

**Where is the Positive?: Exploring the role of positive affect in the relationship
between mindfulness and psychological well-being in the workplace.**

by

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Dedication

I would like to dedicate this thesis to my two sons, Kinnon and Kye, may you grow up in a world that not only has a better understanding of psychological well-being, but one that knows its worth and embraces practices that allow you, and others, to not only be healthy but to thrive.

Where is the Positive?: Exploring the role of positive affect in the relationship between mindfulness and psychological well-being in the workplace.

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Abstract

Research focused on the relationship between mindfulness and psychological well-being has demonstrated inconsistent results with regards to the role of positive affect. Analysis of two samples established that positive affect was positively correlated with mindfulness and negatively correlated with perceived stress, while it was demonstrated to be a mediator in the initial sample. A second study with a larger sample with a more diverse participant recruitment strategy was conducted and positive affect was found to mediate the relationship. Beyond identifying a possible issue of insufficient power in the first sample, there other possible limitations were identified, namely that the current dominant measure of affect may not fully capture the applicable range of affect and positive affect may be more susceptible to issues of homogeneity than negative affect with regards to their impact on psychological well-being.

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Introduction

One in four Canadians describe themselves as being highly-stressed in their day to day lives, and 62% of respondents identified work as their main source of stress (Crompton, 2011). In the United Kingdom, 40% of all work-related illness is attributed to workplace stress. In addition, 69% of employees in the United States indicated that work is a significant source of stress (Shonin et al., 2014). Clearly, stress is a global issue with adverse implications for the individual, organizations, and society.

While various organizations like the American Psychological Association and the Canadian Mental Health Commission have published guidelines to address the issue of stress in the workplace, adoption of these initiatives is entirely voluntary and it's unclear how many organizational leaders are aware of these initiatives (American Psychological Association, 2016; Canadian Standards Association, 2013). On the other hand, mindfulness and the adoption of mindfulness-based interventions appear to be gaining the attention of organizational leaders concerned with the psychological well-being and productivity of their employees.

Organizations such as Google, Aetna, the Mayo Clinic, Huffington Post and the U.S. Army among others use mindfulness training to decrease employee stress, improve employee psychological well-being and increase productivity (Glomb et al., 2011; Good et al., 2015). Mindfulness programs are being implemented in public schools to decrease stress, improve pro-social behaviour, and decrease physical confrontations (Black & Fernando, 2014). In fact, mindfulness was recently the focus of a special edition of Time magazine (TIME, 2016). Although there is always the concern of organizations adopting the latest fad in order to increase productivity, research over the past half-century has consistently shown that increases in mindfulness are related to increases in psychological

well-being and self-regulation, and decreases in negative psychological factors, such as depression and anxiety, poor sleep quality, as well as reductions in emotional reactivity in both clinical and non-clinical populations (Brown & Ryan, 2003; Chiesa & Serretti, 2009; Howell et al., 2008; Hülshager et al., 2013; Khoury et al., 2013; Shapiro et al., 2010; Zivnuska et al., 2016).

Despite this plethora of research, the mechanisms through which mindfulness influences well-being remain unclear. In fact, one publication referred to processes involved in mindfulness as “mysterious and complex” (Shapiro et al., 2006). There are data supporting mindfulness as a reliable and validly measurable construct that is linked to a broad array of outcomes (Sutcliffe, Vogus, & Dane, 2016). However, there are still questions regarding how exactly the underlying processes involved in these relationships function. Affect, both positive and negative, have long been held to be instrumental factors in this relationship (Brown & Ryan, 2003). Unfortunately, the role of positive affect in the relationship between mindfulness and psychological well-being has been inconclusive, with research showing mixed results, resulting in the current practice of simply not including measures of positive affect. The purpose of the current study is to examine the role of negative and positive affect and determine if they are both mediators of the relationship between mindfulness and psychological well-being. First, a brief overview of mindfulness must be discussed.

Mindfulness

While the concept of mindfulness originated in eastern contemplative traditions such as Hinduism, Buddhism and Jainism, mindfulness itself is not inherently religious, philosophical or ideological in nature (Hulsheger et al., 2013; Kabat-Zinn et al., 2003; Keng et al., 2011). Mindfulness was first studied as a construct within western psychology in the late 1970's and there has been a steadily growing body of literature

devoted to its exploration since. A recent search of the PsychInfo database indicated that almost 9,000 academic articles, books, and dissertations included the keyword mindfulness had been published since 2000. An area of primary interest within this literature has been the relationship between mindfulness and psychological well-being. There is convincing evidence that mindfulness-based interventions improve the psychological well-being of participants in both clinical and non-clinical settings (e.g., Brown & Ryan, 2003; Grossman et al., 2004; Keng et al., 2011), increased sleep quality among professionals (Hülshager et al., 2014), increases in employee's level of work engagement (Leroy et al., 2013), increases in job performance (Dane & Brummel, 2014), and reductions in emotional exhaustion (Hülshager et al., 2013). In addition, meta-analyses have consistently confirmed mindfulness-based interventions lead to a reduction in self-reported levels of anxiety and depression (Chiesa & Serretti, 2009; Hofmann et al., 2010; Khoury et al., 2013; and Virgili, 2015).

Jon Kabat-Zinn first offered a working definition of mindfulness as “the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment” (Kabat-Zinn, 2003, p.145). As the academic study of mindfulness has increased over time so too has the number of definitions applied to the term mindfulness; for example, Sutcliffe and Vogus in their review on mindfulness research included 14 different definitions of mindfulness (Sutcliffe et al., 2016). This diversity in definitions has led to some ambiguity with regards to the construct of mindfulness, however, there is enough continuity regarding the constituent factors of mindfulness to bring a sufficient level of clarity to key elements of this construct (Keng et al., 2011). These factors are: 1) mindfulness is a state of consciousness, 2) where attention is focused on experiences in the present moment,

including one's thoughts, emotions, sensations and perceptions, 3) in a non-judgmental fashion (Brown & Ryan, 2003; Kabat-Zinn, 2003; Hülshager et al., 2013). It is important to note these factors are inter-related. That is to say that mindfulness cannot be reduced to any independent factors; it is in the interactions between these core factors that mindfulness arises as a conscious state.

