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Five factor model personality factors moderated the effects of an intervention to enhance chronic disease management self-efficacy

Peter Franks¹, Benjamin Chapman², Paul Duberstein², and Anthony Jerant^{1,*}

¹Center for Healthcare Policy and Research, Department of Family and Community Medicine, University of California Davis School of Medicine, Sacramento California, USA

²Laboratory of Personality and Development, Department of Psychiatry, University of Rochester School of Medicine and Dentistry, Rochester, New York, USA

Abstract

Objectives—Peer led interventions can enhance patient self-efficacy for managing chronic illnesses, but little is known regarding the moderators or duration of their effects. We hypothesized Homing in on Health (HIOH), a variant of the Chronic Disease Self-Management Program, would be most effective in patients high in neuroticism and low in extraversion, openness, agreeableness, and/or conscientiousness.

Design—Analysis of data from subjects ($N = 415$) enrolled in an ongoing randomized controlled trial

Methods—Regression analyses were conducted to explore whether Five Factor Model (FFM) personality factors moderated the effects of HIOH, delivered in subjects' homes or via telephone, on disease management self-efficacy. Data were collected at 6 time points over the course of 1 year.

Results—Compared with control and telephone HIOH, home HIOH significantly increased self-efficacy, an effect peaking at 6 weeks and fully attenuating by 1 year. Moderation analyses revealed the benefit was confined to patients higher in neuroticism and/or lower in conscientiousness, agreeableness, and extraversion.

Conclusions—A peer led intervention to enhance disease management self-efficacy had only short-term effects, and FFM personality factors moderated those effects. Measuring personality factors in chronically ill individuals may facilitate targeting of self-management interventions to those most likely to respond.

Self-efficacy, or an individual's perceptions regarding their ability to execute actions required to achieve valued outcomes, is a powerful mediator of health behaviors and outcomes across a wide array of patient populations and health conditions (Aljasem, Peyrot, Wissow & Rubin, 2001; DiClemente, Prochaska & Gibertini, 1985; Holloway & Watson, 2002; Litt, 1988; Marks, Allegrante, & Lorig, 2005). Well-conceived psychosocial health care interventions have been shown to strengthen self-efficacy and result in positive changes in patient health behaviors (Warnecke, Morera, Turner, Mermelstein, Johnson & Parsons, 2001) and outcomes (Barnason, Zimmerman, Nieveen, Schmaderer, Carranza, & Reilly, 2003; Brody, Roch-Levecq, Gamst, Maclean, Kaplan, & Brown, 2002; Dallow & Anderson, 2003; Goeppinger,

Arthur, Baglioni, Brunk & Brunner, 1989; Kukafka, Lussier, Eng, Patel & Cimino, 2002; Lorig, Holman, Sobel, Laurent, Gonzalez, & Minor, 1999; Tsay, 2003). Peer led interventions to enhance patient self-efficacy for managing chronic conditions have typically been associated with an effect size of around 0.3, and have also led to improvements in important clinical outcomes at 4 – 6 months follow-up, including exercise behavior, cognitive symptom management, and psychological well-being (Foster, Taylor, Eldridge, Ramsay, & Griffiths, 2007). However, the longer-term effects of such programs on disease management self-efficacy remain unknown.

Perhaps the most widely used and researched self-efficacy enhancing health care intervention is the peer led Chronic Disease Self Management Program (CDSMP), developed by Lorig and colleagues at Stanford University and now offered in multiple languages in over 15 countries (Stanford Patient Education Research Center, 2008). The CDSMP aims to provide participants with the self-efficacy and skills required to optimally manage their chronic medical conditions, regardless of specific diagnosis. Pairs of extensively trained and certified peer facilitators deliver the intervention to groups of 8 – 10 participants over six weekly sessions, via a highly interactive, participatory format. Despite the success and wide dissemination of the CDSMP, little is known about the moderators of its effects. At a theoretical level, identifying treatment moderators may lead to increased understanding of for whom the intervention works (Kraemer, Wilson, Fairburn, & Agras, 2002). At a practical level, understanding treatment moderators can help health care providers and administrators increase intervention delivery efficiency, or ratio of clinical benefit to delivery effort (Issel, 2004) by pinpointing optimal candidates for whom the intervention is liable to be most effective.

