The relationship of mindfulness and self-compassion to desired wildland fire leadership

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The relationship of mindfulness and self-compassion to desired wildland fire leadership

Alexis L. Waldron and Vicki Ebbeck

Abstract. A quantitative approach was adopted to explore facets of mindfulness and self-compassion in relation to their ability to predict crewmembers’ perceptions of their supervisors’ leadership capabilities. The sample comprised 43 wildland fire crews consisting of their primary supervisors (n = 43) and crewmembers (n = 246). A partial least-squares path modelling approach was employed to test hypotheses regarding the relationships among mindfulness, self-compassion and leadership. Findings revealed that supervisor scores on mindfulness were significant predictors of crewmember-rated scores of supervisor leadership. Although not as strong, aspects of self-compassion were also significant predictors of perceived supervisor leadership. Unlike mindfulness, the aspects of self-compassion that predicted supervisor leadership were more varied between desirable self-compassion scores and undesirable self-compassion scores. Overall, the results indicate that mindfulness and self-compassion were predictors of desired wildland fire leadership by crewmembers; these results suggest potential functions that mindfulness and self-compassion could serve in the development of leaders in wildland firefighting.

Additional keywords: Crewmember Perceived Leadership Scale, decision-making.

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concept is consistent with the notion of ability described previously, in that one must have a coherent understanding of the environment to have a clear ‘vision’ of what is needed in a situation. Next, personally genuine refers to leaders who are humble, and open to suggestions, care about their crewmembers and their growth, and seem to hold an unassumingly confident. In the context of the leadership theories, this quality aligns with behavioural components concerned with care for a follower’s wellbeing and openness to input, in that to be open and listen, one must be comfortable with oneself and must sincerely care about what followers have to say. The last leadership quality, integrity, involves understanding one’s own capabilities while being consistent in reliably relaying information to the crew; leaders are then found trustworthy by consistently following through with actions that align with their stated objectives. This construct closely resembles relational transparency and self-awareness in the three leadership theories in that crewmembers know they are going to receive information from these leaders that they can count on being helpful and accurate. Further, a leader has an understanding of his or her limitations and adheres to his or her capabilities when discussing tactics with the crew. The three components offered above have several similarities to the three current maxims guiding wildland fire leadership in the USA – duty, respect and integrity – and suggest that there are some similarities to these maxims, but also suggest that there is more involved in wildland fire leadership that has not been fully captured by these maxims. As such, a primary goal with the current research is to understand the dynamics among the three wildland fire leadership qualities of the CPLS as an aside from their relationship with mindfulness and self-compassion.

Some studies have examined the antecedents of different types of leadership characteristics, including workplace and personal culture, context, situational triggers and level of maturity (Gardner et al. 2005; van Dierendonck 2011; Northouse 2013). And although all three of the previously described theories have been linked to positive work-related outcomes, such as employee engagement and citizenship behaviour (Walumbwa et al. 2010), positive job attitudes (van Dierendonck 2011) and organisational innovation (Jung et al. 2003), the methods and prescriptions for achieving these types of outcomes through leadership are lacking in the literature. As such, our aim was to explore and understand processes that could explain and potentially develop important leadership qualities such as heightened awareness of self, others, and critical aspects of the job. Two processes were identified through an extensive literature review that addressed awareness of the self, others and the environment, and effective ways of interacting with oneself – mindfulness and self-compassion.

Mindfulness

Mindfulness can be defined as paying attention, on purpose, to unfolding life events (Kabat-Zinn 1994; Kabat-Zinn 2003). There are, however, many different ways to conceptualise mindfulness, although there are also important similarities. In all definitions, the central component of ‘awareness’ is noted. The differences merely denote where the awareness is directed and for what purpose. The awareness itself is consistently conveyed as being a purposeful action that occurs at a deep level within the individual. Baer et al. (2006) further indicated five key elements that they found across five different, popular mindfulness assessments: (i) being non-judgmental of inner experiences, (ii) being non-reactive to inner experiences, (iii) describing or labelling thoughts and feelings effectively with words, (iv) acting with awareness, and (v) observing as well as attending to thoughts, feelings and sensations.

Glomb et al. (2011) linked mindfulness to many positive work-related outcomes, such as self-regulation, self-determination, persistence, social relationships, task performance, resiliency and positive leadership qualities. More recent studies have found that mindfulness was related to reduced symptoms of burnout (Leroy et al. 2012) and emotional exhaustion (Hülsheger et al. 2013), as well as increased job satisfaction and overall job performance (Reb et al. 2012; Hülsheger et al. 2013). Additionally, Leroy et al. (2012) found mindfulness to be an antecedent to authentic functioning that is an aspect of authentic leadership (Luthans and Avolio 2003) and work engagement. Although the initial work examining mindfulness in work environments is promising, it is clearly still in its infancy (Glomb et al. 2011) and in need of further exploration, which was a need addressed with the current investigation.

