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Threshold assessment of attitude, subjective norm, and perceived behavioral control for predicting exercise intention and behavior

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Abstract

According to the theory of planned behavior (TPB), attitude, subjective norm, and perceived behavioral control (PBC) are hypothesized to have linear associations with intention and behavior. However, no previous research has examined this hypothesized linearity across scale responses. Further, no study using social cognitive measures has detailed the incremental increases in the proportion of people meeting the American College of Sports Medicine's (ACSM) exercise guidelines across scale responses. The purpose of this study was to examine mean scores of intention and behavior and detail the proportion of participants meeting ACSM's exercise guidelines for each TPB construct response category (i.e. 1–7). Participants were university undergraduates ($N = 585$) who completed measures of the TPB and a 2-week follow-up of exercise behavior. Results were evaluated using effect sizes (d, w) and p-levels, and provided general support for the linear effects of affective and instrumental attitude, but PBC and subjective norm were identified as having specific thresholds. Further, thresholds of positive, but not negative, exercise social cognition were identified for meeting ACSM's criteria with the exception of affective attitude. Threshold analysis was discussed as a novel way of analyzing TPB data by providing additional information about the expected success of intervention efforts focused on TPB constructs.

Keywords: Theory of planned behavior; Exercise prescription

There is substantial evidence that physical inactivity is associated with the development of several chronic diseases and premature mortality (Booth, Gordon, Carlson, & Hamilton, 2000; Katzmarzyk, Gledhill, & Shephard, 2000; Blair & Brodney, 1999). There is also extensive literature indicating that physical activity is an effective preventive strategy against cardiovascular disease, obesity, stroke,

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hypertension, type 2 diabetes, colon cancer, breast cancer, osteoporosis, and several psychological disorders (Bouchard & Shephard, 1994; Blair & Brodney, 1999; US Department of Health and Human Services, 1996). Despite this information, the majority of adults do not meet the minimal requirements for physical activity wherein health benefits are thought to occur (Canadian Fitness and Lifestyle Research Institute, 2001; US Department of Health and Human Services, 1996). Thus, there is a need to understand the determinants of physical activity behavior in order to develop appropriate intervention strategies.

One leading theoretical model explaining informational and motivational influences on behavior is the theory of planned behavior (TPB; Ajzen, 1985, 1991). Further, empirical reviews of the TPB have supported a relationship for the prediction of many disparate health behaviors including exercise and physical activity (Godin & Kok, 1996; Hagger, Chatzisarantis, & Biddle, 2002; Hausenblas, Carron, & Mack, 1997). The TPB suggests that the proximal determinant of volitional behavior is one's intention to engage in that behavior. Attitudes and subjective norm are hypothesized to influence behavior through intentions. Attitude is the affective and instrumental evaluations of performing the behavior by the individual. Subjective norm is the social pressure on the individual to perform or not to perform a particular behavior. The TPB attempts to also predict behaviors that are not completely volitional by incorporating perceptions of control over performance of the behavior as an additional predictor of intention and behavior (Ajzen, 1991). Perceived behavioral control (PBC) is the perceived ease or difficulty of performing the behavior, and takes into account the individual's perception of skills, resources, and opportunities needed to perform a behavior (Ajzen, 1991).

The TPB is hypothesized to act as a linear model (Ajzen, 1991). Accordingly, the greater one's attitude, subjective norm, or PBC, the greater one's resulting intention and behavior should be. Certainly evidence of this linear effect has been repeatedly demonstrated with the use of bivariate correlations, ordinary least squares regression, and structural equation models (Armitage & Conner, 2001; Hagger et al., 2002). However, no research has actually examined this hypothesized linearity across scale responses. Thus, although general linearity has been supported through correlation analyses, it is possible that critical thresholds are responsible for linear effects previously reported (Fishbein, Von Haeften, & Appleyard, 2001). Thresholds between particular scale metrics may be of import, as they indicate a potential dose-response relationship between social cognition and exercise behavior. For example it may be that a difference between 'slight' PBC and 'moderate' PBC results in a strong effect on subsequent exercise behavior but no differences exist between moderate PBC and "strong" PBC. Although this still partially supports a linear model because differences between slight and moderate PBC are meaningful, the effect of PBC on behavior would be at a ceiling threshold once moderate PBC is obtained rather than linear across the PBC scale to strong levels.

Testing these theoretical assumptions of linearity in the TPB is warranted for a better understanding of exercise motivation, but the practical value of threshold analysis may be of even more interest. First, linearity or critical thresholds for the effects of TPB constructs has direct application in intervention efforts. Improving physical activity interventions and understanding the social cognitive mediators of change is an utmost concern (Baranowski, Anderson, & Carmack, 1998; Sallis, 2001). If effects of the TPB on intention and behavior are indeed linear across a scale, then intervention efforts should continue to focus on improving TPB constructs to a maximum value. However, if threshold ceilings are identified, it suggests that interventions need only improve TPB constructs to a certain point. For example, if a meaningful subjective norm threshold for improvements in intention is identified between slight and moderate but not between moderate and strong, then targeting subjective norm to moderate represents