The extent to which participant dispositional characteristics might moderate the effects of the CDSMP program remains unknown, but personality theory is suggestive. Although social-cognitive and trait-based models of personality were at one time seen as antithetical, increasing interest in the integration of traits and social cognition (Mischel and Shoda, 1999) has led to more unified contemporary perspectives that consider the interface of these two aspects of personality. For instance, Five Factor Theory (FFM; McCrae and Costa, 1999), which underlies the FFM of personality (Goldberg, 1993; McCrae and Costa, 1997), distinguishes between basic tendencies, represented in aggregate by the FFM domains of Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness, and characteristic adaptations, or more specific modes of interacting with the environment that arise from basic tendencies. This distinction has been elaborated by other integrated frameworks for personality (Hooker and McAdams, 2003; McAdams and Pals, 2006), which consider the Big Five to underlie a range of characteristic adaptations involving social cognitive functions such as self-evaluation, self-monitoring, goal setting, and self-efficacy. These considerations suggest that self-efficacy in chronic disease management is likely to be a function of both the circumstances surrounding the disease and its management as well as personality dispositions, indexed by FFM domains.

Several prior studies have explored the degree of correlation between FFM factors and the construct of general self-efficacy. In a meta-analytic review of these studies, Judge, Erez, Bono & Thoresen, 2002 estimated the population correlation of -0.62 between Neuroticism and general self-efficacy, with similar associations across self and peer reports of these two constructs. Judge *et al.*, (2002) also observed small to large-sized correlations (i.e. from 0.05 to 0.58) between general self-efficacy and each of the other FFM factors across six independent samples, ranging from college students to pharmaceutical salespersons to employees in food manufacturing plants. Self-efficacy tended to show the largest positive associations with Conscientiousness and Extraversion, and smaller positive associations with Agreeableness and Openness. Thus, while general self-efficacy has been most strongly related to Neuroticism, the other four dimensions of the FFM played a role in stable aspects of this social-cognitive construct.

While intriguing, such analyses have limited applicability to the question of whether FFM factors moderate the self-efficacy enhancing effects of the disease self-management interventions. By definition, general self-efficacy affects an individual's belief in his or her capabilities in general; in other words, *regardless* of the task being engaged in, an individual will tend to feel less capable of executing the task if he or she has a lower general self-efficacy. Yet it is often the case that an individual has high levels of self-efficacy for tasks in certain life domains — for example, for job-related tasks — and simultaneously has quite low levels of self-efficacy in other domains — such as for disease management tasks (Bandura, 1997). A single prior study examined relationships between FFM factors and self-efficacy specifically within the health behavior domain, and found moderately strong correlations between health behavior self-efficacy and Neuroticism (negative correlation) and Extraversion (positive correlation; Williams, O'Brien, & Colder, 2004). However, a major limitation was that the data were derived from a sample of well college students rather than people with chronic illnesses. Additionally, the health behavior domain only partially overlaps with the disease self-management domain. Finally, this study was observational, and an important aspect of self-efficacy is its potential to be modified by interventions. Thus, studies are needed that explore relationships between FFM personality factors and self-efficacy specifically within the disease self-management domain, involve people with chronic illnesses (rather than well college students), examine the interaction between self-efficacy and FFM personality factors in the context of an intervention, and follow participants beyond 4 – 6 months.

To address these research gaps, we explored the moderating role of FFM personality factors on the self-efficacy enhancing effects of Homing in on Health (HIOH), a home delivery variant of the peer led CDSMP (Lorig, Sobel, Stewart, Brown, Bandura, Ritter, *et al.*, 1999). Data included in our analyses were derived from a sample of primary care patients aged 40 and older suffering from one or more chronic diseases and enrolled in a 1 year randomized controlled trial (RCT) of HIOH. Whereas the CDSMP is provided to small groups of individuals in centralized locations, our one-to-one, home delivered adaptation was designed to make the CDSMP content available to those less able to participate in the original program, due to functional limitations, transportation problems, or discomfort with group settings. The overall goals of the project were to determine whether in-home and/or telephone versions of HIOH would enhance disease management self-efficacy and thereby improve health outcomes for people with chronic conditions. Based on the findings of prior studies exploring relationships between FFM personality factors and general (Judge *et al.*, 2002) and health behavior (Williams *et al.*, 2004) self-efficacy, and considering prior research regarding the psychological and behavioral correlates of FFM factors (Costa and McCrae, 1992), we hypothesized that the HIOH would lead to greater improvements in disease management self-efficacy among individuals higher in Neuroticism and lower in Extraversion, conscientiousness, openness, and agreeableness, than among individuals of opposite standing on these dimensions.