Mindfulness can be understood as a state of consciousness, in that mindfulness is fundamentally concerned with the interpretation of all the internal and external stimuli of which an individual is consciously aware of (Sutcliffe et al., 2016). This includes, thoughts, feelings, emotions, sensations, and perceptions (Creswell, 2016; Good et al., 2015; Sutcliffe et al., 2016). When individuals are conscious of their experiences in a mindful fashion, they are observing these phenomena as passing mental events rather than identifying with them or believing they are accurate representations of themselves or reality (Keng et al., 2011). This level of conscious awareness of internal and external stimuli has been referred to as a 'metacognitive state of awareness', where mindful individuals are consciously observing the internal and external stimuli (including cognitions) as they experience them, rather than being immersed within them (Shapiro, 2006). This observational perspective to one's internal and external experiences has a decentering, or decoupling effect which can create psychological distance between the self and one's experience (Glomb et al., 2011; Good et al., 2015; Keng et al., 2011; Shapiro et al., 2006). For example, a less mindful person would experience an emotion like anger as, 'I am angry' while a more mindful person would observe the sensation of anger as, "I am experiencing anger" without identifying the experience of anger as part of their sense of self identity.

The second element of mindfulness is an intentional focus of attention to what one is experiencing in the present moment (Kabat-Zinn, 2003; Keng et al., 2011; Sutcliffe et al., 2016). There is a general assumption within the literature that attention is limited and can be affected by a myriad of internal and external factors (Good et al., 2015). As Creswell points out, this focusing of attention to what one is currently experiencing is in direct contrast to one's normal daily life experience, which is typically caught up in unintentional mind wandering, running on autopilot, or actively distracting ourselves from unwanted experiences (Creswell, 2016). For example, research on mind wandering has indicated that people's minds frequently wander (Killingsworth & Gilbert, 2010; Smallwood & Schooler, 2015). Research indicates that those who incorporate mindfulness practices experience less mind wandering (Jha et al., 2010; Mrazek et al., 2013). Increased attentional capacity, generated by the reduction in mind wandering, leads to increases in self-regulation and more economical uses of cognitive resources (Good et al., 2015).

Mindfulness has been understood as broadening of awareness - that is to say a mindful individual would be more consciously aware of internal and external phenomena than a less mindful individual. While this may seem contradictory since more stimuli generally means more distraction, mindful individuals are more adept focusing their attention on a particular stimuli and are more able to direct attention effectively, vice being distracted by thoughts, emotions, or other phenomena (Creswell & Lindsay, 2014). This can be understood as a heightened attentional self-regulation (Shapiro et al., 2010). Also, the focus of attention on one's immediate condition fosters the realization that all phenomena are transient in nature. Thoughts, feelings, emotions, sensations and other stimuli come and go, which reduces their impact on one's self-identity and re-enforces the

psychological distance, or observational perspective discussed previously. This, in turn, reduces rumination, the dwelling on past experiences, as well as a preoccupation with future-oriented thinking; both of which can lead to depression and/or anxiety, again freeing up cognitive resources that can be refocused on the task at hand (Good et al., 2015).

The third component of mindfulness is an open and accepting of a non-judgmental attitude towards the internal and external stimuli one is experiencing in the present moment (Brown & Leigh, 1996; Creswell, 2016; Good et al., 2015; Hülshager et al., 2013; Kabat-Zinn, 2003). In other words, value judgements or assignments, for example, whether a particular thought is good or bad, are absent, instead is simply accepted as being present within our conscious experience. This is facilitated by both the psychological distance between phenomena and self that occurs in the decoupling process and the emphasis on the transient nature of experience both discussed previously. Given the psychological distance created by observing one's internal and external experiences previously discussed, this non-judgmental attitude allows individuals to observe these stimuli as they occur and refrain from making biased interpretations (Good et al., 2015). This can lead to a more realistic understanding of one's experience, which can ameliorate negative ideations associated with maladaptive stress responses (Hülshager et al., 2013). This has an important role in self-regulation, as it facilitates an objective view of distractions, such as the need to check your email or social media while engaging in a goal related activity, which allows one to engage with these compulsive thoughts more skillfully, rather than being swept away by them (Creswell, 2016; Hülshager et al., 2013).

Finally, although previously described as a state of consciousness, however, as demonstrated in much of the literature it can also be understood as trait (e.g., Brown &

Ryan, 2003). Like many other state-based construct (e.g., psychological well-being and affect), mindfulness can be understood to fluctuate in one's the moment to moment experience, depending on a variety of internal and external factors (Ries, Sheldon, Gable, Roscoe, & Ryan, 2000; Watson, Clark, & Tellegen, 1988). For example, one does not experience an affect state like enthusiasm, or even sensations of well-being in every single moment of conscious experience. This is primarily an issue of perspective, if one is concerned with in-subject measures, that is to say, how often a person experiences mindfulness in a minute by minute or day by day fashion that we are treating it as a state. If we are concerned with how people differ (between-subject) on their overall range of mindfulness over longer durations then we are treating it as a trait (Ries, et al., 2000). Mindfulness has been measured both as a state and as a trait, and research has demonstrated the validity of this approach (Brown & Ryan, 2003). For the purposes of this research, mindfulness will be measured as a trait, as we are interested in between-subject analysis of mindfulness, affect and psychological well-being over relatively longer periods of time, rather than in-subject variance.

Affect

Given the discussion about the factors of mindfulness above, it is clear that mindfulness heavily influences affect. For example, mindfulness is associated with an increased awareness of internal external phenomena, including affect states. The observational perspective generated by cultivating mindfulness, should also create separation between the affective state one is experiencing and their sense of identity. The focus of attention in the present moment, should in turn reduce the effect of past and future orientated affect states, while emphasizing the transient nature of the experience of

affect states. In addition, the non-judgmental factor of mindfulness has the potential to change how one interacts with one's affect state, and how that affect state informs one's perceptions of reality. To understand these effects, we must first clarify the nature of affect and affect states.

