



Relationship between dispositional mindfulness and repressive coping style: an exploratory dissertation

Jamila Al Ibrahim

Supervised by: Dr. Therese Shepherd

May 2013

Relationship between dispositional mindfulness and repressive coping style: an exploratory dissertation

### **ABSTRACT**

Mindfulness is a set of cognitive skills that encourage full attention to the present moment, identifying in a non-judgemental manner both physical and mental states (Baer, Smith, Hopkins, Krietemeyer & Toney, 2006). There is much evidence to suggest that higher levels of mindfulness are associated with positive physical and mental health outcomes (Brown & Ryan, 2003). In contrast, repressive coping is associated with negative physical health outcomes that are assumed to result from elevated physiological anxiety in the absence of cognitive awareness. Theories of repressive coping suggest that, in contrast to the characteristics associated with mindfulness, these individuals are not attentive to their inner mental/bodily states, and avoid cues that represent a threat to their self-concepts (Derakshan & Eysenck, 1997). Therefore, it seems possible that repressors may be particularly low in mindfulness and that, if they are, mindfulness-based interventions might be effective in improving their health outcomes. The aim of the present study is to assess whether repressors (assessed with the Marlowe-Crowne Social Desirability Scale, Crowne & Marlowe, 1960, and the State-Trait Anxiety Inventory, Spielberger, Gorsuch & Lushene, 1970) have particularly low levels of dispositional mindfulness (assessed with the Five Facets Mindfulness Questionnaire (Baer, Smith, Hopkins, Krietemeyer & Toney, 2006)). The investigation was conducted on a pool of 60 (N=60) voluntary, psychology undergraduates and the data was analysed via hierarchical multiple regressions. The results revealed that, contrary to the hypotheses, repressors showed high levels of dispositional mindfulness. The findings can be interpreted considering methodological issues and further implications are discussed.

### **KEY**

**WORDS: MINDFULNESS; REPRESSORS; COPING STYLE; HEALTH OUTCOMES; REGRESSIONS**

## Introduction

Mindfulness is a concept rooted in eastern meditative traditions that promotes the active cultivation of an attentive mind and of an aware consciousness, providing access to a higher receptivity to the present moment and to internal and external stimuli in a non-judgemental manner (Baer, Smith, Hopkins, Krietemeyer & Toney, 2006). This conscious and voluntary focus on the present moment permits one to fully perceive the complexity of inner mental states, bodily sensations and external stimuli whereas the non-judgemental component permits an objective recognition of the internal and external stimuli without automatically labelling them with the qualitative attributes of “good”, “bad” or “threatening” (Brown & Ryan, 2003).

There is a large body of empirical research that suggests that higher levels of mindfulness are associated with more positive psychological and health outcomes (Mendelson, Greenberg, Dariotis, Feagans Gould, Rhoades & Leaf, 2010). For examples, interventions aimed at increasing mindfulness are associated with positive outcomes in a variety of domains: more specifically, mindfulness-based stress Reduction (MBSR) conceived by Kabat-Zinn increased the skin clearing rate in patients with mild to moderate psoriasis (Chambers et al., 2009), Mindfulness-based Dialectical Behavioural Therapy (MBDBT) has been employed to reduce impulsivity in subjects with borderline personality disorder (Chiesa & Serretti, 2010), mindfulness-based/integrated therapies (i.e.: Mindfulness-based Cognitive Behavioural Therapy) have been shown to enhance immunity responses in cancer patients (Baer et al. 2006) whilst mindfulness meditation training has greatly alleviated symptoms and ameliorated quality of life in patients suffering from eating disorders (Green & Bieling, 2012), chronic pain (Cho, Heiby, McCracken, Lee & Moon, 2010), fibromyalgia (Grossman, Tiefenthaler-Gilmer, Raysz, Kesper, 2007), anxiety (Ma & Teasdale, 2004) and chronic depression (Barnhofer, Crane, Hargus, Amarasinghe, Winder & Williams, 2009).

As a consequence of these positive outcomes, in the last decades, researchers have developed a growing number of applications of mindfulness-based therapies in clinical settings but, since their use is relatively new, there are still some controversies regarding the conceptualisation and operationalization of mindfulness (Grossman, 2008). In fact, depending on the field in which mindfulness-based interventions are developed, different definitions are conceived and, consequently, different measures are employed in order to detect condition-specific characteristics and targets. Therefore, conceptualisations of the mindfulness construct vary from being considered as a uni-dimensional trait as measured by the MAAS (Mindfulness Attention Awareness Scale, Brown & Ryan, 2003) to being studied as a multifaceted construct as measured by the FFMQ (Five Facets Mindfulness Questionnaire, Baer, Smith, Hopkins et al., 2006).

However, even though the nature of mindfulness is still debated, researchers do concur in considering mindfulness as a set of skills that can be learned and that enhance the quality of life in the general population and prevents relapses and decreases acute episodes in a wide range of medical and psychological domains (Shapiro, Carlson, Astin & Freedman, 2006). In order to gain a better understanding of how mindfulness leads to positive health outcomes across both mental and physical conditions, neurobiological studies have recently been conducted and have suggested that mindfulness practices produce structural brain changes such as increased volume and density of grey matter in specific brain areas (Chiesa, Calati &

Serretti, 2011). Murakami, Nakao, Matsunaga, Kasuya, Shinoda, Yamada & Ohira (2012) found these structural changes in non-clinical subjects: after an 8-week meditation program, changes in the grey matter were registered in the meditators whilst the control group showed no differences. These changes occurred in the right orbitofrontal cortex, which is involved in emotion regulation (Luders, Toga, Lepore, Gaser, 2009); in the right anterior insula concerned with interoceptive bodily sensations and self-referential processing (Holzel, Carmody, Vangel, Congleton, Yerramsetti, Gard et al., 2011) in the right amygdala that regulates physiological and emotional responses (Murakami et al., 2012) and in the right hippocampus, which size has been found to decrease as a response to sustained stress responses (Gianaros, Jennings, Sheu, Greer, Kuller & Matthews, 2007). Moreover, in the meditators, the brain areas involved in learning the meditation techniques maintained an increased grey matter volume even after a year- follow up.

Given these enduring positive effects of mindfulness meditation, some researchers have argued that the skills learned via the mindfulness training become automatic after prolonged periods of time, replacing the original maladaptive patterns of thoughts and behaviours (Davidson, Kabat-Zinn, Schumacher, Rosenkranz, Muller, Santorelli et al., 2003). Interestingly, other supporting findings evidenced the durable benefits of a regular 10 minutes mindfulness training: Moore, Gruber, Derose and Malinowski (2012) found that after 8-weeks training, non-clinical participants showed increased effectiveness in the allocation of brain resources and an improvement in the executive functions during a Stroop task, with the additional positive outcome of a reduction of the activation of the HPA axis (Hypothalamic-Pituitary-Adrenal axis) registered in response to stressors: improvements were found to be stable after 3 months follow-up.

These findings were replicated in medical student samples and further cognitive enhancements such as improved memory, learning ability, motivation and greater effectiveness in pursuing tasks were registered after a 16-week follow-up (Warnecke, Quinn, Ogden, Towle & Nelson, 2011).

Considering the positive outcomes on non-clinical samples, research has been focusing on mental illnesses and medical conditions. For instance, in a clinical experiment conducted by Davidson, Kabat-Zinn, Schumacher et al. (2003), HIV patients were injected with the influenza vaccine at the end of an 8-week program for which patients were randomly assigned to either a meditation-training group (MBSR) or to a waiting-list control group. Blood tests revealed that in the meditation group there was a significant increase in antibodies and an immunological peak in the 9th week after the training paired with an enhanced activation of the prefrontal cortex: the controls did not show any of the mentioned improvements.