Methods

Study setting, sample recruitment, and randomization

Study activities described were conducted from July 2004 through February 2008. The local Institutional Review Board provided approval of the study protocol and ethics. Written informed consent was obtained from each participant.

The convenience sample of subjects was recruited from the 12 offices and 70 family physician and general internist practices in the University-affiliated primary care network located in Northern California. Billing code information was used to identify those aged 40 or older with one or more of the following chronic illnesses: arthritis, asthma, chronic obstructive pulmonary disease, congestive heart failure, depression, and/or diabetes mellitus. Mass mailed study

announcements, direct telephone calls, and announcement flyers posted in participating offices were employed to recruit patients who met these criteria.

The study coordinator used a standard script to screen interested patients for further eligibility criteria: ability to speak and read English; residence in a private home with an active telephone; adequate eyesight and hearing to participate via telephone and read study materials; and at least one basic activity impairment, as assessed by the health assessment questionnaire (Fries, Spitz, Kraines, & Holman, 1980), and/or a score of 4 points or greater, suggestive of clinically significant depressive symptoms, on the 10-item version of the Center for Epidemiologic Studies Depression Scale (Irwin, Artin, & Oxman, 1999). The requirement for participants to have some basic activity impairment and/or active depression symptoms was based on the findings of pre-study focus groups (Jerant, von Friederichs-Fitzwater, & Moore, 2005) and discussions with the developers of the CDSMP, which indicated such individuals would be least likely to participate in the original CDSMP but might still be willing and able to participate in a one-to-one, home delivered variant of the program.

A study nurse visited eligible individuals in their homes, using a standardized interview checklist, augmented by clinical judgment, to assure they were medically stable for participation in the study. The average number of days from telephonic study eligibility screening to the nurse home visit was 33 [standard deviation (*SD*) = 22, range = 1 – 107]. During the home visit, the nurse also obtained informed consent, administered the baseline study questionnaire (see *Measures*), and implemented randomized allocation in blocks of 12 subjects via sealed opaque envelopes containing slips of paper printed with group assignments.

Procedures

Subjects randomly assigned to either HIOH intervention group received the intervention via either home visits or telephone calls (see also Figure 1).

Study intervention—The CDSMP, described in detail previously (Lorig *et al.*, 1999), seeks to bolster patient self-efficacy for managing chronic medical conditions, regardless of diagnosis. The overall aim is to help the participants master six fundamental self-management task: solving problems, making decisions, utilizing resources, forming a patient-provider partnership, making action plans for health behavior change, and self-tailoring. Specific topics covered include exercising safely, coping with difficult emotions, communicating effectively with family and health care providers, using relaxation and cognitive symptom management techniques, and taking medications. Participants are given frequent opportunities to practice and receive feedback on their performance of these tasks.

The original CDSMP is provided by pairs of non-health care professionals who have personal experience with chronic health conditions. Using an interactive, participatory format, the peer facilitators deliver the intervention to groups of 8 – 10 participants over six weekly sessions. While the HIOH intervention was essentially identical to the CDSMP in content, it differed in terms of setting, being provided in subjects' homes or via telephone, and delivery process, with a single trained peer providing the intervention to each participant. The four non-health care professionals who delivered the HIOH intervention used a single written script to provide the HIOH program to subjects in both experimental groups, to ensure identical content. They underwent intensive, highly scripted training prior to participating, similar to the training received by original CDSMP facilitators. A single health coach delivered all six sessions to their assigned participants. Group activities in the original CDSMP, such as collective brainstorming to solve health behavior change problems, were not possible in the HIOH. Thus, analogs were substituted, such as joint trained peer/participant generation of lists of potential solutions to health behavior change problems. All intervention subjects were also given identical laminated, spiral-bound booklets to reinforce key HIOH teaching points, as well as

a copy of the book *Living a healthy life with chronic conditions* (Lorig et al., 2000). The study nurse audited the fidelity of the health coaches' delivery of the intervention and provided corrective feedback as indicated on a quarterly basis.

