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# Prescription Pain Medication Use Among Midlife and Older Adults With Chronic Pain: The Roles of Generativity and Perceived Family Support

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**Introduction:** This study examined the roles of generativity (i.e., the need to care for and contribute to future generations) and perceived family support in prescription pain medication use among midlife and older adults with chronic pain. **Methods:** The sample consisted of 826 participants with chronic pain from the Midlife in the United States data set (Midlife in the United States III, 2013–2014). **Results:** The results of a moderated mediation analysis indicated that generativity significantly mitigated the negative association between pain interference and perceived family support, and those with high generativity reported consuming more prescription pain medications at all levels of pain interference. **Discussion:** The findings indicated the protective roles of generativity in attenuating the detrimental effects of chronic pain on family support and suggested the potential roles of perceived family support and generativity in medication adherence among midlife and older adults with chronic pain.

## Public Significance Statement

The present study suggests that having a supportive family helps midlife and older adults with chronic pain become more adherent to their prescription pain medication treatments. The findings also suggest that engaging in socially productive activities may help adults with chronic pain receive more support from their families, which, in turn, could reduce their risks of not adhering to pain medication treatments.

**Keywords:** midlife, chronic pain, generativity, family support, prescribed pain medication

Chronic pain is one of the most common health issues among midlife and older adults, with 43% of those in the United States reported that they experience pain daily (Reid et al., 2015). Given that chronic pain is a multidimen-

sional health issue that affects all aspects of life (e.g., biological, social, and psychological; Bevers et al., 2016), older adults with chronic pain also face a greater risk of social isolation and perceived lack of family support (Gold, 2001; Ferreira & Sherman, 2007), and lack of family support has been found to predict unhealthful medication use behaviors, including both medication misuse (West et al., 2012) and nonadherence (DiMatteo, 2004). To the best of our knowledge, there has been no recent and detailed investigation of the relation between perceived family support and prescription pain medication use as well as relevant psychosocial factors that may influence this association

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among midlife adults with chronic pain. Moreover, the field of pain and health psychology has recently called for the integrated and holistic approach to treat chronic pain, which emphasizes equally on reducing physical pain through pharmaceutical treatment and promoting individuals' family function, social relationship, and quality of life through psychosocial interventions (Dueñas et al., 2016). Given this need and gap in the literature, the study's objective was to investigate the associations among generativity (i.e., the psychosocial hallmark and characteristic among midlife adults to care for future generations and contribute to the community; Erikson, 1968), pain interference, perceived family support, and prescription pain medication use among this population.

### Perceived Family Support

The biopsychosocial-diathesis stress model of chronic pain (Bever et al., 2016) postulates that lack of psychosocial agencies, such as family support, serve as a potential mediator that helps to explain the mechanism of how chronic pain adversely affects individuals' pain behaviors and health-related outcomes (e.g., medication misuse or nonadherence, social isolation; Bever et al., 2016; Gatchel et al., 2003; Traeger et al., 2016). To capture the multidimensional nature of chronic pain, pain interference is a validated construct that assesses the extent to which chronic pain interfered with multiple domains of individuals' lives (e.g., enjoyment, relationships, mood, sleep, general activities; Cleeland & Ryan, 1994). Studies have shown that pain interference is a reliable indicator of pain severity (Jensen et al., 2017). Overwhelming evidence from pain literature has revealed that because chronic pain adversely affects individuals' health and their ability to fulfill social roles, their relationships with spouses and other family members will be disrupted, which, in turn, could lead them to perceive a lack of support from their family (i.e., perceived family support; Bruckenthal et al., 2009; Dueñas et al., 2016; Gold, 2001; McGrath et al., 2005; Reid et al., 2015).

