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ROLE OF RESILIENCE IN MINDFULNESS TRAINING FOR FIRST RESPONDERS

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Abstract

First responders are exposed to critical incidents and chronic stressors that contribute to a higher prevalence of negative health outcomes compared to other occupations. Psychological resilience, a learnable process of positive adaptation to stress, has been identified as a protective factor against the negative impact of burnout. Mindfulness-Based Resilience Training (MBRT) is a preventive intervention tailored for first responders to reduce negative health outcomes, such as burnout. This study is a secondary analysis of law enforcement and firefighters samples to examine the mechanistic role of psychological resilience on burnout. Results indicated that changes in resilience partially mediated the relationship between mindfulness and burnout, and that increased mindfulness was related to increased resilience ($b = .41$, $SE = .11$, $p < .01$), which in turn was related to decreased burnout ($b = -.25$, $SE = .12$, $p = .03$). The bootstrapped confidence interval of the indirect effect did not contain zero [95% CI; $-.27$, $-.01$], providing evidence for mediation. Limitations and implications are discussed.

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Author Contributions

JK: participated in data analysis, writing, and coordination of efforts. AB: assisted with writing and editing of manuscript. MC: designed and conducted study, and assisted with writing and editing. SB: participated in design, writing, and editing of study. MH: conducted data analysis and participated in writing.

This author declares they have no conflicts of interest

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Informed consent: Informed consent was obtained from all individual participants included in the study.

Introduction

First responders, such as law enforcement officers (LEOs) and firefighters (FFs), are routinely exposed to traumatic stressors (Stanley, Horn, & Joiner, 2016), including threats of violence, assaults, and fatalities (Regambal et al., 2015; Regehr, Hill, Goldberg, & Hughes, 2003; Regehr, Hill, Knott, & Sault, 2003). Among first responders these stressors are linked to poorer mental and physical health, including increased risk for burnout (Setti, Lourel, & Argentero, 2016), suicide, post-traumatic stress disorder (PTSD; Fullerton, Ursano, & Wang, 2004), and reduced longevity (Stanley, Horn, & Joiner, 2016). LEOs and FFs exhibit significant negative health and psychological consequences of these multiple stressors (Anshel, 2000; Jacobsson, Backteman-Erlanson, Brulin, & Hornsten, 2015).

Policing is among the most stressful first responder occupations (United States Bureau of Labor Statistics January, 2014) and LEO stressors have been linked to depression (Wang et al., 2010), PTSD (Hartley, Violanti, Sarkisian, Andrew, & Burchfiel, 2013; Marmar et al., 2006), and substance abuse (Rees & Smith, 2008). LEOs also endorse higher rates of harmful coping strategies such as emotional avoidance and alcohol use (Pastwa-Wokciechowska & Piotrowski, 2016), which are related to higher levels of burnout in the general population (e.g., Bittner, Khan, Babu, & Hamed, 2011; Fares, 2016). Consequences of occupational stress and poor coping can be fatal; an officer is more likely to die by suicide than in the line of duty (Miller, 2006).

LEO occupational stress has also been linked to burnout (Schaible & Six, 2016). LEOs experience higher rates of job dissatisfaction and burnout than many other occupations (De la Fuente Solana et al., 2013; Kop, Euwema, & Schaufeli, 1999), a phenomenon that has been attributed to the unique emotional demand of law enforcement work and cultural norms that limit genuine expression of personal emotional experience (Bakker & Heuven, 2006; Schaible & Six, 2016). LEO burnout has behavioral consequences as well, such as aggression (Rajaratnam et al., 2011; Sack, 2009), impaired ethical decision-making (Kligyte, 2013) disrupted problem-solving (Arslan, 2010), as well as administrative and tactical errors, absenteeism, and falling asleep while driving (Rajaratnam et al., 2011).