Ma and Teasdale (2004) instead, tested mindfulness-based control training (MBCT), (consisting of a voluntary deployment of attention, control and development of awareness via meditation) on individuals suffering from major depression to either a control group that continued the treatment as usual (TAU) or to a group who received the TAU integrated with MBCT. After the training, the TAU patients relapse rates were 66% whilst only 37% of the TAU plus MBCT patients suffered from depressive episodes. The authors argued that MBCT interrupted the automatic patterns of mood-related reactivation of negative thinking such as rumination, experiential avoidance and intrusive thoughts, decreasing the likelihood of recurrent depressive episodes triggered by external stressors. These positive findings were replicated in several studies that considered subjects suffering from anxiety disorder (Walsh, Balint, Smolira, Kamstrup-Fredericksen & Madsen, 2009): the typical bias

towards detecting, interpreting and elaborating threat was contrasted with mindfulness-based interventions, that enhanced acceptance of the current moment in a non-judgemental manner.

A further application of mindfulness-based programs was found effective in significantly reducing anxiety and depression scores amongst individuals with generalised anxiety disorder (GAD) and panic disorder, with and without agoraphobia (PDA, PD) (Vujanovic, Zvolensky, Bernstein, Feldner & McLeish, 2007): these positive effects were maintained after a 3-months follow-up. These experiments provide support for the theory (Brown & Ryan, 2003) that attending to the present situation with a more objective perception, enables the subject to minimise and disengage from the feelings of personal threat and from automatic anxiety-related reactions such as a sense of impending doom and catastrophic thoughts.

As evidenced by the studies considered so far, mindfulness-based therapies and programs have the merit of lowering negative affect as measured by stress, anxiety, depression and other psychometric and biological tests in clinical samples (Jung, Kang, Jang, Park, Byun, Kwon, Janga, Leed, An & Kwon, 2010); whilst the non-clinical samples attained a greater wellbeing and enhanced executive functions (Weinstein, Brown & Ryan, 2009). Therefore, mindfulness strategies appear to offer an efficient tool in facilitating self-regulation, integrating physiological and psychological components (cognitive, affective and behavioural aspects) that become more easily accessible and manageable by the trained individual (Baer et al., 2006).

Unfortunately an evident criticism has to be made (Grossman, 2008): depending on the differences between the therapies or programs applied in diverse medical and psychological domains, mindfulness takes different connotations and aims that can range from the purpose of gaining control in the MBCT to the positive appraisal of stressful events in the MBSR. The heterogeneity of the construct definitions and the relative diversity of treatments pose a limit in the identification of the underlying principles regulating mindfulness (Brown & Ryan, 2003; Baer, Samuel & Lykins, 2011). However, despite the criticism and considering the vast body of empirical research that has shown the positive impact of mindfulness practice in a broad context ranging from the treatment of mental health disorders and physical conditions to the enhancement of wellbeing and cognitive capabilities in non-clinical populations (Shapiro et al., 2006); there is reason to believe that there is still a great potential to be developed from current mindfulness practices.

Thus far, for instance, the focus in the literature has mainly been on the benefits that increasing levels of mindfulness can have on individuals who experience high levels of negative affect. However, less attention has been paid to individuals who experience low levels of negative affect. Although such individuals are generally assumed to have relatively high levels of mindfulness (Branstrom, Duncan & Moskovitz, 2011), there is a strong theoretical rationale to suggest that at least some individuals who experience low levels of negative affect may also be low in mindfulness and that, as a result of this, they might be at a heightened risk of a variety of negative health outcomes. This dissertation aims to explore this possibility by examining levels of dispositional mindfulness in those who display a repressive coping style.

Repressive coping style was identified in Weinberger's early studies (Weinberger, Schwartz & Davidson, 1979) on anxiety and coping styles. He divided individuals into four categories depending on their scores on self-report questionnaire measures of trait anxiety (TA, as measured by the State-Trait Anxiety Inventory, STAI, Spielberger, Gorsuch & Lushene, 1970) and social desirability (SD, as measured by the Marlowe-Crowne Social Desirability Scale, MCSDS, Crowne & Marlowe, 1960). These were low anxious participants (LA) who self-reported low TA and low SD; high-anxious (HA) displayed high self-reported TA but low SD, defensive high anxious (DHA) showed high levels of both self-reported TA and SD and repressors (REP) showed high SD but low self-reported TA (Derakshan & Eysenck, 2000). Participants were exposed to environmental stressors and their physiological and self-reported anxiety responses were measured. The key findings were in the low TA groups. While LA participants self-reported low levels of anxiety and had low levels of physiological responding, the repressors self-reported low levels of anxiety, but displayed physiological responding that was as high as the HA and DHA and much higher than the LA group.

However, because of the discrepant self-reported and physiological measures, the profile in repressors appeared unclear: in fact, initially it was thought that their overly positive responding to self-reported TA measures was affected by social desirability bias. Derakshan and Eysenck (1999, cited in Derakshan & Eysenck, 2005) tested this assumption measuring self-reported TA under control and bogus pipeline condition: in the second condition, participants were made believe that a sophisticated electronic device (i.e. bogus pipeline) could detect the truthfulness of their answers. It was found that, in repressors, trait anxiety scores did not change from control to bogus pipeline condition. This finding evidenced that repressors are self-deceivers for what concerns TA and that their scores in the control conditions were not voluntary distorted, aimed at deceiving others (Derakshan & Eysenck, 2005).

This may be due to the fact that they are genuinely unaware of their own responses (e.g. low self-reported anxiety) even when they are highly physiologically aroused (e.g. high GSR, HR) (Vendemia & Rodriguez, 2010) and these characteristics are in clear contrast with the complete awareness of bodily and mental states deployed in mindfulness (Baer, Samuel & Lykins, 2011).

A number of theories have been proposed to explain the discrepant responding between self-reported and physiological measures and they all assume that repressors, in order to minimise conscious levels of anxiety, automatically and involuntarily attend away from their anxiety-related mental and physiological states (Furnham, Petrides, Sisterson & Baluch, 2003). Hence, the way in which repressors process self-relevant information seems to fall at the opposite end of the continuum from mindfulness (Brown, Ryan & Creswell, 2007).

In order to understand how repressors' strategies take place, Eysenck proposed a four-factor model in which he suggested that repressors show cognitive biases in relation to four sources of potentially threatening stimuli (Derakshan & Eysenck, 2000): environmental cues, their own physiological state, their behaviour and the information stored in the long-term memory. More specifically, Eysenck suggested that repressors would display *opposite* attentional and interpretive biases whereby they would avoid attending to threatening stimuli from these four sources and would tend to interpret negative stimuli from these four sources as non-threatening (Derakshan & Eysenck, 1997). It appears evident that these types of avoidant strategies are opposite to the mindfulness ones for which attention and awareness

are deployed towards environmental and physiological states in a non-judgemental manner, so that stimuli are perceived as neutral rather than interpreted as negative or threatening (Shapiro et al., 2006). However Eysenck's four-factor theory was found to be limited by a number of authors (e.g. Derakshan, Eysenck and Myers, 2007) since it did not account for the high physiological responding seen by repressors: if they could avoid threat so effectively, what drove their heightened physiological responses?