Regarding perceived family support and medication-taking behaviors among individuals with chronic pain, the evidence from the literature has been inconsistent. On the one hand, several studies found that lack of family support

is associated with an increased risk of dependence on prescription medication (Bruckenthal et al., 2009; McGrath et al., 2005; Reid et al., 2015). On the other hand, the meta-analysis of 122 studies indicated that social and family support had the highest correlations with treatment adherence, in which individuals who had a strong support system from family adhered better to treatment than those who did not (DiMatteo, 2004). Among individuals with chronic pain, numerous studies have shown that older adults tend to be reluctant to take prescribed pain medications or take much lower doses because they are concerned about severe side effects, complex medication interactions, or fear of becoming addicted (Chang et al., 2011; Sale et al., 2006). Thus, having a supportive family may help them overcome these concerns and motivate them to be more adherent to the treatment (DiMatteo, 2004). Although both medication overuse and nonadherence are evident among chronic pain patients, scholars have suggested that nonadherence is a much more salient issue among older adults with chronic pain (Lewis et al., 2010; Molton & Terrill, 2014). Overall, the theory and previous literature suggested the potential mediating role of perceived family support in the association between pain interference and prescription pain medication use. However, there is still a dearth of research investigating these constructs in one mediation model to gather meaningful information about the mechanism of perceived family support in pain and medication use behaviors.

### Generativity

According to Erikson's theory of psychosocial development (Erikson, 1968), generativity is a hallmark of psychosocial development of midlife and older adults. This concept illustrates the overarching developmental theme among this population, in which the primary focus and desire of midlife adults are to leave a legacy and contribute to the well-being of the community (Erikson, 1968), and this goal is fulfilled through generative activities, such as parenting, caregiving, volunteering, and civic engagement (McAdams, 2013). Several studies have recognized the major role of generativity in promoting social well-being, such as happy and enduring marriages, healthy relationships with others, and receiving more social support (Hart et al.,

2001; Westermeyer, 2004; Peterson et al., 1997). Furthermore, engaging in generative and prosocial activities have also been found to significantly predict favorable perceived health status, longevity, psychological well-being, and lower risk of disability (Momtaz et al., 2014; Nguyen et al., 2020; Gruenewald et al., 2012; Post, 2005). Even though there is no existing literature in the comprehensive relations among generativity, family support, and prescription medication use among midlife adults with chronic pain, the biopsychosocial-diathesis stress theory postulates that the presence of a psychological resource (e.g., generativity) could potentially moderate pain's adverse effects on health, social, and behavioral outcomes (Bever et al., 2016).

### Current Study

Drawing from theories and previous literature, the study examined the moderated mediation model among pain interference, generativity, perceived family support, and prescription pain medication use with two hypotheses (see Figure 1). In Hypothesis 1 (H1), the study anticipated that generativity would significantly moderate or buffer against the negative association between pain interference and perceived family support, in which participants with

higher levels of generativity would report significantly higher levels of perceived family support at both high and low levels of pain interference. In Hypothesis 2 (H2), the study hypothesized that generativity would also significantly moderate the indirect effects of pain interference on prescription pain medication use through perceived family support. In other words, the magnitude of pain interference's indirect effect on prescription pain medication use through perceived family support would significantly differ across low and high levels of generativity.