Self-compassion

The other central component of this research, self-compassion, fits well as a partner with mindfulness to enhance a more complete process of developing effective fire leadership. Self-compassion offers ways of explaining and navigating troublesome circumstances regarding emotions in a positive manner. In addition, Neff (2011) noted that self-compassion is related to accepting the self emotionally – which promotes an openness to be honest about what one perceives about the self. This in turn, is related to aspects of leadership in terms of relational transparency and integrity, in that one must be open and honest with the inner self to accurately portray oneself to others.

Self-compassion consists of three components and their opposing elements. The first, kindness, refers to the amount of understanding and care that a person gives to oneself in difficult times as opposed to the amount of self-judgment. Second, common humanity refers to the degree to which an individual sees current experiences as being part of a larger human experience, rather than as an isolated incident. Third, and taking a narrower, specific view of mindfulness than what has been previously described, compassion pertains to maintaining a balanced perspective of one’s current experience instead of over-identifying with thoughts and emotions (Neff 2003a, 2003b). Those high in self-compassion have been found to be more resilient and stable through difficulties (Neff and Vonk 2009; Siebert 2010), maintain strong relationships with others (Neff 2006), be more motivated to self-improve (Breines and Chen 2012), and be more capable of addressing problems and other issues because they are not concerned with hiding painful truths from themselves (Peck 1993; Neff 2003a, 2003b). In sum, Germer (2009) described mindfulness as being concerned with thoughts, and self-compassion with feelings and emotion. Programs related to developing wellbeing, dealing effectively with life stressors, and becoming more self-compassionate are currently being developed that utilise both mindfulness and self-compassion in the areas of helping professions and therapy (Neff and Germer 2012; Newsome et al. 2012).
The wildland fire environment is wrought with difficult circumstances, intense situations, multiple stakeholder views and limited resources such that wildland fire personnel can be overwhelmed with difficulties when leading others. Therefore, individuals who are able to be resilient and maintain a more realistic view of the world by being honest through these hardships are likely to be more successful. This research project provided one of the first examinations of the notion of self-compassion in the context of wildland fire.

The purposes of this study were to test the hypotheses (seen in Fig. 1) that (i) there is a positive relationship between more mindful supervisors and crewmember perceptions of their supervisors’ leadership qualities, whereby self-rated scores recorded on mindfulness by supervisors would explain variance in the ratings of supervisors by their crewmembers on leadership, and (ii) there is a positive relationship between more self-compassionate supervisors and crewmember perceptions of their supervisors’ leadership qualities, whereby self-rated scores on self-compassion recorded by supervisors would explain variance in the ratings of supervisors by their crewmembers on leadership. Although multiple components of mindfulness (five components), self-compassion (six components) and leadership (three components) were modelled in testing the stated hypotheses in this study, there was no basis in the initial examination of how mindfulness components would interact with leadership components and how self-compassionate components would interact with leadership components. The researchers felt it was a significant contribution to the existing literature, however, to not only study these relationships in a unique and relevant context, but to also allow a more detailed understanding of exactly which components of mindfulness and which components of self-compassion played a more significant role as the findings could inform future work.

Methods
Participants and procedures
A total of 842 wildland firefighters (level 1) nested within 102 wildland firefighting crews, with 102 primary crew supervisors (level 2) were sent questionnaire packets during the summer and fall (autumn) of 2012. Completed questionnaires were returned by November 2012. Not all supervisors filled out questionnaires for their crews, nor did all crews fill out questionnaires for their supervisors; as such, our final return was 43 intact crews that included both a crew supervisor questionnaire (n = 43) and 75% of the adjoining crewmember questionnaires (n = 246) for each crew. We calculated the response rate (42%) based on crews, as that was our main unit of analysis. Also, regarding crew types, there are at least four general agency classes of crew types from which we aimed to gain participation: type 1 (hotshot crews and wildland fire modules), type 2 (e.g. basic handcrews, fuels crews), engine, and aviation (helitack crews; smokejumpers were not included owing to their unique structure of not having consistent interaction with a single supervisor through fire operations). Type 1 and type 2 crews are distinguished by the qualifications of individuals on the crew, where type 1 crews generally hold higher qualifications. Helitack crews operate from an aviation platform to perform various functions and are thus included in a single category, and engine crews are considered their own type because of their unique skill with a particular type of machinery.