Considering this limitation, Derakshan, Eysenck and Myers (2007) elaborated Eysenck's theory proposing a new approach to the study of repressive coping style for which the avoidance shown by repressors occurs after an initial vigilance stage. This vigilance-avoidance theory would account for the discrepancies between physiological and self-reported measures that, supposedly, involve different processes (Calvo & Eysenck, 2000). According to this model, the vigilant process that repressors undergo when presented with a self-threatening stimulus, is an automatic and involuntary process of which the repressor is not aware: in this phase repressors show the attentional and interpretive biases towards stimuli triggering the negative schemas retrieved from long-term memory, as previously theorised by Eysenck (Myers & Derakshan, 2000). This type of automatized labelling can have an adaptive function by enabling the brain to impose order to reality, and categorise and interpret stimuli and events via cognitive schemas and prior similar experiences relevant to the self (Shapiro, Carlson, Astin & Freedman, 2006). However, it can also be problematic when schemas and prior conditioned learning filter a distorted image of reality causing the development of maladaptive patterns of thoughts and behaviours (Chambers, Gullone & Allen, 2009). Amongst these maladaptive behavioural patterns, are included involuntary and automatized defence mechanisms employed, in this case, by repressors to protect self-concepts and ego-invested schemas from threatening stimuli: these processes may remain hidden from conscious awareness and, in the long run, might be responsible for negative health outcomes (i.e.: chronic stress, skin cancer etc.) (Derakshan & Eysenck, 1997). This pattern of automatized and defensive behaviour results to be in contrast with the mental gap created by mindfulness practices: in fact, contrary to these processes, mindfulness operates in the opposite direction creating a mental gap between the stimuli and the overlearned reactions triggered by them: this means that self-regulation is directed by conscious awareness rather than by cognitions about the self. As a result, the individual becomes a detached observer of the external/internal stimuli and events and, by interrupting the overlearned stimulus-response pattern, reaches an aware state of mind: this permits them to adopt more flexible behaviours that serve specific situations rather than impulsively enacting their habitual, overlearned reactions (Brown, Ryan & Creswell, 2007).

Subsequently, in the avoidant stage, repressors enact coping strategies that include cognitive biases such as avoidant attentional, interpretive and memory biases aimed at lowering their experienced anxiety (Avero, Corace, Endler & Calvo, 2003).

Therefore, the vigilance-avoidance theory seems to provide a more structured model of repressive coping by examining separately the automatized involuntary behaviour and the learned reactions to threats. This model was tested by Rauch, Ohrmann, Bauer, Kugel, Englien, Arolt et al. (2007) who measured brain activity in repressors and HA when presented with angry, happy or fearful faces. Repressors showed a greater activation of the prefrontal cortex for happy and fearful faces and a greater activation of the visual area for angry and fearful ones, evidencing an early, increased visual processing of those stimuli. HA participants only showed greater amygdala activation for fearful faces. Repressors, therefore, displayed an enhanced reactivity to threatening stimuli and, at the same time, a prompt top-down emotional

regulation to avoid their potential negative effects (Schwerdtfeger & Derakshan, 2010).

Derakshan and Eysenck (2001a) found other supportive evidence of the vigilance-avoidance theory encouraging self-focused attention in repressors during a challenging task: it resulted that, when required to display a self-monitoring behaviour focusing on their internal states, repressors reported high levels of experienced anxiety and high GSR. This finding is particularly interesting since it further suggests that repressors do not lack of the basic perceptual consciousness, that allows them to be highly receptive to self-threatening stimuli, but they fail to acknowledge it via meta-cognitive processes such as awareness (Schooler, 2002), confirming the self-deceptive nature of the repressive coping style. Moreover, researchers have found that, by manipulating self-focus attention, the discrepancies of self-reported and physiological measures are greatly reduced, supporting the assumption for which the avoidance stage is an overlearned automatic behaviour (Derakshan & Eysenck, 2001b). This experiment provided some support to the theoretical rationale of this study for which the focus on one's self deployed in mindfulness may enhance repressors' meta-cognitive processing of information, reducing the automatized, avoidant behavioural pattern and increasing metacognitive awareness (Chambers et al., 2009).

Importantly, because of their avoidant style of coping, repressors are more likely to incur in severe stress-related illnesses (Myers, 2010) presumably because they do not attend to their own physiology and are therefore less likely to identify health related issues and seek help (Schwerdtfeger, Schmukle & Egloff, 2006). Even more crucially, clinical studies have reported large numbers of repressors amongst patients with coronary heart disease, skin cancer (even amongst children), breast cancer and chronic conditions (Myers, 2010). A large body of evidence shows that cardiac patients with a repressive copying style frequently incur in ischemic episodes without being consciously aware of them (i.e. silent ischemia) and, as a result, they do not seek medical help (Schwerdtfeger, Schmukle & Egloff, 2006). This is an extreme example of how repressors do not attend even to the most acute bodily perceptions (Myers & Reynolds, 2000). Repressive coping style seems therefore to dampen the receptivity of pain and other bodily manifestations to the extent that, since bodily symptoms are unrecognised as they occur, repressors might eventually develop chronic illnesses or detect tumor-related symptoms only at late stages of the disease (Lewis, Fowler, Woby & Holmes, 2012). These findings suggest the possibility that repressors may be able to avoid these severe negative health outcomes by developing mindfulness skills aimed at focusing one's awareness of bodily states, recognising them as they occur (Moore, Gruber, Derosé & Malinowski, 2012).

Therefore, considering the aforementioned studies on mindfulness and on repressive coping style is possible to notice that the avoidance of anxiety-related mental and physiological states shown by repressors might be regarded as being incompatible with the enhanced attention to these states that characterises mindfulness.

The theoretical and empirical research reviewed from the repressive coping style literature suggests that, as a group, these individuals may be particularly low in mindfulness despite reporting low levels of experienced anxiety (Derakshan & Eysenck, 1997). This seems at odds with the bulk of the mindfulness literature previously reviewed, which suggested that low mindfulness is associated with high levels of negative affect (Baer et al., 2011). Therefore, the aim of this dissertation



was to examine if it is indeed the case that repressors score low on mindfulness measures. If this assumption is correct, interventions aimed at increasing mindfulness may prove effective in reducing the negative health outcomes associated with their characteristic avoidance. This enquiry could also provide a better understanding of the relationship between negative affect and mindfulness.

In the current study repressors were identified by their relatively low scores on measures of self-reported trait anxiety (TA, as measured by the State-Trait Anxiety Inventory, STAI, Spielberger, Gorsuch & Lushene, 1970) in combination with their relatively high scores on self-reported measures of social desirability (SD, as measured by the Marlowe-Crowne Social Desirability Scale, MCSDS, Crowne & Marlowe, 1960). The STAI (Spielberger et al., 1970) and the MCSDS (Crowne & Marlowe, 1960) are widely used self-reported measures adopted to detect levels of defensiveness and their validity and reliability has been consolidated by relevant studies (Derakshan & Eysenck, 1997). The self-reported Five Facets Mindfulness Questionnaire (FFMQ) conceived by Baer et al. (2006), instead, was used to measure dispositional mindfulness: it was chosen above alternative measures because it is the product of an exploratory factor-analysis of five mindfulness questionnaires and provides the most valid and reliable self-reported measure. FFMQ includes five distinct facets of mindfulness that, in comparison with uni-dimensional mindfulness measures, can investigate more precisely its different components and their effects on the total score (Baer et al., 2006).

Traditionally repressive coping effects have been examined performing Anova analysis comparing groups who score high and low (usually based on sample median split) in TA and SD measures: however, this approach limits the analysis of the phenomenon by arbitrarily generating the groups to compare. Therefore, in the present study was used the more statistically sensitive method of moderated multiple regression: both TA and SD scores are considered as continuous predictor variables and effects of repressive coping are revealed by their interaction, which also predicts the mindfulness scores (outcome variable) when placed as predictor variable in a multiple regression analysis. Thus the aim of the current study was to explore if repressive coping and mindfulness are related by examining whether TA, SD and their interaction were significant predictors of dispositional mindfulness as measured by participants scores on each of the five facets of the FFMQ and their total scores on this measure.