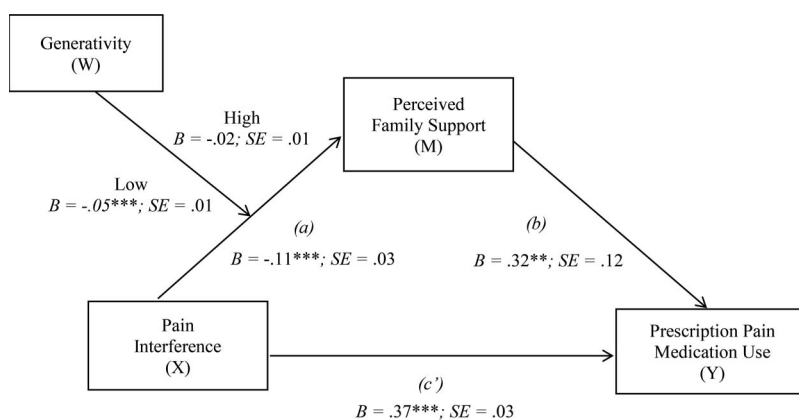
## Method

### Participants

The study used a data set from a national longitudinal study Midlife in the United States (MIDUS) III, from 2013 to 2014 (Ryff et al., 2013-2014). The sample consisted of 826 participants who reported having chronic pain or pain that persisted beyond normal (e.g., "Do you have pain that persists beyond the time of normal healing and has lasted from anywhere from a few months to many years?"). Participants' ages ranged from 39 to 92 years ( $M = 63.92$ ,  $SD = 10.83$ ), with 59.3% identified as female. Furthermore, 90.2% of participants identified as White,

**Figure 1**

*Moderated Mediated Model for the Indirect Effects of Pain Interference on Prescription Pain Medication Use Through Perceived Family Support, Depending on the Levels of Generativity While Controlling for Marital Status and Subjective Social Status. (Model 7; Hayes, 2017).*



Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

3.4% as Black, and 6.4% as others. Additionally, 69% of participants were married or cohabiting at the time of the study. In terms of pain locations, greater than half of the participants reported having back pain (54.2%) and followed by legs pain (45.2%), knees pain (35.4%), arms and shoulder pain (26.2%), neck pain (25.8%), hips pain (24.6%), and head pain (9.2%).

## Measures

### *Pain interference.*

The levels of pain interference of participants who experienced chronic pain were assessed using a 5-item version of the Brief Pain Inventory's interference subscale (Cleeland et al., 1994). The scale assesses participants' perceived interference from pain in the past week across the five following domains: enjoyment of life, sleep, relationships with others, mood, and general activity (e.g., "During the past week (DTPW), how much did your pain interfere with your mood?"; "DTPW, how much did your pain interfere with your general activity?"; "DTPW, how much did your pain interfere with your relations with other people?"; "DTPW, how much did your pain interfere with your sleep?"; "DTPW, how much did your pain interfere with your enjoyment of life?"). Item responses are measured on a scale that ranges from 0 (*not at all*) to 10 (*completely*). The responses were averaged to derive an overall score, in which higher scores reflected greater interference from pain, as suggested by Cleeland et al. (1994). Scale scores were found to be associated with increased pain severity, lack of social support, and decreased psychological well-being among individuals with chronic pain (Schütze et al., 2010; Nguyen et al., 2020). In the study of Nguyen et al. (2020) using the MIDUS data set, pain interference items yielded a Cronbach's alpha of .95. In the current study, pain interference yielded a Cronbach's alpha of .91.

### *Generativity.*

The 6-item abbreviated Loyola Generativity Scale (LGS; McAdams & de St. Aubin, 1992) from MIDUS was used to assess participants' level of generativity overall. The items evaluate participants' perceptions of their contribution to society, transfer of skills and knowledge to others, and giving back to the next generation. Participants were asked to rate the extent to which each statement would describe them (e.g., "Others

would say that you have made unique contributions to society"; "you have important skills you can pass along to others"; "many people come to you for advice"; "you feel that other people need you"; "you have had a good influence on the lives of many people"; "you like to teach things to people") using a 4-point scale that ranged from 1 = *not at all* to 4 = *a lot*. As recommended by McAdams et al. (1992), the overall scale score was calculated by summing the items, with higher LGS scores indicating greater generativity. In a sample of MIDUS participants, LGS scores were associated positively with caregiver status and level of caregiving (Grossman & Gruenewald, 2017). In this study, the LGS items yielded a Cronbach's alpha of .84.