Affect comprises the basic feelings, experienced individually, that form the base of other more complex psychological constructs such as mood and emotion (Warr et al., 2013). As the building blocks of emotion, different affective states can be understood as perceptual filters through which individuals form their understanding of their environment, and determine how individuals interact with that environment (Devonish, 2013). As such, affect is a core factor in one's perception of self and the surrounding world. Affect is typically (e.g., Watson, Clark & Tellegen, 1988) understood to comprise both positive and negative states.

Positive affect has been shown related to several positive outcomes related to success (e.g., positive perceptions of self and others, sociability, activity, likability, cooperation, prosocial behaviour, physical well-being, coping, problem solving, creativity and vitality) and is generally equated with happiness (Kark & Carmeli, 2009; Lyubomirsky, King, & Diener, 2005). It has also been linked to increased job satisfaction, which has been identified as an integral component in building cognitive, physical and social resources (Glomb et al., 2011). For example, positive affect is related to cognitive flexibility, the reduction of framing effects and heuristic based decision-making (Raglan, 2014).

Negative Affect is directly and inversely related to psychological well-being (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Devonish, 2013). Negative affect has been linked with decreased job performance, increases in perceived stress,

perpetrating work place aggression and being the target of work place aggression (Adler, 2006; Aquino, Grover, Bradfield, & Allen, 1999; Tepper, 2000). In addition, negative affect has been found to impact decision making, with effects at pre-post decision making, as well as at the time of the decision (Raglan, 2014). There are links between negative affect and physical health as well; for example, one study found that individuals with higher negative affect were more susceptible to higher respiratory illness (Schneiderman et al., 2005). Negative affect appears to be highly transferable, which leads to negative social outcomes and poor group performance (Sy, Côté, & Saavedra, 2005).

Affect and the Relationship between Mindfulness and Well-being

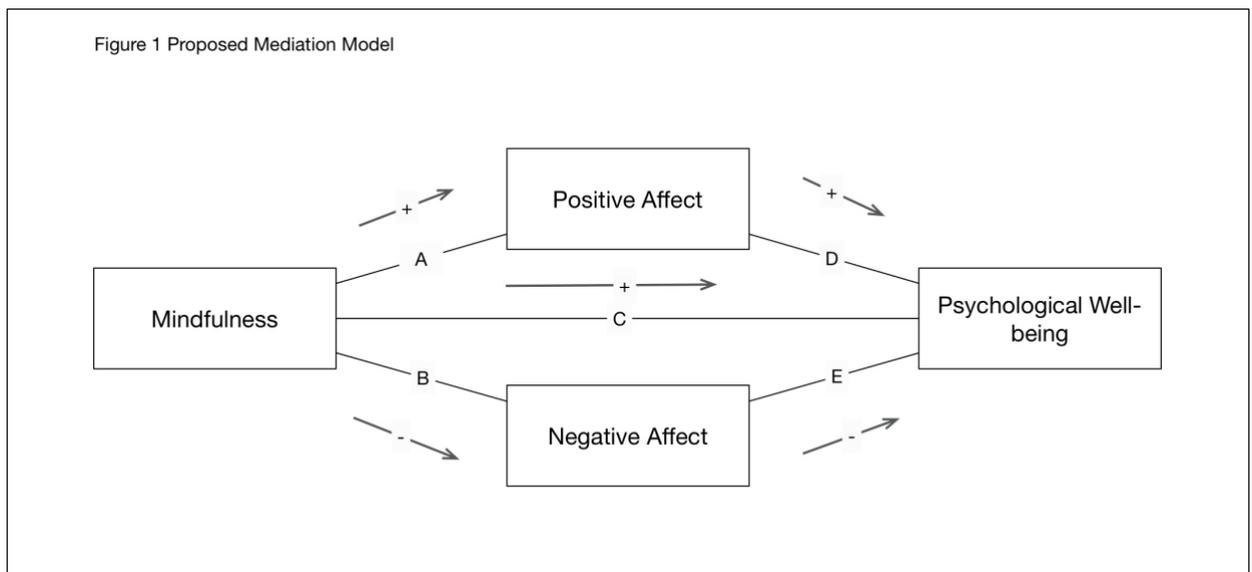
A general review of the literature regarding the relationship between mindfulness and affect generally supports the notion that higher levels of mindfulness are positively related to positive affect, and negatively related to negative affect (Anderson, Lau, Segal, & Bishop, 2007; Brown & Ryan, 2003; Brown et al., 2007a; Carmody & Baer, 2007; Creswell, 2016; Creswell & Lindsay, 2014; Davidson, 2010; Jain et al., 2007). That is to say, people with higher levels of mindfulness, either naturally occurring or as the result of a mindfulness-based interventions (e.g, meditation practice), generally have higher positive affect and lower negative affect. This relationship was first noted when Brown and Ryan first developed the Mindful Attention Awareness Scale in 2003 and there has been a general trend supporting these findings when this scale has been used (Brown & Ryan, 2003; Brown et al., 2007a). In addition, increased mindfulness has been found to be associated with related constructs such as lower anxiety and emotional exhaustion, which also supports this hypothesis (Hülshager et al., 2013; Shapiro et al., 2006).

There are, however, contradictory findings within the literature. Several studies have found no increase in positive affect associated with an increase in mindfulness (Adams, 2011; Kemeny et al., 2012; Martín-Asuero & García-Banda, 2010; Sears & Kraus, 2009). Another study found an initial increase in positive affect after an 8-week mindfulness-based stress reduction intervention, yet this effect disappeared after just one month (Giluk, 2010). Additionally, a study found no effect for either positive or negative affect after a 5-week mindfulness intervention (Delgado et al., 2010). Several meta-analyses measure outcomes related to mindfulness, such as stress reduction, depression and anxiety, but do not include measures of affect and those that do include affect measures place the emphasis on the role negative affect (Chiesa & Serretti, 2009; Khoury et al., 2013; Virgili, 2015). Furthermore, recent mindfulness studies tend to only include negative affect measures (Roche, Haar, & Luthans, 2014) further downplaying the role of positive affect in the reduction of stress and the increase of psychological well-being.

