Published in final edited form as:

Aging Ment Health. 2015 December ; 19(12): 1113–1122. doi:10.1080/13607863.2014.1003286.

The stability of coping strategies in older adults with osteoarthritis and the ability of these strategies to predict changes in depression, disability, and pain

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Abstract

Objectives—Given the chronically painful, incurable nature of osteoarthritis, effective cognitive and behavioral coping strategies may be critical for older adults with the disease. Little is known about how and why coping changes over time, nor about stability of coping strategies in persons with osteoarthritis. The aims of this work were to examine the structure of coping in older adults with osteoarthritis, the association of coping strategies with well-being, the stability of coping over time, and its association with changes in well-being over the same period.

Method—In a longitudinal study, 199 older adults with osteoarthritis of the knee were assessed at baseline and two years' follow-up. Items from two coping scales were factor analyzed, and Pearson's correlations and paired-samples *t*-tests assessed relative and absolute stability of the resultant coping strategies. CFA assessed the stability of the factor structure itself. Ordinary least-squares regression analyses examined the impact of change in coping on well-being.

Results—A five-factor coping solution emerged: stoicism, refocusing, problem-solving, wishful-thinking, and emotion-focused coping. The factor structure showed stability over the two-year period. Absolute stability of strategies varied, indicating that change in coping styles was possible.

Conclusion—Changes in coping style predicts future well-being; however, coping remains malleable with age and maladaptive strategies can be effectively targeted. Greater knowledge of the utility or maladaptive nature of a given strategy may help guide decisions about interventions for patients with osteoarthritis and encourage more adaptive coping styles.

Keywords

osteoarthritis; coping stability; chronic pain; depression; disability

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Declaration of conflicting interests: The authors declared that they had no conflicts of interests with respect to their authorship or the publication of this article

Introduction

Osteoarthritis (OA) is the most common physical disorder of late life, and more than 50% of persons aged 65 and over exhibit evidence of this disorder in at least one joint (Mili, Helmick, & Zack, 2002; American Association of Neurological Surgeons, 2006). It is estimated that, by 2030, close to 70 million persons aged 65 and older will be at risk for OA (American Association of Neurological Surgeons, 2006). A degenerative disease, OA is often associated with pain (Keefe et al., 1987; Parmelee, Harralson, Smith, & Schumacher, 2007), functional impairment (Creamer, Lethbridge-Cejku, & Hochberg, 2000; Rosemann, Laux, & Kuehle, 2007; Verbrugge, 1992), activity limitations and decreased independence in activities of daily living (Penninx et al., 2001), depressed mood (Hawker et al., 2010), and a reduction in quality of life (Dominick, Ahern, Gold, & Heller, 2004). Pain is frequently identified as the most distressing symptom of OA, as the progressive joint failure can cause normally innocuous joint movements to elicit painful responses (Hunter, McDougall, & Keefe, 2008). Given the negative correlates of OA, its chronic nature, and the absence of a cure, the development of effective coping skills may be a crucial determinant of well-being in older adults with this disease.

While the existing literature on coping specifically with OA in the older population is relatively small, there is substantial research on coping with chronic illness in general and pain in particular. The prevailing notion throughout the literature on coping is that coping strategies are orthogonal constructs and individuals are prone to use one type over another (Eisenbarth, 2012). Many studies on coping with chronic pain indicate that disengaged (i.e., aimed at escaping the threat or related emotions via passive or maladaptive responses; Carver & Connor-Smith, 2010) and emotion-centered coping styles (i.e., those that attempt to attenuate discomfort by altering perception or appraisal of the problem; Lazarus & Folkman, 1984) are associated with greater depression, higher levels of pain, and greater functional impairment (e.g., Endler, Corace, Summerfeldt, Johnson, & Rothbart, 2003; Perrot et al., 2008; Somers et al., 2009). Recent findings have linked the use of more passive disengagement coping strategies to higher levels of long-term mental health problems (Görge, Hiller, & Witthöft, 2014).

Although many different styles of coping with pain have been identified, less is known about how and why individuals might adjust their preferred strategies (i.e., favored or usual method of coping) over time. Furthermore, to our knowledge there are currently no studies that have looked at the stability of coping strategies of persons with OA. There is, however, research on stability of coping in other populations. For example, Gil et al. (1993) found that, over the course of nine months, children with sickle cell disease displayed relatively stable coping attempts, negative thinking, and illness-focused strategies. Adolescents showed some stability for active coping attempts, but not for negative thinking or illness-focused strategies, and adult participants' use of coping attempts and negative thinking was fairly stable. Gil, Wilson, and Edens (1997) found that intraclass correlations for coping strategies for adults with sickle cell disease were highly stable, which suggests that they may be more deeply entrenched in their coping patterns than children. This is consistent with the developmental literature on stability of CWI, which indicates that behavioral coping

develops earlier and remains consistent across age groups, while cognitive coping increases with age (Compas, Worsham, & Ey, 1992; Thompson & Gustafson, 1996).

