Development of the Purposeful Action Medication-Taking Questionnaire
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Development of the Purposeful Action Medication-Taking Questionnaire

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This three-phase study describes the development and psychometric properties of the Medication-Taking Questionnaire (MTQ) to measure the purposeful action domain (reasons individuals decide to accept medication treatment) in the medication adherence model for hypertension. During Phase I, items were evaluated for content validity and clarity. Item analysis, internal consistency, and exploratory factor analysis were performed during Phase II to finalize the MTQ: Purposeful Action as 12 items and 2 subscales (treatment benefits and medication safety). Phase III evaluated the MTQ: Purposeful Action for temporal stability and construct validity. The final version MTQ: Purposeful Action demonstrated good internal consistency, temporal stability, and construct validity. The MTQ: Purposeful Action appears to have good psychometric characteristics that represent the decision-making process for adherence in medication treatment for hypertension.

Keywords: hypertension; medication adherence; health attitudes; compliance; beliefs

Hypertension is a prevalent health problem that affects an estimated 63 million people or 24% of the U.S. population, with the prevalence increasing to 60% in individuals reaching the ninth decade of life (Burt et al., 1995; Ionita et al., 2005). Nonadherence is a major reason for inadequate control of high blood pressure and has been identified as the principle clinical problem in the management of hypertension (Haynes, McDonald, Garg, & Montague, 2001; Joint National Committee VI, 1997). This article describes the development and validity testing of a questionnaire to assess whether an individual will cognitively choose to take medications.
The Medication-Taking Process

Forty years of adherence research has demonstrated that adherence is a multifactor phenomenon with more than 250 factors contributing to non-adherent or adherent behaviors (Haynes, 1979; Haynes et al., 2001). Medication taking for chronic illness is complicated requiring continual decision making and lifestyle changes to become adherent with prescribed treatment. Original adherence theories were developed to address the cognitive components of health behaviors in response to perceived health threats (Leventhal, Leventhal, & Contrada, 1998; Rosenstock, 1974). Leventhal et al. (1998) expanded on existing frameworks by addressing the feedback process individuals encounter during dynamic changes in health. Many chronic diseases are asymptomatic, exerting a seemingly nonthreatening silent impact on health. Applying current adherence theories to the context of medication-taking for chronic disease, consequently, has been mostly ineffective. Non-adherence continues to be a major reason for treatment failure (Haynes et al., 2001; Jayne & Rankin, 2001).

Several instruments exist to measure health beliefs about medication taking. The limitations of existing measures include the use of items unrelated to medication-taking behaviors, items that demonstrate potential response bias, failure of items to focus on reasons to take medications, or limited items addressing issues associated with long-term medication taking (Hamilton et al., 1993; Hill & Berk, 1995; Morrell, Park, Kidd, & Martin, 1997; Streiner & Norman, 1995). Most adherence scales measuring individual perceptions use five or fewer response options, potentially increasing the possibility of ceiling effect, which is common in individuals self-reporting adherence (Craig, 1985; Haynes et al., 2001; Streiner & Norman, 1995).

The medication adherence model (MAM) was conceptualized to meet the need for a framework that addressed medication taking in low-threat situations and was user friendly in the clinical setting (Johnson, 2002a, 2002b; Johnson, Williams, & Marshall, 1999). Two types of nonadherence drove the development of the MAM: the intentional decision to take or miss medications and the unintentional interruptions that cause medications not to be taken (Hughes, 2004; Johnson et al., 1999; Kingsnorth & Wilkinson, 1996; Wroe, 2002). The MAM identifies three concepts (purposeful action, patterned behavior, and feedback) that are responsible for long-term adherence to prescribed hypertension medications. The model suggests that patients must first make deliberate decisions, termed purposeful action, to use medications for the control of blood pressure. Patients then develop patterned behaviors to take medications regularly through regular access, routines, and
techniques to facilitate remembering. Feedback, such as blood pressure readings, reinforces the purposeful intent to take medications and guides the patient’s capacity to maintain medication routines. The MAM outlines the dynamic process of initiating and maintaining adherence to medications. A detailed discussion of the MAM and its relationship to existing adherence theories can be found in Johnson (2002a, 2002b).