Usual care control group—Usual care control group subjects received an initial home visit from the study nurse, with the same content as described for intervention subjects, and completed the same baseline and follow-up telephone questionnaires as intervention subjects (see *Measures*). Otherwise, they received the care delivered by their usual health care providers, with no study personnel intervention.

Measures

Disease management self-efficacy—Disease management self-efficacy was measured using a 33-item scale validated in prior CDSMP studies (Lorig et al., 1996). Respondents rated their confidence for performing various chronic disease self-management tasks including getting regular exercise, seeking information about their conditions, obtaining help from others and from community resources, communicating with physicians, maintaining role function, and managing symptoms. A 10-point Likert response scale was employed (range 1 = *not at all confident* to 10 = *totally confident*), yielding a full-scale score (item average) of overall self-efficacy in the disease self-management domain (Lorig & Holman, 2003). Higher scores indicate the greater disease management self-efficacy. The self-efficacy measure was administered at baseline by the study nurse during the initial home assessment, and again via telephone at 2, 4, and 6 weeks, 6 months, and 1 year. Telephone data collection personnel were blinded to subject group assignment. Subjects were paid \$25 after each scheduled follow-up data collection (\$125 if all five follow-up collections were completed). The composite Cronbach's α reliability for the self-efficacy scale in our study was 0.96.

Personality factors—During the baseline nurse visit, subjects also completed the NEO-FFI (Costa & McCrae, 1992), a well-validated 60-item version of the personality factors (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) that constitute the FFM. Cronbach's α for the 5 scales ranged from $\delta.70$ to $\delta.87$ in our sample, quite similar to those observed in previous studies that applied the measure in samples similar to ours (Chapman, Lyness, & Duberstein, 2007; Duberstein, Meldrum, Fiscella, Shields, & Epstein, 2007; Weiss, Costa, Karuza, Duberstein, Friedman, & McCrae, 2005).

Other Measures—At baseline, patients also reported their age, gender, race/ethnicity, and education.

Analyses

Stata (version 9.1, StataCorp, College Station, TX) was used for all analyses. The main effects of the intervention on self-efficacy was examined using a series of random effects linear models for repeated measures (Burton, Gurrin, & Sly, 1998), with self-efficacy at each time point as the dependent variable, the three study conditions, time period (baseline 2, 4 and 6 weeks, 6 months and 1 year), and the interaction between time and study group as the independent variables.

To explore the interaction effects between the personality factors and the intervention, five additional analyses were conducted, one for each of the five NEO-FFI personality factors. No significant effect of the phone intervention on self-efficacy was observed (Figure 2). Thus, to facilitate a clearer presentation of results of the interaction analyses, the control and phone study groups were combined and compared with the home intervention group for these analyses. The independent variables were time (each of the six assessments from baseline to 1 year), treatment arm (home intervention group vs. other [control and phone intervention

group]), the NEO-FFI personality factors (dichotomized at the median score to facilitate interpretation of interactions) and the interactions among time, assigned group and personality factors. The mixed effects model adjusted for the nesting of the six self-efficacy measurements within each subject via random intercepts.

Analyses initially examined interaction effects using the FFM factor-intervention interactions, with the FFM factors as continuous variables (not presented, but available from the authors) and divided by quartiles to explore possible threshold effects. Presented results used the FFM factors dichotomized at their median scores to facilitate interpretation and graphical presentation of the interactions. Also, to facilitate visual presentation of the individual FFM interactions, we conducted five separate analyses, one for each FFM factor.

Results

In all, 415 participants were randomized (home intervention = 138, phone intervention = 139 and usual care = 138). Figure 1 shows the flow of subjects through the study. Of assigned patients, 94 (23%) were male and 321 (77%) female, with a mean age of 60 years (range 41 - 95). Most participants (59%) reported two or more chronic conditions. Table 1 provides a summary of subjects' baseline characteristics. Randomization equilibrated intervention groups on disease management self-efficacy personality and other factors. Self-efficacy at baseline was lower in those with low Conscientiousness, high Neuroticism, low Agreeableness and low Extraversion across study groups (Table 2).