In summation, mindfulness has been demonstrated to have a positive effect on psychological well-being, in particular in the area of reducing perceived stress. However, there is some ambiguity with regards to how increases in mindfulness affect changes in psychological well-being and perceived stress levels. While it's clear that affect plays a role in this relationship, recent practices in mindfulness research show either mixed results, or fail to include or report measures of positive affect. The following hypotheses will seek to bring clarity to this situation by examining the role of positive affect in the relationship between mindfulness and psychological well-being.

Hypotheses

The purpose of this study was to determine what role affect, both positive and negative, plays in the relationship between mindfulness and psychological well-being. The proposed mediating relationships are presented below in Figure 1. It is well established that higher levels of trait mindfulness result in increased psychological well-being (C), therefore this study will specifically focus on the role affect plays in this relationship (Brown & Ryan, 2003; Brown et al., 2007a; Chiesa & Serretti, 2009; Creswell & Lindsay, 2014; Creswell, 2016; Delgado et al., 2010; Grossman et al., 2004; Keng et al., 2011; Martín-Asuero & García-Banda, 2010; Virgili, 2015; Weinstein, Brown & Ryan, 2009). In keeping with previous discussion, I propose the following hypotheses;



Hypothesis 1a: Negative affect will be negatively related to mindfulness; such that higher levels of mindfulness will be associated with lower levels of negative affect (B).

Hypothesis 1b: Negative affect will be negatively related to psychological well-beings, that is to say that lower levels of negative affect will be associated with higher levels of psychological well-being (E).

Secondly, to confirm the general assumption with regards to positive affect in previous research and address the findings that do not support the role positive affect plays in this relationship, I propose the following hypotheses;

Hypothesis 2a: Positive affect will be positively related to mindfulness; such that higher levels of mindfulness will be associated with higher levels of positive affect (A).

Hypothesis 2b: Positive affect will be positively related to psychological well-being, namely that higher levels of positive affect will be related to higher levels of psychological well-being (D).

Finally, to establish that these two constructs do indeed contribute to the relationship between mindfulness and stress, both negative and positive affect will be tested as possible mediators.

Hypothesis 3: Negative affect will mediate the relationship between mindfulness and psychological well-being (BE)

Hypothesis 4: Positive affect will mediate the relationship between mindfulness and psychological well-being (AD).

Study 1

The purpose of this study was to provide an initial exploratory test of the hypotheses using data that was available from another study. The data was collected as part of a mindfulness based intervention study conducted at the Royal Military College of Canada (RMC), which included measures of mindfulness, affect and perceived stress¹. Only the pre-intervention, or time 1 data, was used for this research. Responses to these measures were captured via an electronically distributed questionnaire. RMC cadets participated in the original study in order to assess mindfulness-based training via the Headspace application and to enter into a draw for \$10 coffee gift cards. The original study was approved by the Research Ethics Boards of both the Royal Military College of Canada and Saint Mary's University.

Method

Participants

Participants for this study were recruited from third and fourth year officer cadets attending the Royal Military College of Canada (RMC). Of the 93 cadets that indicated that they would like to participate in the study only 41 responded the initial questionnaire, for a response rate of 44%. 70% of respondents were male (29) and 30% were female (12), which is representative of the student population at the military college. One respondent only responded to the demographic questions and none of the scale items, while another chose not to answer several affect items. These two respondents' data were

¹ This study was originally intended to be the sole study to be conducted in fulfillment of the thesis portion of the Masters in Applied Science at Saint Mary's University. Unfortunately, poor participation levels at time two of the study made the results unusable.

removed from the analysis, providing a final $n = 39$. Participants' age ranged from 20 to 26, with an average age of 21.78. Only six (14.6%) respondents indicated that they had engaged in some form of mindfulness practice in the past.

Measures

Mindfulness was measured by the Mindfulness Attention Awareness Scale (MAAS), which is a psychometrically sound, and widely used 15 item scale, developed by Brown & Ryan (2003). All responses used a six-point response scale (1 = Almost Always, 6 = Almost Never). Items from the MAAS are presented in Appendix A. Responses were summed so that a high composite score represents a high level of mindfulness. The alpha for this scale was .88.

Participants' psychological well-being was measured using the Perceived Stress Scale developed by Cohen, Karmarck, & Mermelstein (1983). This scale contained 14 items and had an alpha of .71. Respondents were asked to rate their responses on a 5 point scale (1 = never, 2 = almost never, 3 = sometimes, 4 = fairly often, 5 = very often). The items for the scale are presented in Appendix B. All positively framed items were reverse coded so higher composite scale total represents a higher level of perceived stress.

Both positive and negative affect were measured by using the Positive and Negative Affect Schedule or PANAS developed by Watson, Clark, and Tellegen (1988). Participants were asked to rate from 1 (very slightly or not at all) to 5 (extremely) how often they experienced certain affective states, represented by certain key words, in the last month. Items comprising the scale are presented in Appendix C. Reliability for the positive and negative affect scales were .87 and .88 respectively.

In addition, general demographical questions were included (participants' gender and age) to determine if these variables impacted the relationship between the dependent variables and the independent variable. Also, participants were asked if they had been involved in a mindfulness practice prior to the training introduced in this study, as this could have an effect on their baseline mindfulness measure.

Results

Analyses

All appropriate assumptions for correlation, regression and mediation were evaluated and determined to have been met. Consistent with proposed hypotheses, perceived stress was considered as the dependent variable, while mindfulness was the independent variable and positive and negative affect were treated as mediators. SPSS Version 24 was used for all analyses, with regression and mediation analyses conducted using the PROCESS macro developed by Andrew Hayes (Hayes, 2012).