Successful treatment of hypertension is first dependent on an individual’s perceptions of the efficacy of medications. The concept purposeful action parallels other constructs that address individual health beliefs and also captures the salient factors influencing an individual’s decision to take medications. The subdomains for purposeful action included: perceived need (need), which assesses an individual’s perception that medications are needed to control blood pressure to maintain and promote health and well-being; perceived effectiveness (effectiveness), which evaluates an individual’s perception that medications are effective in controlling blood pressure and in preventing health problems; and perceived as safe (safe), which assesses an individual’s perception that medications are generally safe and do not pose serious health problems. Because no measure of purposeful action exists, an instrument that reflects prevention and health promotion with relation to the MAM needs to be developed.

**Purpose**

The purpose of this study was to develop a psychometrically sound questionnaire to assess the purposeful action domain, or the decision to take medications.

**Design**

A methodological study was conducted in three phases to establish initial reliability and validity estimates for the Medication-Taking Questionnaire (MTQ): Purposeful Action. Content validity was undertaken during Phase I. Phase II consisted of finalizing the factor structure of the MTQ: Purposeful Action through item analysis, internal consistency analysis, and exploratory factor analysis (EFA). Phase III evaluated test-retest reliability and construct validity. A confirmatory factor analysis (CFA) and multitrait-multimethod (MT-MM) analysis were used to examine construct validity of the finalized MTQ: Purposeful Action.
Sample

Institutional review board approval was obtained from participating facilities (N = 7). Content validity testing was conducted in a sample of five hypertensive patients and five health care professionals who examined the MTQ: Purposeful Action for clarity and content relevance (Imle & Atwood, 1988; Lynn, 1986). Professionals were invited to participate in the study based on their known experience with antihypertensive treatment and included two family physicians, a cardiology nurse practitioner, a nurse working with a statewide cardiovascular disease program, and a nurse researcher who had published articles on adherence. All professionals were Anglo American and were nearly equally divided with regard to gender.

Participants for the content validity phase who had been prescribed antihypertensive medications and lived in a situation in which they managed their own medications were recruited through healthy aging clinics, worksite wellness programs, hospital outpatient clinics, and hospital emergency departments in the intermountain west. The five hypertensive participants were Anglo American, had at least a high school education, and ranged in age from 48 to 90 years (M = 62.0 ± 16.4).

A sample of 229 individuals enrolled from the same sites and meeting the same enrollment criteria for content validity was recruited for Phases II and III. The mean age of the participants was 61.5 years (range = 24-94; SD = 15). Participants were invited to participate in the study by employees of the participating facilities and then referred to the principal investigator. Fewer than 10 individuals refused to participate when the principal investigator explained the study to them. Most of the participants were female (n = 147; 64.9%), Anglo American (n = 218; 96%), and married (n = 167; 72%) and had a high school education or higher (n = 234; 93%). Length of diagnosis with hypertension ranged from less than 6 months to longer than 10 years, with 60% (n = 138) having the diagnosis longer than 5 years. Approximately 66% of individuals (n = 151) indicated they had medication insurance coverage. Individuals were asked to rate their health on a 5-point, Likert-type scale (1 = poor, 5 = excellent); 75% of individuals (n = 171) indicated they had good health or better.

The number of blood pressure pills taken ranged from 0 to 7, with most participants taking one pill per day (M = 1.5 ± 1.1; Mdn = 1.0). Individuals were asked to rate how well they were able to take their medication for a given week on a 10-point adherence visual analog scale (1 = not at all able to take my medications, 10 = never miss my medications). Most participants rated themselves as generally adherent (n = 179; M = 8.5; SD = 2.3). A small number of participants (n = 14; 6%) indicated they had low adherence (a rat-
ing of 1-3) in taking their antihypertensive medications; however, only 50% of participants stated they took their medications 100% of the time.