Despite high burnout rates among LEOs, little research has examined interventions that may mitigate these impacts (Schaible & Six, 2016). Although elements of cognitive-behavioral therapy (Gersons, Carlier, Lamberts, & Van der Kolk, 2000), relaxation, visualization, progressive muscle relaxation, stress inoculation (Arnetz, Nevedal, Lumley, Backman, & Lublin, 2009; Ranta, 2009; Shipley & Baranski, 2002) and cognitive decision-making training (Alpert & Rojek, 2011) have shown improvements in LEO stress outcomes, a recent meta-analysis (Patterson, Chung, & Swan, 2014) among LEOs found small effect sizes, and the authors concluded that “insufficient evidence exists to demonstrate the effectiveness of stress management interventions for reducing negative physiological, psychological or behavioral outcomes among police officers and recruits.” (p. 508).

Firefighting, another high-stress and -risk first responder occupation, similarly involves exposure to chronic stress, critical incidents, and risk of death or injury (Jacobsson, Backteman-Erlanson, Brulin, & Hörnsten, 2015; Kahn, Woods, & Rae, 2015; Kehl, Knuth,

Hulse, & Schmidt, 2014). In 2015, 86 firefighters (FFs) died while on duty (Administration USF, 2015), and 112 FFs committed suicide (Alliance FBH, n.d.). FFs, like LEOs, are at higher risk for harmful coping strategies, such as alcohol misuse (Bacharach, Bamberger, & Doveh, 2008; Kaufmann, Rutkow, Spira, & Mojtabai 2013; Piazza-Gardner et al., 2014) and experiential avoidance (Smith et al., 2011). FFs also experience a higher prevalence of depressive disorders, suicide (Alghamd, Hunt, & Thomas, 2013; Kaufmann et al., 2013), alcohol use disorders (Carey et al., 2011; Haddock et al., 2012; Haddock et al., 2015), trauma and stressor-related disorders (Berger et al., 2012), and sleep disorders (Barger et al., 2015) compared to the general population. Impaired FFs are also more prone to decision-making errors (Bayouth, Keren, Franke, & Godby, 2013; Sallis et al., 2013), and exhibit hazardous work decisions and behaviors (Ângelo & Chambel, 2015; Levy-Gigi & Richter-Levin, 2014;).

Burnout among FFs has been linked to increased suicidality, absenteeism, and turnover (Halbesleben, Osburn, & Mumford, 2006). Research examining effectiveness of stress and burnout reduction interventions among FFs is limited, and findings among the few studies are mixed (Halbesleben, Osburn, & Mumford, 2006). Some studies of Critical Incident Stress Debriefing (CISD; Mitchell & Everly, 1986), one of the most widely applied interventions for acute stress among FFs, have found improvement in post-traumatic growth (Sattler, Boyd, & Kirsch, 2014) and distress reduction (Hokanson & Wirth, 2000); however, several randomized controlled trials, systematic reviews, and meta-analyses have concluded that CISD is ineffective (Adler et al., 2008; Forneris et al., 2013; Harris, Balolu, & Stack, 2002; Jacobs & Horne-Moyer, 2004; Kearns, Ressler, Zatzick, & Rothbaum, 2012), and may exacerbate PTSD symptoms by re-exposing patients to traumatic material (Deville & Cotton, 2003; Kenardy, 2000; Regehr, 2001).

Psychological resilience, which has been described as a dynamic and learnable (Charney, 2004) process of positive adaptation to acute and chronic stress (Jenson & Fraser, 2006; Luthar, Cicchetti, Becker, 2000; Meredith, Sherbourne, & Galliot, 2011) may be a key component for prevention of burnout in high-stress populations. Resilience may be a key mechanism that limits the impact of stress, decreasing the incidence of burnout (Garcia & Calvo, 2012; Hao et al., 2015; Taku, 2014). Resilience mediates the relationship between dispositional mindfulness and burnout among nursing students (Rees, Breen, Cusack, & Hegney, 2015), and resilience-enhancing preventive interventions have been shown to improve the capacity for adapting to stress and adversity and improving health outcomes, including burnout, in high-stress populations (Lee et al., 2014; Leppin et al., 2014). Mindfulness training (MT) has also been shown to increase psychological resilience in high-stress populations, including military personnel (Johnson et al., 2014; Stanley, Schaldach, & Kiyonaga, 2011).