Table 1 presents the descriptive statistics and intercorrelations for all study variables.

Table 1

Study 1 Descriptive Statistics, Reliabilities, and Intercorrelations for Continuous Variables

Measure	<i>M</i>	<i>SD</i>	Correlations			
			1	2	3	4
1. MAAS	3.72	.82	(.88)	.414**	-.345*	-.576**
2. Positive Affect	3.82	1.14		(.87)	-.407**	-.563**
3. Negative Affect	2.67	1.17			(.87)	.727**
4. Perceived Stress Scale	2.65	.58				(.85)

Note. *N* = 40. **p* < .05; ***p* < .01. *M* = mean; *SD* = standard deviation. Reliabilities (α) are presented in parentheses on the diagonal.

The relationships between the variables were as expected. In support of Hypothesis 1a, negative affect was negatively related to mindfulness ($p < .05$). Negative affect was positively related to perceived stress ($p < .01$) supporting Hypothesis 1b. Positive affect was positively related to mindfulness ($p < .01$), which supports Hypothesis 2a, and negatively related to perceived stress ($p < .01$), supporting Hypothesis 2b.

Regression Analysis

Regression analyses were conducted to test the relationships between mindfulness, positive and negative affect and perceived stress (See table 2 for results). Gender, age and past mindfulness practice were examined to see if they had any impact on the regression model and none of these variables were found to have any significance effect and were subsequently dropped from the model.

Table 2

Study 1 Regression Table Predicting Perceived Stress

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>
MAAS	-.20	.07	-.30	-2.86**
Positive Affect	-.16	.08	-.22	-2.05*
Negative Affect	.37	.07	.53	5.08***
R^2			.685	

Note. $N = 39$. *** $p < .001$; ** $p < .01$; * $p < .05$.

As expected, mindfulness and positive affect were shown to have a significant negative relationship to perceived stress, while negative affect had a significant positive relationship to perceived stress (supporting hypotheses 1b and 2b).

Mediation Analysis

The mediation hypotheses were tested by the bootstrapping method outlined by Hayes (Hayes, 2009). In this method, the sampling distribution of the indirect effects of potential mediating variables are repeatedly resampled, with replacement, estimates of path coefficients are generated and their products are calculated. In this analysis, 5000 samples were conducted and bootstrapped based confidence intervals were generated by sorting the 5000 values of the product of the path coefficients in ascending order (from smallest to largest); the lower bound being set at 5000 $(.5 + 95/200)$ and the upper bound at $1 + 5000 (.5 + 95/200)$. If the bootstrapped based confidence intervals do not include zero, then the indirect effect is not zero at $p = .05$.

This method of determining mediation is superior to both Baron & Kenny's causal steps approach several reasons. First, the Baron & Kenny approach has been demonstrated to have the lowest power of the methods commonly used, which means that this approach is the least likely to determine the presence of indirect effects (Hayes, 2009; Fritz & MacKinnon, 2007). Second, the causal steps approach relies on a logical inference and multiple hypotheses testing, which have the potential to increase error (Hayes, 2009). Finally, Baron & Kenny's approach does not take into consideration that indirect effects may exist, even when there may be no significant relationship between the primary variable and the outcome variable (Hayes, 2009).

Results can be found in Table 3.

Table 3

Study 1 Indirect Effects (Mediation Analysis)

Mediator	<i>B</i>	<i>SE B</i>	<i>CI</i> _{.95}	
			Lower	Upper
Positive Affect	-.03	.03	-.1057	.0210
Negative Affect	-.12	.05	-.2326	-.0175

Note. *N* = 39. CI that do not include 0 are significant at $p < .05$.

As shown, the analysis resulted in a significant indirect effect for negative affect, that is to say that negative affect does indeed mediate the relationship between mindfulness and psychological well-being, supporting hypothesis 3. However, no significant indirect effect was found related to positive affect. As such, positive affect was found not to mediate this relationship, which does not support Hypothesis 4.

Study 1 Discussion

The purpose of this exploratory study was to examine the relationships between mindfulness, positive and negative affect and psychological well-being. Particularly, the relationships between mindfulness and positive affect, and positive affect and psychological well-being, which are of interest due to the inconsistent findings and lack of reporting found in the literature. While positive affect was shown to contribute to psychological well-being through the reduction of perceived stress, it was not supported as a mediator between between mindfulness and psychological well-being. There are several shortcomings of this study, which bring into question the validity of these findings. First, the sample size is very small and may not have sufficient power to confidently reject the presence of type II error in the mediation analysis. In addition, this

sample has been taken from a very homogenous group, third and fourth year cadets attending the Royal Military College, who have undergone an extensive selection program and socialization in to a military organization; as such, there may be unknown factors which may uniformly interact with the relationship between positive affect and psychological well-being. Finally, there has been criticism of the PANAS as a valid measure of affect (Warr, et al., 2013). A second study was undertaken to address these issues and re-examine the role of positive affect in the relationship between mindfulness and psychological well-being.

Study 2

The purpose of this second study was to determine if the findings of Study 1 would be replicated in a larger sample, expand the sample beyond a cohort of military college students to be more representative of the general population, and address concerns with the measure of affect used in the previous study. To achieve this a questionnaire measuring mindfulness, perceived stress and affect was distributed electronically through social media (Facebook and Twitter) using a snowball method of distribution, in which the questionnaire was first sent out to known contacts asking for their participation, those who completed the study were asked to forward a link to the study to their contacts, who would then repeat the process. This study was approved by the Research Ethics Board of Saint Mary's University.

Method

Participants

There were 300 respondents; 283 (93%) female, 10 (3%) male, and 7 (2.3%) indicating other as their preferred gender. Participants' age ranged from 19 to 71, with an average age of 33.51 (standard deviation of 8.29). In addition, 62 (21%) of participants indicated that they had engaged in some form of mindfulness practice prior to taking the survey.

