Does Mindfulness Reduce Perceptions of False Self?

By

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Abstract

Mindfulness, as measured by the Five Factor Mindfulness Questionnaire (FFMQ), has been proposed to consist of five component facets. These facets capture the ability to observe present moment experience, to describe that experience using words, to adopt a non-reactive and non-judgemental stance to experience, and to act with awareness. Authenticity is a distinct but related construct, and refers to the perception that one's outward behaviours are in accord with one's inner thoughts, feelings, and beliefs. Levels of both mindfulness and of authenticity have been found to correlate positively with positive psychological outcomes, such as subjective wellbeing, and to correlate negatively with negative psychological outcomes, such as anxiety and depression. This thesis considered the construct of false self, as measured by the Perceptions of False Self scale (PoFS), to be antithetical to authenticity. In other words, false self refers to the experience of that one's behaviour is not in accordance with one's inner thoughts, feelings, or beliefs, leading to the unpleasant experience of inauthenticity or 'phoniness'. A negative relationship between mindfulness and false self was expected to be found. Ratings on the FFMQ and the PoFS were examined in a population of university undergraduates, both concurrently and longitudinally at four months. Hypotheses for this study were as follows: (H1) mindfulness and false self would negatively correlate, (H2) mindfulness scores would predict a decrease in false self over time, and (H3), in line with prior research, the FFMQ facet of Observing would exhibit a weaker relationship with false self compared to the other FFMQ facets. This study also proposed one research question (RQ1), which sought to determine whether the relationship between mindfulness and false self would be curvilinear such that the negative relationship would be stronger at low levels of mindfulness than at high levels. Correlation matrixes and simultaneous inclusion hierarchical regressions were conducted to investigate H1, H2, and H3, and quadratic and cubic terms were entered into regression analyses to investigate RQ1. H1 and H2 were

supported in that FFMQ scores were found to negatively predicted PoFS scores, both concurrently and over time. At the same time, PoFS scores also negatively predicted FFMQ scores over time. However, the predictive effect of mindfulness on false self was stronger than the reverse direction. H3 was supported, in that Observing tended to exhibit a weaker relationship with false self-perceptions compared to the other FFMQ facets. In answer to RQ1, no quadratic and cubic terms reached significance after correcting for the effect of multiple variables, suggesting that the relationship between false self and mindfulness can best be described as linear. The discovery of a longitudinal relationship between mindfulness and false self is a unique finding. This has important implications for the provision of mindfulness as an intervention to prevent the development of known negative psychological outcomes that result from experiences of false self.

Does Being Mindful Reduce Perceptions of False Self?

Mindfulness has been described as the tendency to attend to present-moment experience, whilst taking a non-reactive and non-judgemental stance toward that experience (Kabat-Zinn, 2014). Scale measures of mindfulness tend to correlate positively with positive psychological outcomes, for example subjective wellbeing and self-esteem (Heppner & Kernis, 2007), and correlate negatively with negative psychological outcomes, such as anxiety, depression, and personality disorders (Baer, Smith, & Allen, 2004; Baer et al., 2008; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007). Training in mindfulness through formal meditation practices has been found to increase scores on measures of general psychological wellbeing (Baer et al. 2008; Black, Semple, Pokhrel, & Grenard, 2011; Falkenström, 2010). As a result of these findings, psychotherapy which involves the teaching of mindfulness skills is now a feature of many cognitive interventions (Kabat-Zinn, 2003).

The Five Factor Mindfulness Questionnaire (FFMQ; Baer et al., 2008) is the most frequently used measure of mindfulness (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Baer et al., 2008). Because the FFMQ assesses mindfulness as a multidimensional construct, the component skills involved in mindfulness can be assessed separately, while the total score provides a measure of overall mindfulness. The FFMQ was created by combining items from multiple mindfulness measures, and factor analysis suggested that the overall construct of mindfulness is comprised of five facets, these being Observing, Describing, Non-judging, Non-reacting, and Acting with Awareness. These facets capture unique but affiliated skills, and research suggests these skills have differential relationships with measurable psychological outcomes, and also that these relationships may vary as a result of formal training in mindfulness practices (Baer et al., 2008, Coffey et al., 2010, Falkenström, 2010, Lilja, Lundh, Josefsson, & Falkenström, 2012). Thus, there is reason to examine the unique relationship of each FFMQ facet with measurable psychological outcomes.

Authenticity is related to but distinct from the construct of mindfulness, and has been described as "the unimpeded operation of one's true, or core, self in one's daily enterprise" (Heppner & Kernis, 2007). When people rate their behaviour as being generally more authentic, they are also more likely to rate themselves as being higher in relationship satisfaction, self-esteem, and subjective wellbeing (English & John, 2013; Heppner & Kernis, 2007; Lakey, Kernis, Heppner, & Lance, 2008; Wood, Linley, Maltby, Baliousis, & Joseph, 2008). The psychological correlates of authentic functioning therefore have significant clinical relevance. Because authenticity requires attention to one's internal experiential state, as well as attention to moment by moment external reality regarding one's behaviour, authenticity can be expected to overlap with the FFMQ facets of Acting with Awareness, Observing, and Describing. Furthermore, because authentic functioning requires an attitude of acceptance toward one's internal state, the FFMQ facets of Non-judging and Non-reacting can be expected to overlap with authenticity also.

False self is a construct that can be thought of diametrically opposite to authenticity, whereby individuals experience a discrepancy between their outer behaviour and their inner thoughts or emotions (Weir & Jose, 2010). Therefore, false self can be expected to manifest a negative relationship with mindfulness. However, despite significant theoretical overlap, little research has examined in detail how the distinct facets of mindfulness relate to authenticity or to false self. This thesis will attempt to fill a gap in the literature by testing the empirical relationships between the facets of mindfulness, as assessed by the FFMQ, and a unitary measure of false self.

Mindfulness and Its Measurement with the FFMQ

While the skills comprising mindfulness may be cultivated through formal meditation techniques, such as those stemming from Eastern spiritual traditions, mindfulness is also described as a "way of being", and current psychological theory sees the tendency toward

mindfulness as being present in everybody to a greater or lesser extent (Baer et al., 2008; Kabat-Zinn, 2014). The tendency to be mindful in daily life is arguably best measured through the use of self-report questionnaires because it is a profoundly intra-psychic awareness.

Until recently, scales assessing mindfulness have varied in their conceptualization, length, and structure. For example, some scales comprise a single factor, such as the Mindful Attention Awareness Scale (MAAS, Brown & Ryan, 2003). This scale assesses the general tendency to pay attention to moment-to-moment experience. Other scales comprise up to four facets, yielding both a total score and subscale scores. For example, the Kentucky Inventory of Mindfulness Skills (Baer, Smith, & Allen, 2004) assesses the tendency to observe, accept without judgement, act with awareness, and the ability to describe present moment experience. The Toronto Mindfulness Scale (Lau et al., 2006) assesses mindfulness as comprised of the facets Curiosity and Decentring. Other scales attempt to assess mindfulness as a multidimensional construct, yet yield a single overall score. An example is the Cognitive and Affective Mindfulness Scale (Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007), which assesses awareness, attention, present-moment focus, acceptance, and non-judgement in relation to thoughts and feelings in the present moment.

These scales tend to exhibit good convergent and discriminant validity. For example, scores on the MAAS were higher in individuals who practiced mindfulness meditation. Scores on the MAAS also correlated positively with openness to experience and emotional intelligence, and correlated negatively with social anxiety (Brown & Ryan, 2003). Scores on the Kentucky Inventory of Mindfulness Skills were lower in individuals with a diagnosis of borderline personality disorder (Baer et al., 2004), and scores on the Cognitive and Affective Mindfulness scale correlated negatively with experiential avoidance, anxiety, depression, worry, and thought suppression, and correlated positively with cognitive flexibility and

clarity of feelings (Feldman et al., 2004). However, divergent findings in terms of the facet structure of various scales make it difficult to define and measure the distinct skills involved in overall mindfulness. One limitation of existing mindfulness scales is that they either tend to measure mindfulness as a unidimensional construct, or they do not tap every proposed facet within the overall construct of mindfulness.

In response to the perceived shortcomings of earlier scales, Baer, Smith, Hopkins, Krietemeyer, and Toney (2006) conducted an exploratory factor analysis using items drawn from five existing mindfulness scales to develop The Five Factor Mindfulness Questionnaire (FFMQ). The FFMQ comprises five distinct yet related facets that appear to capture all relevant skills within the overall construct of mindfulness. Baer et al. (2006) have proposed that these are: Observing, Acting with Awareness (Act Aware), Describing, Non-reactivity to Inner Experience (Non-reacting), and Non-judging of Inner Experience (Non-judging). Observing refers to the noticing and attending to of present-moment feelings, thoughts, sensations and perceptions. Acting with Awareness refers to the ability to keep one's attention on present moment behaviour, without distraction. Describing refers to the ability to differentiate and label one's internal experiences, using words. Non-reacting refers to the ability to experience the flow of feelings and thoughts, without becoming caught up or upset by them. Non-judging refers to taking a non-evaluative attitude toward one's own feelings and thoughts, regardless of whether they are pleasant or unpleasant.

The FFMQ has been found to be appropriate for assessing general tendencies towards mindfulness in daily life in the general population, as well as for assessing changes in mindfulness which occur following formal mindfulness training (Baer et al., 2008). Because the FFMQ constitutes a multidimensional measure of trait mindfulness that is comprised from factor analysis of previous mindfulness scales, it can be considered to be a valid and nuanced measure of the most current research on the construct of mindfulness. Because the FFMQ is

one of the more commonly used measures of mindfulness in current research, the FFMQ was selected for use as the measure of mindfulness in the present study.

Differential Relationships between FFMQ Facets

Research suggests that the relationship between mindfulness and particular psychological outcomes may differ depending on the relative levels of each facet measured by the FFMQ. For example, one method for increasing overall mindfulness is via formal meditation practices. Formal meditation practice involves setting time aside to deliberately cultivate the skills involved in mindfulness. During meditation meditators may silently observe their own breath, or focus on the awareness of their own body sensations, in order to cultivate the skills tapped by Observing, Non-judging, and Non-reacting. Other skills measured by the FFMQ, such as Describing, and Act Aware, may flow on from these practices.

However, some evidence exists that suggests that each of these skills may not develop at the same rate. In two studies, Baer et al. (2006; 2008) found that participants who practiced meditation scored higher overall on the FFMQ, and every facet was associated with adaptive psychological processes, such as openness to experience, self-compassion, and emotional intelligence. Amongst non-meditators, all FFMQ facets except for Observing correlated positively with measures of adaptive psychological processes. However, the facet of Observing was found to correlate with measures of maladaptive psychological processes such as thought suppression, dissociation, and absent-mindedness. The positive correlations between Observing and maladaptive processes may be because non-meditators who are high in Observing may be more prone to focus on a narrower range of experiences, particularly those events which are salient and unpleasant. While the ability to observe one's experience is fundamental to the practice of mindfulness, practice in meditation may help to increase relative levels of Describing, Non-judging, Non-reacting, and Act Aware, and these skills

may help individuals to maintain a non-evaluative, compassionate, and accepting awareness of all present-moment experiences, even those which are salient and unpleasant. For example, for an individual experiencing emotional distress, focussing on the experience of rapid shallow breathing may generate more distress. If the same individual learns to notice symptoms of distress, such as the experience of rapid and shallow breathing, while at the same time as maintaining a non-judgemental, non-reactive attitude towards their experience, their distress may begin to reduce. In other words, Observing may become tied to and serve the other facets of mindfulness over time.