Indeed, studies generally show that adults display moderate stability in the use of coping strategies to deal with daily stressors and chronic pain over time (Billingsley, Waehler, & Hardin, 1993; Endler et al., 2002; Fondacaro & Moos, 1989). However, change in coping is possible with interventions, and cognitive-behavioral approaches appear to provide an effective means to train individuals with various chronic pain problems to use more effective coping strategies (Craighead & Nemeroff, 2002; Keefe, 1996; Keefe et al., 1990).

In light of the prevalence of OA as well as the significance of coping style in adjustment to chronic pain, it is important to fill the gap in the literature regarding the stability of pain coping strategies in older adults with OA. To that end, this study compares the coping styles of older adults with OA at baseline with those reported at a 24-month follow-up. This study focuses on OA of the knee, as this is the single most common site of OA (Currier et al., 2007); additionally, the fact that the knee is a weight-bearing joint bears strong implications for ambulation and many functional activities. Furthermore, the extent of disability caused by OA of the knee varies greatly (Watt & Bui, 2008), and therefore easily yields a wide range of disease severity and disability within a community sample.

The purpose of this study is fourfold: (1) to identify the structure of coping with OA among older adults; (2) to delineate the associations among coping styles and well-being in older adults with OA; (3) to assess the stability of coping strategies over time; and (4) to examine whether and how stability vs. change in coping over time is associated with changes in well-being over the same period. Based on available literature, we hypothesize that coping strategies at baseline will largely remain stable over the study period, and that emotion-focused coping strategies will be associated with decreased well-being (i.e., higher levels of pain, disability, and depression). We also expect that persons who increase their utilization of emotion-focused or disengagement coping will experience a concurrent increase in pain, disability, and depression.

Method

Participants

Participants were 369 Philadelphia-area residents who were recruited through a university rheumatology clinic ($N = 53$, 14.6% of total sample), a Veterans Affairs Medical Center (VAMC; 44, 12.2%), two general geriatric outpatient clinics (44, 12.2%), persons who had completed a past psychoeducational study of OA (46, 12.7%), and through public service announcements in newspapers and on radio (PSAs; 175, 48.2% of total). Recruitment site information was missing for one participant.

Inclusion criteria were OA of the knee, as confirmed by chart review or physician communication, and age 45 years and above. Exclusion criteria were cognitive impairment and the presence of life-threatening or functionally severely limiting health problems other than OA (e.g., cancer, chronic obstructive pulmonary disease). Four of the 369 failed to

provide sufficient information on coping to warrant their inclusion in current analyses, reducing the sample for this report to 365.

In order to accurately examine the stability of coping strategies, only those participants who were retained in the two-year follow-up ($N = 199$) were included in the analyses. These respondents were predominantly female (65.8%; $N = 131$) and white (74.9%; $N = 149$). With the exception of two participants, the rest were African American (24.1%; $N = 48$). The majority of participants who completed the two-year follow-up were married (49.2%; $N = 98$) or widowed (25.6%; $N = 51$), and most had at least a high school education (26.6%; $N = 53$). Average age was 68.5 years ($SD = 9.1$; range = 48-89). A comparison of the longitudinal sample with participants who only provided data at T1 can be seen in Table 1.

Assessments and procedure

Data reported here were collected as part of a larger study of psychosocial consequences of OA (supported by NIMH grant R01-MH51800).

Recruitment methods necessarily varied across sites; all recruitment and data collection procedures were approved by Institutional Review Boards at participating institutions when available. For all respondents, the initial telephone contacts established willingness to participate, screened for eligibility, and made plans for data collection. Assenting respondents then were mailed a packet of questionnaires for completion at their convenience. An in-person interview was scheduled to occur within about two weeks of the mailing. During these interviews, which were approximately 60 minutes long, the self-report questionnaires were reviewed and clarified as needed, additional data were collected interactively, and signed consent was obtained to contact the respondent's physician for diagnostic confirmation. In addition to the baseline battery, data were collected again at one- and two-year follow-ups. This analysis examines only baseline and two-year follow-up data, as we did not collect coping data at the one-year assessment.