### *Perceived family support.*

Participants' total perceived family support was assessed with the MIDUS-derived four-item Family Support Scale (FSS) for non-spousal family support and the 6-item Marital Empathy Scale (MES; Schuster et al., 1990) for spouse/partner support. Participants responded to items (e.g., "Can you open up to them if you need to talk about your worries?"; "can you rely on them for help if you have a serious problem"; "do they understand the way you feel about things?"; "do they care about you?"), using a 4-point scale (1 = *not at all* to 4 = *a lot*). Based on the advice of Schuster et al. (1990), the item responses from both scales were averaged to derive a total family support score, in which higher scores indicated greater perceived family support. For participants who reported having no spouse/partner, the four-item FSS's mean was used. Regarding validity, FSS and MES scores were positively associated with coworker support and friend support and negatively associated with family strain and friend strain in samples from MIDUS (Walen & Lachman, 2000) with a Cronbach's alpha of .82 for FSS and .90 for MES, respectively. In this study, Cronbach's alpha was .85 and .93 for FSS and MES, respectively.

### *Prescription pain medication use.*

Participants' frequency of prescription pain medication use was measured with a single item developed specifically for the MIDUS survey. The item measures the frequency with which individuals consumed prescription pain medica-

tions in the past 30 days (“During the past 30 days, have you taken prescription medicine for pain?”). The responses are measured on a scale that ranges from 0 (*not at all*) to 5 (*daily*), with higher responses reflecting greater use. Because the construct was assessed through a single item, no psychometric information is available.

### Covariates.

Participants’ marital and cohabitation status (1 = *yes*, 2 = *no*) at the time of the study was included as a covariate. Because socioeconomic status is a prominent factor in examining health and pain behaviors (Schnittker & McLeod, 2005), participants’ perceived social status from the single-item MacArthur Scale of Subjective Social Status (Adler et al., 2000) was also included as a covariate. Previous studies have indicated that the scale is strongly predictive of participants’ objective indicators of socioeconomic status (e.g., financial resources, education; Adler et al., 2008) as well as health and psychological outcomes (Wolff et al., 2010).

### Statistical Analysis

The moderated mediation analysis was run using the PROCESS macro (Hayes, 2017) for SPSS version 23 (IBM Corp, 2015). PROCESS Model 7 was used to test whether generativity (W) moderated pain interference’s (X) indirect effect on pain medication use (Y) through family support (M). The indirect effect was examined by computing a series of Ordinary Least Squares regression and bootstrapping procedures with 95% confidence intervals (CI) derived from 5,000 bias-corrected resamples. In other words, the analysis randomly and repeatedly resampled 5,000 cases from the study’s sample of 826 participants to estimate the sampling distribution, and statistical significance was deemed, or  $p < .05$ , if the CI values of

these bootstrap resamples did not include zero. Given this bootstrapping CI approach and the study’s adequate sample size, Hayes and Rockwood (2020) stated that this approach is robust to nonnormal distribution, and statistical inferences could be made without having to assume the normality of the data distribution. Furthermore, PROCESS also calculated the conditional indirect effect to determine whether the indirect effect significantly differed at low ( $-1 SD$  from the mean) and high ( $+1 SD$  from the mean) levels of the moderator.

## Results

The means, standard deviations, and bivariate correlations of pain interference, perceived family support, prescription pain medication use, and generativity are shown in Table 1. Pain interference was negatively correlated with perceived family support,  $r = -.22$ ,  $p < .01$ , generativity,  $r = -.08$ ,  $p < .05$ , and positively correlated with prescription pain medication use,  $r = .44$ ,  $p < .01$ . In addition, family support was positively correlated with generativity,  $r = .18$ ,  $p < .01$ .

The test of the highest-order unconditional interaction showed that generativity had a significant moderation effect on the association between pain interference and perceived family support ( $B = .01$ ,  $p < .01$ , 95% CI = [.001, .01]), even after controlling for marital status and subjective social status. Specifically, the negative effect between pain interference and perceived family support was stronger among those with lower generativity ( $B = -.05$ ,  $p < .05$ , 95% CI = [-.07, -.03]) than those with higher generativity ( $B = -.02$ ,  $p > .05$ , 95% CI = [-.04, .002]). Figure 2 illustrated that, compared to those with lower generativity, participants with higher generativity consistently