The main effects analysis revealed a significant beneficial effect of the home-based intervention (compared with the control condition) on self-efficacy, but no effect of the phone intervention (Figure 2). There were no significant differences between the phone and control conditions at any time period (for each comparison $\chi^2(1)$ all < 1.1 , p all $> .29$). By the 6-week visit self-efficacy in the home group was higher than that in the phone group ($z = 2.5$, $p = .01$) and the control group ($z = 3.2$, $p = .001$). At 6 weeks, the difference between self-efficacy in the home vs phone and control arms combined reached an effect size (standard deviation difference) of .3. At 6 months, the beneficial effect in the home group had attenuated, but was still statistically significant compared with the phone group ($z = 2.0$, $p = .05$) and with the control group ($z = 2.04$, $p = .04$). At 1 year, the groups were not significantly different, the home versus phone ($z = .3$, $p = .77$), and home versus control ($z = 1.2$, $p = .23$). Because of a lack of effectiveness of the phone intervention, the phone and control groups were combined in the subsequent moderation analyses.

Mixed models testing FFM factor by the treatment interactions revealed that the significant moderating effects on intervention effectiveness of Neuroticism ($\chi^2(5) = 17.5$, $p = .004$) and conscientiousness ($\chi^2(5) = 19.0$, $p = .002$). The overall interaction effect for extraversion did not reach statistical significance ($\chi^2(5) = 10.5$, $p = .06$), though increase in self-efficacy among those with low Extraversion in the home group was significant at 4 weeks ($z = 2.35$, $p = .019$). The overall interaction effect for Agreeableness was not significant ($\chi^2(5) = 6.7$, $p = .24$), though increase in self-efficacy among those with low Agreeableness in the home group was significant at 4 weeks ($z = 2.43$, $p = .015$). The results of the significant effects observed in the regression analyses are illustrated in Figure 3 (a-d). In each case, the intervention was effective only in those with high Neuroticism, low Agreeableness, low Conscientiousness and low Extraversion. It can be seen that these effects attenuated over the course of 1 year. No significant main ($z = -0.80$, ns) or interaction ($\chi^2(5) = 0.57$, ns) effects were observed for Openness.

Discussion

We investigated the effects of the HIOH intervention, a home delivery variant of the peer led CDSMP, on patient chronic disease management self-efficacy, employing a variety of conditions. The main effect of HIOH delivered in participants' homes resulted in a significant improvement in disease management self-efficacy relative to the control and telephone-delivered HIOH groups, with a peak effect size (.3) at 6 weeks (immediately post-intervention) that is comparable to that observed in prior studies of peer led disease management interventions (Foster, Taylor, Eldridge, Ramsay, & Griffiths, 2007). However, the effect of the home intervention on self-efficacy had waned by 6 months and had completely attenuated by 1 year. Ours was the first randomized controlled trial of face-to-face delivery of the CDSMP to follow patients as randomized for a full year; prior studies followed patients as randomized for only 4 – 6 months. The only prior one year randomized controlled trial of the CDSMP involved the Internet-delivered variant of the program (Lorig *et al.*, 2006). That study also found a significant short-term effect on disease management self-efficacy, but again the effect was no longer significant by 1 year. Taken together, these findings suggest the self-efficacy enhancing effects of the CDSMP are relatively short lasting. Such time-limited benefits have been observed with other behavioral interventions, like cognitive behavioral therapy (Escobar, Gara, Diaz-Martinez, Interian, Warman, Allen *et al.*, 2007) and suggest the need to explore 'booster' interventions as a way of potentially maintaining improved outcomes.

Consistent with prior observational research (Judge *et al.*, 2002; Williams *et al.*, 2004), we found that the lower self-efficacy was associated with higher levels of neuroticism and lower levels of conscientiousness, agreeableness, and extraversion. We further examined whether the FFM personality factors moderated (Kraemer *et al.*, 2002) the disease management self-efficacy enhancing effects of the HIOH intervention. We found that the disease management self-efficacy enhancing effect of HIOH was significantly higher among those high in Neuroticism and/or lower in Conscientiousness. However, consistent with the attenuation of the overall intervention effects, we also observed attenuation of the beneficial effects on self-efficacy among those with higher levels of neuroticism, and/or lower levels of conscientiousness. The findings suggest that the greater potential for improvement outweighed the possibility of greater resistance to the intervention.