The differential relationship between Observing and the remaining four FFMQ facets has been indicated in other research. Falkenström (2010) investigated the effect of intensive meditation retreats on a sample of experienced meditation practitioners, by comparing them with other experienced meditation practitioners who did not attend a retreat. Participants completed the FFMQ, and a measure of subjective wellbeing, both prior to and following the retreat. Falkenström (2010) found that when age was controlled for, Non-judging correlated positively with years of meditation experience. Observing, however, was unrelated to meditation experience, possibly suggestive of a ceiling effect in this already experienced population. These results suggest that Observing may begin to be cultivated early on in mindfulness training, while the factor of Non-judging may be a skill which requires longer cultivation over time.

Results from other studies suggest that, in individuals who have not practiced meditation, Observing may increase the salience of unpleasant moods or sensations, thereby contributing to distress. For example, Coffey et al. (2010) found that the FFMQ facets of Observing and Non-judging were negatively correlated in a sample of meditation novices. However, this relationship was not significant for meditation experts. While the facet of Observing appears to correlate positively with measures of psychological distress, FFMQ

total scores appear to correlate positively with measures of clarity, negative mood regulation, and non-attachment. Clarity, negative mood regulation, and non-attachment may serve to neutralize the direct effect of Observing on distress. In other words, the unique negative effect of Observing may be buffered by higher relative levels of the other facets, such as Non-judging, which may be developed through experience with meditation (Coffey et al. 2010).

Although these studies suggest that the relative levels of FFMQ facets differ between people who practice meditation and those who do not, further research suggests that there is individual variation in the relative levels of these facets prior to an individual engaging in meditation training. Lilja, Lundg, Josefsson, and Falkenström (2012) performed a cluster analysis on data from four prior experiments, comparing groups of participants with varied experience in mindfulness-based meditation practices. When participants were grouped by their relative scores on each FFMQ facet, Lilja et al. found that meditation practitioners tended to be underrepresented in groups with low Observing scores, and overrepresented in groups with high Observing scores. However, participants who scored high in Observing did not necessarily score high in Non-judging, even if they were experienced in meditation. These results suggest that the development of mindfulness skills takes different trajectories in different individuals, based on their natural relative levels of each FFMQ facet at baseline.

In sum, prior research indicates that mindfulness is associated with lower levels of psychological distress and with higher levels of positive psychological outcomes. Furthermore, there may be differential relationships between the relative levels of mindfulness skills, as measured by the facets of the FFMQ, and psychological outcomes. The purpose of this thesis was to consider the relationship between mindfulness with a related construct, namely authenticity/inauthenticity. Despite theoretical similarities between mindfulness and authenticity, little empirical research has been conducted to explore the

association between these constructs. Before examining the theoretical relationship between mindfulness and authenticity, it will be helpful to define what is meant by authenticity, and the diametrically opposed construct which will be the focus of this research, namely false self (inauthenticity).

Authentic Functioning and Perceptions of False Self

Conceptions of a 'true self' are prevalent in folk psychology as well as in the history of psychology. The true self is conceptualised as an authentic internal psychological reality comprised of mental experiences, wishes, beliefs, and emotions. It is generally perceived to be stable over time, and may or may not be enacted through external behaviour. Authentic functioning describes behaviour which is experienced as both autonomous and congruent with one's sense of true self (Schlegel & Hicks, 2011). Goldman and Kernis (2004) propose that authenticity is comprised of four components, these being awareness, unbiased processing, behaviour, and relational orientation. First, awareness is self-awareness or the desire for knowledge regarding one's internal thoughts, characteristics, and emotions. Second, unbiased processing is the undistorted recognition of positive and negative aspects of one's internal thoughts, characteristics, and emotions. Third, behaviour refers to external actions, which are experienced as congruent with one's internal thoughts, characteristics, and emotions, rather than acting in a certain way simply to please others. Finally, relational orientation relates to the desire for close others to understand one's 'true self'. Authenticity has been described similarly by other authors as comprising three components, these being perceived congruence between a) physiological, psychological, and emotional inner states, b) conscious awareness of those states, and c) external behaviour (Wood et al., 2008).

The construct of authenticity has psychological relevance, as measures of authenticity tend to correlate positively with measures of self-esteem, life satisfaction, and positive affect. For example, Wood et al. (2008) created a scale measuring authenticity as conceptualised by

three facets: self-alienation (reverse-scored), which describes feeling ‘out of touch’ with one’s true self; authentic living, which describes congruence between one’s expressed behaviour and one’s internal thoughts and feelings; and accepting external influence (reverse-scored), which describes the degree to which an individual feels obliged to conform to the expectations of others. Overall ratings on this scale were found to correlate positively with self-reported happiness. Authenticity ratings also correlated negatively with measures of anxiety and stress, and with the tendency to accept external influence. Another study, conducted online using participants from 15 countries found that, when describing events during which participants rated themselves as feeling least like their ‘real’ or ‘true’ self, participants were more likely to rate themselves as experiencing greater negative affect, lower positive affect, lower ideal self-overlap, lower need satisfaction, lower self-esteem, and higher self-consciousness, compared with participants describing an event where they felt most like their ‘real’ or ‘true’ selves (Lenton, Slabu, Bruder, & Sedikides, 2014). These results suggest that authenticity is an important aspect of adaptive emotional and social functioning. Because conceptions of the one’s ‘true’ self in relation to significant others may vary across across cultures, the study by Lenton et al. also considered the effect of culture on how participants described authentic and inauthentic experiences. Lenton et al. found that participants from western countries (i.e., the United States, United Kingdon, Canada, New Zealand, Australia, and Ireland) were more likely than participants from China, Japan, Singapore, the Philippines, Indonesia, Malaysia, and Thailand to report experiences of authenticity that were associated with strong positive emotions, low self-esteem, and low self-consciousness. Participants from western countries were also more likely than participants from China and Japan to report experiences of inauthenticity associated with strong negative emotions, low need-satisfaction and self-esteem, and high self-consciousness. However, significant overlap occurred between cultures, suggesting that while culture may

have an effect on the way in which authenticity/inauthenticity is experienced, the psychological correlates of authenticity/inauthenticity hold across culture.

Measurement of False Self, Using the Perceptions of False Self Scale (PoFS)

While previous authors have examined the correlates of authenticity as experienced during a discrete event (Lenton et al., 2014), other research has looked at more generalised perceptions of authenticity and related constructs. False self can arguably be thought of as authenticity's opposite pole. When an individual perceives themselves to be enacting a false self, their outward actions are felt to be incongruent with their internal thoughts and emotions, or true self. Weir and Jose (2010) examined perceptions of false self in a sample of adolescents by asking them to describe experiences of overlap, and of separation, between their 'public' and 'private' selves. The themes of displaying false emotions, altering one's physical appearance to fit in or to impress others, and feeling uncomfortable expressing one's true opinion, emerged as features of the experience of false self. These themes were used to create the Perceptions of False Self scale (PoFS), a brief scale designed to assess generalised and pervasive experiences of false self, as distinct from false self as experienced during a discrete event. False self is conceptually related to self-silencing, or restricting the free expression of one's thoughts and opinions around others (Smolak & Munstertieger, 2002). For example, adolescents reporting high false self self-perceptions were more likely to endorse statements such as "I tend to say one thing even when I think another" (Lopez & Snyder, 2009; Weir & Jose, 2010). Three out of four items on the PoFS assess authenticity, for example, "I act in ways that express who I really am", and these items are reverse-coded for the construct of false self to yield a unitary total score. Reverse-coded authenticity items tend to highly load onto the overall construct of false self, thus supporting the opposite pole relationship between authenticity and false self. False self as measured by the PoFS should be distinguished from self-reports where individuals enact different selves appropriate to

different relational contexts, for example being boisterous around friends and more reserved around family members, in that false self-behaviour is subjectively experienced as feeling unpleasantly inauthentic or 'phoney' (Harter & Waters, 1991; Harter, Waters, & Whitesell, 1997). This experience of inauthentic 'phoniness' has in turn been linked to experiences of low self-esteem and depression (Neff & Harter, 2002).

The experience of false self as measured by the PoFS tends to be stable over time. For example, ratings on the PoFS were found to be relatively stable over 10 weeks (r = .84) in a sample of adolescents (Weir & Jose, 2010). Validity has been demonstrated to be good, in particular, ratings on the PoFS were found to correlate positively with measures of depression and anxiety (Weir & Jose, 2010). As anxiety and depression have been found to correlate negatively with authenticity, this set of results provides additional support for the view that false self is diametrically opposed to authenticity (Harter et al., 1997). Furthermore, longitudinal associations between measures of anxiety and depression, and ratings on the PoFS, revealed that scores on the PoFS temporally predicted anxious symptoms (Weir & Jose 2010). These findings suggest that there is clinical utility in assessing false self as a temporal predictor of distress, and that the PoFS is an effective measure for assessing the generalised experience of perceived false self.

The Relationship between Mindfulness and Authenticity

Mindfulness and authenticity are theoretically related constructs, yet only a small number of studies have explicitly explored the relationship between them. Two empirical studies have found significant positive correlations between measures of mindfulness and authenticity when examined concurrently. Kernis and Goldman (2007) found a significant positive correlation between scores on the MAAS and authenticity as measured by the Authenticity Inventory (AI-3, Kernis & Goldman, 2006), a 45-item scale that assesses awareness, unbiased processing, behaviour, and relational orientation. A second study

assessed authentic behaviour using the 'Authentic Living' subscale of the Authenticity Scale (Wood et al., 2008) and the behaviour subscale from the AI-3. When scores on these scales were associated with scores on the MAAS and the Non-judging subscale from the FFMQ, mindfulness scores were found to positively correlate with authentic behaviour scores (Tsur, Berkovitz, & Ginzburg, 2015).

Other research findings suggest that mindfulness and authenticity similarly influence particular psychological outcomes, such as self-esteem. Heppner and Kernis (2007) reviewed empirical research on mindfulness, authenticity, and self-esteem. Findings from this review suggest that greater levels of mindfulness are associated with higher levels of self-esteem. Mindfulness was also associated with self-esteem which is less contingent on external events, thus making it more stable. In support of these findings, research by Lakey, Kernis, Heppner, and Lance (2008) found that scores on the AI-3 and the MAAS were both negatively associated with scores on a measure of verbal defensiveness, the Defensive Verbal Behavior Assessment (Feldman Barrett et al., 2002), which assesses the degree to which participant are aware of, and distort, recollections of behaviour in relation to their ideal self. Lakey et al. (2008) proposed that the negative associations between mindfulness and authenticity, and verbal defensiveness, may reflect that both authenticity and mindfulness involve the ability to non-judgementally accept present moment experience, which reduces the need to act defensively. Heppner et al. (2007b) also found that participants who were given a brief mindfulness induction displayed less aggressive behaviour, and fewer hostile attribution biases, compared with controls, following negative social evaluation. Furthermore, Heppner et al. (2007b) reported that both mindfulness and authenticity were positively associated with measures of openness and non-defensiveness when describing difficult life experiences. These relationships may occur because individuals who are high in mindfulness may be less

likely to react defensively to internal thoughts or external feedback which is in conflict with one's ideal self-image.