## Method

### Design

This study was correlational in nature and investigated how the variables of Trait Anxiety (TA) as measured by the State-Trait Anxiety Inventory (STAI, Spielberger et al., 1970) and Social Desirability (SD) as measured by the Marlowe-Crowne Social Desirability Scale (MCSDS, Crowne & Marlowe, 1960), and the interaction between them were related to five facets of dispositional mindfulness as measured by the Five Facet Mindfulness Questionnaire (including the facets Observing, Describing, Acting with Awareness, Non-Judging inner experiences and Non-Reacting to inner experiences) as well as overall mindfulness measured by this scale (FFMQ, Baer et al., 2006). The relationship between these factors was analysed via six separate moderated multiple regression analyses where TA and SD and their cross-product (TAxSD) were the predictors and each of the five mindfulness facets, and overall mindfulness scores, were outcome variables.

### Participants

The pool of 60 voluntary participants has been recruited amongst psychology students aged above 18 (Mean=23.6 Standard Deviation=7.18) at the University of West London (UWL). The participants were equally recruited (see Procedure) from the first, second and third year psychology students (10 males and 10 females from each year for a total of 20 participants per year), and gave their contribution in order to gain one research participation point.

### Materials

Three widely validated self-reported questionnaires were used to measure three variables: the 20-item State-Trait Anxiety Inventory (STAI, Spielberger et al., 1970) (See Appendix 5) was used to measure trait anxiety. This self-report scale asks respondents to rate a number of statements describing affective and cognitive components of anxiety on a 4-point Likert scale from 1=*Almost never* to 4=*Almost always*: 11 of the items on the scale describe anxiety (e.g. "I lack self-confidence") and, 9 of the items are negatively worded, to describe non-anxious experiences (e.g. "I feel pleasant"). The total scoring is obtained via summation of each item after having reverse-scored the negatively worded items: total scores can range from a minimum of 20, which indicates low anxiety, to a maximum of 80, which indicates high trait anxiety.

Spielberger (1970) reported a high internal consistency for this scale (.86-.92) and a high internal consistency ( $\alpha$ =.90) was also found for this scale in the current study.

The 33-item Social Desirability Scale (SDS, Crowne & Marlowe, 1960) (See Appendix 6) was used to assess to what extent subjects answer in a socially acceptable manner by asking them to decide whether the 18, socially desirable statements such as "No matter who I'm talking to, I'm always a good listener" and, 15 socially undesirable items such as "I sometimes feel resentful if I don't get my way" were, "True" or "False" of them. The 18 socially desirable items were keyed as "True"= 1 point and "False"=0 point, whilst the 15 undesirable ones were reverse-scored following the opposite fashion, so that, when adding up the items, a high total score would correspond to a high level of social desirability. Scores on this measure can range from 0 to 33. The internal reliability for this self-reported measure assessed by Marlowe and Crowne (1960) was found to be .88, whilst in this study the scale revealed a slightly lower Cronbach's Alpha of .69.

Self-reported, dispositional mindfulness was measured with the 39-item Five Facets Mindfulness Questionnaire (Baer et al., 2006), (See Appendix 4) which was developed from an exploratory factor analysis of six self-report measures of dispositional mindfulness. Participants are asked to respond to a series of items that describe elements of mindfulness, on a 5-point Likert scale from 1=*Never/Rarely True* to 5=*Always/Often True*, where high scores indicate high mindfulness after having reverse-scored the 19 negatively worded items. The FFMQ is divided into 5 subscales measuring different facets denominated: "Observing", that measures the attentiveness towards external and internal experiences (8 items positively worded such as "When I'm walking, I deliberately notice the sensations of my body moving"), "Describing", that measures the ability to identify and define these experiences (8 items, 3 of which negatively worded such as "It's hard for me to find the words to describe what I'm thinking" and 5 positively worded such as "I'm good at finding words to describe my feelings"), "Acting with Awareness", that measures the level of focus and self-monitoring employed to attend external and internal experiences (8 items negatively worded such as "When I do things, my mind wanders off and I'm easily distracted"), "Non-judging inner experiences", that measures the judgemental nature of the negative labels given to the feelings perceived (8 items negatively worded such as "I criticize myself for having irrational or inappropriate emotions") and "Non-reactivity to inner experience", that measures the level of behaviour regulation in relation to thoughts and feelings (7 items positively worded such as "I perceive my feelings and emotions without having to react to them"). These subscales have displayed good internal consistency with a Cronbach's Alpha of .83 for the Observing facet, .91 for the Describing one, .87 for Acting with Awareness, .87 for the Non-judging facet and .75 for the Non-reactivity facet in Baer's study (2006) and an equally reliably alpha coefficients of .77 for the Observing facet, .87 for the Describing facet, .83 for the Acting with Awareness facet, .82 for the Non-judging facet and .76 for the Non-reactivity facet were found in this study. A high internal consistency was reported for the overall FFMQ with an Alpha value of .83, value confirming the high internal consistency (.87) reported by Baer (2006). After reversing the scores of 19 items worded negatively, the single scores of each facet were summed to obtain scores for each facet (each ranging from 8 to 40 except for the non-reactivity facet that ranges from 7 to 35) whilst the overall mindfulness score was obtained by summing the subscales scores (ranging from 39 to 195).

The order in which the questionnaires were presented was varied between participants to counterbalance possible order effects: half of the students were given first the STAI, then the SDS and the FFMQ last, whilst the other half was given the FFMQ, then the SDS and the STAI last. An equal number of males and females in each year of study were given the questionnaires in order 1 and order 2. This counterbalancing strategy was due to the possible influence that the content of the STAI can exert on the FFMQ answers in order 1 and vice-versa in order 2 and the SDS was administered between the other two functioning as a buffer. In the first case, thinking about anxiety and self-related perceptions was expected to impact on the mindfulness answers in order 1, whilst in order 2 considering bodily feelings and mental states contained in the mindfulness scale was expected to impact on the anxiety-related answers.

### **Procedure**

The 60 participants were psychology students at the University of West London (UWL) and were recruited after the study had been given the ethical approval by the UWL Ethics Committee. Participants were recruited via the Research Participation

Program, which enables them to gain participation points for their contribution to dissertation studies. If students collect enough points, they are able to recruit participants for their own final year projects. Students who showed an interest in taking part in the study were provided with an information sheet describing the study procedures including details regarding their right to withdraw at any time, the possibility to withdraw their data after the study and regarding the possibility to leave items unanswered if they wished to do so (See Appendix 1, 2 and 3). They were also informed that the data collected would have been stored securely and kept anonymous and confidential, identifiable only via a research participation number. Upon reading all the aforementioned information they were asked to give their consent by circling "Yes". The students then filled in the questionnaire pack in their own time and returned it to the researcher in order to receive their participation point. On completion of the study, participants were thanked for their time and provided with a written debrief containing the supervisor and the researcher's contact details and the University Counselling service details, in case the participant would have decided to seek professional help on matters arising from the survey.

### **Analysis procedures**

Questionnaires responses were scored following the procedures outlined in the materials section above and reliability analyses using Cronbach's alpha (also reported above) were performed. In order to address the research questions, six moderated multiple regression analyses were performed on the data where TA, SD and their interaction were the predictors in each analysis and the five facets of mindfulness and total mindfulness were six separate outcome variables. For each multiple regression, a hierarchical approach was taken where TA and SD were entered as separate predictors in step one in order to assess their ability to independently predict mindfulness, and their cross product (TAxSD) was entered in step 2 in order to assess whether or not the interaction between these two variables could add significant predictive ability to the model. Before creating the interaction term (TAxSD) and proceeding in performing the hierarchical multiple regressions, both the predictor variables were centred so that the mean of each the centred variable was equal to zero. The process of centring the predictor variables is aimed at making the regression coefficients more interpretable and it reduces the problems that might derive from multicollinearity, avoiding high correlations between predictors and their cross-product.

