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# Mindfulness Is Associated With Fewer PTSD Symptoms, Depressive Symptoms, Physical Symptoms, and Alcohol Problems in Urban Firefighters

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***Objective:*** This study investigated the association between mindfulness, other resilience resources, and several measures of health in 124 urban firefighters. ***Method:*** Participants completed health measures of posttraumatic stress disorder (PTSD) symptoms, depressive symptoms, physical symptoms, and alcohol problems and measures of resilience resources including mindfulness, optimism, personal mastery, and social support. The Mindful Awareness and Attention Scale (MAAS; Brown & Ryan, 2003) was used to assess mindfulness. Participants also completed measures of firefighter stress, number of calls, and years as a firefighter as control variables. Hierarchical multiple regressions were conducted with the health measures as the dependent variables with 3 levels of independent variables: (a) demographic characteristics, (b) firefighter variables, and (c) resilience resources. ***Results:*** The results showed that mindfulness was associated with fewer PTSD symptoms, depressive symptoms, physical symptoms, and alcohol problems when controlling for the other study variables. Personal mastery and social support were also related to fewer depressive symptoms, firefighter stress was related to more PTSD symptoms and alcohol problems, and years as a firefighter were related to fewer alcohol problems. ***Conclusions:*** Mindfulness may be important to consider and include in models of stress, coping, and resilience in firefighters. Future studies should examine the prospective relationship between mindfulness and health in firefighters and others in high-stress occupations.

*Keywords:* mindfulness, firefighter, trauma, stress

The emergent literature on the benefits of mindfulness highlights the need to understand mindfulness in the context of other resilience resources and in populations facing chronic and traumatic stressors. Such research is important if mindfulness is to be incorporated successfully into models of treatment and resilience programs. Mindfulness involves the ability to pay attention to and be aware of present moment experience (Brown & Ryan, 2003; Kabat-Zinn, 1990). It includes the ability to pay attention to and closely observe and describe sensations, perceptions, thoughts, and feelings and to act with full awareness of them and whatever else is occurring (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The effects of mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990) on physical and mental health (Grossman, Niemann, Schmidt, & Walach, 2004) have led to the inclusion of mindfulness training in a variety of resilience programs (e.g., Stanley, Schaldach, Kiyonaga, & Jha, 2011).

Mindfulness is thought to allow for greater cognitive flexibility, deeper experiencing of thoughts and emotions, and the improved regulation of emotion (Coffey & Hartman, 2008; Shapiro, Carlson, Astin, & Freedman, 2006). Mindfulness-based interventions may complement cognitive behavioral approaches, which focus on teaching people to regulate distressing thoughts and feelings that occur in response to stressful events (Beck, 1993). Studying mindfulness with other resilience resources emphasized in cognitive behavioral models may help to identify important interactions with these variables and better targets for intervention.

Mindfulness may be important in the context of traumatic events and the prevention of posttraumatic stress disorder (PTSD). The risk factors for PTSD include prior trauma and psychopathology, trauma severity, posttrauma social support, emotion dysregulation, dissociation, and additional stressors (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weis, 2008). Mindfulness may improve the regulation of emotions associated with traumatic and other stressful events (Follette, Palm, & Pearson, 2006; Kabat-Zinn, 1990). During a traumatic event, mindfulness may allow one

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to maintain a sharper focus on the emergency at hand and decrease the likelihood of dissociation (Lanius et al., 2010; Ozer et al., 2008). When recalling a traumatic event, mindfulness may increase one's ability to tolerate the associated emotional arousal by keeping a healthy distance and maintaining a healthy engagement with distressing emotions (Follette et al., 2006). This may decrease the need for avoidant coping such as using alcohol to reduce arousal (Ostafin & Marlatt, 2008).