The adopted protocol was approved by the author-affiliated Institutional Review Board for the Protection of Human Subjects involved in research projects. Participants were recruited through convenience sampling via two methods during the month of August 2012. The first method consisted of an email explaining the purpose of the study, time required, contact information for the researchers, and information about an incentive if they participated. The email was first sent to national and regional government agency fire personnel in the US who then forwarded it to various fire supervisors and managers. If supervisors of crews (crews in this context consist of modules, engines, handcrews and other units who consist of two or more individuals working together for fire-related activities) were interested, they contacted the researcher via email or phone and provided their mailing address, number of individuals on the crew besides themselves, and crew type. The second method of recruitment consisted of the lead author visiting three large fire camps in the north-west United States during the month of August of 2012. She presented the study and information at the morning briefings of the fires to a wide array of fire personnel. Interested fire supervisors provided the researcher with the same information that was required of supervisors using the first method. Although there was a potential bias that only supervisors who were more proactive, self-aware and confident about their leadership would contact the researcher, gaining a representative sample of ‘good’ and ‘bad’ leadership was not the primary purpose of the study. The intent of the study was to explore if, and the extent to which, relationships exist (positive or negative) between the concepts identified.

When the researchers had all of the necessary information, a packet was put together for each crew, which consisted of enough crew surveys for each crewmember as well as a self-return envelope for each crewmember. A supervisor survey was sent in the same packet and also included a self-return envelope. With each questionnaire, a letter of explanation was included that described the purpose of the survey to the participants, along with a description of an incentive that if at least 75% of a crew participated, which had to include the leader, a $25 donation would be made on behalf of the crews to the Wildland Firefighter Foundation, a non-profit organisation that aids fallen and injured firefighters and their families. Participants were also
informed of their rights as research participants and were encouraged to return the survey in the self-addressed envelope as soon as possible. Each survey included a number and the researchers kept track of which supervisor survey belonged to which numbered set of crewmember surveys. If surveys were not received within 3 weeks, the researcher sent out a reminder email to crew supervisors. The surveys required ≈10 min for crewmembers and 30 min for crew supervisors to complete. The middle-to-end of the fire season was chosen because although it was busy, at this point the crewmembers had had a chance to get to know the supervisors and were more able to accurately rate these individuals. Owing to the busy fire season, we expected that not all crews who signed up would be able to complete the surveys.

**Instruments**

The Crewmember Perceived Leadership Scale (CPLS) (A. L. Waldron and D. P. Schary, unpubl. data) includes 24 items and provides scores for three leadership subscales (personally genuine, integrity, competent decision-making) that align with common components represented in leadership theories described earlier (Bass 1985; Luthans and Avolio 2003; van Dierendonck 2011). The subscales record how often crewmembers perceive their supervisor enacting fire-related qualities on a 5-point scale (1 = never, to 5 = always). Scores were calculated for each subscale by averaging the total number of items within each subscale, where higher scores indicated higher levels of effective leadership as perceived by the crew. When tested with two wildland fire populations (n = 244 and 281) (A. L. Waldron and D. P. Schary, unpubl. data) composed of managers, supervisors, and firefighter participants, the scale was shown to have good internal consistencies (ranging from α = 0.86 to 0.94) and was correlated in predicted directions with work engagement and job satisfaction. Internal consistencies for the present investigation were 0.94 for personally genuine, 0.86 for integrity, and 0.92 for competent decision-making.

The Five-Factor Mindfulness Questionnaire (FFMQ, Baer et al. 2006) is a comprehensive trait questionnaire that assesses a person’s general tendency to be mindful in everyday occurrences, and was used for assessing each supervisor’s degree of mindfulness. The scale consists of 39 items assessing five distinct elements of mindfulness including: (i) non-judgment of inner experiences, (ii) non-reactivity to inner experiences, (iii) describing or labelling thoughts and feelings effectively with words, (iv) acting with awareness, and (v) observing and attending to thoughts, feelings and sensations. Items are measured on a 5-point scale (1 = never or rarely true, to 5 = very often or always true); participants answer each question according to what is, in their opinion, true for them. Psychometric properties of the FFMQ have been established by Baer et al. (2006), who have reported adequate to good internal consistencies for a 5-point scale (α ranging from 0.67 to 0.81), construct validity and significant correlations in predicted directions with other relevant constructs (Baer et al. 2006, 2008). A score was calculated for each of the five subscales, by first reverse-coding all negatively worded items, and then by averaging the items within each subscale. Higher scores indicate higher levels of mindfulness. Internal consistencies for the current study ranged from α = 0.74 to 0.87.