Method

Phase I: Initial Instrument Development and Content Validity Testing

A total of 20 items (need, \( n = 8 \); effectiveness, \( n = 6 \); and safe, \( n = 6 \)) were initially developed to tap the three underlying dimensions of purposeful action based on the statements given by participants in a qualitative study (Johnson, 2002a; Johnson et al., 1999). The method for item construction was guided by the principles outlined in DeVellis (1991) and Streiner and Norman (1995). Items were worded at approximately a sixth-grade reading level, evaluated by using the Flesch-Kincaid grade-level assessment program in Microsoft Word 2000 (Rasin, 1997). Items ranged from a 1.0 to 6.2 grade level, with a 3.5 grade level readability score for the overall questionnaire. After the items were constructed, psychometric testing was formally conducted.

Content validity testing was undertaken to determine clarity and relevance of content. Participants and experts were given verbal instructions and a packet consisting of a consent form, written instructions, clarity instrument, content validity instrument, and demographic questionnaire. The clarity instrument asked participants to rate items as clear or unclear (Imle & Atwood, 1988). Participants were given a definition of each subscale and asked to rate each item’s relevancy using a 4-point scale from 1 (irrelevant) to 4 (extremely relevant; Lynn, 1986). Space was provided to make comments after each rating procedure.

Phase II: Finalizing Items and Subscales

The MTQ: Purposeful Action was subjected to further psychometric testing after revisions were made based on the clarity and content validity analysis in a separate sample of individuals prescribed hypertensive medications. After the study purpose was explained and the consent was signed, participants were asked to complete a demographic questionnaire and the revised MTQ: Purposeful Action.

The MTQ: Purposeful Action items were arranged in a 7-point, Likert-type format describing responses based on agreement (7 = always agree, 6 = very frequently agree, 5 = usually agree, 4 = occasionally agree, 3 = rarely agree, 2 = almost never agree, 1 = never agree). The 7-response option was
used in an attempt to obtain optimal variance while discouraging a ceiling effect (Streiner & Norman, 1995). Higher scores for the MTQ: Purposeful Action indicated greater intent to take medications based on perceived need, effectiveness, and safety.

**Phase III: Stability and Construct Validity**

At the time of Phase II enrollment, individuals were randomized into two groups to participate in the Phase III analyses (temporal stability or construct validity testing). Three Phase II participants declined to participate in Phase III. The MTQ: Purposeful Action was readministered 1 week after first completing the questionnaire to evaluate temporal stability ($n = 116$) because medication adherence was thought to change even within a 1-week period.

Participants ($n = 111$) randomized to the construct validity testing, in addition to completing the MTQ: Purposeful Action, were asked to complete the Hamilton Health Belief Model Hypertension Scale (HBM scale) and Lifestyle Busyness Questionnaire (LBQ) and to keep a Blood Pressure Feedback Log (FB Log) daily for 1 week.

The HBM scale (Hamilton, 1982) is an 18-item, 5-choice, self-report scale (1 = *not at all*, 5 = *a lot*) developed to measure patients’ perceptions of hypertension and their health, which was hypothesized to be similar to the purposeful action domain. This instrument has four subscales: (a) Susceptibility, (b) Severity, (c) Benefits, and (d) Barriers. The HBM scale overall coefficient alpha for this sample was .86, with subscale coefficient alphas of .79 for HBM-Susceptibility, .43 for HBM-Severity, .86 for HBM-Benefits, and .36 for HBM-Barriers.

The LBQ is a 13-item scale developed to assess patients’ consistency in keeping general daily routines (routines) and level of general busyness (busyness), which was hypothesized to be related to the behavioral component of medication adherence and be dissimilar to purposeful action (Park et al., 1999). The LBQ’s overall coefficient alpha for this sample was .70, with a Busyness subscale alpha of .90 and a Routine subscale alpha of .71.

The FB Log was developed specifically for this study to capture the actual appraisal process of taking antihypertensive medications, which was hypothesized to represent feedback frequency and be dissimilar to an individual’s belief structure characterized as purposeful action (Burman, 1995; Johnson, 2002a, 2002b). Study participants were asked to check items (concrete and intuitive) that reflected influences on adherence for 7 days. There were two 8-item sections. The first section listed reasons why participants did not take their medications (FB Log: Nonadherent). The second section listed reasons...
why participants took their medications (FB Log: Adherent). Log scores were counted based on the frequency of events checked by the participant.