In a pilot trial, Mindfulness-Based Resilience Training (MBRT) increased mindfulness, resilience, mental and physical health, and reduced burnout among LEOs (see Christopher et al., 2016 for full study description). The current study combines unpublished MBRT data among FFs and a secondary analysis of the parent study data (LEOs). We hypothesized that LEOs and FFs would experience statistically significant improvement in mindfulness, resilience, and burnout, and that improvements in psychological resilience would mediate

the relationship between increased mindfulness and decreased burnout among the combined sample.

Method

Participants

Participants were recruited from police and fire departments in a suburban community of a major city in the Pacific Northwestern United States. The LEO sample ($n = 47$) was 57% male, with an average age of 43.53 years ($SD = 7.72$; range = 24-61). Approximately 81% identified as Euro American, 13% as Latino/a American, and 6% as Other. Average number of years on the force was 13.28 ($SD = 5.94$; range 2-25). The FF sample ($n = 22$) was 73% male with an average of 13.67 years on the force ($SD = 6.99$; range 2-27). Approximately 90% identified as Euro American; 4% as multi-racial; 4% as Asian American; and 2% as African American.

Procedure

Participants (LEOs and FFs) completed a battery of measures via paper and pencil immediately preceding the first MBRT class and immediately following the final class. Participants who were unable to attend these classes were asked to complete the battery in the lab at Pacific University. Written informed consent was provided prior to enrollment in the study. Inclusion of Human Subjects approval for the original studies was obtained through the Pacific University Institutional Review Board. MBRT courses were offered at Pacific University and a community-based wellness center all located in the same area.

MBRT is designed to enhance resilience in the face of acute and chronic stressors common to LEOs. Based on a Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990) framework, it is an 8-week course with experiential and didactic exercises, including body scan, sitting and walking meditations, mindful movement and other MBSR practices. Each class contains experiential, didactic, and discussion periods, and assigned homework. Content and language of experiential exercises have been altered to be more relevant to LEOs, and much of the curriculum is focused on learning strategies to manage stressors inherent to police work, including critical incidents, job dissatisfaction, and public scrutiny, as well as interpersonal, affective and behavioral challenges. Weekly classes last 2 hours, and the seventh week is an extended 6-hour class.

Measures

The Five Facet Mindfulness Questionnaire-Short Form (FFMQ-SF; Bohlmeijer et al., 2011), a 24-item version of the FFMQ (Baer et al., 2006), was used to assess the tendency to be mindful in daily life. In the current study, we included 3 of the 5 facets – Acting with Awareness, Nonjudging of experience, and Nonreactivity to inner experience – because the Observe and Describe facets have demonstrated weaker psychometric properties (de Bruin, Topper, Muskens, Bogels, & Kamphuis, 2012). Each of these facets had five items, resulting in a 15-item scale, and the internal consistency the present sample was good (pre-MBRT $\alpha = .82$; post-MBRT $\alpha = .88$).

The Brief Resilience Scale (BRS; Smith et al., 2008) is a 6-item measure designed to assess the ability to rebound or recover from stress. The BRS has demonstrated good internal consistency ($\alpha = .83$) and expected correlations with a variety of constructs, including perceived stress, depression, and active coping (Smith et al., 2008). In the present sample the BRS demonstrated good internal consistency (pre-MBRT $\alpha = .87$; post-MBRT $\alpha = .90$).

The Oldenburg Burnout Inventory (OLBI; Demerouti, Bakker, Vardakou, & Kantas, 2003) is a 16-item measure of burnout. The OLBI features two subscales which describe “exhaustion-vigor” and “cynicism-dedication” aspects of burnout (Demerouti, Mostert, & Bakker, 2010). The OLBI has demonstrated acceptable internal consistency across its two subscales (exhaustion: $\alpha = .87$; disengagement: $\alpha = .81$) and expected correlations with other constructs (Demerouti, Mostert, & Bakker, 2010; Reis, Xanthopoulou, & Tsaoasis, 2015). In the present sample, the OLBI (pre-MBRT $\alpha = .85$; post-MBRT $\alpha = .88$) demonstrated acceptable internal consistency.