The Self-Compassion Scale (SCS; Neff 2003b) was used for measuring supervisors’ levels of self-compassion. The SCS is a 26-item scale measuring: (i) degrees of kindness, (ii) common humanity, and (iii) the aspect of mindfulness that pertains to maintaining a balanced perspective among participants, as well as their opposing elements of (iv) self-judgment, (v) isolation, and (vi) over-identification. Items were measured on a 5-point scale (1 = almost never, to 5 = almost always) following the heading ‘How I typically act towards myself in difficult times’. The SCS has been found to have good test–retest reliability, and has also demonstrated acceptable concurrent, convergent and discriminate validity (Neff 2003b). Scores were calculated for each subscale by averaging the total of items within each subscale, where higher scores on kindness, common humanity and mindfulness indicated higher levels of self-compassion and higher scores on self-judgment, isolation and over-identification indicated lower levels of self-compassion. Internal consistencies for the current study ranged from α = 0.72 to 0.86.

General background questions for both crewmembers and supervisors included age, years of experience, sex and type of crew.

**Analyses**

Initial analyses included running descriptive statistics and testing the internal consistencies (Chronbach’s α) of each of the subscales. If participants were missing no more than two data points (4% of crewmembers; 7% of supervisors), their answers were included in the analyses and a mean substitution of an individual’s subscale was used in place of missing data points (Acock 2005).

Owing to multiple latent variables being assessed in this study, structural equation modelling (SEM) was first considered as a potential method for testing the two hypotheses. However, key assumptions of SEM were not met including a large sample size, a valid and reliable model that is to be used in a confirmatory nature to test the goodness-of-fit of indicator variables, and a normal distribution of those indicator variables (Kline 2010). Owing to the exploratory nature of our model, small sample size and non-normal distribution, partial least-squares (PLS) path modelling was used for this study to test the two hypotheses.

PLS path modelling has become more popular in the last decade, in business research (Temme et al. 2006; Henseler et al. 2009; Wetzels et al. 2009; Anderson and Swaminathan 2011), in management and leadership studies (Mayfield and Mayfield 2012), and to construct models of educational systems (Balzano and Trinchera 2010). PLS path modelling is similar to SEM, because it constructs latent variables from indicator variables using factor analysis. Each latent variable is assumed to consist of one factor. Unlike SEM, however, PLS path modelling is generally viewed as an exploratory rather than a confirmatory method, implying that PLS is often used, as in this study, to develop a new model and focus on explaining variance (Chin 2010) rather than to confirm the goodness-of-fit of data to an existing model. PLS path analysis is also very robust, meaning that it has minimal assumptions about the distributional or measurement characteristics, validity or reliability of the data. With that said, a main assumption of PLS path modelling is that the latent variables are reliably measured, consisting of three or more intercorrelated indicators to define a latent variable.
Regarding sample size, Hair et al. (2010, p. 776) have stated "PLS is sensitive to sample size considerations. PLS path modeling is particularly useful in generating estimates even with very small sample sizes (as low as 30 observations or less)." PLS path modelling assumes that all the variance in the data can be explained; consequently, there is no concern for residual or unexplained variance. Last, PLS path analysis is not sensitive to the inflation of the variance caused by multicollinearity (i.e. intercorrelation between the predictor variables) that often compromises multiple regression.

Smart-PLS version 2.0 software (Ringle et al. 2005; Temme et al. 2006) was used to conduct the PLS path analysis in this study. Smart-PLS is based on a graphic user interface to construct the path diagram. The latent variables were computed by Smart-PLS using factor analysis, and each latent variable was assumed to consist of one factor. The Smart-PLS algorithm was executed simply without intervention by the researcher to compute: (i) the factor loadings between the indicators and the latent variables; (ii) the path coefficients; and (iii) the $R^2$ values. The statistical significance of the factors loadings, path coefficients and $R^2$ values were estimated by bootstrapping that drew 100 random samples with 30 cases in each sample. The mean and the standard error of each factor loading was also computed.

A series of one-sample $t$-tests was automatically conducted by Smart-PLS to test the hypothesis that each mean value was significantly different from zero at the $z = 0.05$ level of significance.

**Results**

Chin (2010) has stated that when reporting the statistical results for PLS path modelling, graphical representations are provided to explain the results, while reporting on the validity and reliability of the items measured. The current study consisted of 113 items within 17 latent variables that were each measured more than once to address each of our hypotheses; as such, for the sake of clarity of the model, only latent variable constructs will be represented in each path model. Provided is a reporting of the factor loadings for each construct that speaks to convergent validity using average variance explained (AVE), which "measures the amount of variance that a latent variable captures from its indicators relative to measurement error" (Chin 2010, p. 670), and internal consistency reliability assessed using Chronbach’s $z$ value of each factor.