## Results

A series of Pearson's correlations were conducted in order to examine the inter-relations between TA, SD and mindfulness and the results are displayed in Table 1. Trait anxiety was significantly negatively correlated with Total Mindfulness and the mindfulness facets of Act-aware, Non-judge and Non-reactivity, meaning that lower TA was associated with higher mindfulness on these measures. However, TA was not significantly related to the remaining subscales of mindfulness (Observing and Describing) or to SD. Social desirability instead, was significantly positively correlated with Total Mindfulness and the facet Act-Aware, meaning that higher SD was associated with higher mindfulness on these measures, but it was not significantly related to the facets Observing, Describing, Non-judge and Non-react.

Pearson's values between total mindfulness and the five facets showed that each subscale was significantly positively correlated to total mindfulness. However, the facets did not show a consistent pattern of positive and significant inter-correlations between themselves. In fact, the facet Observing was significantly positively correlated with Describing and Non-judge whilst it was not significantly related to Act-Aware and Non-React; the facet Describing was significantly positively correlated with Observing and Act-Aware but was not significantly related to Non-judge and Non-react; the facet Non-judge was significantly positively correlated with Observing and Act-Aware whilst it was not significantly related to Describing and Non-react and, finally, Non-react was found to be not significantly related to any of the other mindfulness subscales. Finally TA and SD were not significantly related to each other.

**Table 1**  
**Bivariate Pearson's Correlation, Means (and Standard Deviations) for Trait Anxiety, Social Desirability and Mindfulness (total and facets)**

	Trait Anxiety	Social Desirability	Tot Mindfulness	Observe	Describe	Act Aware	Non-Judge	Non-React
<b>Trait Anxiety</b>	—							
<b>Social Desirability</b>	-.13	—						
<b>Tot Mindfulness</b>	-.47 **	.29 *	—					
<b>Observe</b>	-.15	.06	.46 **	—				
<b>Describe</b>	-.15	.10	.73 **	.43 **	—			
<b>Act Aware</b>	-.37 **	.40 **	.69 **	-.06	.37 **	—		
<b>Non-Judge</b>	-.28 **	.12	.40 **	-.33 **	.04	.38 **	—	
<b>Non-React</b>	-.48 **	.12	.47 **	.22	.09	.19	-.05	—
<b>Mean (S.D.)</b>	42.42 (9.95)	16.32 (4.81)	124.98 (15.28)	25.48 (5.58)	28.33 (6.10)	24.93 (5.50)	25.18 (5.83)	21.05 (4.61)

p<.05\* ; p<.001\*\*

**Research Question 1:** Are TA, SD and/or their interaction significant predictors of total mindfulness?

As noted above, bivariate correlational analyses indicated that TA was significantly negatively correlated with total mindfulness, while SD was significantly positively correlated with this measure. Both the predictors were centred before progressing with the analyses and their cross-product was computed and used in the hierarchical multiple regressions.

A hierarchical multiple regression analysis was performed to test to which extent TA, SD and their interaction could predict total mindfulness. TA and SD were included in step 1 of the analysis, and a significant model emerged ( $F(2,57)=11.04$ ,  $p<.001$ ,  $R^2=.28$ ) indicating that, in combination, these predictors accounted for 27.9% of the variance in the total mindfulness. After entering the interaction term in step 2, the overall model was again significant with a ( $F(3,56)=7.85$ ,  $p<.001$ ,  $R^2=.30$ ) accounting for 29.6% of variance, a slight increase in comparison to the step 1 model. Nevertheless, this increase in variance represented a non-significant improvement in prediction ( $R^2$  change=.02,  $F$  change (1,56)=1.35,  $p>.05$ ) indicating that the interaction between TA and SD did not add significantly to prediction of total mindfulness. The individual contributions of the predictors in step 1 and step 2 are displayed in Table 2 below.

**Table 2**  
**Summary of Hierarchical Regression Analysis for the Prediction of Total Mindfulness (N=60)**

Predictor Variable	<i>B</i>	<i>SE B</i>	<i>Beta</i>
<b>Step 1</b>			
Anxiety	-.68	.17	-.44**
Social Desirability	.76	.37	.23*
<b>Step 2</b>			
Anxiety	-.63		-.41**
Social Desirability	.77	.37	.24*
Anxiety x Social Des.	-.05	.04	-.13

\* $p<.05$ ; \*\* $p<.001$

Table 2 illustrates that increased total mindfulness was significantly predicted by decreases in trait anxiety, but increases in social desirability. These effects were additive rather than interactive, as shown by the non-significant predictive ability of the interaction term.

**Research question 2:** Are TA, SD and/or their interaction significant predictors of the mindfulness facet Observing?

The bivariate correlational analyses reported that TA and SD were both not significantly related to the facet Observing.

Following the same procedures outlined above, a hierarchical multiple regression analysis was conducted to examine whether TA, SD and their interaction could predict the mindfulness facet Observing. When TA and SD were included in step 1 of the analysis, and a non significant model emerged ( $F(2,57)=.68$ ,  $p>.05$ ,  $R^2=.02$ ) and after entering the interaction term in step 2, the overall model was again non-significant ( $F(3,56)=.53$ ,  $p>.05$ ,  $R^2=.03$ ), The addition of this step did not significantly

improve the predictive ability of the model ( $R^2$  change=.004,  $F$  change (1,56)=2.44,  $p>.05$ ).

Thus, the facet Observing was not significantly predicted by trait anxiety or by social desirability, or by the interaction of these two variables.

**Research Question 3:** Are TA, SD and/or their interaction significant predictors of the Describing mindfulness facet?

As for Research Question 2, the predictors TA and SD were not significantly related to the facet Describing and the same hierarchical regression procedure was followed, this time with Describing as the outcome variable. When TA and SD were included in step 1 of the analysis, and a non-significant model emerged ( $F(2,57)=.87$ ,  $p>.05$ ,  $R^2=.17$ ), and, after entering the interaction term in step 2, the overall model was again non-significant ( $F(3,56)=.67$ ,  $p>.05$ ,  $R^2=.19$ ). Furthermore, the increase in variance explained from step 1 to step 2 was non-significant ( $R^2$  change=.005,  $F$  change (1,56)=3.05,  $p>.05$ ) indicating that the interaction between TA and SD did not significantly predict the facet Describing.

**Research Question 4:** Are TA, SD and/or their interaction significant predictors of the Acting with Awareness mindfulness facet?

Bivariate correlational analyses indicated that TA was significantly negatively correlated with Act-Aware, while SD resulted significantly positively correlated with Act-Aware. The predictors were centred before performing the analysis and their cross-product was used in the hierarchical multiple regressions.

In order to test to which extent TA, SD and their interaction predicted the mindfulness facet Act-Aware, a hierarchical multiple regression analysis was conducted. Therefore, TA and SD were included in step 1 of the analysis, and a significant model emerged ( $F(2,57)= 10.30$ ,  $p<.001$ ,  $R^2=.27$ ) indicating that, in combination, these predictors accounted for 26.5% of the variance of the total mindfulness. After entering the interaction term in step 2, the overall model was again significant ( $F(3,56)=7.85$ ,  $p<.001$ ,  $R^2=.28$ ) accounting for 28% of variance, a modest increase when compared to step 1 model. However, this increase in variance explained, was non-significant ( $R^2$  change=.03,  $F$  change (1,56)=2.55,  $p>.05$ ) indicating that the interaction between TA and SD did not add significantly to prediction of the facet Act-Aware. The individual contributions of the predictors in step 1 and step 2 are shown in Table 3 below.