Data Analyses

To measure change across the training, each variable at the end of the training was regressed on the same variable at baseline with saved the standardized residuals (e.g., regress responses on the FFMQ at post-MBRT on FFMQ responses at baseline). This created a residualized change score variable for each measure, which statistically accounts for regression towards the mean and has precedent in past MBSR research (Greeson et al. 2011).

To test the mediating effect of resilience in the relationship between mindfulness and burnout, nonparametric bias-corrected bootstrapping with 10,000 resamples was used to test the statistical significance of the indirect effect (Preacher & Hayes, 2008). Rather than a Sobel test, this method tests the degree to which the addition of a mediator to a regression model (i.e., the indirect effect) reduces the strength of the relationship between the predictor and outcome (i.e., the direct effect), where a 95% confidence interval that does not contain zero is thought to suggest the presence of a significant mediation. All analyses were conducted using participants who completed both the baseline and post measures ($N = 69$) We conducted an ad hoc power analysis for the mediation portion of the analysis, which revealed a required sample size of $N = 50$ for a power level of .80.

Results

Pre- and post-MBRT variable means for LEOs and FFs are shown in Table 1. Consistent with expectations, there was a significant main effect for time across all variables, which was not moderated by profession. This suggests that improvement in these variables was consistently significant across the two occupations, and that both groups benefit equally from MBRT. To test the mediation model, we used the PROCESS macro (Hayes, 2013) for SPSS (v. 22; IBM, 2013). Results indicated that pre- to post-training changes in mindfulness were indirectly related to pre- to post-training changes in burnout. Specifically, we found increased mindfulness was related to increased resilience ($b = .41$, $SE = .11$, $p < .01$), which in turn was related to decreased burnout ($b = -.25$, $SE = .12$, $p = .03$). The bootstrapped confidence interval of the indirect effect did not contain zero [95% CI;

-.27, -.01], providing evidence for mediation. There was, however, evidence that increased mindfulness was related to decreased burnout independent of its relationship with increased resilience ($c' = -.44, p < .01$), suggesting that improvements in resilience partially mediated the relationship between increased mindfulness and decreased burnout (see Figure 1.).

To further understand the relationship between dimensions of mindfulness and burnout, we conducted an additional exploratory mediation analysis with Nonreactivity, Nonjudging, and Acting with Awareness facets of the FFMQ as multiple independent variables to examine whether increased resilience mediated the relationship between increases in specific facets of mindfulness and decreased burnout. When simultaneously entering all three facets as independent variables, changes in Nonreactivity were related to increased resilience ($b = .44, SE = .12, p < .01$), which was subsequently related to decreases burnout ($b = -.29, SE = .11, P = .01$). The confidence interval did not contain zero [95% CI; $-.31, -.03$], providing evidence for mediation. There was, however, evidence that increased Nonreactivity was related to decreased burnout independent of its relationship with increased resilience ($c' = -.44, p < .01$). As the confidence intervals contained zero, there was no evidence for mediation for either Nonjudging [95% CI; $-.16, .04$] or Acting with Awareness [95% CI; $-.14, .06$].

Discussion

The purpose of the present study was to explore whether increased psychological resilience mediated the relationship between increased mindfulness and decreased burnout among first responders who completed an 8-week MBRT training. Our results indicated that increased mindfulness was significantly indirectly related to increased resilience, and reduced burnout. These results suggested the presence of a partial mediation, wherein self-reported mindfulness predicted resilience, which then predicted decreased self-reported burnout. These findings lend support to psychological resilience as a mechanism of change in mindfulness training with first responders. These results are also consistent with Jha et al.'s (2014) conceptual model, in which increased mindfulness leads to enhanced resilience, which in turn leads to decreased burnout in high-stress occupations.