The current study had representation from all crew types including three hotshot crews, two fire modules, six type II handcrews, one fuels crew, twenty-five engine crews, and six helitack crews. Of the firefighters who filled out the survey, most were white (84.1%) males (88.1%), with fire supervisors who were also predominantly white (87.5%) males (93.9%). Although no formal data are available for the exact make-up of the wildland firefighter population, Jahn (2012) reported similar demographics in her study with wildland fire personnel.

In Table 1, we present the interconstruct correlations between all constructs being tested as well as the means and standard deviations. The non-normal distribution of scores is apparent for dimensions of crewmember perceived leadership when looking at the constructs of Crew Competence, Personally Genuine, and Integrity.
The results of the PLS path analysis to test the first hypothesis, using the indicators for the five dimensions of the FFMQ that measure mindfulness and the three dimensions of the CPLS that measure crewmember perceived leadership of supervisors, are presented in Fig. 2, with model quality indices available in Table 2. The latent variable of Crewmember Perceived Leadership was represented by the three dimensions of Competent, Personally Genuine, and Integrity. The factor loadings were well above 0.250, with the majority >0.500, indicating that the three dimensions were valid and reliably measured. Personally Genuine and Integrity were related to Competence, which was indicated by the strong path coefficients between Competence and Personally Genuine (Rp = 0.848, $P < 0.001$, where Rp denotes PLS path coefficients), and between Competence and Integrity (Rp = 0.880, $P < 0.001$). The $R^2$ values indicated that 71.9% of the variance in Personally Genuine and 77.5% of the variance in Integrity was explained by Competence; both are substantial amounts of variance explained. The most accurate relationship found among these three concepts was as follows: Competence was assumed to be a hypothetical common cause and Personally Genuine and Integrity were assumed to be the perceived reflections of Competence.

The five dimensions of the FFMQ were linked to Competence in order to determine if fire supervisors who are more mindful were rated more highly on leadership by their crewmembers. All of the factor loadings for the FFMQ indicators were $>0.250$, and most were $>0.500$, reflecting the validity and reliability of the dimensions. The path coefficients for Non-Reactive (Rp = $-0.147$, $P > 0.05$) and Non-Judgmental (Rp = 0.021, $P > 0.05$) were not statistically significant. This implies that these dimensions were not related to crewmembers’ perceptions of supervisor leadership effectiveness. The path coefficients for Act with Awareness (Rp = 0.374, $P < 0.001$), Describe with Words (Rp = 0.423, $P < 0.001$) and Observe (Rp = 0.374, $P < 0.001$) were positive and statistically significant. These statistics implied that the crewmembers’ perceptions of a highly competent fire supervisor (linked to high levels

![Fig. 2. Partial least-squares (PLS) path model of the relationships between the dimensions of the Five Factor Mindfulness Questionnaire (FFMQ) and the Crewmember Perceived Leadership Scale (CPLS). *Path coefficients are significant at the 0.05 level. **Path coefficients are significant at the 0.01 level. ***Path coefficients are significant at the 0.001 level. Note: all coefficients are standardised. Latent variables only are included to clarify the model.](image)

### Table 2. Model I quality criteria

<table>
<thead>
<tr>
<th>Construct</th>
<th>Average variance explained (%)</th>
<th>Cronbach’s alpha α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence</td>
<td>49.2</td>
<td>0.84</td>
</tr>
<tr>
<td>Personally genuine</td>
<td>57.2</td>
<td>0.92</td>
</tr>
<tr>
<td>Integrity</td>
<td>64.9</td>
<td>0.86</td>
</tr>
<tr>
<td>Non-judgmental</td>
<td>58.0</td>
<td>0.85</td>
</tr>
<tr>
<td>Non-reactive</td>
<td>62.0</td>
<td>0.88</td>
</tr>
<tr>
<td>Act with awareness</td>
<td>50.7</td>
<td>0.85</td>
</tr>
<tr>
<td>Describe with words</td>
<td>35.3</td>
<td>0.73</td>
</tr>
<tr>
<td>Observe</td>
<td>37.7</td>
<td>0.85</td>
</tr>
</tbody>
</table>
of trust and care) were reflected by (i) high scores for how often a supervisor deliberately chooses actions without going on autopilot, (ii) high scores for how often a supervisor is able to describe what is happening with words or in writing, and (iii) high scores for how often supervisors internally observe their thoughts, feelings and sensations.