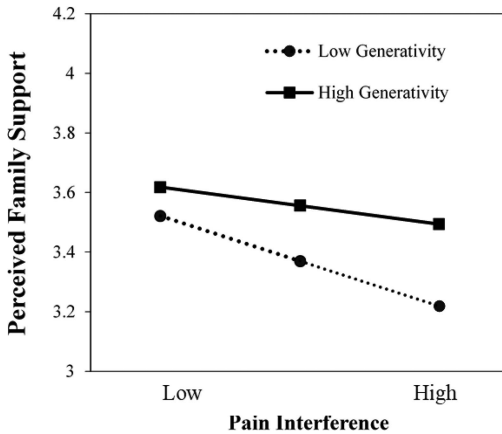
**Table 1**

*Means, Standard Deviations, and Bivariate Correlations Among Variables (N = 826)*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. Pain interference	3.32	2.67				
2. Perceived family support	3.46	0.58	-.22**			
3. Prescription pain medication use	3.22	2.19	.44**	-.02		
4. Generativity	16.92	3.88	-.08*	.18**	.02	

\*  $p < .05$  based on 5,000 bootstrap samples. \*\*  $p < .01$  based on 5,000 bootstrap samples.

**Figure 2**  
Moderation Model for the Effect of Pain Interference on Perceived Family Support at Low and High Levels of Generativity While Controlling for Marital Status and Subjective Social Status



reported greater levels of perceived family support across all levels of pain interference.

In terms of the overall moderated mediation model, as Figure 1 and Table 2 show, the direct effect was significant (*Path c'*:  $B = .37$ , 95% CI = [.32, .43]), indicating that pain interference positively predicted prescription pain medication use. Pain interference was also negatively associated with perceived family support (*Path a*:  $B = -.11$ , 95% CI = [-.17, -.05]), and perceived family support was positively associated with prescription pain medication use (*Path b*:  $B = .32$ , 95% CI = [.08, .56]). The moderated mediation index indicated that generativity significantly moderated the indirect effect of pain interference on prescription pain medication use through perceived family support (*index* = .001, 95% CI = [.0001, .0036]), even after controlling for marital status and subjective social status. To interpret the moderated mediation result, Figure 3 indicated that participants with higher levels of generativity reported using more prescription pain medications at both low and high levels of pain interference.

## Discussion

Chronic pain is a prominent health issue among midlife and older adults (Reid et al., 2015), and investigating psychosocial factors

that mitigate the adverse effects of chronic pain on social and behavioral outcomes is a compelling need to further the holistic and integrated treatment of chronic pain. Grounded in the biopsychosocial-diathesis stress model of chronic pain (Bever et al., 2016) and Erikson's psychosocial development theory (Erikson, 1968), the current study addressed this need by examining the roles of generativity and perceived family support on prescription pain medication use among midlife adults with chronic pain.

Aligning with previous literature, our findings indicated that higher levels of pain interference were associated with lower levels of perceived family support. Perhaps, because pain interferes with individuals' health, mood, and physical ability to a greater extent, their ability to fulfill familial roles would be decreased; thus, tension and strain within the family may arise, which could lead participants to perceive that their family members are less supportive (e.g., Reid et al., 2015; West et al., 2012). This finding also suggests that midlife and older adults with chronic pain may be at greater risk of social isolation because isolation often is conceptualized as a dearth of meaningful social support (Blazer, 1992).

The result showed support for the first hypothesis, suggesting that generativity was a protective factor that buffered against pain's detrimental interference on perceived family support. Specifically, participants who had higher levels of generativity consistently reported higher levels of family support across all levels of pain interference. Perhaps more generative individuals are more likely to engage in prosocial activities that strengthen their relationships with families, which, in turn, would help them receive more support during times of illness. These findings are consistent with Erikson's theory and previous findings (Ackerman, Zuroff, & Moskowitz, 2000; Erikson, 1968; Westermeyer, 2004) highlighting the positive role of generativity on promoting social well-being and support, even in the context of chronic pain. Furthermore, the result revealed that as pain interference increased, participants' perceptions of family support were likely to decrease, which, in turn, predicted a reduced use of prescription pain medication. Aligning with previous literature, this finding suggested that a lack of family support may contribute to underuse or nonadherence to pain medication