Data Analysis

Data were analyzed using SPSS (Version 13.0), except the CFA was analyzed using AMOS 5.0. Descriptive statistics were used to summarize demographic data. Items met the clarity criterion if 70% of participants rated the item as clear and the content validity criterion if 80% of participants rated the item as 3 or 4 (Imle & Atwood, 1988; Lynn, 1986). The comments from the clarity and content validity criterion were used to revise the MTQ: Purposeful Action items and subscales.

The Phase II sample data were used to conduct item analyses, internal consistency analyses, and EFA. Item analysis was used to evaluate the individual performance of each item in relation to the overall instrument (Ferketich, 1991). Internal consistency estimates (coefficient \( \alpha \)) reflected the average correlation among items within the instrument and indicated how well items clustered together or represented a single construct. Factor analysis is a grouping technique that allows for evaluation of the dimensionality of scales (Munro, 2001; Nunnally & Bernstein, 1994). A principal axis factoring solution with an oblimen rotation, considered the best analysis for achieving a theoretical solution uncontaminated by unique and random error variability, was undertaken (Nunnally & Bernstein, 1994; Tabachnick & Fidell, 1996).

The choice of subscale construction and item retention was guided by the desire to achieve a balance in the following criteria: (a) item variability with standard deviations > 1.0, (b) no ceiling effect (\( M < 6.5 \)), (c) factor eigenvalues > 1 (amount of variance in all the items explained by a given factor), (d) item-to-factor loadings > .40 (the correlation between the item and the factor), (e) no cross-loading of an item on more than two factors of < .20 between factors to ensure the item was unique to its factor, (f) maximized total explained variance of the factor solution, (g) maximized coefficient alphas with at least \( \geq .70 \) for each subscale and total MTQ, and (h) keeping in mind subscales need to make theoretical sense (DeVellis, 1991; Nunnally & Bernstein, 1994; Pett, Lackey, & Sullivan, 2003; Streiner & Norman, 1995).

Temporal stability was calculated in two ways: (a) by undertaking correlations between Time 1 and Time 2 (traditional test-retest, \( t_{rr} \), estimate) and (b) by calculating an intraclass coefficient (ICC; Berk, 1975; Meek, 1998). ICC is able to partition random from systematic error (Crocker & Algina, 1986).
A CFA using the Phase II data and MT-MM analyses using the Phase III data were conducted to examine initial construct validity. CFA examined model fit of the items and latent variables for the finalized MTQ: Purposeful Action. The following fit statistics were considered: relative chi-square, normative fit index (NFI), comparative fit index (CFI), and the root mean squared error of approximation (RMSEA; Bryne, 2001; Kline, 1998). The relative chi-square is an informal measure examining chi-square to the degrees of freedom. A value of > 3.0 is generally preferred for indication of good model fit. The NFI is an indicator of the proportion of the overall fit of the hypothesized model with the null model, though it has a tendency to underestimate fit with small sample sizes. The CFI is a revised version of the NFI that accounts for sample size. Good estimates of model fit will demonstrate values of > .90, with CFI values best in the .95 range. The RMSEA is a hypothetical comparison of the covariance matrix between the participants under study and the general population in terms of error of approximation. An RMSEA value of ≤ .08 represents reasonable errors of approximation in the target population with a p value of < .05 (Bryne, 2001; Munro, 2001).

The MT-MM analysis for the overall MTQ: Purposeful Action and subscales was evaluated by comparing them with measures hypothesized to have similar constructs (convergent coefficients) and dissimilar constructs (discriminate coefficients). The MTQ: Purposeful Action should have higher Pearson correlations with related constructs than with differing constructs. The MTQ: Purposeful Action was hypothesized to have convergent correlations with Hamilton’s (1982) HBM scale because they represent the cognitive aspect of the medication-taking process. The LBQ and FB Log were hypothesized to demonstrate discriminant correlations because they were believed to represent patterns of behavior and the feedback process, respectively.