The $R^2$ value indicated that the five dimensions of Mindfulness collectively explained 34.5% of the variance in Competence. This was a moderately substantial amount of explained variance, providing statistical evidence to support the hypothesis that fire supervisors who are more mindful will be rated more highly on leadership through competence by their crewmembers.

The results of the PLS path analysis to test the second hypothesis, incorporating the indicators for the six dimensions of the SCS that measure self-compassion and the three dimensions of the CPLS that measure crewmember perceived leadership of their supervisors, are presented in Fig. 3, with model quality indices available in Table 3. The latent variable Crewmember Perceived Leadership was represented by its three dimensions, Competence, Personally Genuine and Integrity. All but one of the factor loadings was $>0.250$, with the majority $>0.500$, indicating that the three dimensions were valid and reliably measured. Personally Genuine and Integrity were related to Competence, indicated by the strong path coefficients between Competence and Personally Genuine ($R_p = 0.849$, $P < 0.001$), and between Competence and Integrity ($R_p = 0.896$, $P < 0.001$). The $R^2$ values indicated that 72.0% of the variance in Personally Genuine and 80.4% of the variance in Integrity was explained by Competence. These were substantial values, and, consequently, just as in the first hypothesis, Competence was assumed to be a hypothetical common cause and Personally Genuine and Integrity were assumed to be the perceived reflections of Competence.

### Table 3. Model II quality criteria

Average variance of each construct by its indicators should collectively explain at least 25% with a preference for more than 50% of the variance explained

<table>
<thead>
<tr>
<th></th>
<th>Average variance explained (%)</th>
<th>Cronbach’s alpha $\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence</td>
<td>49.1</td>
<td>0.843</td>
</tr>
<tr>
<td>Personally genuine</td>
<td>57.2</td>
<td>0.915</td>
</tr>
<tr>
<td>Integrity</td>
<td>54.6</td>
<td>0.810</td>
</tr>
<tr>
<td>Self-judgmental</td>
<td>56.6</td>
<td>0.761</td>
</tr>
<tr>
<td>Over-identification</td>
<td>57.7</td>
<td>0.772</td>
</tr>
<tr>
<td>Common humanity</td>
<td>62.8</td>
<td>0.745</td>
</tr>
<tr>
<td>Mindfulness self-compassion</td>
<td>60.8</td>
<td>0.695</td>
</tr>
<tr>
<td>Self-kindness</td>
<td>67.5</td>
<td>0.762</td>
</tr>
<tr>
<td>Isolation</td>
<td>68.4</td>
<td>0.866</td>
</tr>
</tbody>
</table>

(Rp = 0.896, $P < 0.001$). The $R^2$ values indicated that 72.0% of the variance in Personally Genuine and 80.4% of the variance in Integrity was explained by Competence. These were substantial values, and, consequently, just as in the first hypothesis, Competence was assumed to be a hypothetical common cause and Personally Genuine and Integrity were assumed to be the perceived reflections of Competence.
The six dimensions of the SCS were linked to Competence in order to determine if leaders who are more self-compassionate are rated more highly on leadership through competence by their crewmembers. All but four of the factor loadings (removed from the model) for the SCS indicators were $>0.250$, and most were $>0.500$, reflecting the validity and reliability of the scale items. The path coefficients for Self-Judgment ($R_p = -0.177$, $P > 0.05$), Over-Identification ($R_p = 0.088$, $P > 0.05$), Common Humanity ($R_p = 0.079$; $P > 0.05$), and MindfulnessSC ($R_p = -0.084$, $P > 0.05$) were not statistically significant. This implied that these four dimensions of self-compassion were not related to the crewmembers’ perceived competence of their supervisors. The path coefficients for Isolation ($R_p = 0.315$, $P < 0.01$) and Self-Kindness ($R_p = 0.321$, $P < 0.01$) were statistically significant. These statistics implied that the crewmembers’ perceptions of a highly competent fire supervisor (linked to high levels of Personally Genuine and Integrity) were reflected by (i) high scores for supervisors who feel isolated and separate from others during difficulties, and (ii) high scores for supervisors who show themselves kindness when bad things happen, rather than being harsh on themselves. The $R^2$ value indicated that the six dimensions of self-compassion collectively explained 22.6% of the variance in Competence, which was a small to moderate amount of explained variance in support of the second hypothesis.