Theoretical reasons for these convergent findings have been suggested by Carson and Langer (2006), who have defined a cognitive theory of mindfulness as involving the ability to view situations and objects from multiple perspectives, and to flexibly shift one's perspective according to context. This kind of cognitive flexibility may assist the unbiased processing required for authenticity, by allowing an individual to reframe negative experiences or personal characteristics, and thus generate self-acceptance. As Carson and Langer (2006) note, self-acceptance is a necessary component of authenticity. Cognitive and behavioural flexibility may also reduce behaviour that stems from preconceived assumptions on how one 'ought' to act, which would otherwise result in the enactment of false self. Furthermore, Carson and Langer (2006) note that mindful people may spend more cognitive resources on noticing and accepting novel aspects of both internal and external phenomena, and less on concern over negative evaluations from others and the effortful cognitive task of maintaining a false self. Related to this view, Carson and Langer (2006) report that authenticity has also been associated with high, stable self-esteem which is not contingent on the opinions of others, while conversely, false self may be created through perceptions of conditional positive regard. In this fashion, someone who is high in mindfulness may be less likely to enact aspects of a false self, as mindful behaviour is unlikely to support attempts to manage the opinions of others in order to protect fragile self-esteem.

Mindfulness and authenticity may thus relate to important indicators of psychological wellbeing, such as self-esteem, by common underlying processes such as self-awareness and self-acceptance. However, despite these few indications that the constructs of mindfulness and authenticity converge, no other research was found in the literature that explicitly explored the relationship between authenticity/false self and mindfulness. Also, every study

reported here made use of correlations based on concurrent data, thus making it impossible to infer the temporal influence of mindfulness on authenticity/false self, or vice versa. Furthermore, every study reported here used linear predictive terms, meaning that it was not possible to infer whether the correlational relationship between mindfulness and authenticity/false self may manifest curvilinear relationships. Finally, no studies to date have explored the unique relationships between authenticity and the five distinct facets of mindfulness as measured by the FFMQ.

Purpose of the Current Research

In sum, the existing literature suggests a probable negative association between mindfulness and false self. However, studies explicitly exploring the relationship between these two constructs are few. No studies have examined the longitudinal relationship between mindfulness and false self, and none have examined for the possibility of a curvilinear relationship between these constructs. Although prior research on mindfulness suggests that the facets of mindfulness as measured by the FFMQ exhibit differential relationships with one another and with associated psychological correlates, there is no research examining how distinct FFMQ facets are associated with false self. Because both mindfulness and authenticity tend to be positively associated with adaptive psychological processes, and negatively associated with maladaptive psychological processes, there is considerable clinical utility in examining these constructs. This thesis examined the relationship between mindfulness and false self in both concurrent and longitudinal data sets. Because authenticity and false self are highly inversely related to each other, the decision was made to focus on the measurement of the construct of false self (i.e., combining reverse-coded authenticity items with false self items) for purposes of clarity and efficiency. Because prior research suggests that mindfulness and false self are negatively associated (Heppner & Kernis, 2007; Tsur et al., 2015), the first hypothesis was as follows:

H1: As mindfulness has been shown to support authentic functioning, then FFMQ scores and scores on the PoFS will negatively correlate.

In addition to examining the concurrent relationship between mindfulness and false self, this thesis aimed to explore whether there was a difference in the longitudinal relationship between false self as a predictor of mindfulness, versus mindfulness as a predictor of false self. Previous literature suggests that mindfulness may affect false self by altering an individual's evaluation of their self-image (Carson & Langer, 2006; Heppner & Kernis, 2007; Lakey et al., 2008), which suggests that changes in mindfulness may precede changes in false self, rather than the other way around. Thus, the second hypothesis was as follows:

H2: When examined longitudinally, the relationship between FFMQ scores as a predictor of PoFS scores will be stronger than the relationship between PoFS scores as a predictor of FFMQ scores.

Because prior research has found that the facet of Observing tends to show a weaker – and at times inverse – relationship with positive psychological outcomes when compared with the other FFMQ facets, it was hypothesised that a weaker relationship would be found between Observing and false self, compared with the other facets. Thus, the third hypothesis was as follows:

H3: The relationship between Observing and the PoFS will be weaker compared to the relationship between the remaining FFMQ facets and the PoFS when examined both concurrently and longitudinally. The other four mindfulness facets are expected to yield significant negative relationships with the measure of false self.

Finally, this research also aimed to explore the curvilinear relationships between mindfulness and false self, both concurrently and longitudinally. This thesis sought to determine whether the negative relationship predicted between mindfulness and false self

would manifest a ‘diminishing returns’ quadratic pattern, i.e., strongly negative at low levels of mindfulness but decreasingly negative at higher levels of mindfulness, or an increasingly shallower slope over time (see Grant & Schwartz, 2011). Thus, the only research question was as follows:

RQ1: Would reliable curvilinear relationships between mindfulness facets and false self-perceptions be identified?

Method

Participants

Participants were undergraduate psychology students enrolled in two separate psychology courses, here named Term 1 and Term 2. Term 1 is a required second year research methods course, while Term 2 is a required third year research methods course. Term 1 and Term 2 constituted two different concurrent data sets. The longitudinal data set was comprised of a separate sample of undergraduate psychology students drawn from the School of Psychology’s subject pool. In the longitudinal data set, participants were assessed at two time points (T1 and T2), four weeks apart. Participant demographics for each data set are presented in Table 1.

Table 1

Frequency of participants in each age and gender category, by data set

	Concurrent		*Longitudinal*	
	Term 1	*Term 2*	*T1*	*T2*
Gender				
Female	260	191	166	
Male	81	55	61	
Unknown/other	2	1	1	
Age (years)				
18-19	178	12	-	-
20-25	127	202	-	-
26-30	16	12	-	-
31+	19	19	-	-
17-18	-	-	142	133
19-20	-	-	57	68
21-23	-	-	16	18
24-31	-	-	9	8
31+	-	-	1	1
Unknown	-	-	3	0
Total	343	247	288	

Note: Questionaries administered to participants in the concurrent and longitudinal data sets made use of different age-bracket categories

Materials

Questionnaires were administered to participants online using desktop computers. The entire survey was comprised of a number of scales including the FFMQ and the PoFS. Regression analyses were conducted using the program IBM SPSS Statistics 23. Path modelling was conducted using the program IBM SPSS Amos 23.

Measures. ***The PoFS.*** The Perception of False Self scale is a 17-item scale designed to assess generalised experiences of false self (Weir & Jose, 2010). Three items are oriented to assess authenticity (e.g., "I act in ways that express who I really am"), and these items are reverse-coded. The PoFS was developed based on qualitative interviews with adolescents, and existing research on conceptualisations of false self. Participants rate their agreement with each item on a five-point Likert scale ranging from one (*strongly disagree*) to five (*strongly agree*). Items relate to the areas of appearance/presentation ("I hide the real me by looking like others"), false emotions ("I hide my true feelings if I think they will upset others"), and lack of voice ("I stay quiet when I don't agree with others"). In order to fit the measure into a large, multi-measure survey, a shortened version of the scale was used: items relating to authenticity were excluded, and ten of the 17 PoFS items specifically relating to false self were included in the current analyses. Internal reliability has been reported at α = .88, and 10 week test-retest reliability has been reported at r = .84 (Weir & Jose, 2010). The PoFS also correlates positively with measures of depression (r = .62) and anxiety (r = .61), and has good convergent validity with other scale measures of false self (the Say What I think Scale, Harter & Waters, 1991; and the Silencing the Self Scale Jack, 1991). For the full list of items on the PoFS, see Weir and Jose, 2010.

The Five Factor Mindfulness Questionnaire (FFMQ). The FFMQ was developed by Baer et al. (2008) from existing scale measures of mindfulness, using exploratory and confirmatory factor analysis to generate a five-factor solution. The five FFMQ factors represent distinct yet related facets of trait mindfulness, which correlate with the overall mindfulness construct. Internal consistency (Cronbach's alpha) for the FFMQ facets range from .75 to .91, and overall scores on the FFMQ correlate positively with indicators of positive psychological outcomes such as self-compassion and emotional intelligence, and correlate negatively with negative psychological outcomes such as psychiatric symptoms.

Participants completing the original FFMQ rate their agreement on 39 items on a five-point Likert scale ranging from one (*never or very rarely true*) to five (*very often or always true*). In order to reduce completion time, we used a modified FFMQ, which comprises five items for each of the five facets. FFMQ facets with item exemplars are presented in Table 2. For the full list of FFMQ items, see Baer et al., 2006.

Table 2

FFMQ facets with item exemplars

FFMQ Facet	Item exemplar
Observing	*"When I'm walking, I deliberately notice the sensations of my body moving"*
Describing	*"I'm good at finding words to describe my feelings"*
Act Aware	*"When I do things, my mind wanders off and I'm easily distracted" (reverse coded)*
Non-judging	*"I criticise myself for having irrational or inappropriate emotions" (reverse coded)*
Non-reacting	*"I perceive my feelings and emotions without having to react to them"*

Procedure

Participants in the two concurrent data sets were recruited during lab sessions associated with second (Term 1) and third year (Term 2) research methods courses. Participants completed an online survey comprising a number of scale measures including the FFMQ and the PoFS. Participants in the separate longitudinal data set were recruited from a subject pool procedure, which included only first year introductory psychology students. These participants took part at two time points separated by four weeks. All data collection efforts were granted ethical approval by the Victoria University of Wellington ethics

committee, and participants provided written consent for their involvement. Participation was voluntary and participants were advised that they were free to withdraw at any time.

Data Analysis Plan

Correlations. To investigate H1, correlations between FFMQ facet scores and FFMQ total score, and the PoFS, were examined using correlation matrices of the concurrent Term 1 and Term 2 data sets, and of the longitudinal data set at T1 and T2. In order to test whether the general strength of relationships were equivalent in Term 1 and Term 2 data sets, and at T1 and T2 in the longitudinal data set, an equality constraints analysis was conducted across the two data sets.

Longitudinal path model with FFMQ total score and the PoFS. To investigate H2, the longitudinal relationship between FFMQ total score at T1 and the PoFS at T2 was examined using path modelling. The path model was then pruned, whereby non-significant paths were removed from the model. To complete the investigation of H2, the same longitudinal analysis using the reverse order of variables was then conducted in order to determine whether temporality made a difference.

Multiple regression including polynomial terms. To investigate H3, a multiple regression was conducted on each data set to examine the relationships between each FFMQ facet and the PoFS, while controlling for the effects of the remaining facets. To investigate RQ1, quadratic and cubic terms were created by respectively squaring and cubing FFMQ facet scores, FFMQ total score, and PoFS score for each data set. Simultaneous inclusion hierarchical regressions were then conducted for each FFMQ facet, using these polynomial terms. FFMQ facet terms were initially treated as the independent variables. In the first step, the linear term was entered. In the second step, the quadratic term was entered. In the third step, the cubic term was entered. PoFS score was treated as the dependent variable. For longitudinal data, residualization of the dependent variable was achieved by entering PoFS

score at T1 as an additional independent variable on PoFS score at T2 as the dependent variable. Polynomial terms of FFMQ total score were entered in separate steps in the regression, using the same process. To investigate directionality, separate hierarchical regressions were then conducted treating linear, quadratic, and cubic terms of the PoFS as independent variables, and each FFMQ facet and total score as the dependent variable. For longitudinal data, residualization of the dependent variable was achieved by entering the FFMQ facet or total score at T1 as an additional independent variable on the FFMQ facet or total score at T2 as the dependent variable. To correct for the effect of numerous regression analyses on the same variables, a Sidak adjustment was then performed. This adjustment recommended that the *p*-value be lowered from $p = .05$ to $p = .006$. Thus, relationships that met the standard significance criteria of $p = .05$ were reported, while only relationships that reached significance at $p = .006$ were interpreted.