Missing Data

There were 21 participants with missing data, which corresponds to 7% of the total number of cases. These cases were deleted listwise from the analysis, producing a final $n = 279$. While this slightly exceeds the suggested limit of 5% proposed by Graham, given that the sample size is relatively large, the desire to generate standard error measurements and that there be as little bias as possible in the analysis of the data, which includes multiple regression, listwise deletion is an acceptable approach (Graham, 2009).

Measures

Mindfulness was again measured with the Mindfulness Attention Awareness Scale (MAAS), the alpha attained with this measure in this sample was .88. In addition, the Perceived Stress Scale developed by Cohen, Karmarck, & Mermelstein (1983) was again used to measure participants' psychological well-being, the alpha attained in this sample was .87.

The Multi-Affect Indicator (MAI) developed by Warr et al., was used to measure both positive and negative affect (Warr et al., 2013). This measure was used instead of the PANAS, to address a broader range of affect states. Warr and his colleagues believe that

the PANAS scales focus only on affective states that are characterized by high arousal, such as anger, or inspiration and do not include low arousal affective states, such as feeling bored or calm (Warr et al., 2013). These shortcomings are addressed in the MAI, which allows this scale to be more comprehensive than the PANAS. In addition, this measure is shorter than the PANAS and there was concern that item fatigue may be a factor given the distribution method of the questionnaire since individuals could simply close their browsers at any time before completion to opt out of participating.

Participants were asked to indicate approximately how often they felt a particular affect related keyword (e.g, calm, dejected, anxious, pleased), during the past week. Items from the MAI are presented in Appendix D. Analysis of the reliability of these scales indicated that one item, 'laid-back' was significantly impacting the reliability of positive affect scale, as such it was removed from scale. Reliabilities for the positive and negative affect scales, after the removal of the laid-back item was removed were .88 and .91, respectively.

As in the previous study, general demographical questions were included to determine participants gender, age, and whether or not they have, or had a mindfulness practice, in order to determine if these variables impacted the relationship between the dependent variables and the independent variable.

Results

Analyses

All appropriate assumptions for correlation, multiple regression and mediation were evaluated and determined to have been met, with the exception of the outcome variable, PSS, being normally distributed. Examination of the distribution of the PSS

resulted in a significant result ($p < .05$) on the Shapiro-Wilk's test, which implies that PSS is not normally distributed. However, given the relative size of the sample used, the increased likelihood of finding significant results in larger sample sizes and the central limit theorem, which holds that as sample sizes increase their distribution become normal, PSS can be assumed to be normally distributed (Field, 2013). Scale totals for the MAAS, PSS, and MAI, with positive and negative affect having their own scale totals, were calculated. Consistent with proposed hypotheses, perceived stress was considered as the dependent variable, while mindfulness was the independent variable and positive and negative affect were treated as mediators.

Correlation Analysis

Table 4 presents the descriptive statistics and intercorrelations for all study variables.

Table 4

Study 2 Descriptive Statistics, Reliabilities, and Intercorrelations for Continuous Variables

Measure	<i>M</i>	<i>SD</i>	Correlations			
			1	2	3	4
1. MAAS	3.45	.82	(.88)	.434**	-.418**	-.483**
2. Positive Affect	3.04	.97		(.88)	-.502**	-.608**
3. Negative Affect	3.21	1.25			(.92)	.764**
4. Perceived Stress Scale	3.08	.58				(.87)

Note. $N = 279$. * $p < .05$; ** $p < .01$. M = mean; SD = standard deviation. Reliabilities (α) are presented in parentheses on the diagonal.

All relationships between the variables were as expected. In support of Hypothesis 1a, negative affect was negatively related to mindfulness ($p < .01$). Negative affect was positively related to perceived stress ($p < .01$) supporting Hypothesis 1b. Positive affect

was positively related to mindfulness ($p < .01$), which supports Hypothesis 2a, and negatively related to perceived stress ($p < .01$), supporting Hypothesis 2b.

Regression Analysis

Regression models were conducted testing the relationship between mindfulness and both positive and negative affect, respectively. As in the previous study gender, age and past mindfulness practice were examined to see if they had any impact on the regression model. Again, none of these variables were found to be significant and were dropped from the further analyses (See Table 5).

Table 5

Study 2 Regression Table Predicting Perceived Stress

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>
MAAS	-.18	.03	-.26	-5.40***
Positive Affect	-.60	.06	-.47	-10.02***
Negative Affect	.02	.01	.08	1.83***
R^2		.435		

Note. $N = 279$. *** $p < .001$; ** $p < .01$; * $p < .05$.

As expected, mindfulness and positive affect were shown to have a significant negative effect on perceived stress, while negative affect had a positive relationship with perceived stress.

Mediation Analysis

The mediation hypotheses were tested by examining the confidence intervals around the indirect effects for each equation (i.e., for positive and negative affect) using

the same methodology proposed by Hayes used in the Study 1 (Hayes, 2009).

Significance, at $p < .05$, was determined if the confidence intervals did not include zero.

Results can be found in Table 6.

Table 6

Study 2 Indirect Effects (Mediation Analysis)

Mediator	<i>B</i>	<i>SE B</i>	<i>CI</i> .95 Upper	<i>CI</i> .95 Lower
Positive Affect	-.0721	.02	-.1084	-.0449
Negative Affect	-.1439	.02	-.1926	-.1048

Note. $N = 300$. CI that do not include 0 are significant at $p < .05$.

Both positive and negative affect have confidence intervals that did not include zero, indicating significant indirect effects for both variables. These findings support both positive and negative affect as mediators between mindfulness and psychological well-being (Hypotheses 3 and 4).

Study 2 Discussion

As stated previously, the purpose of this study was to determine if the findings of Study 1 could be replicated in a larger sample, in other words, to determine if the lack of support for positive affect being a mediator between mindfulness and psychological well-being found in Study 1 was due to a lack of power. In addition, there was concern that the homogeneity of the sample used in the first study. All participants in the first study were students at a military college, which may have impacted the results and bring into question the generalizability of the studies' findings. Also, concerns with the affect measure (PANAS) used in Study 1 needed to be addressed.