Discussion

Leadership in wildland firefighting

Ziegler and DeGrosky (2008) discuss wildland firefighting leadership in what they term ‘post-industrial’ leadership as turning away from focussing on the individual leader to more relational aspects of new leadership paradigms that focus on decision-making collaboration with followers; these types of paradigms are readily seen in servant leadership (van Dierendonck 2011), transformational leadership (Bass 1985) and authentic leadership (Luthans and Avolio 2003). However, as noted by Ziegler (2007) and Ziegler and DeGrosky (2008), the wildland firefighting culture has been heavily influenced by military processes and ideals that have focussed on a rule-based system to aid leaders in making decisions in the past; new initiatives, courses and other guides designed by national-level fire leaders such as the publications Leading in the Wildland Fire Service (NWCG 2007) and the Incident Response Pocket Guide (NWCG 2006) have sought to expand a rule-based system to integrate post-industrial leadership. The findings from the current study are supportive of these directions and goals of the fire service in general.

Mindfulness and leadership

It can be seen from this research how aspects of mindfulness, particularly acting with awareness (acting), describing and labelling with words (describing), and observing and attending to thoughts, sensations, and feelings (observing) were important predictors in explaining a considerable proportion of variance in leadership. When fire supervisors paid attention to the details of what they were doing, were able to effectively communicate and describe how they were thinking and feeling, and were observant of their thoughts, physiological sensations and feelings, then higher leadership effectiveness scores were predicted. Two of these components, acting and observing, have the commonality of being aware of the interactions between the self and the outer environment, which is related to situational awareness, a frequently emphasised component of effective firefighting (NWCG 2006). Authentic leadership stresses the importance of continual development of leaders through self-regulation, which is defined as the ability to grow and change in a positive way in response to self-awareness (Luthans and Avolio 2003; Gardner et al. 2005). As such, one avenue of growth to explore in the development of fire leaders may be through aspects of mindfulness.

The supported hypothesis that leaders who tend to be more mindful would also be seen by crewmembers in a similar way was supported. By scoring highly on three components of mindfulness described by Baer et al. (2006), follower scores were associated with more effective leaders. Glomb et al. (2011) has noted expected outcomes of mindfulness in the work environment are positive leadership behaviours, increased confidence and self-efficacy, improved communication, and the ability to perform well under stress. Through the relationship of mindfulness to the components of leadership assessed in this study, evidence of these outcomes is supported.

Self-compassion and leadership

Self-compassion elements explained a moderate amount of variance in leadership scores. One of the central aspects of self-compassion, self-kindness, was a positive, moderate predictor of a supervisor’s competence as correlated with crewmember scores. One opposing element, isolation, was positively related to high crewmember leadership scores. It could be understood how leaders’ capacities to take positive stances towards themselves when moving forward during difficult or stressful situations could lead to being rated more highly on effective leadership qualities; what is less understood is crewmembers’ scores being linked to higher supervisor scores of feeling isolated from others during difficulties. When the researchers posed this finding to a handful of experienced wildfire supervisors, their responses were that leadership is often lonely, and that feeling isolated is part of having knowledge, information and responsibility that others do not. Saporito (2012) found that half of CEOs reported feeling isolated in their positions in a recent survey, and noted that if this was not addressed, it would affect their performance in the long run. Both wildfire supervisors and Saporito (2012) recognised similar ways of dealing with isolation, including to accept and acknowledge it, to build a group of advisors that could be trusted to collaborate and offer honest feedback (similar to common humanity), and to keep moving forward with decisions in order to avoid inaction. The correlation of isolation with high leadership scores from crewmembers could mean that leaders are taking at least one positive step in dealing with the isolation that comes with leadership by acknowledging it. However, what is evident from the current study is that there is room for development of the other elements of self-compassion, particularly common humanity as being a way to address isolation. Regardless, this is one area that future research should explore.
Advancing wildland firefighting leadership in the current investigation

