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Theory of Planned Behavior, Self-Care Motivation, and Blood Pressure Self-Care

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Abstract

The theory of planned behavior (TPB) was integrated within the theory of self-care (SCT) to explore the predictive value of extending TPB to measure attitudes and beliefs regarding a behavioral *goal*, and determine the ability of goal beliefs to predict engagement in the combined, multiple behaviors necessary to control BP. The hypothesized model was evaluated in a sample of 306 community-dwelling African Americans between 21 and 65 years of age. Scales developed for the study achieved acceptable reliability ($\alpha=.68-95$). Structural equation modeling analysis resulted in a second-order factor structure with attitude, subjective norm, perceived behavioral control, and intention modeled as indicators of a construct representing *goal beliefs* related to keeping BP within normal limits. This latent construct was conceptualized within the theory of self-care as “self-care motivation,” and predicted 18% of the variance in self-care behaviors necessary for BP control. The model achieved acceptable fit (CMIN/ $df=2.32$; CFI = .95; RMSEA = .066). Final assessment of fit was done using multi-group SEM and bootstrapping techniques. In this extension of the TPB attitudes and beliefs regarding the goal of keeping BP within normal limits were found to determine one's motivation to engage in the multiple behaviors necessary for BP control.

Keywords

Blood pressure; self-care; self-care agency; self-care motivation; theory of planned behavior; structural equation modeling

One in three African Americans has high blood pressure (HBP), a rate that is 45% higher than that of their Caucasian counterparts (Centers for Disease Control and Prevention [CDC], 2005; Fields et al., 2004). African Americans develop hypertension at an earlier age of onset, tend to maintain higher BP readings, develop more frequent and severe complications, and are less likely to achieve BP control than other racial groups (Chobanian et al., 2003). The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7; Chobanian) indicates that lifestyle self-care strategies are essential for preventing high blood pressure, and lifestyle modification is an indispensable aspect in the treatment of all stages of hypertensive disease. Yet, little is known about African Americans' attitudes and beliefs regarding the self-care behaviors and lifestyle modification needed to attain BP control and prevent hypertension. In addition, no research was found that examined the pattern of attitudes and beliefs regarding the need to engage in multiple lifestyle modifications to control blood pressure. The aim of this study, therefore, was to assess the salient beliefs of African Americans

related to engaging in the *totality* of self-care behaviors required to attain the goal of keeping BP within normal limits and preventing or controlling HBP.

The JNC 7 report (Chobanian et al., 2003) identified five causative factors of HBP that could be mitigated through self-care strategies. These include: excess body weight, inadequate level of physical activity, inadequate intake of fruits and vegetables, excess sodium intake, and excess alcohol intake. Other researchers have found that the use of tobacco products and excessive stress affect blood pressure, contributing to overall cardiovascular risk (Kaplan, 2004; U.S. Department of Health and Human Services, 2004). Unfortunately, African Americans have a low prevalence of engaging in self-care strategies to reduce their risk of HBP.

African Americans have the highest rates of obesity and physical inactivity of any racial group. The prevalence of extreme obesity is 2.5 times greater in African Americans than Non-Hispanic Whites (Ogden et al., 2006) and as many as two-thirds of all African American women are physically inactive (CDC, 2007). Less than 25% of African Americans consume a diet containing the recommended five fruit and vegetable servings per day (CDC); Jen and colleagues (2007) found that the diets of African Americans contain an excess of sodium but a deficiency of potassium. Additionally, 13% consume alcohol at a rate considered to be moderate or heavy consumption (Schoenborn & Adams, 2002), while 6.5% meet the criteria of alcohol dependence or abuse (SAMHSA, 2006). Although the JNC 7 report found insufficient evidence for a causal relationship between stress and hypertension (Chobanian et al., 2003), African Americans disproportionately experience a number of chronic stressors (e.g., lower socioeconomic status, exposure to racism, lack of access to health care) that may contribute to difficulty controlling blood pressure (DeNavas-Walt, Proctor, & Smith, 2007; Smedley, Stith, & Nelson, 2003).