Firefighters may be an important group in which to study mindfulness. Emergency responders have shown high dissociation and are at elevated risk for stress-related disorders such as PTSD (Corneil, Beaton, Murphy, Johnson, & Pike, 1999; Laposa & Alden, 2003). For instance, a 2-year prospective study of firefighters found that high hostility and low self-efficacy predicted PTSD scores at a 24-month follow-up (Heinrichs et al., 2005). Given that mindfulness has been related to less hostility (Borders, Earleywine, & Jajodia, 2010) and MBSR has been applied successfully to stress-related problems (Grossman et al., 2004), it may be an important resource for reducing vulnerability and enhancing resilience in firefighters and others in high-stress occupations.

Mindfulness may also be important for firefighters outside of the context of traumatic events and PTSD. The increased cognitive flexibility and improved emotion regulation and engagement may also increase resilience in the context of the chronic nontraumatic stressors that they may experience. Whereas chronic stress may increase vulnerability to several important health problems (e.g., depression, cardiac conditions, and substance abuse; Sapolsky, 2004), little is known about how mindfulness may affect firefighters during repeated, episodic stress. Examining mindfulness in the context of cognitive behavioral variables related to resilience may aid in determining how to best incorporate mindfulness in resilience interventions for people in high-stress occupations.

The purpose of this study was to better understand mindfulness and resilience in firefighters. To examine mindfulness in the context of cognitive behavioral constructs, we assessed mindfulness, personal mastery, optimism, and social support in urban firefighters. Personal mastery, optimism, and social support are resources with strong theoretical and empirical support for having beneficial effects for people facing a variety of challenges, including traumatic stress (Cohen, Mermelstein, Kamarck, & Hoberman, 1985; Pearlin & Schooler, 1978; Scheier, Carver, & Bridges, 1994). These variables also provide important contrasts to mindfulness, as mastery focuses more on control than acceptance, optimism focuses more on the future than the present, and social support focuses more on the interpersonal than the intrapersonal domain. Our hypotheses were that mindfulness would be related to fewer PTSD, depressive, and physical symptoms and fewer alcohol problems, controlling for other resilience and job-related variables.

## Method

### Participants

The sample consisted of 124 firefighters in the Albuquerque, New Mexico metropolitan area. All of the firefighters were paid (e.g., professional and not volunteer) and currently employed as firefighters. They were recruited through e-mail announcements sent to all Albuquerque firefighters and by flyers distributed at the fire stations.

### Procedure

Participants completed questionnaires and computer tasks and were paid $80. These questions and tasks included measures of resilience resources, health, demographics, and job-related characteristics (firefighter stress, years as a firefighter, and firefighter calls during the previous year).

### Measures

**Alcohol problems.** The Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) was used to assess hazardous and harmful patterns of alcohol consumption. It consists of 10 items (e.g., "How often during the last year have you found that you were not able to stop drinking once you started?") to which participants responded on either 3- or 5-point scales. Anchors varied with each item. The AUDIT has been found to be a reliable measure (mean and median reliability scores of .79 and .81, respectively) with sensitivity in detecting alcohol problems around .90 (Shields & Caruso, 2004).

**Depressive symptoms.** The revised version of the Beck Depression Inventory (BDI–II; Beck, Steer, & Brown, 1996) was used to assess depressive symptoms over the previous 2 weeks. Participants responded to the 21 items on a 0–3 scale with anchors that varied by item. The BDI–II has been found to correlate with clinician ratings of depression (range = .62–.66), and test–retest reliability for the BDI–II has been reported at .93 among outpatients (Beck et al., 1996).

**Firefighter stress.** A list of 33 duty-related incident stressors developed with urban firefighters and paramedics (Beaton, Murphy, Johnson, Pike, & Corneil, 1998) was used to assess firefighter stress. Participants indicated whether they had experienced events such as "fire incident with multiple deaths," "completed suicides," and "motor vehicle accidents involving multiple deaths." This measure has high face validity, although it remains to be further psychometrically validated.