**Table 2**

*Moderated Mediation Analyses for Pain Interference (X), Perceived Family Support (M), Generativity (W), Prescription Pain Medication Use (Y), and Marital/Cohabitation Status and Subjective Social Status as Covariate.*

Variable	B	SE	p	LLCI	ULCI
Regression path analysis					
PI to FS	-.11	.03	<.001	-.17	-.05
PI × GEN to FS	.01	.002	<.01	.001	.01
FS to PPMU	.32	.12	<.01	.08	.56
PI to PPMU through FS	.37	.03	<.001	.32	.43
GEN	Effect	SE	p	LLCI	ULCI
Conditional effects of PI on FS at values of GEN (moderation analysis)					
-1 SD	-.05	.01	<.001	-.07	-.03
Mean	-.04	.01	<.001	-.05	-.02
+1 SD	-.02	.01	.08	-.04	.002
GEN	Effect	Boot SE	p	LLCI	ULCI
Indirect effects of PI on PPMU through FS at values of GEN (moderated mediation analysis)					
-1 SD	-.02	.01	—	-.035	-.003
Mean	-.01	.01	—	-.024	-.002
+1 SD	-.01	.01	—	-.016	.001

*Note.* PI = pain interference; FS = perceived family support; PPMU = prescription pain medication use; GEN = generativity; LLCI = lower-level 95% confidence interval; ULCI = upper-level 95% confidence interval. Marital/cohabitation status and subjective social status were included as covariates.

among midlife and older adults with chronic pain (Molton et al., 2014).

The results from the moderated mediation analysis supported the second hypothesis, indicating that the indirect effects of pain interference on prescription pain medication use through perceived family support differed significantly at high and low levels of generativity. Specifically, participants with high levels of generativity reported using more prescription pain medications at all levels of pain interference compared with those with lower levels. This result could be interpreted based on previous literature, which suggested that highly generative participants are likely to have greater family support, and these supports may provide them psychological comfort, reassurance, and assistance that could relieve some of the concerns that individuals have about pain medication (e.g., addiction potential, side effects; Chang et al., 2011) and encourage them to be more adherent to their prescribed pain medications (DiMatteo, 2004).

It is important to note that the measurement of prescription pain medication use that this study utilized did not specifically indicate medication adherence or misuse; thus, we inter-

preted these findings cautiously and strictly based on the previous literature. It also is possible that using more prescription pain medication may be an indication of medication overuse rather than adherence. However, a body of research has demonstrated that pain medication overuse is far less common than is underuse or nonadherence among older adults with chronic pain (Chang et al., 2011; Molton et al., 2014). Thus, we speculated that the finding is more likely to indicate adherence than overuse. However, given the possibility of an alternative explanation, further investigations into the relation between perceived family support and pain medication use are recommended strongly.

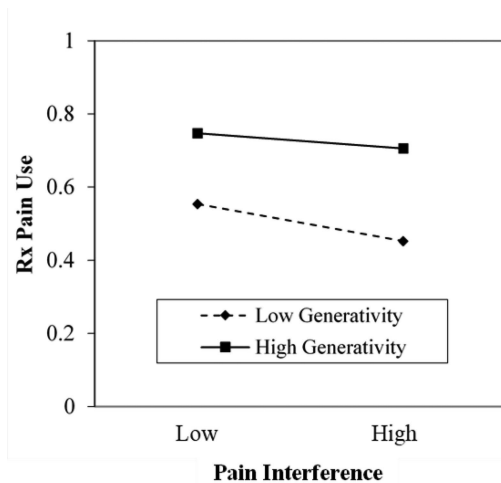
### Limitations and Future Research Directions

Overall, this is the first study to illustrate the significant associations between generativity, perceived family support, and pain medication use among midlife and older adults using a large and representative public data set using a complex moderated mediation analysis. However, the study has some limitations that must be acknowledged. First, the use of a secondary data set, such as MIDUS, limits our ability to choose