Results

Clarity and Content Validity

Of the 20 MTQ: Purposeful Action items, 19 achieved clarity and content validity agreement. The 1 item that had an unacceptable clarity agreement was eventually eliminated from the questionnaire. Professionals expressed a concern about the lack of specificity in the questions, but that was not an issue for the hypertensive participants. For example, one professional indicated that the item, “Blood pressure pills keep me from having problems,” lacked specificity. Because the purpose of this questionnaire was to establish a general screening tool for individuals who potentially may choose not to
take their medications rather than to create a diagnostic tool, the participants’ scores were given priority. Of the 20 items, 12 underwent minor grammatical revisions guided by the comments of both the participants and professionals. For example, items were made specific to blood pressure and the term *medication* was changed to *pills*. Several items were reworded, or the tense of a verb was changed.

**Item Analysis, Internal Consistency, and EFA**

A total of 236 persons were enrolled in Phase II of the study, with 229 completing the questionnaires. Seven participants were dropped from the study because they did not cooperate in completing the study or did not meet the inclusion criteria. The sample exceeded the recommended 200 for undertaking a reliability analysis and 10 participants per item for the factor analysis (Nunnally & Bernstein, 1994).

Prior to undertaking the EFA, two items were eliminated because of ceiling effect or redundancy with other items (the original items and their statistics can be seen in Table 1). An EFA using principal axis factoring with an oblimen rotation \( \Delta = 0 \) was undertaken to determine the underlying dimensions of the MTQ: Purposeful Action. The EFA yielded two interpretable factors (see Table 2), which eliminated six additional items because of factor loadings < .40. The first factor merged the need and effectiveness items along with one item from the Safe subscale. This factor was renamed treatment benefits (benefits). The second factor, renamed medication safety (safety), was reduced to three of the original safe subscale items.

The Benefits subscale retained nine items that focused on the actual perceived benefits of treatment, such as preventing a stroke, controlling blood pressure, preventing further health problems, and feeling better when taking medications, which indicated a desire to control blood pressure to maintain and promote health and well-being. The subscale had an eigenvalue of 5.5 and a total item variance explained by the factor of 46%. Pattern factor loadings ranged from .54 to .84. The internal consistency estimate was strong \( (\alpha = .90) \). The item means ranged from 5.4 to 6.4. The standard deviations ranged from 1.3 to 1.8. The alpha for items if deleted from the scale ranged from .88 to .90, and interitem correlations ranged from .25 to .72, with one interitem correlation less than .30. This subscale’s mean score was 52.0 (range 9.0-63.0), with a SD of 10.3.

The Safety subscale (three items) focused on side effects of medications. This subscale had an eigenvalue of 1.9 and a total item variance explained by the factor of 16%. Pattern factor loadings ranged from .82 to .87. The internal consistency estimate was good for a newly developed instrument \( (\alpha = .80) \).
Table 1
Medication-Taking Questionnaire: Purposeful Action Initial 20 Items Statistics