Treatment of Missing Values

Each variable was tested for skewness and kurtosis, and all variables were found to be within acceptable range. Skewness values for PoFS score across each data set ranged from -.120 to .204, while kurtosis values ranged between -.313 and .042. Skewness values for FFMQ total score across each data set ranged between -.146 and .430, kurtosis values ranged from .602 and 1.48.

Results

Descriptive Statistics

Overall, participants tended to report moderate levels of mindfulness (as measured by moderate overall scores on the FFMQ) and low levels of false self (as measured by low scores on the PoFS). Means and standard deviations for FFMQ facets, FFMQ total score, and PoFS score in each data set are presented in Table 3.

Table 3

Means and standard deviations for each FFMQ facet, FFMQ total score, and PoFS score, in each data set

	Act A	Des	Non J	Non R	Obs	FFMQ total	PoFS
Term 1	3.28 (.62)	3.08 (.85)	3.32 (.76)	2.99 (.88)	3.68 (.70)	3.27 (.51)	2.86 (.76)
Term 2	3.35 (.58)	3.10 (.82)	3.36 (.76)	3.08 (.84)	3.69 (.70)	3.31 (.51)	2.81 (.61)
T1	4.46 (.60)	4.00 (.82)	3.98 (.83)	2.91 (.72)	4.30 (.67)	4.04 (.41)	2.92 (.66)
T2	4.48 (.62)	3.98 (.83)	4.11 (.69)	2.93 (.73)	4.28 (.71)	4.03 (.44)	2.92 (.69)

Note: Measurement was on a 1 to 5 Likert scale. Standard deviations are shown in brackets.

Associations between FFMQ Total Score and PoFS Score

H1 proposed that when examined concurrently, FFMQ total score would correlate negatively with PoFS score. H2 proposed that changes in FFMQ score would negatively predict changes in PoFS score when examined longitudinally. Consistent with H1 and H2, significant negative relationships were found between FFMQ total score and PoFS score in each data set, when examined both concurrently and longitudinally. Pearson correlations between FFMQ total score and PoFS scores for each data set are presented in Table 4.

Table 4

Pearson correlations between FFMQ total score and PoFS score for each data set

Data set	Pearson coefficient (FFMQ total score / PoFS)
Term 1 (concurrent)	-.542***
Term 2 (concurrent)	-.503***
T1 (concurrent)	-.548 ***
T2 (concurrent)	-.605 ***
T1 – T2 (longitudinal)	-.573***

Key: ^{NS} Non significant, $^{\dagger}p < .10$ *$p = .05$, **$p = .01$, ***$p < .001$.

Associations between FFMQ Facet Scores and PoFS Score

H3 proposed that a weaker relationship would be found between the FFMQ facet Observing and PoFS score, compared with the other FFMQ facets. To investigate H3, correlation matrixes were created for each data set to investigate the basic relationships between each FFMQ facet and PoFS score.

Term 1 data set. H1 was supported in that significant negative relationships were obtained between each FFMQ facet and PoFS score. H3 was also supported, in that Observing exhibited a weaker relationship with PoFS score (r = -.17) compared to the relationships between the remaining FFMQ facets and PoFS score (r = -.40 to -.54). A weaker relationship between Observing and FFMQ total score was also found (r = .50), compared to between the remaining facets and FFMQ total score (r = .67 to .74). Internal reliability for each subscale was adequate (αs = .67 - .83). Internal reliability for the overall FFMQ in the Term 1 data set was adequate, α = .69 (see Table 5), indicating that FFMQ facet scores reflected related components of a central underlying construct.

Table 5

Pearson correlations between each FFMQ facet, FFMQ total score, and the PoFS, in Term 1 data set. Internal reliability coefficients for each subscale are reported in diagonal.

	Des	**Non-J**	**Non-R**	**Obs**	**Act-A**	**FFMQ total**
Des	α = .83					
Non-J	.354***	α = .67				
Non-R	.280***	.554**	α = .83			
Obs	.153**	.165**	.147**	α = .71		
Act-A	.382***	.372***	.350***	.303***	α = .67	
FFMQ total	.670***	.742***	.730***	.499***	.684***	α = .69
PoFS	-.419***	-.437***	-.374***	-.171**	-.398***	-.542***

Key: ^{NS} Non significant, †p < .10 *p = .05, **p = .01, ***p <.001.

Term 2 data set. A similar pattern of results was obtained as in the Term 1 data set and H1 was supported, in that significant negative relationships were found between each FFMQ facet and PoFS score. H3 was supported in that the facet of Observing exhibited a weaker relationship to PoFS score (r = -.27) compared to the relationships between the remaining FFMQ facets and PoFS score (r = -.28 to -.44). Observing also exhibited a weaker relationship with total FFMQ score (r = .50), compared to the relationship between the remaining facets and FFMQ total score (r = .69 to .78). Internal reliability for each subscale was adequate (αs = .73 - .83. Internal reliability for the FFMQ in this data set was adequate at α = .72 see Table 6), indicating that FFMQ facet scores reflected related components of a central underlying construct.

Table 6

Pearson correlations between each FFMQ facet, FFMQ total score, and the PoFS, in Term 2 data set. Internal reliability coefficients for each subscale are reported in diagonal.

	Des	**Non-J**	**Non-R**	**Obs**	**Act-A**	**FFMQ total**
Des	α = .82					
Non-J	.461***	α = .79				
Non-R	.382***	.527**	α = .83			
Obs	.177**	.241***	.106†	α = .73		
Act-A	.463***	.396***	.368***	.259***	α = .78	
FFMQ total	.739***	.755***	.722***	.497***	.688***	α = .72
PoFS	-.417***	-.443***	-.275***	-.270**	-.317***	-.503***

Key: ^{NS} Non significant, †p < .10 *p = .05, **p = .01, ***p <.001.

T1 concurrent data set. A similar pattern of results was obtained as in Term 1 and Term 2 data sets, and H1 was supported in that significant negative relationships were obtained between each FFMQ facet and total score, and PoFS score, other than for Non-reacting, which was marginally significant. H3 was supported in that the relationship between Observing and PoFS score was weaker (r = .17) compared to the relationship between the remaining FFMQ facets and PoFS score (r = .32 to .55). The relationship between Observing and FFMQ total score was also weaker (r = .52) compared to the relationship between the remaining FFMQ facets and FFMQ total score (r = .56 to .72), other than for Non-reacting, which was also r = .52. Internal reliability for each subscale was adequate (αs = .67 - .81). Internal reliability for the FFMQ in this data set was lower than in the Term 1 and Term 2 data sets, and was marginally acceptable at α = .55 (see Table 7), indicating that FFMQ facet scores tended to hang together as a unitary construct in the T1 data set.

Table 7

Pearson correlations between each FFMQ facet, FFMQ total score, and the PoFS, in T1 concurrent data set. Internal reliability coefficients for each subscale are reported in diagonal.

	Des	**Non-J**	**Non-R**	**Obs**	**Act-A**	**FFMQ total**
Des	α = .81					
Non-J	.228**	α = .67				
Non-R	.079NS	.272***	α = .74			
Obs	.118†	.125†	.161†	α = .74		
Act-A	.325***	.306***	.194**	.261***	α = .80	
FFMQ total	.561***	.665***	.521***	.516***	.721***	α = .55
PoFS	-.317***	-.551***	-.135†	-.171**	-.433***	-.548***

Key: NS Non significant, †p < .10 **p* = .05, ***p* = .01, ****p* <.001.

T2 concurrent data set. The same basic pattern of results was found as for the remaining data sets. H1 was supported in that significant negative relationships were found between every FFMQ facet, FFMQ total score, and PoFS score. H3 was supported in that the weakest of these relationships was between Observing and PoFS score (r = -.22) compared to between the remaining facets and PoFS score (r = -.28 to -.55). A weaker relationship was also found between Observing and total FFMQ score (r = .54) compared to between the remaining facets and total FFMQ score (r = .56 to .69). Internal reliability for each subscale was adequate (αs = .76 - .86). Internal reliability for the FFMQ in this data set was acceptable at α = .62, indicating that FFMQ facet scores tended to hang together well in the T2 data set (see Table 8).

Table 8

Pearson correlations between each FFMQ facet, FFMQ total score, and the PoFS, in T2 concurrent data set. Internal reliability coefficients for each subscale are reported in diagonal.

	Des	**Non-J**	**Non-R**	**Obs**	**Act-A**	**FFMQ total**
Des	α = .86					
Non-J	.184**	α = .82				
Non-R	.214**	.413***	α = .80			
Obs	.174**	.165†	.199**	α = .82		
Act-A	.360***	.301***	.213**	.271***	α = .76	
FFMQ total	.564***	.687***	.621***	.539***	.688***	α = .62
PoFS	-.415***	-.546***	-.283***	-.218**	-.449***	-.605***

Key: NS Non significant, †p < .10 **p* = .05, ***p* = .01, ****p* <.001.

T1 and T2: Longitudinal associations. H2 proposed that when examined longitudinally, FFMQ facet scores would negatively predict PoFS score. H3 proposed that the weaker relationship between Observing and PoFS score, compared with those between the remaining FFMQ facets and PoFS score, would be consistent when examined longitudinally as well as concurrently. To investigate H2 and H3, a third correlation matrix was conducted to compare relationships between FFMQ facets, FFMQ total score, and PoFS score at T1 and at T2 in the longitudinal data set. Test-retest reliability for the overall FFMQ total score was *r* = .75. H1 was supported in that the same pattern of results emerged as with the other data sets examined, in that there were significant negative relationships between FFMQ facet scores at T1 and PoFS score at T2. H3 was also supported in that the facet of Observing at T1 exhibited a weaker relationship with PoFS score at T2 (*r* = -.14) compared to the relationship between the remaining facets at T1 and PoFS score at T2 (*r* = -.19 to -.51). Similar to

previous data sets, there was a weaker relationship between Observing at T1 and FFMQ total score at T2 (r = .35) compared to the relationship between the remaining FFMQ facets at T1 and FFMQ total score at T2 (r = .45 to r = .54, see Table 9).

Table 9

Pearson correlations between FFMQ facets and the PoFS at T1 and FFMQ facets and the PoFS at T2

	Des T2	**Non-J T2**	**Non-R T2**	**Obs T2**	**Act A T2**	**FFMQ total T2**	**PoFS T2**
Des T1	.702***	.244***	.089 ^{NS}	.111†	.304***	.468***	-.371***
Non-J T1	.131*	.669***	.302***	.089 ^{NS}	.260***	.491***	-.513***
Non-R T1	.107 ^{NS}	.307***	.621***	.161*	.207**	.435***	-.185**
Obs T1	.089 ^{NS}	.120†	.046 ^{NS}	.668***	.166*	.345***	-.136**
Act A T1	.310***	.268***	.119†	.242***	.690***	.538***	-.338***
FFMQ total T1	.402***	.522***	.360***	.4373***	.514***	.706***	-.487***
PoFS T1	-.375***	-.494***	-.178***	-.210**	-.451***	-.573***	.754***

Key: ^{NS} Non significant, †p < .10 *p = .05, **p = .01, ***p <.001.