**Mindfulness.** The Mindful Awareness Attention Scale (MAAS; Brown & Ryan, 2003) was used to assess awareness of and attention to present-moment experience. The MAAS assessed trait mindfulness and was not intended to assess the results of training in mindfulness. Participants responded to the 15 items (e.g., "I feel it is difficult to stay focused on what's happening in the present," reverse scored) on a 6-point scale from 1 = *almost never* to 6 = *almost always*. The MAAS shows good reliability, with alphas of .82 and .87 (Brown & Ryan, 2003).

**Optimism.** The Life Orientation Test—Revised (LOT–R; Scheier et al., 1994) was used to assess optimism. Participants responded to the six items (e.g., "I'm always optimistic about my future") on a 5-point scale from 1 = *strongly disagree* to 5 = *strongly agree*. The LOT–R has good internal consistency ($\alpha$ = .78) and test–retest reliability from .56–.79 (Scheier et al., 1994).

**Personal mastery.** The Pearlin Mastery Scale (Pearlin & Schooler, 1978) was used to assess personal mastery. Participants responded to the seven items (e.g., "I can do just about anything I set my mind to") on a 5-point scale from 1 = *strongly disagree* to 5 = *strongly agree*. Confirmatory factor analysis has confirmed the one-factor structure, with fit indices above .90. Cronbach's alpha averaged across four samples was reported at .76.

**Physical symptoms.** The Patient Health Questionnaire (PHQ-15; Kroenke, Spitzer, & Williams, 2002) was used to assess

somatic symptoms over the past 4 weeks. Participants responded to the 15 items (e.g., "headaches," "stomach pain") on a 3-point scale from 0 = *not bothered at all* to 2 = *bothered a lot*. The PHQ-15 has demonstrated excellent internal reliability (Cronbach's alpha of .80). Validity has been confirmed by a strong association between PHQ-15 scores and indices of functional status, disability days, and clinical visits (Kroenke et al., 2002).

**PTSD symptoms.** The Posttraumatic Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997) was used to assess PTSD symptoms over the past month. There are 17 items assessing reexperiencing, avoidance, and arousal to which participants respond on a 4-point scale from 0 = *not at all or only one time* to 3 = *5 or more times a week/almost always*. Firefighters responded to the items in reference to the experience on the job that had bothered or disturbed them the most in the past month. The scores on each item were added together to form a summary score for each participant. The PDS has high face validity with high internal consistency (coefficient alpha of .92). Test–retest reliability for diagnosis of PTSD is good ($\kappa = .74$), and test–retest reliability of symptom severity scores has yielded a significant correlation of .83. Eighty-two percent agreement between the PDS and the Structured Clinical Interview for *DSM* Disorders (SCID) using a kappa of .65 suggests convergent validity (Foa et al., 1997).

**Social support.** The Interpersonal Support Evaluation List (ISEL; Cohen et al., 1985) was used to assess social support. Participants responded to the 12 items (e.g., "When I need suggestions on how to deal with personal problems, I know someone I can turn to") on a 4-point scale from 1 = *definitely false* to 4 = *definitely true*. The ISEL has demonstrated reliability and validity among diverse samples (Cohen & Hoberman, 1983; Cohen et al., 1985). Test–retest reliability has been reported at .87, with subscale ranges between .71 and .87, and internal consistency has been reported as ranging from .77 to .86 (Cohen & Hoberman, 1983).

## Results

The descriptive statistics for the continuous study variables are displayed in Table 1. The means for PTSD symptoms, depressive symptoms, physical symptoms, and alcohol problems were all within the normal range. The sample was 93% male. All participants were high school graduates, 67% had completed some college, 31% had bachelor's degrees, and 15% had graduate degrees. Fifty percent were Hispanic, 37% were non-Hispanic White, 4% were African American, 3% were Asian American, 2% were Native American, and 4% were other or mixed ethnicity. Correlations are displayed in Table 2.