Theoretical Approaches to Promote Self-Care Behavior

There is sufficient evidence to support the efficacy of lifestyle modification in controlling BP. To obtain increased understanding of factors influencing African Americans' behaviors related to BP control, this study tested a conceptual framework that integrates the theory of planned behavior (TPB; Ajzen, 1991, 2001) within the theory of self-care (SCT; Orem, 2001).

Theory of Planned Behavior

The TPB postulates that attitude, subjective norms, and perceived behavioral control predict intention, and intention along with perceived behavioral control predicts actual behavior. In addition, the TPB which is based on an expectancy-value model further postulates that the development of attitude, subjective norm, and perceived behavioral control involves an interaction between underlying salient beliefs combined with the subjective value or relevance the person attributes to those beliefs.

Attitude is conceptualized as a multidimensional construct consisting of cognition, affect, and conation (Ajzen, 1988). The cognitive portion reflects a person's information about and perceptions of a particular attitude object (in this study the attitude object is BP control behaviors), affective responses have to do with the feelings toward the object, and conative responses are concerned with behavioral inclinations and commitments (Ajzen). Globally, attitude is the degree to which the performance of the behavior is positively or negatively valued. Attitude reflects a person's beliefs regarding the behavior combined with the value the person places on the outcome of performing the behavior

Subjective norm is a person's perception of the social expectations to adopt a particular behavior. Subjective norm is influenced by a person's normative beliefs combined with the person's motivation to comply. Normative beliefs are concerned with the likelihood that important others would approve or disapprove of a behavior, and motivation to comply is an assessment of how important it is to have approval of important others (Ajzen, 1991).

Perceived behavioral control reflects a person's beliefs as to how easy/difficult it will be to perform the behavior. The salient beliefs underlying the formation of this concept are control beliefs, which involve the person's perceptions of resources versus barriers for engaging in the behavior. These beliefs are combined with the perceived power of each control factor to facilitate/impede the behavior to form the overall perceived behavioral control.

In addition to the antecedents specific to the three main TPB concepts addressed above, distal factors may influence the beliefs that persons hold about a particular behavior. These distal factors may include demographic characteristics, personality traits, and cultural beliefs.

Theory of Self-Care

Integrating the TPB within the SCT allows health-related behavior to be examined from a self-care and nursing perspective, and also provides the theoretical link from behavior to health outcomes (Villarruel, Bishop, Simpson, Jemmott, & Fawcett, 2001). Combining concepts from complementary theories may increase the predictiveness of such an integrated model (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003). Within the SCT, self-care is a human regulatory function, deliberately engaged in by a person in order to attain structural integrity and human functioning for the purpose of maintaining life, health, and well-being (Orem, 2001, p. 45). Self-care "is purposeful goal- or result-seeking activity" (Orem, 271). Self-care behaviors are learned within a sociocultural context and are influenced by a person's values and goals. The actual self-care behaviors produced are a result of a person's self-care agency or ability. There are three components to that ability. First the person must have knowledge of the courses of action open to them, as well as knowledge of the effectiveness and desirability of those actions (Orem). Second, a person needs to judge among the options and decide on the course of self-care behavior to be taken. Finally, the person must have the resources (physical, psychological, emotional, and material) to take the necessary action steps. The components of self-care agency closely reflect concepts within the TPB allowing for integration of concepts that predict self-care behaviors, but now also link those behaviors to a specific health outcome.

TPB and Multiple Self-Care Behaviors

There is strong theoretical support that attitudes and beliefs are important predictors of behavior, strong evidence that certain unhealthy behaviors cause HBP, and strong evidence that African Americans have a low prevalence of engaging in the self-care behaviors necessary to control BP. Yet, there is surprisingly little in the literature specific to the attitudes and beliefs of African Americans related to prevention and control of HBP. Although the TPB has been used extensively in health behavior research, including in areas relevant to blood pressure control, most of this research has been done with Non-Hispanic White samples (Ajzen & Timko, 1986; Godin & Kok, 1996; Hagger, Chatzisarantis, & Biddle, 2002). Additionally, regardless of the theoretical perspective used, the majority of health-behavior research conducted to date has focused on single, individual behaviors. However, the reality of clinical practice is that patients are routinely instructed to make multiple, simultaneous changes in lifestyle behaviors in order to attain some health-related outcome. Despite this clinical reality, no studies could be found that dealt with the combined