Major classes of variables were demographic characteristics and arthritis severity (used as control variables), general health, pain, disability, symptoms of depression, and coping.

Demographic variables were age, sex, marital status (living with a spouse or partner vs. not), ethnicity (white vs. other), education (7-point categorical scale), and income (8-point scale representing \$10,000 increments). Of the 199 persons retained at follow-up, 39 declined to report income at baseline; to preserve these cases for analysis, we substituted the scale mean.

Arthritis severity was represented by three self-report variables: duration of knee symptoms in months, involvement of one or both knees, and a count of other joints affected by OA.

Two *general health status* measures were compiled from the Multilevel Assessment Instrument (MAI; Lawton, Moss, Fulcomer, & Kleban, 1982) and the National Center for Health Statistics Long-Term Care Survey (Bacon & Mullner, 1983). A 31-item checklist yielded a count of specific *health problems* other than OA, while the MAI identified *perceived health*, which was summarized by averaging ratings of health in general (4-point

scale, 'excellent' to 'poor'), now as compared with 5 years ago (3-point scale), and as compared with others the same age (3-point scale). To parallel the health problems composite, we coded perceived health items such that higher scores indicated poorer health.

The widely-used Center for Epidemiologic Studies Depression scale (CESD; Radloff, 1977; Radloff & Teri, 1986) tapped *depressive symptoms*. Cronbach's alpha for the current sample ($N = 199$) was .89. Fifty-two (25.9%) of the 199 respondents scored 16 or higher on the summary scale, indicating probable depression.

Osteoarthritis pain was assessed using the 11-item Arthritis Impact Measurement Scales II Pain Scale (AIMS2; Meenan, Mason, Anderson, Guccione, & Kazis, 1992) supplemented by the Philadelphia Geriatric Center Pain Scale (Parmelee, Katz, & Lawton, 1991). The six items of the latter scale were modified to refer specifically to arthritis pain. The resulting combined measure ($\alpha = .89$) captures frequency, intensity, and impact of OA pain.

Arthritis-related disability was measured by 28 AIMS2 items tapping six dimensions: mobility, walking and bending, hand and finger function, arm function, self-care and household tasks. The six subscale scores were averaged to yield a summary measure of OA-related disability ($\alpha = .80$).

Coping strategies for dealing with OA symptoms and related limitations were represented by 63 items drawn from two widely-used instruments. Participants were explicitly asked to code how they cope with their OA of the knee pain. The coping-related instruments were administered at both time points. Of the original 54 items on Felton and Revenson's (1984) coping with illness (CWI) measure, two were dropped because pre-test respondents indicated that they were redundant or of little relevance to knee OA. Two others were combined into a single question, again to reduce perceived redundancy. The remaining 50 items were augmented by a subscale of the Coping Strategies Questionnaire (CSQ; Rosenstiel & Keefe, 1983) that previous research and our own pre-tests indicated is particularly relevant to coping with OA pain: Coping Self-Statements (CSS; six items). Respondents rated how much they used each of the final 57 items on a 4-point scale ranging from 'not at all' to 'a great deal.'

Analytic strategy

In order to directly compare the stability of coping strategies utilized by participants at baseline (T1) and the two-year follow-up (T2), only those participants for whom T2 data was available were used in the analyses. First, however, a comparison was made between the demographic characteristics of the longitudinal sample and those participants who did not continue. A dichotomous variable was created to indicate whether or not a participant provided data for both time points or only for the first. When the dependent variable in an analysis of attrition is dichotomous (i.e., T1 vs. both waves), logistic regression is particularly appropriate, as it provides predicted probabilities of retention for combinations of the independent variables (i.e., demographics). According to Hosmer and Lemeshow (1989), the following procedure was utilized for selection of significant independent variables and interactions: (1) stepwise selection of main effects; (2) forced entry of the main effects significant on step 1, followed by stepwise selection of interaction terms given

the main effects variables in the model; and (3) assessment of the final model through examination of goodness-of-fit statistics.

Following the analysis of attrition, data analysis proceeded in three phases. First, we factor analyzed the 57 coping items to determine their underlying structure. Demographic and disease status correlates of resulting coping factors were also identified at this stage to permit their control in subsequent analyses.