We used hierarchical multiple regression analyses to test the hypotheses with the variables in these steps: (a) demographics, (b) firefighter variables, and (c) resilience resources. The results are presented in Table 3. In each model, the demographic variables accounted for only 1% to 3% of the variance and the firefighter variables accounted for an additional 1% to 9% of the variance. The resilience resources accounted for an additional 15% to 34% of the variance in PTSD symptoms, depressive symptoms, and physical symptoms but only 5% of the variance in alcohol problems. Mindfulness was related to less PTSD symptoms, depressive symptoms, physical symptoms, and alcohol problems. Personal mastery and social support were related to less depressive symptoms.

Table 1
*Descriptive Statistics for the Study Variables*

| Variable | *M* | *SD* | Cronbach's α |
|---|---|---|---|
| Demographic characteristics | | | |
| Age | 33.70 | 8.13 | |
| Income (in U.S. $) | 65,916 | 20,025 | |
| Firefighter variables | | | |
| Firefighter calls[a] | 674.11 | 738.11 | |
| Firefighter stress | 18.69 | 5.75 | .89 |
| Firefighter years | 8.54 | 6.88 | |
| Resilience resources | | | |
| Optimism | 3.98 | 0.55 | .75 |
| Personal mastery | 4.28 | 0.53 | .70 |
| Social support | 3.49 | 0.44 | .81 |
| Mindfulness | 4.40 | 0.85 | .91 |
| Health-related outcomes | | | |
| PTSD symptoms | 4.39 | 6.50 | .92 |
| Depressive symptoms | 6.05 | 6.16 | .84 |
| Physical symptoms | 4.02 | 2.89 | .68 |
| Alcohol problems | 5.11 | 4.14 | .81 |

*Note.* PTSD = posttraumatic stress disorder.
[a] Number of firefighter calls during the previous year.

## Discussion

The purpose of this study was to examine the association of trait mindfulness and other resilience resources with measures of health in firefighters. The most striking finding was that the measure of mindfulness was negatively related to PTSD symptoms, depressive symptoms, physical symptoms, and alcohol problems when controlling for other resilience resources and the firefighter job-related variables. Personal mastery and social support were also related to less depressive symptoms.

There are several reasons why trait mindfulness may be an important resilience resource for firefighters and people in other high-stress occupations. Brown and Ryan (2003) contended that attention to and awareness of what is happening may enhance self-regulation. Mindfulness may allow greater cognitive flexibility and improve emotion regulation in the midst of a range of stressful experiences (Coffey & Hartman, 2008; Follette et al., 2006; Shapiro et al., 2006) and reduce the tendency to dissociate during traumatic events (Ozer et al., 2008). In addition, mindfulness may increase one's ability to tolerate the emotional arousal associated with recalling a traumatic event and facilitate the healthy engagement with and processing of distressing emotions (Follette et al., 2006). This may also reduce the likelihood of avoidant coping, such as using alcohol to cope, and the prolonged activation of the stress response (Ostafin & Marlatt, 2008).

The results of this study are also consistent with the notion that cognitive behavioral variables may be important for resilience in firefighters. Personal mastery and social support were both related to fewer depressive symptoms. Both were also correlated with fewer PTSD and physical symptoms when mindfulness and the other study variables were not controlled. This suggests that both mindful acceptance of the present moment and the sense that one can master and control external circumstances may be important