totality of multiple self-care behaviors necessary for BP control. Evaluating aggregated behaviors adds another dimension to understanding health-related self-care. Specifically, it requires an understanding of the attitudes and beliefs of individuals as it relates to their valuing of the *regulatory goal* to be achieved through these aggregated behaviors (e.g., BP control). Therefore, the purpose of this study was to explore the predictive value of extending the TPB to (1) measure attitudes and beliefs toward a behavioral goal (i.e., keeping BP within normal limits) and (2) determine the ability of these goal attitudes to predict self-care behavior and attainment of BP control among African Americans who are at greatest risk from hypertension and its consequences.

Methods

Participants

A community sample of 306 African Americans, ages 21–65 ($M = 44.4$ years, $SD = 12.41$) were recruited through flyers distributed in public locations (e.g., community centers, supermarkets, churches) and through outreach BP screening programs at public events. Adults reporting general good health, without obvious dementia, psychiatric disorders, or drug use, and able to read/write English were invited to participate in the study. The sample included 161 women (53%) and 145 men (47%) who were well distributed by education with a range of 4 to 20 years ($M = 12$, $SD = 2.35$). Income levels were varied with 26% ($n = 78$) reporting $< \$10,000/\text{year}$ and 24% ($n = 75$) reporting $\$40,000/\text{year}$. Forty-eight percent ($n = 148$) of the respondents were employed full-time, another 14% ($n = 44$) worked part-time, and 20% were either permanently or temporarily out of work. The sample was evenly divided based on medical history. Participants included both individuals with no known chronic illnesses ($n = 153$, 50%) and those with chronic illnesses that predispose to cardiovascular disease ($n = 153$, 50%). Approximately one-third of participants ($n = 115$) had a history of hypertension and 98% of those diagnosed reported taking anti-hypertensive medications.

Scale Construction and Variables Measured

Since no instruments were found in the literature that measured the totality of combined behaviors required to control BP, it was necessary to create new instruments. Focus groups elicited culturally-specific attitudes and beliefs that may influence African Americans' engagement in BP control behaviors (Peters, Aroian, & Flack, 2006). This data was used to develop ten scales with items reflecting the three TPB key concepts and their associated antecedent concepts (Ajzen, 1991). Additional items were developed to measure the frequency with which participants engaged in the totality of self-care behaviors needed for BP control (BP Self Care Scale; Peters & Templin, 2008), resulting in a total of 11 scales (see Table 1, bottom row). Both expert and cultural peer review processes were used to establish content validity of the scales. All instruments were pre-tested using the "Think Aloud" method to reveal any problems relating to content, comprehension, or ease of response (Kucan & Beck, 1997).

In accordance with recommendations made by Ajzen (1991), three principles were followed when creating the scales. First, each scale used a bipolar, 7-point scaling format (e.g., unlikely-likely), with 7 representing the high end. Second, direct (global) measures were created for the TPB concepts of attitude, subjective norm, perceived behavioral control, and intention. Each of the four direct measures consisted of five items that were summated to yield a total score. Third, within the TPB indirect measures also are created for attitude, subjective norm, and perceived behavioral control. The indirect measures are composite scales based on the mathematical product of a salient belief multiplied by the value attributed to that belief. (Ajzen, 1991, Ajzen & Fishbein, 2008). Each of the indirect

measures was constructed from 7 to 10 pairs of items. For example, one pair of items on the indirect measure of attitude consisted of the following “Keeping my blood pressure within normal limits will help prevent me from getting severe headaches” (*very unlikely* = 1 to *very likely* = 7)” and “For me to prevent getting severe headaches is ...” (*extremely unimportant* = 1 to *extremely important* = 7)“. The product scores for item pairs were summated to yield a total score for each indirect measure. Further details of the direct and indirect scales are provided below, and the Cronbach's alphas for each of the indirect and direct measures of the TPB concepts are located in Table 1, bottom row.