Equality constraints analyses. These analyses were conducted in path analysis in order to compare the strengths of relationships between Term 1 and Term 2 data sets, and between T1 and T2 in the longitudinal data set. Each comparison was evaluated by the chi-square change test, and all findings were found to be non-significant (all parameters were p > .05), so it can be concluded that associations noted at one point in time were similar to associations noted at a later point in time.

Overall Regression Findings: Path Model

H2 predicted that changes in FFMQ total score would negatively predict changes in PoFS score over time. In order to fully investigate H2 by comparing the relative strength of FFMQ total score at T1 as a predictor of PoFS score at T2, versus the strength of PoFS score

at T1 as a predictor of FFMQ score at T2, a path model was created to depict the fully saturated path model between FFMQ total score and PoFS score across all data sets. This path model indicated that FFMQ total score at T1 had a significant negative relationship with PoFS score at T2. At the same time, PoFS score at T1 had a significant negative relationship with FFMQ total score at T2. However, the relationship between FFMQ total score at T1 and PoFS score at T2 was stronger than the relationship between PoFS score at T1 and FFMQ total score at T2. To test whether the difference between these relationships was significant, a chi-square equality constraint test was conducted. The difference between these relationships was found to be significant at the $p < .001$ level. This indicates that changes in FFMQ total score at T1 had a stronger negative effect on PoFS score at T2, rather than the reverse order (see Figure 1).

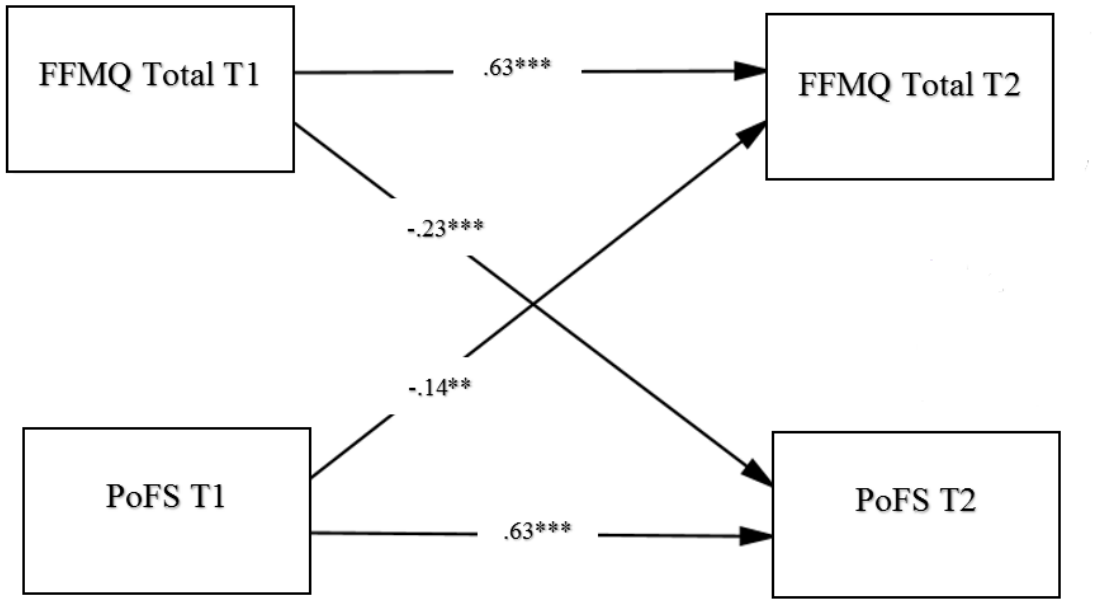

Figure 1. Path model showing the longitudinal relationship between overall FFMQ score PoFS score, at T1 and T2. Numbers depict standardized regression weights.

Key: * $p < .05$, ** $p < .01$, *** $p < .001$.

Regression Findings with FFMQ Facet Scores as Predictors of PoFS Score: Concurrent Associations

H1 and H2 proposed that when the relative effects of the remaining variables were controlled for, each FFMQ facet would exhibit a negative relationship with PoFS score both concurrently, and over time. H3 proposed that a weaker relationship would be found between Observing and PoFS score when the relative effects of the remaining variables had been controlled for, compared to the relationship between the other FFMQ facets and PoFS score. RQ1 queried whether the negative relationship between the FFMQ facet scores and PoFS score would be stronger at low levels of FFMQ score than at high levels of FFMQ score. Thus, in order to examine the curvilinear relationship between FFMQ facet scores and PoFS score, linear, quadratic, and cubic terms were created for each FFMQ facet. Simultaneous

hierarchical regressions were then conducted for each data set, with linear, quadratic, and cubic FFMQ facet score terms entered hierarchically as independent variables. Separate regressions were then conducted for each data set using the same process, with polynomial terms of FFMQ total score as the independent variables. PoFS was treated as the dependent variable in all cases. This was followed by a Sidak adjustment to correct for numerous analyses on the same variables. This adjustment recommended that the *p*-value be lowered from $p = .05$ to $p = .006$. Thus, relationships in the regression analysis that reached the standard significance criteria of $p = .05$ were reported, while only relationships that reached significance at $p = .006$ were interpreted.

Term 1. H1 was partially supported in that, when the relative effect of each FFMQ facet was controlled for, a significant negative association was obtained at the level of $p = .006$ between PoFS score and the linear terms of Describing, Non-judging, and FFMQ total score. H3 was partially supported in that the relationship between PoFS score and Observing was small and statistically non-significant, however, the relationship between PoFS score and Act Aware, and also Non-reacting, was also non-significant. RQ1 could not be answered, as none of the quadratic or cubic FFMQ facet terms reached significance at $p = .006$ (see Table 10).

Table 10

Summary of multiple regression analysis using linear, quadratic, and cubic terms of each FFMQ facet and FFMQ total as predictors of PoFS score, in Term 1 data set

	Unstandardized coefficients		*Standardized coefficients*				
Predictor	*B*	*SE B*	*β*	*t*	R^2	AR^2	ΔR^2
Linear					.314	.304	.314***
Constant	*5.382*	.246		21.910***			
Act Aware	-.219	.006	-.176	-3.330**			
Describing	-.214	.046	-.237	-4.692***			
Non-judging	-.217	.057	-.216	-3.799***			
Non-reacting	-.107	.048	-.122	-2.216*			
Observing	-.030	.052	-.027	-.573			
FFMQ total	-.816	.068	-.542	-11.925***	.294	.294	.294***
Constant	5.527	.226		24.412***			
Quadratic					.324	.304	.010
Constant	4.707	.915		5.144***			
Act Aware	-.114	.065	-.599	-1.765†			
Describing	.022	.037	.151	.591			
Non-judging	-.044	.049	-.293	-.884			
Non-reacting	.045	.039	.317	1.148			
Observing	.033	.055	.218	.596			
FFMQ total	-.019	.084	-.086	-.231	.294	.290	.000
Constant	5.318	.933		5.702***			
Cubic					.350	.321	.026*
Constant	.939	2.719		.345			
Act Aware	.104	.054	2.813	1.926†			
Describing	-.019	.031	-.667	-.618			
Non-judging	.119	.046	4.315	2.591**			
Non-reacting	-.035	.031	-1.231	-1.106			
Observing	-.041	.053	-1.554	-.773			
FFMQ total	.102	.093	3.277	1.100	.297	.291	.003
Constant	1.713	3.407		.503			

Key: †p < .10 *p = .05, **p = .01, ***p <.001. Significant associations are determined by Sidak correction of p = .006.

Term 2. The same basic pattern of results was obtained in the Term 2 as in the Term 1 data set. H1 was partially supported in that, when the relative effect of each FFMQ facet was controlled for, a significant negative association was obtained at the level of $p = .006$ between PoFS score and the linear terms of Describing, Non-judging, and FFMQ total score. H3 was partially supported in that the relationship between PoFS score and Observing was small and statistically non-significant, however, the relationship between PoFS score and Act Aware, and also Non-reacting, was also non-significant. RQ1 could not be answered, as none of the quadratic or cubic FFMQ facet terms reached significance at $p = .006$ (see Table 11).

Table 11

Summary of multiple regression analysis using linear, quadratic, and cubic terms of each FFMQ facet and FFMQ total as predictors of PoFS score, in Term 2 data set

	Unstandardized coefficients		*Standardized coefficients*				
Predictor	*B*	*SE B*	*β*	*t*	R^2	AR^2	ΔR^2
Linear					.279	.264	.279***
Constant	*4.796*	.243		19.720***			
Act Aware	-.063	.068	-.060	-.925			
Describing	-.175	.049	-.236	-3.576***			
Non-judging	-.221	.056	-.273	-3.931***			
Non-reacting	-.003	.048	-.004	-.055			
Observing	-.128	.050	-.147	-2.565*			
FFMQ total	-.603	.066	-.503	-9.147***	.253	.250	.253***
Constant	4.817	.221		21.802***			
Quadratic					.542	.294	.015
Constant	4.403	.898		4.904***			
Act Aware	-.060	.064	-.060	-.938			
Describing	.083	.042	.083	1.985*			
Non-judging	-.005	.049	-.005	-.102			
Non-reacting	-.028	.039	-.028	-.724			
Observing	-.016	.054	-.016	-.296			
FFMQ total	-.025	.081	-.139	-.311	.253	.247	.000
Constant	4.552	.882		5.163***			
Cubic					.544	.296	.002
Constant	4.028	2.427		1.659***			
Act Aware	.004	.053	.004	.083			
Describing	-4.146E-	.037	-.002	-.001			
Non-judging	-.019	.047	-.019	-.403			
Non-reacting	.029	.035	.029	.835			
Observing	.006	.054	.006	.112			
FFMQ total	-.026	.082	-7.44	-.318	.254	.244	.000[N]
Constant	5.240	2.334		2.245*			

Key: †p < .10 *p = .05, **p = .01, ***p <.001. Significant associations are determined by Sidak correction of p = .006.

Term 1 and Term 2 equality constraints analysis. An equality constraints analysis was conducted to investigate whether the relationships between Term 1 and Term 2 data sets were invariant. This analysis indicated that the two data sets were equivalent regarding the strengths of relationships (all parameters were $p > .05$).

T1 concurrent. H1 was partially supported, in that significant negative relationships were obtained between PoFS scores and Act Aware, Non-judging, and FFMQ total score. H3 was partially supported in that the strength of the relationship between PoFS score and Observing was small and non-significance, however, the relationships between PoFS score and Non-reacting, and also Describing were also non-significant. RQ1 could not be answered in this data set, as none of the quadratic and cubic terms of FFMQ total score reached significance at $p = .006$ (see Table 12).