In order to test the structure identified in the exploratory factor analysis, a confirmatory factor analysis (CFA) was conducted in MPlus (Múthen & Múthen, 1998). Three criteria were used to evaluate model fit: (1) the model chi-square, where p -values of greater than 0.5 indicate good fit, (2) the root-mean square error of approximation (RMSEA), where a value of 0.6 or less is considered acceptable, though a value of 0.5 or less is preferred, and (3) the comparative fit index (CFI), where a value above 0.90 indicates adequate fit.

After assessing the stability of the factor structure itself, Pearson Product-Moment correlation coefficients were used to examine degree of change in coping strategies over a moderate period of time within the sample of participants relative to their own baseline coping pattern. Paired samples t -tests were also conducted to further assess the extent to which coping strategies changed from baseline to follow-up. Ordinary least-squares regression analyses were used to predict degree of pain, disability, and depression at follow-up as a function of change in coping from baseline to follow-up. SPSS Version 21 was used to analyze the data.

Results

Attrition analysis

Logistic regression analysis was conducted to examine whether or not specific demographic variables contributed to participant retention at T2. Instead of the conventional beta coefficient, the logistic model is rewritten in terms of the odds of an event occurring, defined as the ratio of the probability that an event will occur to the probability that it will not. Factors with values greater than one indicate that the odds are increased, while values less than one indicate decreased odds. Of the 10 demographic independent variables available to the regression solution (age, sex, race, highest level of education, marital status, number of medical diagnoses, living environment, pain, disability, and depression), none bore a statistically significant relationship to the prediction of retention at T2 in the logistic regression model.

Structure of coping

The 57 items of the CWI plus the CSS scale of the CSQ were subjected to principal components analysis (PCA) using SPSS Version 21. Prior to performing PCA, the suitability of the data for factor analysis was assessed. The correlation matrix was inspected to ensure that it contained a fair proportion of elements that were significantly different from zero, which revealed many coefficients of .3 and above. The Kaiser-Meyer-Olkin value was .80, exceeding the recommended minimum value of .6 (Kaiser, 1970) and Bartlett's Test of Sphericity (Bartlett, 1954) reached statistical significance, (χ^2 (903) = 3202.53, $p < .001$),

supporting the factorability of the component matrix. Finally, the communalities were all above .3, further confirming that each item shared some common variance with other items.

Principal components analysis was used because the primary purpose was to identify and compute composite coping scores for the factors underlying the current version of items. In adherence with the Kaiser-Guttman criterion, factors with an eigenvalue greater than one were retained for subsequent varimax rotation (Kim & Mueller, 1978), and these components explained a total of 64.8% of the variance. Based on the high number of singlets and doublets in the 15 factor and subsequent exploratory structures, we determined that a maximum of seven factors were potentially viable. However, the five-factor solution, which explained 48.7% of total variance, was preferred for both clarity of factor structure and interpretability and was supported by the scree plot. A total of 21 items were eliminated because they consistently formed singlet or doublet factors, or failed to meet a minimum criterion of having a primary factor loading of .4 or above (Bailey, 1982). Cronbach's alpha for the 42 items retained was .88. The factor loading matrix for this final solution is presented in Table 2, and reviewed briefly below.

The first factor contained strategies reflective of *stoicism*, and accounted for 13.2% of the total variance. Cronbach's alpha for these 14 items was .87. The second factor, accounting for 9.2% of the variance, contained items indicative of *refocusing* strategies ($\alpha = .79$ for the eight items). The third factor accounted for 8.1% of the variance, and these five items were representative of *problem-solving* strategies ($\alpha = .67$). The fourth factor clearly represents *wishful thinking*, comprising all of its psychological aspects and accounting for 7.8% of the total variance ($\alpha = .76$ for the five items). The seven items on the fifth factor were indicative of *emotion-focused* coping strategies, and accounted for 7.1% of the total variance ($\alpha = .74$).

Composites representing each of the five coping strategies were calculated by averaging all items loading on that factor. Thus, the resulting stoicism, refocusing, problem-solving, wishful thinking, and emotion-focused composites each ranged in value from 1 (not at all) to 4 (a great deal).

Baseline associations and identification of covariates

The associations among baseline coping strategies and baseline outcome variables were tested using the Pearson Product-Moment two-tailed correlation coefficient analysis. Stoicism was significantly associated with depression ($r = -.28, p < .001$), such that utilizing these strategies significantly decreased depressive symptomatology. Coping strategies that were reflective of refocusing corresponded with a higher degree of disability ($r = .22, p < .01$). Increased use of wishful thinking was positively and significantly correlated with the three outcome variables, which indicates that persons implementing these strategies had higher degrees of pain ($r = .18, p < .05$), disability ($r = .27, p < .001$), and depression ($r = .52, p < .001$). Emotion-focused coping mechanisms were significantly associated with increased disability ($r = .23, p < .01$) and depression ($r = .44, p < .001$). Problem-solving approaches to osteoarthritis were not significantly associated with any of the three outcome variables at baseline.