Attitude—The *direct* measure of attitude (dm_att) was obtained using five items with the statement: “For me to keep my blood pressure within normal limits is...” The bipolar adjectives used were terms such as: good/bad, beneficial/harmful, pleasant/unpleasant. To determine an indirect measure of attitude, two belief scales were created: behavioral beliefs (BB) and outcome evaluation (OE). The *indirect* measure of attitude ($\Sigma_{BB \times OE}$) was then created by multiplying each of seven behavioral belief items by its corresponding outcome evaluation item. Participants were asked to indicate on a 7-point bipolar scale, with *unlikely* (= 1) and *likely* (= 7) as the anchors, to what extent they believed keeping their BP within normal limits would have the stated positive or negative outcomes. Corresponding outcome evaluation items were scored on a 7-point bipolar scale with participants stating how *unimportant* (= 1) or *important* (= 7) the stated outcome was to them. Thus each pair of attitude items consisted of a belief rating how likely keeping blood pressure WNL will result in a certain positive outcome multiplied by the rating of how important they perceive that particular outcome. The following seven health-related outcomes were used with the stem, “Keeping my blood within normal limits will help me...” feel better, have more energy, live longer, prevent kidney disease, stay healthy, avoid serious health problems, take part in activities important to me, and prevent serious headaches. Cronbach's alpha for the direct and indirect measures scales ranged from .75–.95 (Table 1).

Subjective norm—The *direct* measure of subjective norm (dm_sn) was the mean of five items asking about what “people important to me” would think about participants keeping their BP WNL, using anchors such as *agree/disagree*, *likely/unlikely*. Important referents included spouse, children, other family members, and doctors. Based focus group data, other African Americans and pastors were included as additional referents. To determine an indirect measure of subjective norm two belief scales were created: normative beliefs (NB) and motivation to comply (MC). The *indirect* measure of subjective norm ($\Sigma_{NB \times MC}$) combined seven normative belief items with the corresponding motivation to comply items. The normative beliefs scale asked questions in the format: “My [referent] think(s) that I should do everything I can to keep my BP WNL.” Response choices were *false* (= 1) or *true* (= 7). The motivation to comply scale asked participants “When it comes to health, I want to do what my [referent] wants me to do”. The response choices ranged from *completely disagree* (= 1) to *completely agree* (= 7). Cronbach's alpha for the measure of Subjective Norm ranged from .73–.91 (Table 1).

Perceived behavioral control (PBC)—The *direct* measure of PBC was assessed as the mean of five items asking respondents to rate the ease with which they thought they could keep their BP WNL (e.g., “For me to keep my blood pressure within normal limits is... *impossible/possible*”). To determine the indirect measure of PBC two scales were created: control beliefs (CB) and power of control (PC). The *indirect* measure of PBC ($\Sigma_{CB \times PC}$) was the product of 10 control belief items multiplied by 10 corresponding power of control items. Control belief items asked respondents to indicate the probability that various factors (e.g., insurance, finances, family or work responsibilities) would facilitate/impede their ability to keep their BP WNL, while power of control items asked how often those

facilitators/barriers occurred in the participant's life. Cronbach's alpha for the PBC scales ranged from .69–.86 (Table 1).

Intention—Five items were used to create a *direct* measure of intention. Each of the items assessed the goal intention or commitment of participants that in the near future they “*intend to, will try to, will plan to* keep their blood pressure within normal limits”. The mean computed direct measure score of intention was 6.44 (SD = .85; $\alpha = .88$).

Self-care behavior—The *Blood Pressure Self-Care Scale* contained eight items that asked respondents to determine how often they engage in all of the JNC 7 recommended BP control behaviors. The 7-point bipolar scale used the anchors of “*never*” and “*always*.” Cronbach's alpha for this scale was .72 (Table 1). Further discussion of the psychometric properties of this scale is presented elsewhere (Peters & Templin, 2008).

Additional Variables Measured

Blood pressure and body mass index—BP was measured using the professional-grade Omron HEM 907 automatic device. The reliability of the Omron measurement was established by comparison with readings taken with a mercury sphygmomanometer. The average of two readings, taken one minute apart, was recorded for both systolic and diastolic BP. Self-reported data was obtained to determine previous medical history and also to calculate body mass index (BMI; weight [kg]/height [m]²). Self-reported data has been found to be highly correlated with measured BMI among African Americans (McAdams, Van Dam, & Hu, 2007).