In addition to providing further support for the mediating role of negative affect between mindfulness and psychological well-being found result in Study 1, analysis of the larger, more diversified sample found support for the mediating role of positive affect as well. The MAI replaced the PANAS as a measure of affect in an attempt to address the shortcomings associated with that measure.

Discussion

The purpose of this research was to provide evidence that could be used to address critical discrepancies in the literature regarding the mediating role of affect in the relationship between mindfulness and psychological well-being, in particular, to determine if positive affect is in fact a mediator in this relationship. In the first, preliminary study, correlations were established between all the variables measured in the expected directions. Mindfulness was positively correlated with positive affect and negatively correlated with negative affect and perceived stress. Perceived stress was positively correlated with negative affect and negatively correlated with positive affect. Regression models indicated that mindfulness and positive affect contributed to lower perceived stress, while negative affect contributed to higher perceived stress. Mediation analysis of the first sample indicated that negative affect, but not positive affect, mediated the relationship between mindfulness and perceived stress. It is important to note that causation cannot be inferred from this study, as the data were taken at only one point. While the direction of the relationships proposed is in line with theoretical models within the literature, further longitudinal research should be conducted to provide empirical evidence regarding the direction of these relationships.

These findings from Study 1, taken at face value seem to indicate that positive affect does not directly factor, at least as mediator, into the relationship between mindfulness and perceived stress, which supports the current trend in mindfulness research to exclude positive affect as contributing factor in psychological well-being and stress reduction research. However, there are several observations, which suggest that it may be premature to accept these findings; the first being a simple issue of lack of power; the sample size for this preliminary analysis was 39, which falls short of the 74 suggested by applying Green's recommended sample size of $50 + 8k$, where k is the number of predictor variables included in the regression (Green, 1991). In addition, there has been some concern that the affect states measured by the PANAS are limited to only those that can be considered high arousal states, ignoring low arousal states, which may be more in line with the outcomes of mindfulness (Warr, et al., 2013). Without a measure of the complete range of affect states, results may not accurately represent the relationships being examined. Finally, the sample for this analysis was taken from a military population that was selected through a very thorough selection methodology and has undergone a significant amount of socialization in the military setting and is therefore a highly homogenous. This lack of diversity in the sample may bias the results and preclude positive affect from reaching significance, as military populations are not generally associated with positive affect.

In order to ameliorate these concerns and to fully address the question of the role of positive affect in the relationship between mindfulness and psychological well-being, a second study was undertaken with a larger sample size, an expanded measure of affect, and more diverse sample population. As in the first study, relationships between the all the study variables were present and in the expected directions. Increases in mindfulness

were associated with decreased negative affect and perceived stress and increased positive affect. Higher negative affect was related to lower positive affect and increased perceived stress, and positive affect was associated with lower perceived stress. In contrast to the initial study, both positive and negative affect were shown to be mediating factors between mindfulness and perceived stress.

These results suggest that with an adequate and diverse sample population, and robust measure of affect, positive affect is in fact is indeed a mediator in the relationship between mindfulness and psychological well-being. For the most part, longitudinal research on mindfulness and psychological well-being has suffered from low sample sizes, partly due to the common delivery method of mindfulness training, which tend to be limited by class or teacher/student ratios, or in the relatively small portion of the population that are interested in participating and remaining in a study of this nature (e.g., Study 1). Small sample sizes have relatively low power to determine an effect and therefore the mixed results in previous studies regarding positive affect are understandable. However, research should seek to identify as many antecedents as possible in order to provide a comprehensive understanding of the phenomena being studied.

While power seems to be the obvious difference between the two studies, there were two other factors that were altered between Study 1 and Study 2, namely diversity of the sample population and the measure of affect. The data used in Study 1, was originally part of longitudinal study conducted on a military population, as such that dataset generated was only applicable to the military population. It is reasonable to question the generalizability of the results gained by analyzing this data and seeking a more diverse sample from which to generate a more generalizable data is also a reasonable course of

action. However, it is important to pause and note, that power may not be the only factor present. Perhaps there are distinct populations in which positive affect is not mediator. This possibility should be explored further in future research.

In regards to the use of different measure of affect, the PANAS was used in the first study, primarily due to the fact that it was the predominant measure used within the mindfulness literature. Upon further examination of the current trends in affect research it became clear that there was sound criticism of the breadth of the affect states included in the PANAS, namely that it focused on high arousal states very little attention was paid to low arousal states (Warr, et al., 2013). For example, the PANAS does not include any positive low arousal states, such as comfortable, calm, or contented. The failure to capture the breadth of affect states could in turn bring into question the relationships being investigated in this study. It should be noted that all expected relationships were present in both studies, with the exception of the mediating relationship of positive affect between mindfulness and perceived stress, which, as discussed above is most likely due to insufficient power, not a difference in affect measure. Future research in this area should seek to use the most robust and comprehensive measures possible.

Implications, Limitations and Future Research

The implications of this research are fairly clear, first, these findings demonstrate that positive affect is indeed a mediator in the relationship between mindfulness and psychological well-being factors, such as reduced perceived stress. Although, as indicated above, there still remains the unanswered question that there may be certain populations that might inhibit this relationship. Second, the current trend in research to either not include positive affect as viable factor in the relationship between mindfulness and

psychological well-being is in error. Researchers should endeavor to at least meet the minimum sample size suggested by Green before discounting relationships between factors (Green, 1991). Third, there is a need to employ broader and more inclusive measures of affect, beyond the PANAS, which take into consideration affect states characterized by both high and low arousal in order to have a more comprehensive understanding of the impact of affect states. Finally, the discrepancy in results between the two studies included in this research may reveal differences in the role of negative and positive affect play in the mindfulness well-being relationship. While power is definitely a contributing factor, there was sufficient power to establish the relationships between mindfulness and lower perceived stress, and to confirm the negative affect as a mediator. Positive affect, may simply have a smaller effect size, therefore requires a larger sample size, or it may be more susceptible issues to homogenous characteristics within the sample. For example, group, organizational or societal norms which do not facilitate positive affect states, may reduce the effect of positive affect on relationship between mindfulness and psychological well-being. This may also reduce the efficacy of mindfulness based stress reduction interventions within those populations. While the results of the first study are only preliminary, they do suggest that this may be the case. More research should be conducted to determine the effects these norms may have in regard to mindfulness and its relationship to psychological well-being.