**Table 3**

**Summary of Hierarchical Regression Analysis for the Prediction of the Act with Awareness facet of Mindfulness (N=60)**

Predictor Variable	<i>B</i>	<i>SE B</i>	<i>Beta</i>
<b>Step 1</b>			
Anxiety	-.18	.06	-.32*
Social Desirability	.42	.13	.36*
<b>Step 2</b>			
Anxiety	-.15	.06	-.28*
Social Desirability	.43	.13	.37*
Anxiety x Social Des.	-.02	.01	-.18

\* $p<.05$ ; \*\* $p<.001$



In Table 3 is reported that increases of the facet Act-Aware were significantly predicted by decreases in trait anxiety and, conversely, by increases in social desirability. However, the non-significant predictive ability of the interaction term indicates that the effects of the two predictors were additive rather than interactive.

**Research Question 5:** Are TA, SD and/or their interaction significant predictors of the Non-judge mindfulness facet?

After having performed bivariate correlational analyses it was found that TA was significantly negatively correlated with Non-judge, whereas SD was not significantly related to it.

Hierarchical multiple regression was again performed and when the predictors TA and SD were input in step 1 of the analysis, and a non significant model was revealed ( $F(2,57)= 1.7, p>.05, R^2=.06$ ). Subsequently, the interaction term was entered in step 2, but the overall model was again non-significant ( $F(3,56)=1.33, p>.05, R^2=.07$ ) and the increase in variance explained from step 1 to step 2 was, also, non-significant ( $R^2$  change=.010,  $F$  change (1,56)=.62,  $p>.05$ ).

**Research Question 6:** Are TA and SD and their interaction significant predictors of the Non-react mindfulness facet?

As for Research Question 5, bivariate correlational analyses revealed that TA was significantly negatively correlated with Non-react, whereas SD was not significantly related to it.

In order to assess whether TA, SD and their interaction could predict the mindfulness facet Non-react, a hierarchical multiple regression analysis was performed. Both TA and SD were included in step 1 of the analysis, and a significant model emerged ( $F(2,57)= 8.65, p<.001, R^2=.23$ ) indicating that, in combination, these predictors accounted for 23.3% of the variance of the total mindfulness. Then, after having input the interaction term in step 2, the overall model was again significant ( $F(3,56)=5.90, p<.001, R^2=.24$ ) accounting for 24% of variance, slightly increased in comparison to step 1 model. Nevertheless, this increase in variance explained a non-significant improvement in the prediction ( $R^2$  change=.007,  $F$  change (1,56)=.54  $p>.05$ ). The individual contributions of the predictors in step 1 and step 2 are displayed in Table 4 below.

**Table 4**

**Summary of Hierarchical Regression Analysis for the Prediction of the Non-react facet of Mindfulness (N=60)**

Predictor Variable	<i>B</i>	<i>SE B</i>	<i>Beta</i>
<b>Step 1</b>			
Anxiety	-.22	.05	-.47**
Social Desirability	.06	.11	.06
<b>Step 2</b>			
Anxiety	-.23	.06	-.50**
Social Desirability	.06	.11	.06
Anxiety x Social Des.	-.01	.01	-.09

\* $p<.05$ ; \*\* $p<.001$

Table 4 illustrates that increases in the facet Non-react was significantly predicted by decreases in trait anxiety, and by increases in social desirability and the non-

significant predictive ability of the interaction term shows that these effects were additive rather than interactive.

**General Assumptions:** For each of the multiple regression analyses reported in this section, a number of assumptions were checked. Firstly, across all analyses, all tolerance values were found to be greater than .10 and VIF values were all less than 10, confirming the absence of a problematic level of multicollinearity between the predictor variables. Secondly, for each analysis, residuals were plotted using histograms and PP-plots and inspection of these graphs revealed that they were normally distributed around zero. Thirdly, the assumption on homoscedasticity was assessed by plotting a graph of standardised residuals against standardised predicted values and the variance of residuals around the predicted scores was shown to be roughly the same for each of the predicted scores. Finally, there were no Cook's values above 1 for any of the analyses, indicating that there were no particular cases unduly influencing the overall regression models.

## Discussion

From the results of the study emerged no evidence that repressive coping style (lower TA in combination with higher SD) is associated with particularly low levels of dispositional mindfulness. In particular, three of the facets of mindfulness (Observing, Describing, Non-judge) were not significantly predicted by TA, SD or their interaction.

Instead, the Non-react factor was negatively predicted by TA (lower TA was associated with higher mindfulness) and this effect was consistent across all levels of SD (as evidence by the lack of interaction between TA and SD) suggesting that repressors and genuinely low anxious scored similarly on this facet of mindfulness. Importantly, in terms of the study predictions, low levels of TA predicted *higher* mindfulness, which was not in line with the idea that repressors may be particularly *low* in mindfulness.

Finally, for both total mindfulness and the Act-Aware facet, TA was again a significant negative predictor (lower levels associated with higher mindfulness) and SD was also identified as a significant positive predictor of these mindfulness measures. The effects of TA and SD were additive rather than interactive meaning that, at all levels of SD, lower TA was associated with higher mindfulness and that, at all levels of TA, higher SD was associated with higher mindfulness. Therefore, this means that repressors' combination of low TA and high SD was actually predictive of the *highest* levels of mindfulness on these two measures. This finding is clearly at odds with the possibility that repressors may be particularly low in mindfulness.

The fact that the effects of TA and SD on these measures were additive rather than interactive shows that higher SD was associated with higher mindfulness at all levels of TA, rather than uniquely predicting changes in mindfulness at low levels of TA (a repressive coping effect). Therefore, given that the SD and TA effects were additive, the TA and SD effect will be considered separately in the remaining discussion.

For what concerns the SD effects, it appears counterintuitive that high defensiveness, that in repressors is proposed to be a marker for an automatic behaviour (aimed at protecting self-schemas, attending away from threatening stimuli from inner states and external cues) (Derakshan & Eysenk, 1997), would be positively associated with high levels of mindfulness (that entails the opposite processes promoting attention to and awareness of the present moment in a non-judgemental manner) (Baer et al., 2006). A possible explanation for which SD positively predicted total mindfulness and the facet Act-aware is that repressors have enacted other-deceiving strategies while answering the mindfulness questionnaire. This observation was evidenced by Puhlius (1984) for which the social desirability construct entails two main components characterised by different, and somehow, opposite features: impression management and self-deception. Respectively, impression management concerns the attempt that individuals voluntarily enact to portray themselves in a positive manner to someone else, whereas self-deception is an involuntary process displayed towards the individual's own self, aimed at denying negative stimuli and, conversely, enhancing a sense of positivity and perceived control. Therefore, Puhlius (2002) concluded that, given the dichotomous nature of social desirability, the Marlowe-Crowne SDS items assess more aspects of impression management in social situations rather than self-deception (Seol, 2007): this means that a high score would be indicative of a high level of impression management rather than a high level of the overarching construct social desirability that the MCSDS claims to measure.