Procedure

All procedures and measures were approved by the institutional Human Investigation Committee. Participants completed the instrument package that contained questions assessing demographic characteristics as well as scales measuring the relevant concepts. The instruments were designed to be self-administered, but a few participants (< 5%) requested the instruments be read to them by the African American research assistants. After completing the instruments, BP readings were taken following the protocol established by the American Heart Association (Pickering et al., 2005). Participants with elevated pressures were counseled by masters or doctorally-prepared nurses involved with the study. Participants received a \$20.00 gift card to Target stores as compensation for taking their time to participate in the study.

Data Analysis

Descriptive analyses was done using SPSS (v. 17) to characterize study participants by demographic characteristics and scores on each of the measures. Structural equation modeling (SEM) were done using AMOS (v. 17) software. In the SEM analysis, the sample covariance matrix was used as input and a maximum likelihood was used for parameter estimation. Both absolute and relative fit indices were used to evaluate model fit. Absolute fit indices included the chi-square statistic and the chi-square divided by degrees of freedom χ^2/df (CMIN/df), while the Comparative Fit Index (CFI) tested relative fit (Byrne, 2001). The Root Mean Square Error of Approximation (RMSEA) also was calculated to discern the discrepancy in fit per degree of freedom and thus “adjust” for sample size. We evaluated good fit as chi-square equal to or less than three times the degree of freedom (Kline, 2004); CMIN/df < 3 (Byrne), and RMSEA < .08 (Byrne). In addition to measures of overall fit, standardized residuals and modification indices were carefully examined to determine the true fit of the model. Parameter adequacy was assessed by examining feasibility of solutions,

assessing standard errors, and evaluating the statistical significance of the estimates (Jöreskog, 1993).

Results

Preliminary Analysis

Preliminary analyses focused on estimating reliability of the scales and examining correlations among them. Using item-total correlations, three items with negative item-total correlations were dropped from the indirect measures of perceived behavioral control; no other changes were made to scales measuring the TPB concepts. There was good internal consistency reliability of all scales ($\alpha = .68-.95$; Table 1). There were moderate to strong, positive and significant correlations between the indirect and direct measures of each TPB concept, providing evidence that the scales offered related, but not redundant, measures of these concepts (Table 1). As hoped, the TPB scale means were relatively high, suggesting that the participants had favorable attitudes toward the goal of keeping BP within normal limits. Participants also reported fairly high engagement in the multiple behaviors necessary to control BP. Table 1 presents the scale means, standard deviations, and final Cronbach's alpha for each scale as well as the correlation matrix which depicts the relationships among the scales.

Since alpha is not a good measure of scale homogeneity (McDonald, 1999), confirmatory factor analysis of both the direct and indirect/multiplicative TPB scales was performed. The model fit the data well (CMIN/ $df = 2.15$; CFI = .90; RMSEA = .06) with factors loading on their intended items, with no correlated measurement error across factors, or cross factor loadings, the results indicate that the individual scale constructs were homogeneous.

SEM Analysis

SEM analysis was performed to test the integrated TPB and self-care model. Scale scores for the direct and indirect measures were used to define the latent constructs of attitude, subjective norm, and perceived behavioral control, with those latent constructs predicting to intention to control BP, which in turn was modeled as predicting self-care behavior. In keeping with Azjen's work (1991), perceived behavioral control also was modeled to have a direct effect on behavior (Figure 1). Since previous examination of the relationship between self-care behaviors and BP suggested the possibility of a bidirectional relationship (Peters & Templin, 2008), bidirectional pathways were tested in the current analysis. Body mass index and age were included as covariates of BP. The overall fit of this model was fair (CMIN/ $df = 3.02$; CFI = .93; RMSEA = .081). However, analysis of parameter adequacy revealed high intercorrelations (.84-.94) between the key TPB concepts of attitude, subjective norm, and perceived behavioral control. Only attitude had a strong path to intention, and intention had a very weak path to behavior (Figure 1). The high collinearity among attitude, subjective norm, and perceived behavioral control makes it difficult to have confidence in their individual predictability to intention, and suggests the proposed measurement model was incorrect. The high correlations suggest that as measured, these constructs represent a univocal underlying dimension.