<table>
<thead>
<tr>
<th>Item</th>
<th>M</th>
<th>SD</th>
<th>Item-Total Correlation</th>
<th>Mann-Whitney Adherence p Values&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived need</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My blood pressure pills keep me from having a stroke.</td>
<td>5.8</td>
<td>1.5</td>
<td>.58</td>
<td>.08</td>
</tr>
<tr>
<td>I need to take my blood pressure pills.</td>
<td>6.4</td>
<td>1.4</td>
<td>.77</td>
<td>.01</td>
</tr>
<tr>
<td>I take my blood pressure pills for my health.</td>
<td>6.5</td>
<td>1.3</td>
<td>.75</td>
<td>.01</td>
</tr>
<tr>
<td>Blood pressure pills keep me from having health-related problems.</td>
<td>5.7</td>
<td>1.5</td>
<td>.63</td>
<td>.17</td>
</tr>
<tr>
<td>I could have health problems if I do not take my blood pressure pills.</td>
<td>6.1</td>
<td>1.3</td>
<td>.74</td>
<td>.13</td>
</tr>
<tr>
<td>It's not a problem if I miss my blood pressure pills.&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.1</td>
<td>2.0</td>
<td>.30</td>
<td>.02</td>
</tr>
<tr>
<td>I would rather treat my blood pressure without pills.&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.1</td>
<td>2.3</td>
<td>.37</td>
<td>.26</td>
</tr>
<tr>
<td>I am OK if I do not take my blood pressure pills.&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.6</td>
<td>1.8</td>
<td>.64</td>
<td>.012</td>
</tr>
<tr>
<td>Perceived effectiveness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My blood pressure will come down enough without pills.&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.4</td>
<td>1.8</td>
<td>.40</td>
<td>.10</td>
</tr>
<tr>
<td>I will have problems if I don't take my blood pressure pills.</td>
<td>6.1</td>
<td>1.4</td>
<td>.63</td>
<td>.001</td>
</tr>
<tr>
<td>My blood pressure pills control my blood pressure.</td>
<td>6.0</td>
<td>1.4</td>
<td>.66</td>
<td>.46</td>
</tr>
<tr>
<td>Blood pressure pills benefit my health.</td>
<td>6.1</td>
<td>1.4</td>
<td>.74</td>
<td>.01</td>
</tr>
<tr>
<td>I feel better when I take my blood pressure pills.</td>
<td>5.4</td>
<td>1.8</td>
<td>.56</td>
<td>.01</td>
</tr>
<tr>
<td>I have problems finding pills that will control my blood pressure.&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.7</td>
<td>1.8</td>
<td>.09</td>
<td>.059</td>
</tr>
<tr>
<td>Perceived as safe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The side effects from my blood pressure pills are a problem.&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.2</td>
<td>1.9</td>
<td>.40</td>
<td>.10</td>
</tr>
<tr>
<td>The side effects from my blood pressure pills are harmful.&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.6</td>
<td>1.8</td>
<td>.63</td>
<td>.27</td>
</tr>
<tr>
<td>My blood pressure pills are safe.</td>
<td>5.8</td>
<td>1.4</td>
<td>.66</td>
<td>.47</td>
</tr>
<tr>
<td>Taking my blood pressure pills is not a problem because they benefit my health.</td>
<td>6.0</td>
<td>1.4</td>
<td>.74</td>
<td>.02</td>
</tr>
<tr>
<td>My blood pressure pills cause other health problems.&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.4</td>
<td>1.8</td>
<td>.56</td>
<td>.35</td>
</tr>
<tr>
<td>I will become dependent on my blood pressure pills.&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.9</td>
<td>2.3</td>
<td>- .05</td>
<td>.20</td>
</tr>
</tbody>
</table>

<sup>a</sup> Difference between low (scored 1-3) versus high (scored 7-10) adherence.

<sup>b</sup> Reverse coded.
Table 2

Principal Axis Factor Analysis With Oblimin Rotation Pattern
(and Structure in Parentheses) Coefficients for the MTQ: Purposeful Action Two Factor Solution

| Treatment benefits | Factor Loadings |  |  |  |  |  |
|---------------------|-----------------|---|---|---|---|
|                     | 1   | 2   | $h^2$ | $\alpha$ | Explained |
| I need to take my blood pressure pills. | .84 (.85) | (.34) | .73 |
| Taking my blood pressure pills is not a problem because they benefit my health. | .82 (.84) | (.35) | .72 |
| I could have problems if I do not take my blood pressure pills. | .81 (.84) | (.21) | .70 |
| Blood pressure pills keep me from having health-related problems. | .81 (.79) | (.16) | .63 |
| My blood pressure pills keep me from having a stroke. | .75 (.75) | (.23) | .55 |
| I feel better when I take my blood pressure pills. | .74 (.74) | (.21) | .55 |
| My blood pressure pills control my blood pressure | .74 (.74) | (.26) | .55 |
| I am OK if I do not take my blood pressure pills. | .72 (.71) | | .52 |
| My blood pressure will come down enough without pills. | .54 (.48) | | .30 |

Medication safety

|                     | Factor Loadings |  |  |  |  |  |
|---------------------|-----------------|---|---|---|---|
|                     | 1   | 2   | $h^2$ | $\alpha$ | Explained |
| The side effects from my blood pressure pills are harmful. | (.19) | (.87) | (.86) | .74 |
| The side effects from my blood pressure pills are a problem. | (.27) | (.84) | (.84) | .71 |
| My blood pressure pills cause other health problems. | (.20) | (.82) | (.83) | .70 |