There are several possible explanations for our finding that the HIOH variant of the CDSMP was most effective in individuals high in neuroticism and/or those low in Conscientiousness. First, such individuals tended to have lower disease management self-efficacy at baseline than did other participants in our study, regardless of study arm. Thus, participants with higher levels of Neuroticism and/or lower levels of Conscientiousness appear to have the most room for improvement in self-efficacy, and when assigned to an intervention that aggressively targeted this deficit, they responded.

Additionally, patient personality factors might also moderate the effects of interventions like HIOH if dispositional tendencies affect the way participants perceive and respond to their specific components, demands, and features (Christensen, 2000). For example, the negative self-perceptions such as poor self-esteem and vulnerability have been included in most definitions of Neuroticism (Costa & McCrae, 1992), and these lower self-evaluations may affect one's perceived ability to achieve desired outcomes (Judge *et al.*, 2002). Given the link between negative affect and self-efficacy, interventions such as HIOH, which includes modules on affective regulation, may lead to self-efficacy improvements among individuals relatively high in Neuroticism by helping them cope with difficult emotions. Likewise, the moderating effects of Conscientiousness might be understood in the context of this personality factor's core elements of self-control, organization and goal-orientation. Low levels of these tendencies are likely to give rise to worse health behaviors within the disease self-management domain,

including poor diet and exercise habits (Bogg & Roberts, 2004; Goldberg & Strycker, 2002; Roberts, Walton, & Bogg, 2005). Several aspects of the HIOH intervention would appear particularly beneficial to individuals low in Conscientiousness. For example, the concept of ‘action planning,’ or setting personal health goals, with revision as needed, is emphasized weekly throughout the intervention. This instructive scaffolding may be particularly useful to less Conscientious persons who tend to be disorganized, have lower levels of self control and are less likely to set goals and/or follow through with them. However, while all of these hypotheses appear plausible, our study was unable to test them. Future studies will be required to examine whether particular components of peer led disease self-management interventions interface with participant dispositional tendencies such as personality factors.

Openness was not found to moderate the effects of HIOH in our study. The initial hypothesis that it would have been based on the results of prior studies linking lower openness to lower general self-efficacy (Judge *et al.*, 2002), yet it is also the case that, of all the FFM personality factors, openness has had the most inconsistent and lowest associations with general self-efficacy (Judge *et al.*, 2002). Furthermore, in our study openness was not associated with the baseline disease management self-efficacy. Thus, the degree of correlation between self-efficacy and openness may depend on the self-efficacy domain (e.g. general versus disease management) and/or study sample (e.g. chronically ill individuals versus others) being considered. Another possibility is that disease management self-efficacy could be positively correlated with some aspects of Openness but negatively with others, in effect ‘canceling out’ at the level of the higher order trait. Again, these possible explanations appear worthy of formal study.

Strengths of our study included rigorous RCT methodology, use of a well-validated and comprehensive personality taxonomy and measure, and repeated measurement of self-efficacy, the outcome of interest, which allowed for clear assessments of changeover time. Our study also had several limitations. We recruited individuals who had at least one of six target chronic conditions and who also had functional impairment and/or active depressive symptoms. The extent to which the sample reflects the broader chronic disease-burdened population in the US is unknown, so generalizations must be considered in this context. Women were somewhat over represented in our sample compared with the general primary care population, in part due to the higher prevalence of depression (one of our six study diagnoses) in women relative to men (Kuehner, 2003). Randomization appeared successful in distributing other measured individual differences equally across groups, but the possibility of randomization failure on unmeasured confounders — although unlikely given the large sample size — cannot be ruled out. Additional studies examining the role of personality factors in moderating responses to other types of interventions, and which involve study samples with characteristics different from our sample, would be helpful in assessing the generalizability of the current findings.

Disease management self-efficacy is associated with significant short-term health outcomes (Foster *et al.*, 2007; Lorig *et al.*, 1999), highlighting the importance of understanding who is most likely to benefit from peer led disease management programs. Our results extend prior work on the CDSMP by demonstrating that the self-efficacy enhancing effects of such programs may be of relatively short duration, and by specifying the manner in which the intervention interacts with fundamental axes of personality variation. Two contributions of these findings are theoretical: (a) in the course of assessing in whom the intervention works, hypotheses may be generated about why or how it works, or what components drive its effectiveness; and (b) the study explicates the relationship of FFM personality factors to self-efficacy in the context of an intervention designed to increase self-efficacy.