A second SEM analysis respecified the TBP measurement model as follows: A second-order factor structure was specified with attitude, subjective norm, and perceived behavioral control modeled as indicators of a construct representing "goal beliefs" or goal orientation related to keeping BP within normal limits. The fit of this overall model was good (CMIN/ $df = 2.60$; CFI = .94; RMSEA = .072), a strong path from intention to behavior ($\beta = .45$), and with a very strong relationship between goal beliefs and intention ($\beta = .97$). Evaluation of this strong standardized path from goal belief to intention, combined with an examination of

item content on the intention scale, suggested that instead of goal beliefs predicting to an outcome of intention, that intention was better conceptualized as an additional indicator of goal beliefs in combination with attitude, subjective norm, and perceived behavioral control. To test this hypothesis, a third SEM was specified (Figure 2).

In this third model, intention was added as an indicator of goal beliefs, and the construct “goal beliefs” was renamed self-care motivation. Reconceptualizing “goal beliefs” as self-care motivation was suggested because each indicator appeared to represent an aspect of a person's orientation toward behaviors necessary to keep BP within normal limits, and within self-care theory, goal orientation is equated with motivation for self-care (Orem, 2001, p. 265). The initial fit of this third model was good (CMIN/ df = 2.58; CFI = .94; RMSEA = .072), with self-care motivation having strong, significant loadings on attitude, subjective norm, perceived behavioral control, and intention (β = .86–.98). Examination of the modification indices suggested two additional pathways with theoretical relevance. One path was added to go from age to self-care motivation. As a result, the direct effects of age statistically controlled for any linear association between self-care motivation and BP. The other pathway was added as a link from self-care motivation to BMI. With this pathway, BMI functioned as a mediator, explaining in part, the relationship between self-care motivation and BP. Although neither of the BMI paths was significant, they both were retained because of the relevance of BMI to BP. The final model (Figure 2) had good fit (CMIN/ df = 2.32; CFI = .95; RMSEA = .066). There was a strong significant path from self-care motivation to self-care behaviors (β = .46, p < .001), and moderately strong paths in the bidirectional relationship between self-care behaviors and BP (β = -.22, p = .056; β = .27, p = .009). Self-care motivation explained 18% of the variance in BP self-care behavior scores. The model accounted for a small amount (4%) of the variance in actual BP.

Further assessment of model fit was done by performing multi-group SEM. The model was simultaneously tested in two groups: those without chronic illness (Low Risk; n = 153) and those with chronic illnesses that predispose to cardiovascular disease (e.g., diabetes, kidney disease; High Risk; n = 153). This division was based on the fact that having a chronic illness increased the likelihood of more frequent contact with healthcare providers as well as potentially increasing attention to self-care behaviors. In the multi-group assessment, the structural paths were constrained to be equal across both groups, and evaluation was done using chi-square with five degrees of freedom. Results revealed no significant difference in fit between the constrained and unconstrained models ($\chi^2_{(5)} = 8.20$, p > .05). Thus, the single group model was accepted as the final model. As a final step in the analysis process, bootstrapping was performed to check the sensitivity of parameter estimates to violations of distributional assumptions. All bootstrapped estimates were within $\pm .02$ of the asymptotic estimates. The Bentler and Freeman stability index (Kline, 2006) was computed to check the stability of the nonrecursive path coefficients. This stability index was .054 which is within the acceptable limits of less than 1.

Discussion

The purpose of this study was to determine if attitudes and beliefs toward a behavioral goal would predict aggregated self-care behaviors necessary for BP control, and whether that would predict measured BP. As such, this study is the first to assess the ability of TPB concepts to predict a medically recommended *goal* related to multiple, combined behaviors. The TPB was developed to be predictive of individual, specific behaviors (e.g., attitude toward exercising for 30 minutes, five days a week). However, clinicians consistently instruct patients to make *multiple, simultaneous* behavior changes to achieve various health outcomes. Yet those changes will not occur if the patient does not value the goal underlying the behavioral prescriptions.