The present study contributes to a growing body of literature suggesting that enhanced psychological resilience may function to mitigate the negative impact of occupational stressors among first responders (Arnetz et al., 2009; Gager & Elias, 1997). Several recent studies have shown similar evidence for resilience as a key mechanism of change between stress and burnout (Hao et al., 2015), and between risk factors and burnout in nurses (Garcia & Calvo, 2012) and doctors (Taku, 2014). Results from the present study are also consistent with research examining the mediating role of resilience between mindfulness and mental health (Nitzan-Assayag, Aderka, & Bernstein, 2015) and well-being (Gross et al., 2011).

In addition to evaluating our primary hypothesis regarding resilience as a mediator of the relationship between mindfulness and burnout, we examined resilience as a mediator of the relationship between three individual facets of mindfulness and burnout. Changes in Nonreactivity, but not Nonjudging or Acting with Awareness, were shown to be significantly and indirectly related to changes in burnout and resilience. In support of these findings,

Nonreactivity was identified as one of five most important components of mindfulness by Baer (2006) and may be seen as an operationalization of acceptance, which is a crucial mechanism for not engaging in impulsive reactions to experiences (Baer, 2006). Evaluations of MBIs have found that improvements in Nonreactivity predict reductions in depression symptoms in veterans (Colgan, Christopher, Michael, & Wahbeh, 2016), and increases in predicted stress and anger outcomes in LEOs (Bergman, Christopher, & Bowen, 2016).

These results also suggest there may be additional mechanisms underlying the relationship between mindfulness and burnout among first responders. However, Nonreactivity may be a precursor to changes in both resilience and burnout, which is consistent with existing literature suggesting Nonreactivity is an important factor in mitigating negative health outcomes amongst first responders and other high-risk populations (Kaplan, Christopher, & Bowen, under review; Kalill, Treanor, & Roemer, 2014). Conceptually, increasing a nonreactive relationship with the stressors inherent in first responders' daily lives may be a significant first step in reducing the extent to which these stressors contribute to burnout, even above and beyond the benefits of awareness or nonjudgment. A recent study of LEOs found that Nonreactivity moderated the relationship between occupational stressors and perceived stress (Kaplan, Christopher, & Bowen, 2016, under review). Our findings add to a nascent body of literature that points to Nonreactivity and resilience as significant targets for preventive interventions for first responders.

The present study has several limitations that should be noted. The sample size is small, impacting the power and the generalizability, and due to the absence of a control group, statements of causality cannot be made. The present sample was recruited from a fairly homogeneous, small area in the Pacific Northwest which further limits the generalizability of our findings beyond this specific geographic area and culture. Finally, all measures were completed via self-report. The inherent limitations of self-report measures, such as response bias, practice effects, and regression toward the mean, are compounded by difficulties measuring the construct of mindfulness. The FFMQ, for example, has demonstrated inconsistent psychometric properties among meditators and non-meditators (de Bruin et al., 2012) and has been critiqued for lack of cultural validity and missing construct content by subject-matter experts (Christopher, Woodrich, & Tiernan, 2014). Future research should consider more objective, physiological measures of assessment. Additionally, the Describing and Observing facets of the FFMQ have been shown to positively correlate with pathology such as alexithymia, thought suppression, rumination, worry, and dissociation (de Bruin et al., 2012). We are also aware of the conceptual overlap between the FFMQ and the BRS. For this reason, we explored post hoc correlations between these measures. Despite these limitations, results from the present study have implications for the development of preventative interventions for high-risk populations, and support future randomized controlled trials of MBRT.

The current study adds to the emerging research examining resilience as a mechanism of change in mindfulness training among first responders. While further research is needed to substantiate these findings, the present study lends support to the development and optimization of preventive interventions for first responders, and for examining proposed mechanisms of change in mindfulness-based interventions.