The relationships of demographic variables with coping were examined, to permit their control in primary analyses. All baseline demographic variables were entered together in an ordinary least squares regression analysis to assess their impact on coping strategy use. Those not independently associated with coping were eliminated, and all others were retained for covariate adjustment. As shown in Table 3, baseline income was negatively associated with refocusing ($\beta = -.092, p < .01$) and wishful thinking ($\beta = -.087, p < .05$). Perceived health was negatively associated with stoicism ($\beta = -.204, p < .01$), and positively associated with wishful thinking ($\beta = .337, p < .001$) and emotion-focused coping ($\beta = .202, p < .001$). There were no significant differences in coping as a function of age, sex, race, marital status, or level of education. Based on these associations, we retained only income and perceived health for covariate adjustment in further analyses.

Stability of coping

Prior to directly examining the relative and absolute stability of coping strategies, the stability of the five-factor structure itself was examined through CFA. Although one of the assumptions of CFA is that variables are measured at the continuous level (Kline, 1998), it is possible to indicate in Mplus that variables are categorical. Chi-square value for the overall model fit was significant, $\chi^2_{(41)} = 134.5, p < .001$, suggesting a lack of fit between the hypothesized model and the data. However, examination of other fit indices showed acceptable model fit (RMSEA = .052, CFI = .91).

In order to directly examine the relative stability of coping strategies (i.e., the extent to which relative differences among individuals remain the same over time), the correlation of each T1 coping strategy with its T2 counterpart was obtained. All correlations were significant at $p < .001$, indicating high relative stability of the five coping factors from baseline to two-year follow-up (Table 4).

After ensuring that the data met the necessary assumptions, paired samples *t*-tests were conducted to investigate the absolute stability of coping strategies, i.e., the extent to which utilization of coping strategies changed over the two-year study period (Table 4). Significant differences in strategy utilization at baseline and follow-up were found for all five coping factors from T1 to T2. Specifically, utilization of refocusing, problem-solving, and wishful thinking increased over time, while the use of stoicism and emotion-focused coping decreased. Effect sizes indicated that these differences ranged from small (stoicism, wishful thinking, emotion-focused) to medium (problem-solving) to large (refocusing). Therefore, while the relative stability for the different coping strategies was high, the absolute stability varied.

Change in coping strategies as a predictor of pain, disability, and depression

Table 5 presents analyses examining the effects of change in coping strategies on change in pain, disability, and depression over the two-year study period. Change in coping strategies was not significantly predictive of pain at T2, $F_{(5,181)} = 4.08, p = .29$, although examination of beta coefficients indicated that increased utilization of Refocusing was significantly associated with an increase in pain ($\beta = .38, p < .05$). Change in coping strategies was a statistically significant predictor of disability at T2, $F_{(5,181)} = 26.56, p < .$

001, driven by the strong effects of change in stoicism usage ($\beta = -.99, p < .01$) and, to a lesser extent, change in utilization of emotion-focused coping ($\beta = .87, p < .05$). The direction of the coefficients indicated that decreased reliance on stoicism and greater use of emotion-focused strategies were associated with increased disability at T2. Change in coping strategies was not significantly predictive of depressive symptomatology at follow-up, $F_{(5,159)} = .23, p = .95$, although change in the utilization of wishful thinking was marginally predictive of depression at T2 (Table 5).

Discussion

In spite of the fact that OA is the most common physical disorder of late life, the large bodies of research on coping with chronic illness and pain includes limited information on coping with OA in the older population. While research has identified different styles of coping with other types of chronic pain, little is known about how and why individuals might adjust their preferred strategies over time or the stability of these coping strategies. Consequently, the primary goal of this study was to fill the gap in the literature regarding the stability of pain coping strategies in older adults with OA.