Theoretical Implications

This study extended the TPB to evaluate “goal beliefs” while integrating TPB concepts within SCT to connect beliefs to multiple health behaviors and health outcomes. Our findings indicated that within the proposed extension of the TPB, attitude, subjective norms, and perceived behavioral control did not predict intention. Instead intention along with the other constructs appears to be an indicator of an underlying factor related to goal beliefs. This unexpected finding has significance, however, when viewed from the perspective of SCT. The underlying factor of goal beliefs could be conceptualized as representing a person's goal orientation. Within the SCT, the “goal orientation of individuals ...is to bring about the regulation (changing or maintaining) of existent conditions in themselves or their environment” (Orem, 2001, p. 191). Additionally, goal orientation is viewed as equaling “motivation,” a power component of self-care agency (p. 265). Within the current study, the goal orientation was toward maintaining BP WNL. This conceptualization of the second-order factor as self-care motivation is further supported by the strong, significant path from self-care motivation to self-care behaviors. Thus, attitudes and beliefs about the goal of keeping BP WNL determine one's motivation to engage in the multiple behaviors necessary for BP control. Additionally, the fact that this one variable of motivation is able to explain 18% of the variance in behavior is an important first step in understanding what helps people commit to multiple lifestyle modification behaviors. This study provides beginning evidence for the proposed extension of TPB and its integration within SCT.

Another key finding is that the integration of the TPB with SCT while theoretically sound, explained only a small amount of variance in actual BP. There are a number of potential explanations for this finding. It may be that attitudes and beliefs have only a small effect on actual BP and that other variables need to be further explicated in the model. Within the current sample, the multi-group comparison did not show an appreciable difference in model fit, nor did it show moderation effects of a history of hypertension. However, the small amount of BP variance explained may be due to the fact that the majority of hypertensive participants in the study were on anti-hypertensive medications and thus did not have significantly different BP readings compared to the normotensive participants who were in the Low Risk group. The significant bidirectional paths between self-care and BP suggests that increasing BP prior to a hypertensive diagnosis requires increased self-care (a positive association), whereas in patients with a known history of hypertension, increased self-care may be associated with decreased BP (inverse association). Thus, keeping BP WNL may be preventive for some patients and therapeutic for others, resulting in the bidirectionality of effects noted. This explanation is theoretically sound from a SCT perspective, but further empirical testing is needed.

Research Implications

Future studies are needed to continue exploring the value of integrating the TPB within the SCT. Greater understanding of factors contributing to self-care motivation and to self-care behaviors has important clinical significance. Developing and testing models that predict the likelihood of persons engaging in multiple health-related behaviors are needed to support clinical practice. As with all studies, there are limitations that should be noted when planning future research. Specifically, the use of the TPB for a *goal* rather than a specific behavior is not in keeping with the original intent of the model. Further exploration of its use in this manner is needed. The fact that a bidirectional model had good fit suggests alternative causal pathways exist in the relationship between self-care and health outcomes. This bidirectional hypothesis was developed post hoc, and it is difficult to test longitudinal hypotheses with cross-sectional data. However, the bidirectional relationship between self-care and BP represents a substantial source of confounding that might be better controlled in the design than in the analysis stage of an investigation. To improve exploration of

postulated relationships, future studies should be either longitudinal in nature or use a cross-sectional design specifically planned for reciprocal SEM analysis. Future studies should also consider including other variables in the model in order to increase the amount of variance explained in the participants' recorded BP.