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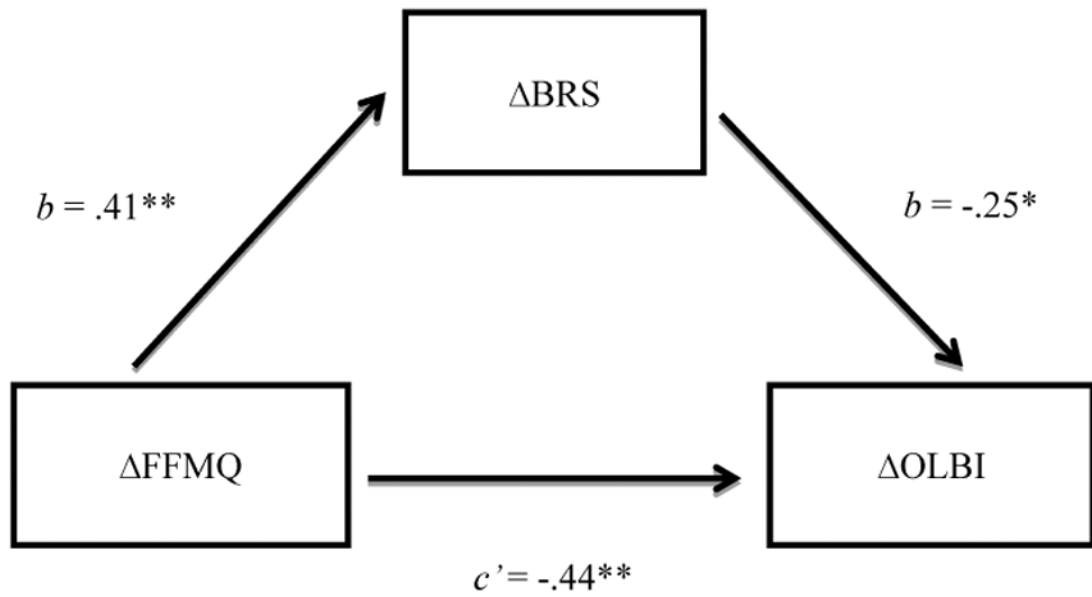


Figure 1. Increased Resilience Partially Mediates the Relationship Between Mindfulness and Burnout among First Responders. $*=p < .05$, $**=p < .01$. FFMQ = Change in Five Facet Mindfulness Questionnaire, BRS = Change in Brief Resilience Scale, OLBI = Change in Oldenburg Burnout Inventory.

Table 1

Pre- and Post- Means, Standard Deviations, F-values, and p-values for Mindfulness Facets, Resilience, and Burnout by Profession

	Pre-MBRT LEO <i>M</i> (SD) <i>n</i> = 47 FF <i>M</i> (SD) <i>n</i> = 22	Post-MBRT LEO <i>M</i> (SD) <i>n</i> = 47 FF <i>M</i> (SD) <i>n</i> = 22	Main Effect for Time <i>F</i>-value, <i>p</i>- value	Time x Group Interaction <i>F</i>- value, <i>p</i>-value
NR	14.87 (2.70) 15.22 (3.36)	17.70 (3.24) 18.43 (2.23)	58.61, <.001	.14, .71
NJ	16.96 (3.50) 16.04 (3.20)	19.75 (3.39) 17.30 (4.00)	24.70, <.001	2.23, .14
AWA	14.43 (3.58) 14.48 (3.66)	17.55 (3.51) 16.95 (3.73)	27.61, <.001	.56, .45
BRS	21.40 (4.17) 20.95 (2.78)	24.23 (4.31) 24.86 (3.07)	49.56, <.001	1.12, .29
OLBI	39.18 (6.98) 37.43 (6.85)	34.36 (7.38) 31.90 (7.50)	29.57, <.001	.10, .75

Note. LEO = Law enforcement officer, FF = Firefighter, MBRT = Mindfulness-Based Resilience Training, NR = Nonreactivity Facet of Five Facet Mindfulness Questionnaire, NJ = Nonjudging Facet of Five Facet Mindfulness Questionnaire, AWA = Act with Awareness Facet of Five Facet Mindfulness Questionnaire, BRS = Brief Resiliency Scale, OLBI = Oldenburg Burnout Inventory.