Table 12

Summary of multiple regression analysis using linear, quadratic, and cubic terms of each FFMQ facet as predictors of PoFS score, in T1 concurrent data set

	Unstandardized coefficients		*Standardized coefficients*				
Predictor	*B*	*SE B*	*β*	*t*	R^2	AR^2	ΔR^2
Linear					.400	.386	.400***
Constant	6.579	.345		19.046***			
Act Aware	-.275	.064	-.251	-4.286***			
Describing	-.106	.045	-.131	-2.365*			
Non-judging	-.475	.059	-.454	-8.005***			
Non-reacting	.050	.050	.055	.995			
Observing	-.042	.054	-.042	-.778			
FFMQ total	-.885	.090	-.548	-9.844***	.300	.297	.300***
Constant	6.493	.365		17.787***			
Quadratic					.410	.410	.010
Constant	5.467	1.752		3.121**			
Act Aware	-.115	.066	-.942	-1.760†			
Describing	.028	.041	.280	.681			
Non-judging	.050	.067	.410	.749			
Non-reacting	.021	.050	.138	.412			
Observing	-.020	.067	-.177	-.301			
FFMQ total	.011	.125	.058	.090	.300	.294	.000
Constant	6.682	2.138		3.125**			
Cubic					.417	.385	.007
Constant	8.355	2.971		2.813**			
Act Aware	-	-	-	-			
Describing	-.057	.035	-3.608	-1.639			
Non-judging	-	-	-	-			
Non-reacting	.002	.046	.072	.046			
Observing	-	-	-	-			
FFMQ total	-	-	-	-	-	-	-
Constant	-	-		-			

Key: †p < .10 *p = .05, **p = .01, ***p <.001, - Term not entered into regression analysis due to high collinearity. Significant associations are determined by Sidak correction of p = .006.

T2 concurrent. H1 was partially supported in that significant negative relationships were obtained between PoFS score and the linear terms of Act Aware, Describing, Non-judging and FFMQ total score. H3 was partially supported in that the relationship between PoFS score and the linear term of Observing was small and non-significant, however, the relationship between PoFS score and the linear term of Non-reacting was also non-significant. RQ1 could not be answered, as none of the quadratic and cubic terms reached significance at $p = .006$ (see Table 13).

Table 13

Summary of multiple regression analysis using linear, quadratic, and cubic terms of each FFMQ facet as predictors of PoFS score, in T2 concurrent data set

	Unstandardized coefficients		*Standardized coefficients*				
Predictor	*B*	*SE B*	*β*	*t*	R^2	AR^2	ΔR^2
Linear					.445	.432	.445***
Constant	6.764	.322		21.017***			
Act Aware	-.242	.063	-.218	-3.842***			
Describing	-.209	.045	-.251	-4.611***			
Non-judging	-.425	.056	-.428	-7.556***			
Non-reacting	.002	.054	.002	.044			
Observing	-.044	.051	-.046	-.868			
FFMQ total	-.948	.083	-.605	-11.425***	.366	.363	.366***
Constant	6.734	.336		20.043***			
Quadratic					.453	.428	.009
Constant	6.911	1.424		4.853***			
Act Aware	-.032	.065	-.262	-.496			
Describing	-.034	.042	-.317	-.807			
Non-judging	.058	.053	.488	1.098			
Non-reacting	-.045	.050	-.277	-.900			
Observing	.041	.056	.358	.730			
FFMQ total	-.032	.103	-.165	-.312	.366	.361	.000
Constant	6.222	1.678		3.709			
Cubic					.470	.438	.017†
Constant	9.605	3.412		2.815**			
Act Aware	-	-	-	-			
Describing	-.006	.031	-.380	-.209			
Non-judging	.007	.045	.366	.148			
Non-reacting	-.101	.039	-2.994	-2.557*			
Observing	-	-	-	-			
FFMQ total	-	-	-	-	-	-	-
Constant	-	-		-			

Key: †p < .10 *p = .05, **p = .01, ***p <.001, - Term not entered into regression analysis due to high collinearity. Significant associations are determined by Sidak correction of p = .006.

FFMQ as a Predictor of PoFS Scores: T1 and T2 Longitudinal Associations

H2 proposed that all linear FFMQ terms at T1 would manifest a negative longitudinal relationship with PoFS score at T2, and H3 proposed that the relationship between the facet Observing at T1 and PoFS score at T2 would be weaker compared to the relationship between the remaining FFMQ facets at T1 and PoFS score at T2. RQ1 involved the investigation of curvilinear relationships between the FFMQ and the PoFS. To investigate H2, H3, and RQ1, linear, quadratic, and cubic terms were created for each FFMQ facet at T1. A simultaneous inclusion multiple regression was then conducted. The linear, quadratic, and cubic T1 FFMQ facet terms were entered hierarchically as independent variables, and PoFS scores at T2 was entered as the dependent variable. PoFS scores at T1 were entered on the first step to residualize all cross-lag relationships.

H2 was partially supported, in that a significant negative relationship was obtained between the linear term of FFMQ at T1 and PoFS score at T2. However, no significant relationships were obtained between the linear FFMQ facet terms and PoFS score. H3 was partially supported in that the relationship between the linear term of Observing at T1 and PoFS score at T2 was small ($\beta = -.04$) compared to the remaining facet terms ($\beta = -.08$. to $\beta = -.10$) other than for Non-reacting ($\beta = .04$). RQ1 could not be answered as none of the quadratic or cubic terms reached significance at $p = .006$ (see Table 14).

Table 14

Summary of multiple regression analysis using linear, quadratic, and cubic terms of each FFMQ facet and FFMQ total at T1 as predictors of PoFS score at T2

	Unstandardized coefficients		*Standardized coefficients*				
Predictor	*B*	*SE B*	*β*	*t*	R^2	AR^2	ΔR^2
Linear					.611	.600	.042***
Constant	2.655	.474		5.598***			
PoFS T1	.644	.057	.614	11.337***	.569	.567	.569***
Act Aware	-.118	.056	-.102	-2.081*			
Describing	-.101	.038	-.120	-2.639**			
Non-judging	-.090	.057	-.082	-1.571			
Non-reacting	-.034	.043	-.036	-.805			
Observing	-.050	.045	-.048	-1.095			
FFMQ total	.791	.046	.754	17.267***	.602	.434	.037***
Constant	.611	.137		4.465***			
Quadratic					.616	.596	.005
Constant	3.836	1.518		2.526**			
Act Aware	.076	.056	.596	1.366			
Describing	-.009	.035	-.090	-.271			
Non-judging	.028	.057	.217	.491			
Non-reacting	-.033	.042	-.209	-.770			
Observing	-.018	.057	-.149	-.314			
FFMQ total	.157	.098	.769	1.604	.610	.605	.433
Constant	-	-		-			
Cubic					.626	.604	.011*
Constant	4.513	2.545		1.773†			
Act Aware	-	-	-	-			
Describing	.033	.029	2.026	1.139			
Non-judging	-	-	-	-			
Non-reacting	-.081	.039	-2.596	-2.073*			
Observing	-	-	-	-			
FFMQ total	-	-	-	-	-	-	-
Constant	-	-		-			

Key: †p < .10 *p = .05, **p = .01, ***p <.001, - Term not entered into regression analysis due to high collinearity. Significant associations are determined by Sidak correction of p = .006.

Testing the Reverse Order: PoFS Score as a Predictor of FFMQ Scores

To test for the directionality of relationships, quadratic and cubic terms were created for PoFS score for each data set. Because testing the directionality of these relationships involved multiple dependent variables (each of the five FFMQ facets and FFMQ total score), separate hierarchical regressions were estimated for each significant FFMQ facet and FFMQ total score. Linear, quadratic, and cubic terms of PoFS score were assigned as the independent variables, and FFMQ facet or total score as the dependent variables. This was followed by a Sidak adjustment to correct for numerous analyses on the same variables. This adjustment recommended that the p-value be lowered from p=.05 to p=.006.

Term 1. H1 was supported in that five significant linear relationships were obtained between PoFS score and FFMQ facet scores. H3 was supported in that the weakest relationship was obtained between the linear term of PoFS score and Observing (β = -.17) compared to the relationships between the linear term of PoFS score and the remaining FFMQ scores (βs = -.37 to -.44). For RQ1, no relationships between FFMQ scores and the PoFS quadratic or cubic terms reached significance. Significant results are reported in Table 15.

Table 15

Summary of significant results from separate regression analyses using linear, quadratic, and cubic terms of the PoFS as predictors of FFMQ facets in Term 1 data set

	Unstandardized coefficients		*Standardized coefficients*				
Predictor	*B*	*SE B*	*β*	*t*	R^2	AR^2	ΔR^2
(DV: Act Aware)							
Constant	4.198	.118		35.453***			
Linear PoFS	-.321	.040	-.398	-8.014***	.159	.156	.159***
(DV: Describing)							
Constant	4.407	.161		27.316***			
Linear PoFS	-.464	.055	-.419	-8.518***	.175	.173	.175***
(DV: Non-judging)							
Constant	4.561	.143		31.812***			
Linear PoFS	-.435	.048	-.437	-8.983***	.191	.189	.191***
(DV: Non-							
Constant	4.217	.171		24.716***			
Linear PoFS	-.429	.058	-.374	-7.444***	.140	.137	.140***
(DV: Observing)							
Constant	4.123	.144		28.610***			
Linear PoFS	-.156	.049	-.171	-3.196**	.029	.026	.029**
(DV: FFMQ total)							
Constant	4.300	.089		48.054***			
Linear PoFS	-.361	.030	-.542	-11.925***	.175	.173	.175***

Key: $^{\dagger}p < .10$ *$p = .05$, **$p = .01$, ***$p < .001$. Significant associations are determined by Sidak correction of $p \leq .006$.

Term 2. H1 was supported in that all linear terms of PoFS score emerged as significant negative predictors of all FFMQ facets, and of FFMQ total score. H3 was supported in that a weakest relationship was found between linear PoFS score and Observing (β = -.27) compared to the relationship between linear PoFS score and the remaining FFMQ facets (βs = -.26 to -.44). None of the relationships between the quadratic or cubic terms of PoFS score and FFMQ facets or total score reached significance at $p \leq .006$.

Table 16

Summary of significant results from separate regression analyses using linear, quadratic, and cubic terms of PoFS score as predictors of FFMQ scores in Term 2 data set

	Unstandardized		*Standardized*				
Predictor	*B*	*SE B*	*β*	*t*	R^2	AR^2	ΔR^2
(DV: Act Aware)							
Constant	4.202	.166		25.281***			
Linear PoFS	-.302	.058	-.317	-5.246***	.100	.097	.100***
(DV: Describing)							
Constant	4.679	.224		20.854***			
Linear PoFS	-.560	.078	-.417	-7.205***	.174	.170	.174***
(DV: Non-judging)							
Constant	4.904	.204		24.085***			
Linear PoFS	-.548	.071	-.443	-7.765***	.196	.193	.196***
(DV: Non-reacting)							
Constant	4.145	.243		17.059***			
Linear PoFS	-.379	.084	-.275	-4.501***	.076	.072	.076***
(DV: Observing)							
Constant	4.560	.202		22.536***			
Linear PoFS	-.310	.070	-.270	-4.413***	.073	.069	.073***
Constant	7.863	1.496		5.254***			
Cubic PoFS	-.174	.079	-3.847	-2.214*	.092	.081	.018*
(DV: FFMQ total)							
Constant	4.498	1.32		33.969***			
Linear PoFS	-.420	.046	-.503	-0.147***	.253	.250	.253***
Constant	6.40	.980		6.537***			
Cubic PoFS	-.109	.051	-3.318	-2.125*	.267	.258	.014*

Key: $^{\dagger}p < .10$ *p = .05, **p = .01, ***p <.001. Significant associations are determined by Sidak correction of $p \leq .006$.

T1 concurrent. H1 was supported in that significant negative relationships were obtained between the linear term of PoFS score and each FFMQ facet. H3 was partially supported in that the weakest relationship was obtained between PoFS score and Observing (β = -.17), with the exception of PoFS score and Non-reacting (β = -.14), compared to the remaining FFMQ facets (βs = -.32 to -.43). None of the relationships between the quadratic or cubic terms of PoFS score and FFMQ facets or total score reached significance at p=.006.