Clinical Implications

This study has demonstrated the usefulness of integrating concepts from the TPB within the SCT. This integration more fully explicates the cognitive and affective processes that influence a person's willingness to engage in multiple self-care behaviors in order to achieve a health-related goal. Clinicians routinely instruct patients on the need for multiple, simultaneous behavior changes (e.g., eat a low-fat, low-salt diet, lose weight, exercise more). These instructions are based on national guidelines and/or professional judgments regarding the behaviors necessary to achieve a health-related goal such as reducing BP. However, there is an implicit assumption underlying these instructions. Despite the fact that nurses state they value "mutual goal setting," the reality of much clinical practice is based on the assumption that patients agree with the professional's goal. Using the integrated model depicted in this study may help nurses be more cognizant of the attitudes and beliefs patients hold toward the health-related goal, and therefore recognize the influence of goal-orientation (i.e., motivation) on actual self-care behaviors. Assessing these fundamental attitudes and beliefs is an important first step in developing a plan of care to assist patients in making behavioral changes that promote health.

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Figure 1.

Initial Model.

Note: dm_att = Direct measure of attitude; BB × OE = Behavioral beliefs × outcome evaluation; dm_sn = Direct measure of subjective norm; NB × MC = Normative beliefs × motivation to comply; dm_pbc = Direct measure of perceived behavioral control; CB × PC = Control beliefs × power of control; dm_int = Direct measure of intention; bp_sc8 = blood pressure self-care scale; SBP = systolic blood pressure; DBP = diastolic blood pressure; BMI = body mass index.

Figure 2.

Final Model

Note: *dm_att* = Direct measure of attitude; *BB × OE* = Behavioral beliefs × outcome evaluation; *dm_sn* = Direct measure of subjective norm; *NB × MC* = Normative beliefs × motivation to comply; *dm_pbc* = Direct measure of perceived behavioral control; *CB × PC* = Control beliefs × power of control; *dm_int* = Direct measure of intention; *SC-motivation* = self-care motivation; *bp_sc8* = blood pressure self-care scale; *SBP* = systolic blood pressure; *DBP* = diastolic blood pressure; *BMI* = body mass index; Path coefficients (3) in italics were not significant $p < .05$.

Correlation Matrix, Distributions, and Reliability for Scales in the Study

Table 1

	dm_att	$\Sigma BB \times OE$	dm_sn	$\Sigma NB \times MC$	dm_pbc	$\Sigma CB \times PC$	dm_int	bp_sc	SBP	DBP
Direct Attitude	---									
Indirect Attitude ($\Sigma BB \times OE$)	.49**	---								
Direct Subjective Norm	.58**	.45**	---							
Indirect Subjective Norm ($\Sigma NB \times MC$)	.34**	.31**	.44**	---						
Direct Perceived Behavioral Control	.65**	.46**	.60**	.32**	---					
Indirect Perceived Behavioral Control ($\Sigma CB \times PC$)	.24**	.25**	.31**	.37**	.27**	---				
Intention	.76**	.50**	.67**	.39**	.68**	.34**	---			
BP Self-care	.37**	.22**	.29**	.22**	.37**	.31**	.42**	---		
Systolic BP	-.08	.00	.04	.07	-.09	.07	.03	.09	---	
Diastolic BP	-.07	-.02	-.00	.06	-.07	.01	.00	.06	.75**	---
Scale Mean (SD)	6.48 ¹ (.77)	43.36 ² (9.81)	6.10 ¹ (.99)	29.07 ² (12.92)	5.99 ¹ (.04)	26.07 ² (11.21)	6.44 ¹ (.85)	4.43 ¹ (1.17)	129.09 (19.07)	80.81 (12.86)
Cronbach's alpha scales	.75 (dm_att)	.95 (BB=.94) (OE=.93)	.73 (dm_sn)	.91 (NB=.91) (MC=.90)	.68 (dm_pbc)	.82 (CB=.72) (PC=.86)	.88 (dm_int)	.72 (bp_sc)	---	---

Note: Attitude: dm_att = direct measure of attitude; BB= behavioral beliefs; OE = outcome evaluation; Subjective norm: dm_sn = direct measure of subjective norm; NB = normative beliefs; MC = motivation to comply; Perceived Behavioral Control: dm_pbc = direct measure of perceived behavioral control; CB = control beliefs; PC = power of control; Σ = the combined product term of two measures; dm_int = direct measure of intention; bp_sc = blood pressure self-care; SBP = systolic blood pressure; DBP = diastolic blood pressure; SD = standard deviation.

Score ranges for Scale Mean superscripts:

¹ 1–7;
² 1–49