For what concerns trait anxiety effects, the findings evidenced that TA was a reliable predictor of total mindfulness: in fact, in line with previous studies, mindfulness was negatively associated with attentional biases (poor attentional control and attending to threat-related stimuli) and with negative affect, typical features of TA. Moreover, TA negatively predicted both Act-Aware and Non-react, which are closely related with the core characteristics of mindfulness such as cognitive awareness and the lack of the automatized behaviours: some researchers (Branstrom, Duncan & Moskowitz, 2011) have argued that these facets are possibly the most accurate indicators of mindfulness in the FFMQ scale and the negative relation with TA supports this view. Interestingly, no relation was found with the facets Observing, Describing and Non-judging, which in previous literature were found to be negatively associated with TA (Vujanovic, Zvolensky, Bernstein, Feldner & McLeish, 2007): these facets are closely related to the attentional and interpretive bias discussed above and the absence of a correlation in this study may be explained by the self-deceptive strategies that repressors typically display when responding to TA self-reported measures (Derakshan & Eysenck, 2005). Moreover, it seems plausible to think that repressors' responding to TA measures was also influenced by a lack of awareness for mental states as frequently reported in the literature (Schooler, 2002): in a further study manipulating their self-focus attention may induce repressors to respond to TA self-reported measures in a less biased manner and, therefore, the negative correlation with mindfulness measures may result enhanced.

Moreover, it is interesting to notice that both TA and SD did not predict the facets Observing, Describing and Non-judging. A possible explanation is that observing and describing one's physiological states automatically triggers the overlearned behaviours for which repressors interpret (judge) negatively their mental/bodily states (Derakshan & Eysenck, 1998). Repressors' coping style aims at the opposite outcome by adopting self-deceiving strategies that avoid the threatening stimuli, generating experienced low anxiety and a sense of control. This might explain why they scored higher on the facets Act-Aware and Non-react: repressors truly believe they are aware (Act-aware) of their own mental/physiological states and that they have control (Non-react) over them. Moreover, previous studies evidenced that the mindfulness facets Act-aware and Non-react are more often related to positive health outcomes in comparison to Observing, Describing and Non-judging that, instead, were found to be weakly correlated to positive health outcomes (Branstrom, Duncan, & Moskowitz, 2011). As a result, some researchers argue that the use of the facets Act-Aware and Non-react may be sufficient in detecting mindfulness levels.

Additionally, the interpretation of the SD effects in this study is made even more difficult by the evidence that the MCSDS has been found to have a heterogeneous structure: in fact the use of these measures might have yielded some inaccuracies for what concerns the internal reliability of the scale. Barger (2002) conducted a comprehensive exploratory factor analysis that revealed that the MCSDS does not measure social desirability as a unitary construct: confirmatory factor analysis displayed a heterogeneous structure of the MCSDS consisting of small-item clusters. Therefore, the MCSDS would not measure a single personality dimension (as it was supposed by Crowne & Marlowe, 1960) generating discrepancies between the naming of the questionnaire and what actually measures, so that the term "social desirability" in this context results to be a misnomer. In fact, in the current study, the alpha value for the SD scale was relatively low, indicating a weak correlation between the items in measuring the defensiveness construct: these issues make the interpretation of the SD effects even more problematic.

Another possible explanation for the current findings regarded the participants' tendency to respond accordingly to different levels of item interpretation: Borkenau and Ostendorf (1992) theorised that even though Marlowe and Crowne (1960) believed that their scale was effective in detecting response implausibility due to socially desirable bias, the actual bias might be generated by the subject personal interpretation of the items. Borkenau et al. (1992) suggested that individuals might interpret the items trying to report their self-concepts in the most accurate manner, disregarding the exact wording of the items questionnaire. That means that a subject might decide to positively answer the item 21 "I am always courteous, even to people who are disagreeable" on the basis of what they genuinely do in the majority of the occasions being aware of the impossibility of being "always courteous". In this case, the experimenter may interpret this as an attempt to portray one's self in a socially desirable manner whereas the subject wants to convey his/her general self-image and the usual behaviour rather than minding the exact wording (Seol, 2007). Therefore, in the subject's perspective, answering negatively to item 21 would represent an untruthful statement whilst the researcher would assume that the subject's answer is not biased in a socially desirable manner. These discrepancies in the interpretation of the MCSDS items might have played a part in the final outcome for which repressors would show high defensiveness and high dispositional mindfulness.

However, the MCSDS has been widely used in a large body of studies producing accurate results (Vendemia & Rodriguez, 2010), and the current findings might have been yielded by the interplay of methodological bias with other factors that are going to be discussed.

For what concerns the FFMQ scores, the most plausible explanation for the high mindfulness levels in repressors is that they responded in a socially desirable manner to the self-reported measures, as evidenced by the literature reviewed earlier (Furnham, Petrides, & Spencer-Bowdage, 2002). Another interesting critique was raised concerning the mindfulness self-reported measures: in fact, even though the FFMQ content is aimed at assessing awareness and attention to the present moment, the questions necessarily require the subject to recall those moments from the past (Derakshan & Eysenk, 1998), retrieving them from the long-term memory. The retrieval of past events might represent a difficult process if we consider that a strong body of research claims that repressors display a series of memory biases for what concerns negative past events: these biases include a limited accessibility to those memories and an enhanced ability to use compensatory strategies such as opposite interpretative biases aimed at avoiding their threatening content (Derakshan & Eysenk, 1997).

Moreover, another issue was raised by some researchers for what concerns the use of self-reported measures of mindfulness that resulted ineffective when employed with certain categories of individuals (Newton & Contrada, 1992), such as repressors in this specific case. In fact, it seems plausible to think that a basic metacognitive awareness of awareness (Schooler, 2002) is needed in order to recognise mindful or mindless moments and that is relatively unlikely to expect that, considering the attentional and cognitive biases typical of repressors, these events would be effectively recognised as they occur and, even more unlikely, that those memories would have been stored adequately in the long-term memory.

This observation might also explain the reasons for which, in previous studies (Van Dam Earleywine & Danoff-Burg, 2009), mindful individuals tend to be more accurate when completing the FFMQ, providing scores that reflect their actual mental and

bodily states, whilst, for what concerns repressors, the reconstruction of past events to which they were not fully attentive to and aware of in the first place, might represent a more challenging task to perform. These issues might be a set of factors that have come into play in increasing the likelihood of incurring in errors and bias whilst conducting the current study on levels of dispositional mindfulness in repressors (Pauhlus, 2002).

As a result these considerations imply that, adopting the FFMQ when assessing levels of mindfulness in this specific category of individuals, it would wrongly appear that repressors are high in mindfulness providing the false impression of not being in need of interventions aimed at lowering their physiological, anxiety-related symptoms which pose a threat to their physical health (Furnham et al., 2003).

Furthermore, some studies have evidenced that, despite its adequate psychometric properties (i.e. internal consistency and good item correlation), the FFMQ functioning might vary across different groups of meditators and non-meditators for what concerns negatively and positively worded items. In support of this observation, a study conducted by Van Dam, Earleywine and Danoff-Burg (2009), displayed that the way in which items were presented to participants would exert a main effect on the final scores depending on the group considered (differential item functioning, DIF).

In the aforementioned experiment, non-meditators students were found to mainly endorse negatively worded items whereas student meditators showed an equal endorsement of positively and negatively worded items, showing that groups and wording interacted significantly.

These findings may account for the particularly high scoring for the facet Act with Awareness amongst repressor students in the present study: in fact, this subscale exclusively contains negatively worded items for which the DIF was found in the previous study. Interestingly enough, the other facet Non-reactivity that received the highest scores, was entirely positively worded: this finding might be explained in terms of self-deceptive strategies enacted by the repressors that answered the questions in an over-positive fashion and in a social desirable manner, in concordance with previous studies and in line with the typical self-deceptive strategies used by individuals with a repressive coping style (Myers, Vetere & Derakshan, 2004).

The other three facets Observing (items positively worded), Describing (items both positively and negatively worded) and Non-judge (items negatively worded) were also considered in Van Dam et al. (2009) study for what concerns the detection of DIF: eighteen out of thirty-nine items, taken from every facet, showed a consistent pattern of DIF, which was shown to have an impact on the overall construct validity of the scale.