This study also sought to explore the structure of coping with OA among older adults. Five main factors of coping emerged, and appeared to reflect the commonly used orthogonal constructs of engagement (i.e., problem-solving, emotion-focused) versus disengagement (i.e., stoicism, wishful thinking, refocusing) coping modes, as engagement coping is described in the literature as incorporating problem-focused coping and emotion-focused coping, while disengagement coping includes such passive and maladaptive responses as avoidance, denial, substance use, and wishful thinking (Bardwell, Ancoli-Israel, & Dimsdale, 2001). Several of the five coping factors that make up this dimension in this study reproduce factors in the general coping literature, although they are often labeled differently. For example, what we have termed problem-solving has been called direct problem solving and cognitive decision making (Ayers, Sandler, West, & Roosa, 1996). Wishful thinking, a common form of coping in the literature, has been labeled escape/avoidance (Ayers et al., 1996; Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000). Refocusing has been split up into seeking support (Skinner, Edge, Altman, & Sherwood, 2003) and cognitive restructuring (Ayers et al., 1996; Connor-Smith et al., 2000).

With regard to the stability of coping, the factor structure itself showed stability over the two-year study period. Pearson Product-Moment two-tailed correlation coefficients and paired samples *t*-tests were used to further assess relative and absolute stability, respectively. Results showed high relative stability of the five coping strategies, indicating that relative differences among individuals remain the same over time (Santor, Bagby, & Joffe, 1997). The absolute stability of coping strategies over the two-year study period was variable, indicating that the overall level of certain strategies in the study population changed with time. Specifically, the extent to which strategies reflective of problem-solving and refocusing were implemented changed significantly from baseline to follow-up. These findings did not support the expectation of high absolute stability based on existing literature, which indicated that coping styles may grow less malleable with age (Gil et al., 1993, 1997). This has significant implications for the psychotherapists and behavioral health

providers, as these findings serve to reinforce the credence that individuals are capable of modifying cognitions and behaviors regardless of age. Although the coping styles of older adults may be more rehearsed or more entrenched than their younger counterparts, our findings suggest that it is nevertheless possible to alter maladaptive or unhelpful coping strategies.

At present, there is no clear consensus as to how well a given coping strategy serves to resolve problems, prevent future difficulties, or relieve psychological distress (Carver & Connor-Smith, 2010). Consequently, the current study also sought to examine whether change in coping strategies over time would be associated with changes in well-being (i.e., pain, disability, and depression) over the two-year study period. Results showed that participants who increased reliance on refocusing strategies from baseline to follow-up reported a significant increase in pain over time. A higher degree of disability at follow-up was significantly associated with decreased utilization of stoicism and increased use of emotion-focused strategies over the study period. Greater use of wishful thinking from baseline to follow-up was also marginally associated with increased endorsement of depressive symptomatology.

The results of this study are significant, as they offer evidence that the way an individual copes with OA can predict change in well-being. In addition, the various strategies examined had unique, distinct effects on participants' pain, disability, and depression. It is unclear whether or not the emergent relationships are causal, as only two waves of data were examined; however, several possible dynamics are suggested. First, individuals may move towards disengagement coping as the emotional and functional effects of OA pain progress. Second, it is possible that in the face of increasing disability, a shift toward disengagement coping is actually more adaptive as it represents an exercise in secondary control, which maintains the motivational and emotional resources of persons who are confronted with loss (Heckhausen & Schulz, 1999). Further research is necessary to explore these possibilities in greater detail.

The results of the disability regression equation were congruent with Rapp, Rejeski, and Miller (2000), who found cross-sectionally that more engaged coping strategies were associated with less disability and better physical function. Though not statistically significant, the results of the depression regression equation were similar to those of Murphy, Dickens, Creed, and Bernstein (1999), who found a significant correlation between depression and avoidant coping. Cross-sectional research also indicates that arthritis patients who rely on wishful thinking and other avoidance-coping strategies may experience more depression and greater physical disability than persons implementing engaged coping strategies (Brown & Nicassio, 1987; Hampson, Glasgow, & Zeiss, 1996; Rapp et al., 2000). Our findings corroborate and extend the cross-sectional work of Perrot et al. (2008), who also found that disengaged coping increases with OA duration. Unlike Perrot et al. (2008), this study included depression as an outcome, and the use of disengaged coping is associated with increased depression over time; thus, disability and distress, rather than duration of symptoms per se, may be the critical variables.

This study offers some of the first contributions to the literature on the stability of coping strategies of persons with OA. These findings have both theoretical implications and practical applications for clinicians and OA patients alike. Identification of OA coping strategies that have the greatest long-term influence on pain, disability, and depression provides the clinician with an empirical rationale for encouraging and discouraging various coping methods. Furthermore, greater knowledge of the utility or maladaptive nature of a given strategy may help guide decisions about interventions with patients with OA and encourage more adaptive coping styles. The findings suggest that the coping strategy of wishful thinking may be associated with increased disability and depression. It is possible that reliance on stoicism could shield against increasing disability, and over-reliance on refocusing may be less adaptive for pain than strategies that target OA pain directly (e.g., physician-approved exercise routines). The variable stability of coping strategies in the present sample indicates that coping patterns in older adults are more malleable than previously thought, and could be receptive to cognitive and behavioral approaches to change.

