change (MHBC) and because they suggest that simultaneous intervention on multiple health behavior risks from a theoretically based intervention accelerates participants toward healthy criteria on both behaviors.

Taken together, these data suggest the following. First, standard intervention for smoking cessation and weight loss is either behavioral, pharmacologic or a combination of both. Second, despite the combination of behavioral and pharmacologic intervention generally improving treatment outcomes for both behaviors, smoking cessation rates have maintained while excess weight has more than doubled in the past 10 years. Third, Acceptance and Commitment Therapy (ACT) is a well-established, empirically supported treatment with proven efficacy for both smoking cessation and weight loss as separate behaviors. Fourth, only recently has research started to investigate simultaneous intervention for multiple behavior risks and MHBC. Toward that end, Project SWISS (RI-INBRE 2P20GM103430) is the first ACT intervention to integrate NRT and simultaneously target both smoking cessation and weight loss. The first phase of this project is to conduct a small pilot while the second phase is to conduct a preliminary randomized controlled trial (RCT). The results of this study will provide preliminary data for an R01 to test this intervention on a larger scale. Developing a novel intervention that has a theoretical rationale for both behavior risks while integrating a pharmacologic intervention may help guide the future of research and intervention toward a paradigm of multiple health behavior change.

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