**Figure 3**

*Pain Interference's Indirect Effect on Prescription Pain Medication Use via Family Support at the Low and High Levels of Generativity While Controlling for Marital Status and Subjective Social Status*



measurements for the constructs of interest, such as prescription pain medication adherence or misuse, types of prescription pain medication, and pain diagnoses. Although these shortcomings limit our ability to interpret and explain the findings extensively, we believe that using the neutral scale still has its merit because it provides more objective information about clients' pain medication use and mitigates the potential social desirability biases to which other measurements of medication-using behaviors (e.g., medication adherence) are more susceptible (as cited in Frederickson et al., 2014). To address this limitation, future research could use valid and specific measurements to assess medication misuse or adherence as well as gather information regarding participants' types of pain diagnoses and pain medication. Moreover, we recommend future work to incorporate reports from participants' friends, families, and physicians to obtain more comprehensive information.

Second, because this study was cross-sectional, no causal conclusions could be drawn. Furthermore, given that the findings had small to moderate effect size, these findings should be interpreted cautiously with an aim to provide strong preliminary support for future

resource-intensive experimental, longitudinal, or intervention studies. Lastly, greater than 95% of participants identified as White. Thus, future studies should examine this model among ethnically and culturally diverse samples to gather more multiculturally relevant information. Moreover, even though subjective social status was not a statistically relevant factor in the current study, examining the role of socioeconomic status in the associations between pain, family support, generativity, and medication use among individuals from diverse background is still an important direction for future research.

### Implications for Practice

The findings of the current study reemphasizes the importance of family system and family functioning in health and pain behaviors (e.g., medication use) as well as the need to integrate multiple disciplines and approaches (e.g., psychological, social, behavioral) in the treatment of chronic pain. A body of research has shown that the integration of pharmacological and psychosocial interventions is the most effective form of treatment modality in terms of reducing pain as well as increasing psychological and social well-being (Deter, 2012; Bevers et al., 2016). Such holistic approaches could be in a form of assessment, in which clinicians may assess for clients' family functioning or their perceptions of family support to gather more comprehensive information and to detect potential risks of social isolation, loneliness, or treatment nonadherence. From this information, clinicians may refer clients to relevant resources (e.g., psychotherapy, behavioral medicine) to get appropriate help.

Regarding interventions to enhance family support, family-based interventions that are grounded in the Family Systems Theory, such as involving spouses and family members in the treatment, may also be relevant (Pratt & Sonney, 2020; White & Klein, 2008). Past research has shown that involving family members in treatments helps to enhance effective communication, foster family cohesion and support, and decrease both clients and their family members' distress and conflicts (e.g., Jamison & Virts, 1990; Keefe & Somers, 2010; Gatchel et al., 2003; Traeger et al., 2016). Additionally, the current study also suggested another possible

approach to enhance family support is through fostering generativity. Although generativity is often related to parenting, multiple studies have revealed that generativity can be promoted by engaging in prosocial behaviors within the family or the community (Gruenewald et al., 2016; Rothrauff & Cooney, 2008). Thus, practitioners could encourage patients to engage in prosocial activities with their families, friends, and communities (e.g., caregiving, teaching, mentoring, and volunteering). It is important to note that chronic pain may serve as a potential barrier for patients to engage in generative behaviors because pain could restrict individuals from engaging in multiple activities (Bevers et al., 2016). Thus, practitioners should explore these potential barriers and collaborate with clients to come up with activities that are suitable for their pain conditions. Previous intervention studies, specifically from Acceptance and Commitment Therapy among chronic pain clients, have shown that participating in activities that are accordant to the value of generativity may facilitate individuals' acceptance of adversity and adjustment to illness (Branstetter-Rost et al., 2009; Vowles et al., 2011). More importantly, it also instills hope and affirms that individuals with chronic pain are still able to live a meaningful life and create a lasting legacy.

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