Total | 7.4 | 61.5 | .88 |

Note: $n = 229.$

a. Item required reverse coding. Factor loadings in parenthesis represent structure coefficients. If patterned or structure coefficient is not listed, the value was <.15.
The item means ranged from 5.2 to 5.6. The item standard deviations were good, ranging from 1.8 to 1.9. The interitem correlations ranged from .57 to .58. The coefficient alpha for items if deleted from the scale ranged from .59 to .80. The Safety subscale had a mean of 16 (range 3-21) and a SD of 4.7. Together, the two factor solution had a coefficient alpha of .87 and an explained variance of 62%. The overall MTQ: Purposeful Action mean was 68.6 (range 15.0-84.0) with a SD of 12.7.

**Phase III: Stability and Construct Validity**

The test-retest correlation and ICCs were good (MTQ: Purposeful Action \(t_{rr} = .80, ICC = .86\); Benefits subscale \(t_{rr} = .81, ICC = .80\); Safe subscale \(t_{rr} = .80, ICC = .79\)). The test-retest and intraclass correlation for the overall MTQ: Purposeful Action suggested that approximately 14% to 21% of the variance was attributed to random time sampling error with little systematic error (Crocker & Algina, 1986).

A first order model with two latent factors, treatment benefit and medication safety, was judged to have good model fit. The relative chi-square value was 2.09. The NFI (.92) and the CFI (.96) indicated that the overall model fit was very good. The RMSEA was .07 (CI .05-.087) with a \(p\) value of .042, indicating reasonable errors of approximation in the population.

Construct validity attempts to establish what underlying constructs an instrument is actually measuring (Nunnally & Bernstein, 1994). The MT-MM results appears to support the hypothesized relationship with the HBM scale, indicating that the perceptions of medication benefit and safety had a moderately positive association with perceptions of hypertension and individual health, especially between purposeful action and Benefits subscale and between HBM and Benefits subscale (\(r = .63\); see Table 3). Very low correlation was seen, as expected, between the LBQ and MTQ: Purposeful Action. The intentional decision to take medications (MTQ: Purposeful Action) had a moderately positive correlation with reasons participants did take their medications (FB: Adherent, \(r = .53\)) and the intentional decision to take medications (MTQ: Purposeful Action) had a moderately negative correlation with reasons individuals did not take their medications (FB: Nonadherent, \(r = -.60\)), which were hypothesized to have little if any correlations.

**Discussion**

The inductively generated MTQ: Purposeful Action demonstrated good psychometric characteristics. The clarity results identified potentially prob-
lemmatic areas that were corrected based on participants’ comments. The content analysis provided a formal opportunity to seek outside review, thus affording a cost-effective and efficient way to establish fundamental validity, reliability, and contemporary relevance of MTQ: Purposeful Action (Cronbach, 1988; Lynn, 1986; Messick, 1988; Nunnally & Bernstein, 1994).

The originally hypothesized factor structure for the MTQ: Purposeful Action was supported (considering that the Benefits subscale is a merger of the Perceived Need and Perceived Effectiveness subscales as a result of the EFA). The newly defined Benefit subscale contributed to a more parsimonious interpretation of the cognitive factors contributing to long-term medication taking.

The problem with measuring temporal stability in relation to medication adherence is determining when to readminister the instrument so that memory effect is not a factor, yet true change has not occurred (Waltz, Strickland, & Lenz, 1991). A 1-week retest period was selected because of the hypothesis that adherence behavior may be volatile and that no information concerning stability has been reported in the literature. With the retest period of 1 week, however, the estimates may be deceptively high. A test-retest reliability study at various lengths of time would be needed to assess the dynamic