In the current investigation, it was seen that supervisors’ abilities to be more mindful and in some ways self-compassionate predicted how crewmembers perceived their supervisors’ leadership. Particularly, if supervisors were more mindful and self-compassionate, crewmembers perceived them to be more competent leaders. This competence then predicted how personally genuine crewmembers perceived these leaders to be and how much integrity they embodied. These results demonstrate an intriguing model on how leadership appears to work in wildland firefighting as well as important directions on how to develop such leadership. In wildland firefighting, competence is consistently stressed in various documents including ones listed previously, and in other works such as Desmond’s (2007) ethnographic study of wildland firefighting or in the study of Lewis et al. (2011) on employee voice as a most prized possession. This was clearly seen in the present study as competence was the central hypothetical cause of how personally genuine supervisors were regarded by crewmembers and of how their integrity was regarded. When considering these results, reasonable explanations exist between these relationships when looking at definitions of these three leadership qualities. For instance, it is plausible that a leader must first develop competencies in him- or herself in order to be personally genuine or have the confidence and capabilities to aid others in their development. Bandura’s (1986) description of self-efficacy highlights this connection between having capabilities and believing in those capabilities, which has an important relational aspect (Bandura 2011). This relational aspect is highlighted in the current investigation’s definition of integrity and personally genuine. Both components emphasise the relationship of leaders and followers led by the actions and atmosphere the leader creates. Self-efficacy and relational aspects of leaders is further stressed by Luthans and Avolio’s (2003) authentic leadership, and by Ziegler and DeGrosky’s (2008) description of the origin of leader’s intent and the current direction of leadership. Moreover, in the guides to fire literature listed previously, competence with the aid of confidence is consistently seen as essential to being effective throughout a firefighter’s career. The results from the present study might further suggest a potential sequencing whereby developing aspects of self-efficacy or confidence in helping others stems from developing a sense of competence in oneself. Notwithstanding, it is evident from this research that the current USA fire maxims – duty, respect, and integrity – do not fully capture all that is needed to maintain and develop a great leader in fire.

When looking to developing such competence, personal genuineness and integrity, mindfulness and self-compassion are critical vehicles to consider. Further, when looking at enhancing self-efficacy to promote group efficacy (or taking competence to personally genuine and integrity) Bandura (2011, p. 8) has noted ‘people do not live their lives in individual autonomy. Many of the things they seek are achievable only by working together through interdependent effort’. This notion is supported by Ziegler and DeGrosky’s (2008) description of original leader’s intent – which was more than giving clear directions, but was a way of cultivating culture and shared meaning by a group. The present study suggests that this effort must be cultivated by the leader and start with his or her own development, and one way is through mindfulness and self-compassion.

Limitations and future directions

There are several limitations and future directions that can be taken from this research. The first concerns the statistical methods used for this study. Although we have made an initial effort to establish relationships between core constructs and extend theoretical knowledge and understanding about the model being tested, this study was exploratory in nature. Correlation analysis may reveal statistically significant relationships and the results may provide evidence to support the presence of associations between mindfulness, self-compassion and leadership; they do not, however, axiomatically confirm the existence of these relationships. Consequently, the limitation that correlation does not imply causation has to be taken into account when interpreting the results of this study. With the evidence presented, future directions should look to incorporate confirmatory approaches such as SEM to further test the reliability, validity and evidence that either support or refute the model when compared with other alternative explanations. Ultimately experimental designs that can address causation should also be employed.

Next, although our sample was representative of all major crew types and the make-up of the sample was similar in gender make-up to one other current study, our sample was a convenience sample and thus may not be representative of all wildland fire personnel. The response rate of 42% of crews invited to participate in the study was lower than desired, although understandable given a hectic fire season. Future studies should look at ways of employing different sampling techniques, and other tools such as online surveys to increase generalisability power. Our study was also a one-time cross-sectional survey, and thus may not show all the variability that can occur across fire seasons and during a particular fire season. Future directions should look to employ longitudinal techniques to gain insight into how fire leaders vary across seasons and their careers.

With that said, the implications of the current research are important to consider regarding the development of mindfulness and self-compassion in wildland fire. This study demonstrated the potential impact that a few aspects of mindfulness and self-compassion can have on perceived effectiveness of leaders. It is worth considering what cultivating the other aspects of mindfulness – non-reactive and non-judgmental – and of self-compassion – common humanity and mindfulness – could have on the effectiveness of supervisors and those they lead. The wildland fire arena has a long road ahead in terms of perfecting the art of leading, communicating and working safely in a dangerous environment. As such, understanding what might be missing is essential to understanding how to take performance to a higher level of proficiency; the results of the current study are indicative of current proficiency, and suggest mindfulness and self-compassion elements are important to consider. Future directions could look to using development tools – some specific to firefighting such as SHARP (Lewis 2013; Lewis and Ebbeck 2014), which promotes the development of all elements of mindfulness and self-compassion for wildland firefighters,
and developing mindfulness and self-compassion through questions (Lewis and Ebbeck 2014); these are just a few ways of developing mindfulness and self-compassion in addition to many other ways available in the literature.

Conclusion
The findings from this study suggest that aspects of mindfulness and self-compassion are associated with wildland fire leadership qualities through the central aspect of competence. This research extends previous research on mindfulness and self-compassion in the work environment in that it has demonstrated relationships among positive leadership qualities in the unique setting of wildland firefighting. Associations to post-industrial leadership theories were made that support the current direction of wildland firefighting. Overall, these findings add to our understanding of the functions of mindfulness and self-compassion in leadership in wildland firefighting.

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