

## Mean Effect Sizes and Correlations Between Outcomes:

### A Letter to the Editor Regarding Rhodes and Dickau (2012)

In Rhodes and Dickau's (2012) meta-analysis of experimental studies of physical activity interventions, the mean effect size for intention outcomes ( $d_+ = .45$ ,  $r = .22$ ) was significantly larger than that for behavior outcomes ( $d_+ = .15$ ,  $r = .07$ ). Rhodes and Dickau (2012, p. 724) concluded that their results "demonstrate a weak relationship between intention and behavior" in this domain and indicate the "considerable bias" of observational (non-experimental) studies previously reporting strong intention-behavior correlations.

This reasoning is faulty. The relative size of the two mean effect sizes does not indicate the strength of the intention-behavior correlation.

In a primary research study, the effect size for an outcome depends on the mean and standard deviation (and  $n$ ) within each condition (treatment and control). Within a condition, the mean and standard deviation for an outcome are unaffected by which particular participant has any given score. The effect size for an outcome is similarly unaffected by which participant has which score within a condition. For example, if a researcher inadvertently swaps intention scores for two treatment-condition participants, the effect size for intention will be unchanged. No matter how one shuffles the assignment of scores on an outcome to participants within a condition, the effect size for that outcome will remain the same.

By contrast, the correlation between two outcomes can change dramatically depending on which participants have which scores. Any given difference in effect sizes between two outcomes thus can be consistent with a wide range of possible correlations between those outcomes—strongly positive, strongly negative, virtually zero. Knowing the relative effect sizes

for two outcomes gives no indication of the correlation between those outcomes. So although the mean effect size for intention is larger than the mean effect size for behavior, intentions and behaviors might nevertheless be strongly positively correlated.

Rhodes and Dickau's (2012) results do make the valuable point that even if an intervention displays a substantial advantage over a control condition in an immediate-post-intervention intention assessment, that does not guarantee that the same magnitude of advantage will be sustained in subsequent behavioral assessments. But Rhodes and Dickau's (2012, p. 724) data do not provide "experimental evidence for the intention-behavior relationship in the physical activity domain" and do not "demonstrate a weak relationship between intention and behavior." The intention-behavior correlation may be weak in this domain, but a difference in mean effect sizes is not relevant to that claim.

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## Reference

Rhodes, R. E., & Dickau, L. (2012). Experimental evidence for the intention-behavior relationship in the physical activity domain: A meta-analysis. *Health Psychology, 31*, 724-727. doi:10.1037/a0027290