However, another contribution is practical: identification of patients more or less likely to benefit can facilitate allocation of resources towards suitable candidates, improving the

intervention's efficiency (Issel, 2004), or ratio of clinical benefit to delivery effort. The utility of targeting medical interventions to those most likely to benefit is well established, though it has heretofore been employed primarily to direct prescription drug therapy. An example is the widely employed evidence-based algorithm to determine the need for and intensity of drug therapy for hyperlipidemia, which encourages careful consideration of each individual's overall risk for cardiovascular disease rather than reacting to serum lipid values in isolation (National Cholesterol Education Program, 2001). Our findings suggest a similarly individualized approach might be fruitfully employed to better target health behavior change interventions to those most likely to benefit. The availability of personality assessment measures for all needs and purposes (DeRaad & Perugini, 2002) make expedient factor-based screening feasible in many medical settings. Future trials of peer led disease self-management interventions may wish to block or stratify on personality factors (Kraemer *et al.*, 2002), and/or include alternative versions of the interventions targeting those who our results suggest are unlikely to respond favorably to the 'standard' program. The moderating role of personality factors in the effectiveness of other psychosocial health interventions may also deserve further study. Ultimately, the most important future questions for psychosocial health interventions for people with chronic conditions may not be whether or not the intervention 'works,' but in whom it is likely to work most effectively, and for how long.

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Figure 1.
Flow of subjects through study.

Figure 2. Relationships among intervention group (home vs. phone vs. control) and time (baseline, 2, 4, and 6 weeks, 6 months, and 1 year) at each time point 95% confidence intervals are shown.

Figure 3. Relationships among intervention group (home vs. other [phone + control]), time (baseline, 2, 4, and 6 weeks, 6 months, and 1 year), and personality factor: (a) Neuroticism; (b) Conscientiousness; (c) Agreeableness; and (d) Extraversion at each time point 95% confidence intervals are shown.

Table I

Baseline characteristics of study participants, by intervention group (home vs. other [phone and control])

N	Home 138	Other 277
Age, years (S.D.)	59.8 (11.2)	60.7 (11.6)
Female (%)	78.2	76.9
Ethnicity (%)		
White	74.6	81.2
African-American	14.5	9.4
Latino	5.8	3.6
Other/unknown	5.1	5.8
Education (%)		
≤12 years	13.8	15.4
13 – 15 years	38.4	39.7
16 years	30.4	29.4
> 16 years	17.4	15.4
Insurance status (%)		
Any private	86.1	80.9
Medicaid	8.0	9.6
Number chronic conditions, mean (S.D.)	1.97 (1.06)	1.86 (0.92)
Specific diagnoses, number (%)		
Arthritis	83 (60)	150 (54)
Depression	59 (43)	134 (48)
Diabetes	64 (46)	108 (39)
Asthma	34 (25)	64 (23)
Congestive heart failure	17 (12)	31 (11)
Chronic obstructive pulmonary disease	15 (11)	28 (10)
CES-D, mean (S.D.)	9.5 (7.1)	9.7 (6.8)
HAQ, mean (S.D.)	0.92 (0.68)	0.83 (0.69)
Self-efficacy, mean (S.D.)	7.02 (1.81)	7.03 (1.76)
NEO-FFI, mean (S.D.)		
Neuroticism	20.6 (9.9)	21.6 (9.2)
Extraversion	25.9 (8.0)	26.0 (7.3)
Openness	28.2 (6.6)	28.7 (6.2)
Agreeableness	34.4 (4.8)	33.3 (5.7)
Conscientiousness	31.3 (7.5)	32.0 (6.6)

Note. SD, Standard deviation; CES-D, Center for epidemiologic studies depression scale, 10 item version; HAQ, Health assessment questionnaire-disability section.

Table 2

Baseline self-efficacy scores by personality factors

Personality factor	Self-efficacy, mean (S.D.)	
	Low factor	High factor
Agreeableness	6.71 (1.84)	7.32 (1.67)
Neuroticism	7.84 (1.42)	6.28 (1.75)
Conscientiousness	6.49 (1.76)	7.57 (1.62)
Extraversion	6.32 (1.77)	7.77 (1.46)
Openness	7.04 (1.79)	7.03 (1.77)

Note. SD, Standard deviation; *t* tests all $p < .001$, except for openness $p = .98$.