Table 2
*Correlations Among the Study Variables*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Age | — | | | | | | | | | | | | | |
| 2. Education | .13 | — | | | | | | | | | | | | |
| 3. Income | .43** | .18* | — | | | | | | | | | | | |
| 4. Firefighter years | .78** | .07 | .36** | — | | | | | | | | | | |
| 5. Firefighter calls | −.13 | .06 | .00 | −.13 | — | | | | | | | | | |
| 6. Firefighter stress | .17† | .16† | .25** | .29** | .19* | — | | | | | | | | |
| 7. Optimism | .01 | .04 | −.13 | .01 | −.06 | −.03 | — | | | | | | | |
| 8. Personal mastery | .01 | .13 | −.01 | −.06 | −.06 | −.03 | .52** | — | | | | | | |
| 9. Social support | −.15 | .02 | −.17† | −.11 | −.11 | −.15 | .38** | .44** | — | | | | | |
| 10. Mindfulness | .14 | .00 | −.11 | .06 | −.07 | −.08 | .27** | .38** | .54** | — | | | | |
| 11. PTSD symptoms | .00 | .00 | .06 | .04 | .13 | .31** | −.12 | −.23* | −.32** | −.40** | — | | | |
| 12. Depressive symptoms | −.04 | −.06 | .02 | .02 | −.02 | .15 | −.25** | −.41** | −.49** | −.50** | .46** | — | | |
| 13. Physical symptoms | −.08 | .04 | .02 | −.09 | .01 | .07 | −.14 | −.29** | −.30** | −.41** | .28** | .40** | — | |
| 14. Alcohol problems | −.09 | −.17† | −.10 | −.14 | .08 | .10 | −.09 | −.11 | −.03 | −.18* | .16† | .03 | .13 | — |

*Note.* PTSD = posttraumatic stress disorder.
† $p < .10$. * $p < .05$. ** $p < .01$.

for firefighters. The findings regarding social support suggest that the interpersonal context as well as the intrapersonal ability to be mindful of the present and have a sense of mastery and control is important.

The study had several limitations. First, the data were cross-sectional, and it is not possible to determine the causal nature of the relationships. Second, the findings may not generalize to clinical samples because PTSD and depressive symptoms were in the normal range. However, PTSD symptoms may have been underestimated because they were assessed only in relation to firefighter-specific traumas and not all lifetime traumas. Third, the retrospective recall task used to answer the PTSD questions may have reduced the accuracy of the symptoms reported. Finally, a selection bias was introduced because we recruited only those who responded to e-mail and flyers.

Overall, the results regarding mindfulness call for a closer study of the role of attention and awareness in coping with stress in relation to the other resilience resources assessed in cognitive behavioral models. Future research should examine the prospective relationship of mindfulness and other resilience resources with measures of health in firefighters and attempt to identify mediating factors. Conducting an intervention that may increase mindfulness

Table 3
*Hierarchical Multiple Regressions With PTSD Symptoms, Depressive Symptoms, Physical Symptoms, and Alcohol Problems as the Dependent Variables*

| Variable | PTSD symptoms | Depressive symptoms | Physical symptoms | Alcohol problems |
|---|---|---|---|---|
| Step 1: Demographic characteristics | | | | |
| Age | −.03 | −.06 | −.11 | −.05 |
| Education | −.01 | −.06 | .05 | −.15† |
| Income | .08 | .06 | .05 | −.05 |
| $R^2$ | .01 | .01 | .01 | .03 |
| $F$ | 0.19 | 0.30 | 0.48 | 1.45 |
| Step 2: Firefighter variables | | | | |
| Firefighter years | −.02 | .04 | −.11 | −.27* |
| Firefighter calls | .06 | −.06 | −.03 | .04 |
| Firefighter stress | .31** | .17† | .10 | .20* |
| Change in $R^2$ | .09 | .03 | .01 | .05 |
| $F$ | 2.24* | 0.75 | 0.43 | 1.86† |
| Step 3: Resilience resources | | | | |
| Optimism | .05 | .03 | .07 | −.06 |
| Personal mastery | −.08 | −.19* | −.19† | −.04 |
| Social support | −.09 | −.27** | −.09 | .16 |
| Mindfulness | −.32** | −.29** | −.31** | −.24* |
| Change in $R^2$ | .15 | .34 | .19 | .05 |
| $F$ | 3.86** | 6.78** | 3.09** | 1.73† |
| Total $R^2$ | .25 | .38 | .22 | .13 |

*Note.* Standardized regression coefficients are shown across the rows where individual variables are listed. PTSD = posttraumatic stress disorder.
† $p < .10$. * $p < .05$. ** $p < .01$.

could provide an instructive test of the effects of mindfulness on resilience and health in firefighters.

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