<table>
<thead>
<tr>
<th></th>
<th>MTQ: Purposeful Action</th>
<th>MTQ Benefit Subscale</th>
<th>MTQ Safe Subscale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamilton HBM Scalea</td>
<td>.30**</td>
<td>.43**</td>
<td>−.12</td>
</tr>
<tr>
<td>HBM: Susceptibility subscale</td>
<td>.36**</td>
<td>.41**</td>
<td>.01</td>
</tr>
<tr>
<td>HBM: Severity subscale</td>
<td>.00</td>
<td>.12</td>
<td>−.27**</td>
</tr>
<tr>
<td>HBM: Benefits subscale</td>
<td>.58**</td>
<td>.63**</td>
<td>.19</td>
</tr>
<tr>
<td>HBM: Barriers subscale</td>
<td>−.49**</td>
<td>−.42**</td>
<td>−.41**</td>
</tr>
<tr>
<td>Lifestyle Busyness Questionnaireb</td>
<td>.08</td>
<td>.11</td>
<td>−.02</td>
</tr>
<tr>
<td>Busyness subscale</td>
<td>.10</td>
<td>.13</td>
<td>.01</td>
</tr>
<tr>
<td>Routine subscale</td>
<td>−.07</td>
<td>−.06</td>
<td>−.06</td>
</tr>
<tr>
<td>Blood Pressure Feedback Logc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adherent</td>
<td>.53**</td>
<td>.54**</td>
<td>.25*</td>
</tr>
<tr>
<td>Nonadherent</td>
<td>−.60**</td>
<td>−.50**</td>
<td>−.53**</td>
</tr>
</tbody>
</table>

Note: HBM is Health Belief Model Hypertension Scale.

a. n = 107.
b. n = 104.
c. n = 102.
*p < .05, two-tailed. **p < .01, two-tailed.
nature of the cognitive component of adherence (Nunnally & Bernstein, 1994).

The CFA supported the hypothesis that benefits and safety underlie the cognitive component of medication taking in hypertensive medications. MT-MM estimates supported the hypothesis that the MTQ: Purposeful Action measures the decision component rather than the behavioral component of medication taking. The relationship between the MTQ: Purposeful Action and the FB Log was much stronger than expected. Because the FB Log represents the frequency of events that occur that reinforce medication benefits and safety, results may implicate that feedback may be more likely to influence intention to take medications rather than establishing routines.

The intended purpose for developing this questionnaire was to generate a valid measure of purposeful action that would be predictive of health beliefs important to taking antihypertensive medications. The reliability and construct validity estimates indicate this measure could be used for individual assessment of factors influencing a patient’s decision to take antihypertensive medication (Perrin et al., 1997). Adequate assessment of an individual’s actual health beliefs regarding medication taking may help health care providers determine medical and educational interventions that will assist patients with making informed decisions regarding taking antihypertensive medications during the long term.

There were several limitations with this study. The first was finding participants who would admit to low and moderate adherence behavior. Although a nonparametric analysis of levels of adherence indicated that some of the items could differentiate between individuals who self-reported high and low levels of adherence to medications, further investigation using more reliable measures of adherence would be required to confirm these results. The second limitation is the inability to generalize the results to ethnic groups other than Anglo Americans, to those in low-income situations, and to those with low literacy levels. Ethnically diverse groups were undersampled because of the limitation of enrolling only individuals who could read English and the population demographics of the location of the study. Further testing is required to see if the underlying construct of purposeful action is generalizable to other groups.

The quality of MT-MM coefficients is dependent on the finding of reliable instruments that measure similar traits (Streiner & Norman, 1995). Low coefficients were obtained between some of the MTQ: Purposeful Action and its subscale and the HBM Severity and Susceptibility subscales. Possible contributing factors in obtaining low correlations could either be because of the low alpha coefficients for the HBM Severity and Susceptibility subscales.
and/or that these subscales have little association with the benefits and safety of medication treatment.

The MTQ: Purposeful Action appears, given its apparent limitations, to be representative of the purposeful action construct (the intentional decision to take medication) in the MAM. The MTQ: Purposeful Action provides a new instrument to further study the aspects of intentional medication taking in relationship to behavior and individual feedback with regard to hypertension and actual adherence. The sample was of sufficient size and variance to generalize the results to moderately and highly adherent individuals. This instrument may best be used to identify individuals’ perceptions of the benefits and safety of antihypertensive treatment; however, further testing is needed to determine its responsiveness. Additional psychometric testing is needed to determine the predictive, discriminate, and responsive characteristics of the MTQ: Purposeful Action in a more diverse population.

References


Joint National Committee VI. (1997). The sixth report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure. *Archives of Internal Medicine, 157*, 2413-2446.


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