Limitations of this study include the use of a smaller-than-desired sample size and the possibility that other analytic strategies may be better-suited to the data. Exploratory factor analysis may not be the ideal strategy for identifying categories of coping, as it does not always converge on a set of core categories (Stanton, Danoff-Burg, Cameron, & Ellis, 1994). However, due to the use of a unique set of items, it was not clear how items should load. An additional potential limitation is the relatively short time-frame of the study, as research suggests that time-frame may play an important role with regard to the effectiveness of coping strategies. For example, certain strategies may have short-term benefits yet be maladaptive in the long-term (Aldwin & Revenson, 1987).

It should also be noted that not all items in the coping measurement tool cleanly fit a quantity of use format. Specifically, items such as 'I cannot let pain stand in the way of what I want,' 'find new faith or some truth about life,' 'feel as if I have changed or grown as a person,' 'rediscover what is important in life,' 'get away for a while or rest,' 'wish I could change [things],' 'hope a miracle will happen,' and 'imagine a better time or place' may not fit neatly into a quantity of use format. However, the utility of both a quantity of use format and a dichotomous used/not used format for each coping factor was explored, and the dichotomous format appeared to artificially reduce variability in the predictors. Thus, despite the possibility that some coping items may not fit a quantity of use format well, this was nonetheless preferred over a quality of use format as it provided greater variance.

Finally, it is conceivable that depression may have colored participants' responses on the self-report measures used in this study, in that it may have resulted in bias in reporting on the coping items.

Despite potential limitations, the results of this study are congruent with study findings from similar lines of research and are promising preliminary contributions to an underdeveloped area of study. Additionally, the majority of studies examining styles of coping have been carried out with mixed samples of younger and older adults, whereas this study focuses on the (rapidly-growing) older population. Future research should involve a larger sample size

in order to account for possible attrition, and should entail additional follow-up periods beyond the two years used in this study.

Acknowledgments

We remember and are deeply indebted to M. Powell Lawton for conceptual guidance at the study's inception. We thank Lori Smith, James Hollender, Meredith Olderman, and Beth Chmar for collecting the data, as well as others who assisted in this project.

Funding: This research was supported by NIMH [grant R01-MH51800] (P. Parmelee, PI) for research conducted at the Philadelphia Geriatric Center and the University of Pennsylvania.

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Table 1

Demographic characteristics of study participants.

Sample Characteristics		
	Participated at T1 only (<i>n</i> = 166)	Participated at T1 & T2 (<i>n</i> = 199)
	<i>M</i> (<i>SD</i>) or % (<i>n</i>)	<i>M</i> (<i>SD</i>) or % (<i>n</i>)
Age	66.9 (10.3)	68.5 (9.1)
Sex (% Female)	61.1%	65.8%
Race (% Caucasian)	70.1%	74.9%
Highest level of education		
Less than high school	17.4%	16.6%
High school graduate	25.7%	26.6%
Some college	30.6%	24.6%
College graduate	17.3%	26.1%
Advanced degree	15.3%	15.1%
Marital status		
Married	55.7%	49.2%
Widowed	22.2%	25.6%
Divorced	16.2%	17.1%
Single	4.8%	7.0%
# of medical diagnoses	5.0 (2.9)	4.7 (2.3)
Living environment		
Community	98.8%	98.5%
Health care facility	1.2%	1.5%
Pain (AIMS score)	3.0 (0.5)	2.9 (0.3)
Disability (AIMS score)	10.2 (3.6)	9.6 (2.8)
Depression (CESD score)	11.0 (10)	10.8 (9.9)

Note. Comparison of participants who participated in both waves with those who dropped out at time 2.

