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Response

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Dear Editor-in-Chief

We thank Dr. Thompson and colleagues (7) for their thoughtful and complimentary comments regarding our recent review. We certainly agree with their proposal that to fully appreciate the impact of exercise on total daily energy expenditure (TDEE) one must consider the activity or activities that are being replaced. Indeed, recent data from one of the coauthors of our review indicate that sedentary time did not change when prescribed exercise was performed by previously sedentary individuals, suggesting that some form of substitution of occurred (5). From the perspective of energy balance, however, the impact will be the same, that is, whether prescribed exercise causes a reduction in nonexercise physical activity, or if it simply replaces nonexercise physical activity, the increase in TDEE will be less than would be expected based upon simple addition (or in cases of complete compensation or equal substitution, no increase would occur). However, given the emerging data clearly indicating that sedentary behavior confers health risks independent of physical activity behavior (4), we agree that it is an area that warrants attention in future investigations. An important consideration will be that the degrees of and variability in compensation and substitution will likely differ between free-living and laboratory-based investigations. Evolving technologies (6) provide an opportunity to more fully characterize the impact of prescribed exercise on multiple components of physical activity and sedentary behavior in free-living humans, and more studies using these technologies are needed.

We also agree with Thompson et al. that prescribing exercise for individuals who already have high levels of nonexercise physical activity will have minimal impact on TDEE if exercise replaces some of the nonexercise physical activity; this is rather intuitive. However, the focus of our review was on prescribing exercise for weight loss in obese individuals. Since high levels of PA are associated with reduced risk of obesity (1) and prospective weight gain (2, 3), it is not likely that many individuals seeking to lose weight through exercise are achieving high levels of PA in their normal lives.

In our mind, the optimal exercise intervention is one that increases physical activity while at the same time reducing sedentary behavior. That is, the prescribed exercise replaces the

sedentary behavior, not any existing habitually physical activity. However, it is a safe assumption that for interventions in extremely sedentary individuals, there is a “ceiling” to the amount of sedentary behavior. Therefore, any increments in physically activity will inevitably lead to a net increase in EE. We feel it is critical to recognize, as highlighted in our review, that some individuals may adopt compensatory behaviors (increased energy intake and/or reduced activity) that limit weight loss. Studies that utilize technologies to monitor free-living behavior may help identify susceptible individuals, and researchers can then develop strategies to minimize the impact of this substitution/compensation through targeted intervention. These studies will inform practitioners on how to prescribe behavioral change to induce weight loss and achieve successful weight loss maintenance.

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