This research is not without several limitations. Both studies included in this research relied on cross-sectional data where all variables, including the outcome measure (perceived stress) were measured at the same time point using self-report measures, as such common method variance (CMV) is a concern. In order to address this concern, future research should seek to incorporate longitudinal data, with more objective

measures of psychological well-being, such as sleep quality, cortisol reactivity (the difference in the presence of cortisol at a baseline and after a stressor is presented), or cortisol/DHEA ratios could offer further support for at these findings (Crum, Salovey, & Achor, 2013; Howell, Digdon, & Buro, 2010; Wemm, et, al., 2010).

While perceived stress measures have been, and still are, used as indicators of psychological well-being, the use of more objective measures such as the ones suggested above, may contribute to the broadening of our understanding of psychological well-being. This is a necessary step in the evolution of the concept of psychological well-being, as it is highly unlikely that it is simply the absence of stress, there are likely a multitude of other contributing factors which may play integral role in this construct. In recent years there have been initiatives to create more robust measures of psychological health in the workplace, for example, the Canadian National Standard for Psychological Health and Safety (CSA Group, 2013). However, these attempts have been difficult implement due to their complexity and lack of substantive empirical support; for instance, the aforementioned Canadian National Standard identified 13 separate factors which may contribute to psychological well-being, and proposed using a 68 item questionnaire to assess psychological well-being (Center for Applied Research in Mental Health and Addiction, 2012; CSA Group, 2013). Regardless of the complexity, the search for more antecedents to psychological well-being and a more complete understanding of how psychological well-being can be achieved in the work place is essential.

In addition, due to the cross-sectional nature of this research, as mentioned previously, causation cannot be assumed. However, there has been a rather large amount of theory and research which supports the direction of the relationships within this model (e.g., Brown & Ryan, 2003; Creswell & Lindsay, 2014; Dane, 2011; Good et al., 2015).

Still, more longitudinal research focusing on the role of both positive and negative affect in the relationship between mindfulness and psychological well-being should be undertaken. Furthermore, this longitudinal research should seek to identify other possible mediators or moderators in this relationship, for example, constructs such as self-awareness, self-regulation, and emotional regulation. This would further our understanding of the mechanisms through which mindfulness affects psychological well-being.

Conclusion

There has been a trend in research concerned with elucidating the relationship between mindfulness and psychological well-being to minimize or exclude the role of positive affect in this relationship. This research clarified that positive affect does indeed contribute to this relationship as a mediator. As such, positive affect should not be excluded from future research concerned with examining mindfulness and psychological well-being. In addition, there is preliminary evidence which suggests that social factors, such as behavioural norms, may affect the strength of the relationship between mindfulness and psychological well-being. Further research should be conducted to determine if this is indeed the case, and if true, to determine the extent it affects this relationship.

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Appendix A – Mindful Attention Awareness Scale (MAAS)

From Brown & Ryan (2003)

1. I could be experiencing some emotion and not be conscious of it until some time later.
2. I break or spill things because of carelessness, not paying attention, or thinking of something else.
3. I find it difficult to stay focused on what's happening in the present.
4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.
6. I forget a person's name almost as soon as I've been told it for the first time.
7. It seems I am "running on automatic" without much awareness of what I'm doing.
8. I rush through activities without being really attentive to them.
9. I get so focused on the goal I want to achieve that I lose touch with what I am doing right now to get there.
10. I do jobs or tasks automatically, without being aware of what I'm doing.
11. I find myself listening to someone with one ear, doing something else at the same time.
12. I drive places on "automatic pilot" and then wonder why I went there.
13. I find myself preoccupied with the future or the past.
14. I find myself doing things without paying attention.
15. I snack without being aware that I'm eating.

Annex B – Perceived Stress Scale (PSS)

From Cohen, Karmarck, & Mermelstein (1983)

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and "stressed"?
4. In the last month, how often have you dealt successfully with irritating life hassles?
5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?
6. In the last month, how often have you felt confident about your ability to handle your personal problems?
7. In the last month, how often have you felt that things were going your way?
8. In the last month, how often have you found that you could not cope with all the things that you had to do?
9. In the last month, how often have you been able to control irritations in your life?
10. In the last month, how often have you felt that you were on top of things?
11. In the last month, how often have you been angered because of things that happened that were outside of your control?
12. In the last month, how often have you found yourself thinking about things that you have to accomplish?

13. In the last month, how often have you been able to control the way you spend your time?

14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Appendix C – Positive Affect – Negative Affect Scale

From Watson, Clark, and Tellegen (1988)

This scale consists of a number of words that describe different feelings and emotions.

Participants were instructed to read each item and then mark the appropriate answer in the space next to that word.

1. Interested
2. Distressed
3. Excited
4. Upset
5. Strong
6. Guilty
7. Scared
8. Hostile
9. Enthusiastic
10. Proud
11. Irritable
12. Alert
13. Ashamed
14. Inspired
15. Nervous
16. Determined
17. Attentive
18. Jittery

19. Active

20. Afraid

Appendix D – Multi-Affect Indicator (MAI)

From Warr et al. (2013)

This scale consists of a number of words that describe different feelings and emotions.

Participants were instructed to read each item and then mark the appropriate answer in the space next to that word.

1. Enthusiastic
2. Nervous
3. Calm
4. Depressed
5. Joyful
6. Anxious
7. Relaxed
8. Dejected
9. Inspired
10. Tense
11. Laid-back
12. Despondent
13. Excited
14. Worried
15. At ease
16. Hopeless