Table 2

Coping factor structure at T1

Strategy	STO	RE	PS	WT	EF
Make light of the situation	.751				
No matter how bad it gets, I know I can handle it	.739				
Do not let it get to me	.686				
Try to work it out by myself	.665				
Go on as if nothing happened	.654				
I cannot let it stand in the way of what I want	.649				
See it as a challenge	.629				
Face the situation head-on	.582				
Keep going even though it hurts	.569				
Try to forget the whole thing	.566				
Try to keep my feelings to myself	.554				
Keep others from knowing how bad things are	.529				
Tell myself I can overcome the pain	.484				
Joke about it	.418				
Find new faith or some truth about life		.725			
Religion becomes more important		.681			
Feel as if I have changed or grown as a person		.564			
Think about things that help me feel better		.545			
Concentrate on something positive		.517			
Do something new that I never would have done		.516			
Rediscover what is important in life		.476			
Read books or magazines		.466			
Recall past successes		.463			
Refuse to believe that it happened		.400			
Make a plan of action and follow it			.656		
Change my approach or the way I do things			.647		
Get away for a while or rest			.564		

Strategy	STO	RE	PS	WT	EF
Turn to work or other things			.543		
Come up with a couple of different solutions		.521			
Wish I could change what happened				.762	
Wish that the situation would go away				.694	
Have fantasies or wishes about how things might be				.606	
Imagine a better time or place				.561	
Hope a miracle will happen				.488	
Wish I were a stronger person				.486	
Criticize or take it out on myself					.724
Get mad at the person or things that cause problems					.638
Let my feelings out					.581
Take it out on other people					.567
Blame myself					.562
Talk to someone about how I'm feeling					.533
Realize I brought it on myself					.433

Note: **STO** = Stoicism; **REF** = Refocusing; **PS** = Problem-Solving; **WT** = Wishful Thinking; **EF** = Emotion-Focused

Table 3
The relationships of demographic variables with baseline coping strategies

	STO		REF		PS		WT		EF	
	R (R ²)	β	R (R ²)	β	R (R ²)	β	R (R ²)	β	R (R ²)	β
Demographics	.226 (.051)		.378^c (.143)		.150 (.023)		.392^c (.154)		.348^b (.121)	
Age		-.001		-.005		-.003		-.003		-.009
Sex		-.14		.013		-.007		.213		.066
Race		.031		.116 ⁺		.074		-.043		-.014
Marital Status		.021		-.002		.068		-.070		-.025
Education		.028		-.045 ⁺		.010		-.039		.017
Income		-.026		-.092^b		-.025		-.087^a		-.026
Overall Health		-.204^b		.109		.025		.337^c		.202^c
F (df)	1.47 (7,198)		4.56^c (7, 198)		.63 (7, 198)		4.95 (7, 198)		3.76^b (7, 152)	

Note: Values in bold indicate statistical significance.

⁺ .05 < *p* < .10

^a *p* < .05

^b *p* < .01

^c *p* < .001

Table 4
Relative and absolute stability of coping factors from baseline (T1) to follow-up (T2)

Coping Factor	Paired Samples Stability T1-T2	T-value	Cohen's <i>d</i>	Descriptives	
				Time 1 M (SD)	Time 2 M (SD)
Stoicism	.57^c	3.54^c	0.24	2.67 (.61)	2.53 (.57)
Refocusing	.55^c	-9.63^c	0.67	1.73 (.60)	2.14 (.63)
Problem-Solving	.55^c	-5.62^c	0.37	2.25 (.64)	2.48 (.59)
Wishful Thinking	.55^c	-3.96^c	0.27	1.92 (.73)	2.10 (.60)
Emotion-Focused	.58^c	4.12^c	0.28	1.40 (.42)	1.28 (.43)

Note: Values in bold indicate statistical significance.

^c *p* < .001

Table 5
The Ability of Change in Coping Strategies to Predict Pain, Disability, and Depression at Two-Year Follow-Up

	Pain		Disability		Depression	
	Adj. R ²	β	Adj. R ²	β	Adj. R ²	β
	.103		.52 ^b		.37	
T2 Pain		.15 ^a		--		
T2 Disability		--		.52 ^b		--
T2 Depression		--		--		.59 ^c
T1 Pain		.38 ^a		--		--
T1 Disability		--		.72 ^c		--
T1 Depression		--		--		.63 ^c
Overall Health		.38		.56		.26
Income		-.03		-.075		.10
Stoicism		-.14		-.99 ^b		-.12
Refocusing		.25 ^a		-.24		-.68
Problem-Solving		.10		.32		-.30
Wishful Thinking		-.10		.40		.88 ⁺
Emotion-Focused		-.01		.87 ^a		.56
F (df)	4.08 ^c (7,188)		26.56 ^c (8,188)		13.29 ^c (8,167)	

Note: All coefficients are final step of hierarchical regression model. See text for details. Values in bold indicate statistical significance.

+ .05 < p < .10

^a p < .05

^b p < .01

^c p < .001