Table 17

Summary of significant results from separate regression analyses using significant linear, quadratic, and cubic terms of the PoFS as predictors of FFMQ facets in T1 data set

	Unstandardized coefficients		*Standardized coefficients*				
Predictor	*B*	*SE B*	*β*	*t*	R^2	AR^2	ΔR^2
(DV: Act Aware)							
Constant	5.609	.164		34.291***			
Linear PoFS	-.395	.055	-.433	-7.214***	.187	.541	.187***
(DV: Describing)							
Constant	5.147	.234		21.982***			
Linear PoFS	-.393	.078	-.317	-5.024***	.100	.097	.100***
(DV: Non-judging)							
Constant	5.699	.159		35.939***			
Linear PoFS	-.526	.053	-.551	-9.918***	.303	.300	.303***
(DV: Non-reacting)							
Constant	3.339	.215		15.535***			
Linear PoFS	-.147	.072	-.135	-2.043*	.018	.014	.018*
Constant	4.861	.687		7.079***			
Quad PoFS	.180	.077	.995	2.331*	.041	.033	.023*
(DV: Observing)							
Constant	4.81	.199		24.222***			
Linear PoFS	-.174	.066	-.171	-2.613*	.029	.025	.029*
Constant	8.714	1.847		4.719***			
Cubic PoFS	-.153	.073	-4.406	-2.100*	.049	.036	.019*
(DV: FFMQ total)							
Constant	5.031	.103		48.826***			
Linear PoFS	-.339	.034	-.548	-9.844***	.300	.297	.300***

Key: †p < .10 *p = .05, **p = .01, ***p <.001

T2 concurrent. H1 was partially supported in that significant relationships were obtained between the linear term of PoFS score and nearly all of the FFMQ facets. H3 was supported in that the relationship between the linear term of PoFS score and Observing was weaker (β = -.22) compared to the relationship between the linear term of PoFS score and the remaining FFMQ facet scores (βs = -.28 to -.55). For RQ1, only a single marginally significant relationship between the quadratic term of PoFS score and Non-judging was obtained, however, this result did not meet the minimum criteria for interpretation of accounting for at least 1% change in variation (see Table 18).

Table 18

Summary of significant findings in separate regression analyses using linear, quadratic, and cubic terms of PoFS score as predictors of each FFMQ facet and FFMQ total score, in T2 concurrent data set

	Unstandardized coefficients		*Standardized coefficients*				
Predictor	*B*	*SE B*	*β*	*t*	R^2	AR^2	ΔR^2
(DV: Act Aware)							
Constant	5.66	.160		35.266***			
Linear PoFS	-.404	.054	-.449	-7.544***	.201	.198	.201***
(DV: Describing)							
Constant	5.434	.218		24.973***			
Linear PoFS	-.498	.073	-.415	-6.857***	.172	.169	.172***
(DV: Non-judging)							
Constant	5.713	.168		33.982***			
Linear PoFS	-.549	.056	-.546	-9.796***	.298	.295	.298***
Constant	4.948	.485		1.201***			
Quadratic PoFS	-.096	.057	-.563	-1.679†	.314	.305	.007
(DV: Non-reacting)							
Constant	3.785	.199		19.034***			
Linear PoFS	-.294	.066	-.283	-4.439***	.080	.076	.080***
(DV: Observing)							
Constant	4.933	.200		24.642***			
Linear PoFS	-.224	.067	-.218	-3.361**	.048	.043	.048**
(DV: FFMQ total)							
Constant	5.154	.101		5.848***			
Linear PoFS	-.386	.034	-.605	11.425***	.366	.363	.366***

Key: †p < .10, *p = .05, **p = .01, ***p <.001

T1 and T2: Longitudinal associations. Separate hierarchical regressions were conducted for PoFS score at T1 as a predictor of each FFMQ facet score and FFMQ total score at T2. T1 FFMQ score was entered on step 1 to residualize mindfulness facets. Linear, quadratic, and cubic terms of PoFS score at T1 were entered hierarchically as independent variables, and FFMQ scores at T2 were entered as the dependent variable.

H1 was partially supported in that significant negative relationships were obtained between the linear term of PoFS score at T1 and Describing, Non-judging, Non-reacting, and FFMQ total score at T2. None of the other terms reached significance. H3 was partially supported in that the relationship between PoFS score at T1 and Observing at T2 was small and non-significant. The relationship between PoFS score at T1 and Act Aware at T2 was likewise small and non-significant. An investigation of RQ1 revealed that no significant relationships were obtained between the quadratic or cubic terms of PoFS score at T1 and FFMQ scores at T2 (Table 19).

Table 19

Summary of significant findings in separate regression analyses using linear, quadratic, and cubic terms of PoFS score at T1 as predictors of FFMQ total and FFMQ facet scores at T2

	Unstandardized coefficients		*Standardized coefficients*				
Predictor	*B*	*SE B*	*β*	*t*	R^2	AR^2	ΔR^2
(DV: Describing)							
Constant	1.954	.309		6.332***			
Describing T1	.711	.048	.702	14.814***	.493	.490	.493***
Linear PoFS	-.207	.061	-.165	-3.370***	.517	.513	.024**
(DV: Non-judging)							
Constant	2.205	.394		5.596***			
Non-judging T1	.738	.055	.669	13.515***	.447	.445	.447***
Linear PoFS	-.220	.061	-.209	-3.611***	.477	.473	.030***
(DV: Non-reacting)							
Constant	1.488	.243		6.127***			
Non-reacting T1	.620	.052	.621	11.898***	.385	.382	.385***
Linear PoFS	-.112	.057	-.103	-1.970*	.396	.390	.010*
Constant	.517	.600		.861			
Quadratic PoFS	-.109	.062	-.604	-1.770†	.404	.396	.008†
(DV: FFMQ total)							
Constant	1.566	.317		4.947***			
FFMQ total T1	.763	.051	.706	14.979***	.498	.496	.498***
Linear PoFS	-.096	.037	-.143	-2.575*	.513	.508	.014*

Key: $^{\dagger}p < .10$ *$p = .05$, **$p = .01$, ***$p < .001$

Combining the Regression Results: Path Model

To further investigate H2, A path model was created using the longitudinal data, in order to confirm the longitudinal relationships suggested by the regression analyses and to derive a single figure that would depict all of the linear relationships. This analysis also controls for the relative influence of each variable. The significant negative relationships between Act Aware, Describing, and Non-judging at T1, and PoFS score at T2 were confirmed. In other words, increases in Act Aware, Describing, and Non-judging at T1 were predictive of decreases in PoFS score at T2. The significant bidirectional relationship between Describing and Non-judging and PoFS score was also confirmed. However, while a significant negative longitudinal relationship between Non-reacting at T1 and PoFS score at T2 was suggested by the regression analyses, this relationship was not supported by the path model (see Figure 9). This discrepancy can be explained by the masking effect of multicollinearity.

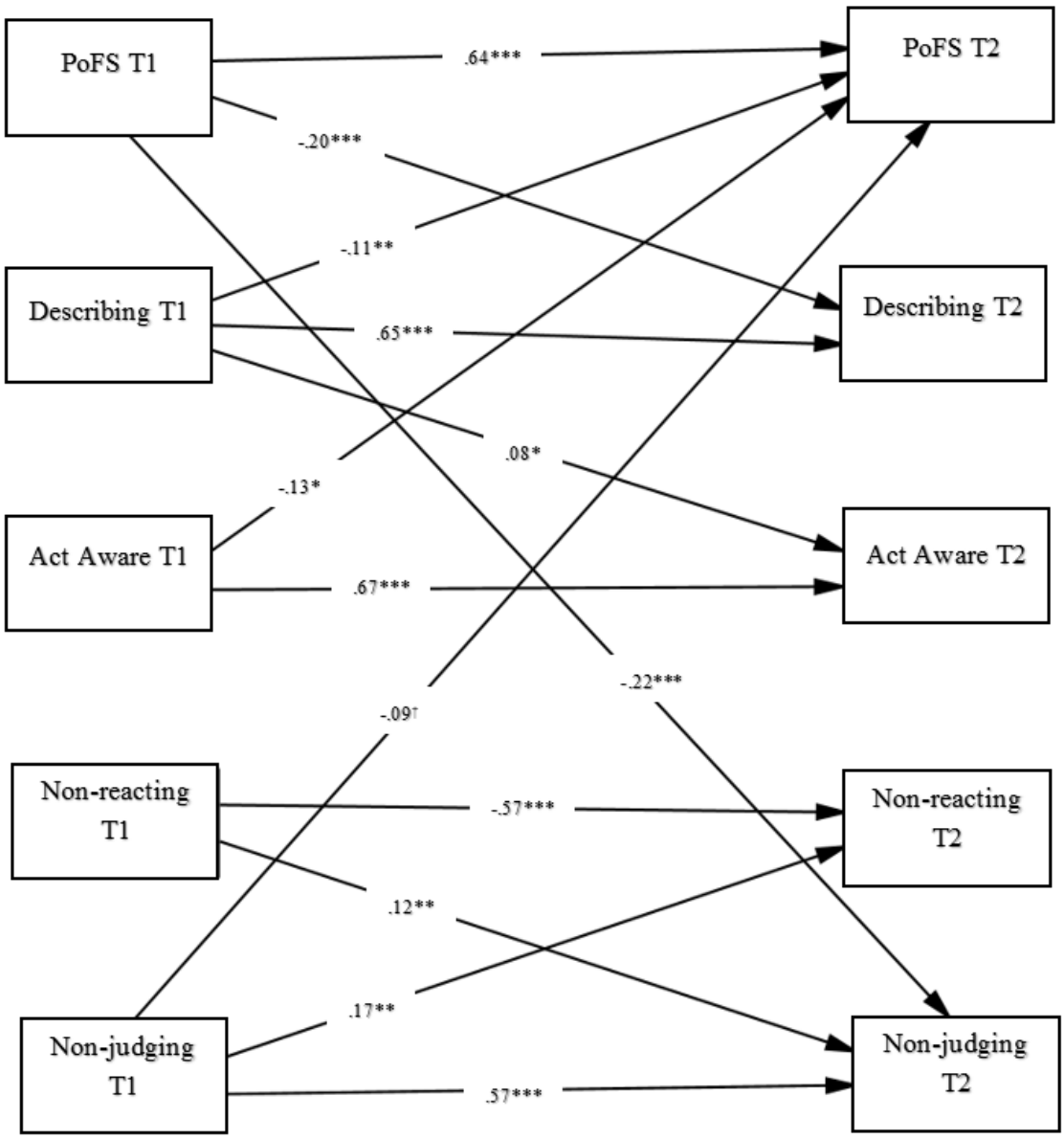

Figure 9. Path model showing significant longitudinal relationships between FFMQ facets and PoFS score at T1 and T2. Numbers represent standardized regression weights.

Key: * p = .05, ** p = .01, *** p <.001

Results Summary

Basic correlations. When basic correlations were examined between the FFMQ and the PoFS, each FFMQ facet, as well as FFMQ total score, was found to correlate negatively with PoFS score almost universally. The sole exception was for the relationship between Non-reacting and PoFS score in the T1 concurrent data set, which did not reach significance. These findings were consistent with H1, which predicted that FFMQ scores and PoFS score would negatively correlate.

Relationship of overall mindfulness with false self perceptions. The longitudinal cross-lag path analysis indicated that while PoFS score and FFMQ total score negatively predicted changes in the other measure over time, FFMQ total score were a stronger longitudinal predictor of PoFS score, rather than the reverse order. This result was consistent with Hx?

Linear associations by mindfulness facet. Simultaneous hierarchical regressions were then conducted using FFMQ facets as predictors of PoFS score. By simultaneously entering all five FFMQ facets as predictors, they controlled for each other's influence, and in this context, significant negative relationships were generally obtained between the linear terms of each FFMQ facet and PoFS score, with a few exceptions where the term did not reach significance. These exceptions were: Observing in the Term 1 data set, Act Aware and Non-reacting in the Term 2 data set, Non-reacting and Observing in both the T1 and T2 concurrent data sets, and Non-reacting, Non-judging, and Observing at T1 as a predictor of PoFS score at T2 in the longitudinal data set. As a contrast, XX significant relationships were noted in these regressions.

Separate hierarchical regressions were then conducted to test the directionality of significant relationships, using PoFS score as a predictor of FFMQ facet scores. Significant relationships were generally obtained for the linear term of PoFS score and FFMQ facet

scores, with a few exceptions where the terms did not reach significance. These exceptions were: Act Aware and Non-reacting in the Term 1 data set, Act Aware and Non-judging in the Tern 2 data set, Non-judging in the T1 concurrent data set, Non-reacting and Observing in the T2 data set, and PoFS score at T1 as a predictor of Describing at T2. As a contrast, XX significant relationships were noted in these regressions. These findings were generally consistent with H1, in that significant negative relationships were generally documented between mindfulness and false self perceptions .

Was the Observing facet of mindfulness a weak predictor? H3 proposed that the relationship between Observing and false self would be weaker than the relationship between the remaining mindfulness facets and false self. When examined both concurrently and longitudinally, a weaker relationship tended to be found between Observing and PoFS score, compared to the relationship between PoFS score and the remaining FFMQ facets. The next weakest relationship tended to be found between Non-reacting and PoFS score.

Longitudinal relationships between mindfulness facets and false self perceptions. A path model was also created to examine the strength of the relationships between the FFMQ facets and PoFS score at T1 and T2. Significant bidirectional relationships were obtained between Describing and Non-judging and PoFS score. However, while the previous regression analysis indicated a significant relationship between Act Aware and PoFS score, this relationship was not supported by the path model analysis.

Curvilinear associations. In order to examine whether the relationships between FFMQ scores and PoFS score included curvilinear components, regressions were conducted using linear, quadratic and cubic terms of each FFMQ facet and FFMQ total score, and also of PoFS score. This was followed by a Sidak adjustment to correct for numerous analyses on the same variables. This adjustment recommended that the p-value be lowered from p=.05 to p=.006. None of the quadratic or cubic terms reached significance based on this adjustment,

suggesting that the associations between mindfulness and false self can efficiently be characterised as linear.

Summary. Collectively, these results suggest that mindfulness and false self can be expected to correlate negatively. Both levels of mindfulness and levels of false self negatively predicted changes in the other across time, however, the longitudinal relationship between false self as a predictor of mindfulness was stronger than the reverse. Overall, a weaker relationship tended to be found between the FFMQ facet Observing and false self, compared to the relationship between the remaining FFMQ facets and false self. An exploratory set of analyses performed to try to uncover curvilinear relationships was largely unsuccessful—the relationships between mindfulness and false self can be basically assumed to be linear.

Discussion

Overall Associations between Mindfulness and False Self

This study set out to investigate the longitudinal and concurrent relationships between a scale measure of trait mindfulness (the FFMQ), and a scale measure of perceptions of false self (the PoFS), in an undergraduate population split across two concurrent data sets, and one longitudinal data set (assessed at two time points). H1, which proposed that mindfulness and false self would negatively correlate, was supported in that significant negative correlations were obtained between FFMQ facet scores and total score, and PoFS score, in every data set, with the exception of Non-reacting in the T1 concurrent data set, which did not reach significance at the conventional alpha level. H2, which proposed that the relationship between mindfulness as a predictor of false self would be stronger than the relationship between false self as a predictor of mindfulness, was also supported in that FFMQ total score at T1 was found to negatively predict PoFS score at T2 in the longitudinal data set. These findings suggest that mindfulness does support authentic functioning, both concurrently, and over time. The cross-lag path model also suggests that false self perceptions can also exert a deleterious effect upon mindfulness characteristics over time, although this effect is weaker than the supportive effect of mindfulness on authenticity.

Associations between FFMQ Facets and False Self

The current research discovered strong, consistent, negative relationships between false self and the FFMQ facets of Describing, Non-judging, Act Aware. Prior research has linked Non-reacting with self-compassion, Act Aware with decreased dissociation and absentmindedness, and Describing with increased emotional intelligence and also with decreased alexithymia (Baer et al., 2006). Thus, we can theorise that Describing, Act Aware and Non-reacting may support the tendency to both notice and accept subtle inner emotional states. The ability to notice and accept one’s inner emotions and experiences may support the

ability to describe one's experiences using words, and this may in turn increase the tendency to authentically communicate one's experiences with close others. Thus, individuals who are high in these facets may be low in false self perceptions, due to an increased tendency to differentiate, accept, and communicate their inner emotional experiences with close others. This explanation would be consistent with the relational orientation component which is proposed by Goldman and Kernis (2004) to be a key feature of authenticity.

Why was Observing a weak predictor? H3 was supported in that Observing tended to exhibit a weaker, and at times non-significant, relationship with PoFS score, when the effects of the remaining FFMQ facets were controlled for. While we may speculate that high levels of the remaining facets may protect against the development of false self perceptions by making individuals more likely to differentiate, accept, and communicate their inner experiences, high levels of Observing may make individuals more likely to notice and attend to unpleasant stimuli, or to notice discrepancies between their 'inner selves' and their outer behaviour. If individuals are high in Observing without being high in the remaining facets, they may not be likely to respond to such experiences in a non-judgemental, accepting, and compassionate manner. This idea would be supported by prior research using the FFMQ, which has reported that Observing at times manifests a differential relationship with measurable psychological outcomes, compared to the other FFMQ facets (Baer at al. 2008), particularly in participant samples that are comprised of people who do not practice mindfulness meditation techniques. For example, Lilja et al. (2012) have suggested that in non-mediating samples, the ability to simply notice one's moment-by-moment experience, captured by the Observing facet, represents a base-level skill which people must acquire before learning more complex skills captured by the remaining facets, such as the ability to accept and respond non-judgementally toward that experience. Over time, Observing becomes tied to and supports the other facets. There was also a trend in the current research

for the relationship between Non-reacting and PoFS score also to be small and at times non-significant. However, the existing literature does not provide suggestions as to why a weaker relationship was also obtained between the facet of Non-reacting and PoFS score, as was found in the present study. We may speculate that participants in the present study who received low scores on Non-reacting may also have a tendency to display noticeable outward reactions to inner thoughts and feelings. An individual who was very reactive to their inner thoughts and feelings may feel unable to keep up the pretence of a false self, and the expression of such reactions in an interpersonal context may lead such participants to perceive themselves as less 'phoney' or false. In contrast, a person with high levels of false self may feel as though they often inhibit reactions based on inner thoughts and feelings. This reasoning could explain why the relationship between Non-reacting and false self was not as strongly negative compared to the other FFMQ facets.

Longitudinal Associations

When examined as a unitary score, mindfulness was found to negatively predict false self at 4 month reassessment (T1-T2 longitudinal data set). This finding was in support of H2. A significant bidirectional longitudinal relationship was also obtained between false self and mindfulness. However, the negative relationship between mindfulness at T1 as a predictor of false self at T2 was stronger than the relationship between mindfulness at T1 as a predictor of false self at T2. In other words, mindfulness appeared to have a protective effect on the development of perception of false self over time. At the same time, levels of false self appeared to impede the development of mindfulness over time. However, the protective effect of mindfulness against false self was the stronger of the two temporal influences. This finding is likely to have several important implications. Because authenticity is associated with positive psychological outcomes, such as relationship satisfaction, self-esteem, life satisfaction, and positive affect (Lenton, Slabu, Bruder, & Sedikides, 2014; Wood et al.,

2008), while false self has been associated with experiences of feeling 'phoney', of low self-esteem, and depression (Harter & Waters, 1991; Harter, Waters, & Whitesell, 1997; Neff & Harter, 2002; Weir & Jose, 2010), clinical interventions that teach mindfulness skills may protect against some of the negative outcomes stemming from perceptions of false self. Furthermore, because adolescents may be particularly vulnerable to experiencing perceptions of false self (Weir & Jose, 2010), the early provision of interventions teaching mindfulness skills may help to protect against psychological distress stemming from perceptions of false self in adolescent populations in particular.

Is the Relationship Between Mindfulness and False Self Linear, or Curvilinear?

RQ1 queried whether significant quadratic and cubic relationships might be found between mindfulness and false self. This was not found to be strongly supported, in that no significant quadratic and cubic relationships were obtained following a Sidak adjustment for multiple variables. Based on these findings, it is fair to assume that the association between mindfulness and false self can best be described as linear.

Limitations of the Present Study and Future Directions

This study has several limitations. It was conducted on a relatively homogenous sample of undergraduate students: 80% were of New Zealand European ethnicity and aged 18-21, and 70% were female. Thus, further research will be needed to ascertain the generalisability of these results, especially as there is some evidence that the way in which people experience false self may vary depending on the demographic group being surveyed. For example, a study by Lenton et al. (2014) using a cross-cultural sample found that that the way in which participants rated their affect, self-esteem, need satisfaction, and ideal-self overlap during an event where they felt most like their 'real' self, varied depending on both culture and age. Research by Weir and Jose (2010) also revealed unexpected features of the performance of false self in an adolescent sample, in that interviews with adolescents during

the creation of the PoFS revealed the theme of altering one's physical appearance, for example, though clothing, as a way to enact false self. Whether this performance of false self via one's physical appearance would emerge as a significant theme in an older population is yet unknown. However, it is also noteworthy that Weir and Jose (2010) did not find a significant effect of age in their relatively young sample of 11-15 year olds. Thus, future research could consider the effect of broad age-ranges as well as culture, on the relationship between mindfulness and false self. Furthermore, although the current research has conceptualised false self as diametrically opposed to authenticity, prior research by Lenton et al. (2014) has found that participants who scored high in authenticity have more homogenous profiles in their ratings on psychological measures, such as positive and negative affect and self-esteem. In contrast, participants in the study by Lenton et al. (2014) who scored high in inauthenticity showed more variation in their ratings on related psychological measures. Future research should thus extend on the present study by examining and comparing measures of authenticity side-by-side with perceptions of false self.

Conclusions

In conclusion, the present study set out to examine the relationship between a measure of mindfulness and a measure of false self across concurrent and longitudinal data sets on several samples of university undergraduate students. Overall, we found that these two measures manifested significant negative relationships with one another both concurrently, and longitudinally at a four month reassessment. These relationships were best described by a linear model. Whilst a bidirectional longitudinal relationship was discovered between the two measures, the effect of mindfulness on false self was stronger than the reverse direction. This result suggests that mindfulness may protect against the development of false self over time. The findings from this research have important ramifications for the provision of mindfulness programmes as a clinical intervention on groups who may be particularly vulnerable to the

negative psychological effects of false self perceptions, for example adolescents. Future research could extend these findings by investigating the effect of age and culture on the relationship between mindfulness and false self, in order to better guide such interventions.

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