Moreover, the number of negatively worded items, their distribution across the subscales and the unequal number of items for each facet (Non-react contains seven positive items whilst the other subscales contain eight either positive, negative or mixed items) was considered to be causing method biases and complications in response interpretation (Baer, Samuel & Lykins, 2011).

These assumptions were partially supported by empirical evidence for which, for instance, the presence of reverse-scored items cause method effects that, nonetheless, do not compromise the overall validity of the total scoring. Some other researchers instead, support the idea that negatively worded items should be removed from self-reported measures since they measure a different construct from the positively worded ones, causing an overall reduced reliability of the scale (Paulhus, 1984).

Nonetheless these analyses were conducted on uni-dimensional, self-reported measures and there is a very limited amount of research on negatively worded items and their effects on multi-dimensional measures such as the FFMQ (Van Dam, Earleywin & Danoff-Burg, 2009): moreover, the studies conducted so far, only provide contrasting evidence that is not directly applicable in the refinement of the already existing measures. Additionally, in the present study inter-correlation between facets were not significant and positive across the different facets even though every facet was strongly correlated with the total mindfulness.

Therefore, the combined effect of DIF (Van Dam et al., 2009), socially desirable responding (Myers & Derakshan, 2000), and the use of self-reported measures of mindfulness (Grossman, 2008) might have contributed to give a distorted total mindfulness scoring.

However, the internal reliability and validity of the FFMQ was found to be stable across a consistent number of experiments assessing mindfulness levels in clinical populations after mindfulness-based interventions (Green & Bieling, 2012): therefore, some further research should be conducted in order to devise more reliable self-reported measures of mindfulness that would increase the likelihood to detect levels of mindfulness in not trained individuals that display a repressive coping style (Grossman, 2008).

Therefore, it appears unreasonable to assume that the individuals with a repressive coping style assessed in this experiment would experience high levels of mindfulness: rather, a series of methodological issues yielded misleading results and revealed some research biases that produced the current outcome. Nonetheless, this study represents the first attempt to explore the relatively new construct of mindfulness in relationship with the repressive coping style: some further research is needed to achieve a better understanding of their interrelations.

Some other limitations have to be acknowledged in the present study. First of all, participants were a self-selected group of psychology undergraduates (i.e. in a higher-level education) and a general interest in psychological domains: this means that participants might have already been familiar with some of the most used self-reported measures and with popular psychological constructs: this knowledge might have exerted an influence in responding the questions and, consequently, on the general outcome.

Moreover, familiarity with mindfulness practices (that include generally known disciplines such as yoga) (Davidson et al., 2003) was not assessed beforehand in the sample and, given the ethnical variety of the participants, some of the students may have or may not have been capable of more comprehensive meditation techniques due to religious purposes, affecting the final outcome.

Therefore, assessing whether participants practice any type of meditation practice (Van Dam et al., 2009) would also improve the accuracy of the outcomes providing a clearer picture of the dynamics underlying the relationship between repressive coping style and mindfulness.

Additionally, it could also be argued that self-reported measures of mindfulness (despite of the conceptualisation of the mindfulness construct and of the psychometric tools devised) might be a generally unreliable tool in assessing mindfulness levels in repressors not only for the already discussed biases relative to the FFMQ itself, but also because self-reported measures fail to accurately capture the typical physiological and behavioural aspects of the repressive coping strategies (Schwerdtfeger & Derakshan, 2010), providing further evidence in support of the

discrepancies between self-reported, behavioural and physiological measures documented in a large body of empirical evidence.

Hence, even though research on mindfulness has only begun to yield some neurobiological evidence of its benefits (Chiesa & Serretti, 2010), it will be determinant for future research to find some reliable and valid physiological and neurological indexes of mindfulness that would better describe the meta-cognitive processes involved and, therefore, provide a more solid conceptualisation of the mechanisms defining the construct itself (Grossman, 2008).

Another possible limitation of the present study is directly linked with the sample selected. In particular, the limited number of participants (N=60) that took part in the study represents an issue: in fact, given the limited, self-selected sample, the current findings cannot be extended and related to the general population. Therefore, further research on levels of mindfulness in repressor would be greatly improved by taking into consideration a larger and more representative sample of the general population, including more diverse categories of people rather than exclusively sampling psychology undergraduates (Branstrom, Duncan & Moskovitz, 2001).

On the other hand, the study has shown diverse strengths such as recruiting an equal number of students for every undergraduate year, with an equal number of males and females for each year of study. Additionally, the three paper questionnaires were administered following counterbalancing procedures aimed at avoiding order effects. This aim was achieved providing half of the participants (10 males and females) in each year were with the questionnaire pack in order 1 (STAI, MCSDS, and FFMQ) whilst the other half of the participants were given the questionnaires in order 2 (FFMQ, MCSDS and STAI) so that in the first order TA scores were not influenced by the content of the FFMQ and vice-versa for the second order.

The present study has to be considered and evaluated in the light of its limitation: even though the results appear controversial, this is the first attempt to establish a relationship between dispositional mindfulness and the repressive coping style. In fact, the results found in the present study are deriving from a preliminary theoretical, exploratory research that surely requires further improvements such as the inclusion of more valid self-reported measures, behavioural measures and, possibly, physiological measures. The implementation of physiological measures and the research for more accurate measures of defensiveness paired with a more heterogeneous and varied sample of subjects may improve the accuracy of the results.

Overall, the present study has the merit of posing a new question on the applicability of mindfulness practices to people displaying a repressive coping style that might greatly benefit from disengaging from their automatized, defensive behaviour applying the mindfulness techniques and improving their overall health outcomes.

**Acknowledgments:** I would like to thank my supervisor Dr. Therese Shepherd for the constant support and encouragement.

I would also like to dedicate my efforts to my loving family.



## References

- Avero, P., Corace, K. M., Endler, N. S. & Calvo, M. G. (2003), Coping Styles and Threat Processing, *Personality and Individual Differences*, Vol. 35, pp. 843–861.
- Baer, R. A., Samuel, D. B. & Lykins, E. L. B. (2011), Differential Item Functioning on the Five Facet Mindfulness Questionnaire Is Minimal in Demographically Matched Meditators and Non-meditators, *Assessment*, Vol.18, Issue 1, pp. 3–10.
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J. & Toney, L. (2006), Using Self-Report Assessment Methods to Explore Facets of Mindfulness, *Assessment*, Vol. 13, Issue 1, pp. 27-45.
- Barger, S. D. (2002), The Marlowe–Crowne Affair: Short Forms, Psychometric Structure, and Social Desirability, *Journal of Personality Assessment*, Vol. 79, Issue 2, pp. 286–305.
- Barnhofer, T., Crane, C., Hargus, E., Amarasinghe, M., Winder, R. & Williams, J. M. G. (2009), Mindfulness-based Cognitive Therapy as a Treatment for Chronic Depression: A Preliminary Study, *Behaviour Research and Therapy*, Vol. 47, pp. 366–373.
- Borkenau, P. & Ostendorf, F. (1992), Social Desirability Scale as Moderator and Suppressor Variables, *European Journal of Personality*, Vol. 6, pp. 199- 214.
- Branstrom, R., Duncan, L. G. & Moskowitz, J. T. (2011), The Association between Dispositional Mindfulness, Psychological Well-being, and Perceived Health in a Swedish Population-based Sample, *British Journal of Health Psychology*, Vol.16, pp. 300-316.
- Brown, K. W. & Ryan, R. M. (2003), The Benefits of Being Present: Mindfulness and Its Role in Psychological Well-Being, *Journal of Personality and Social Psychology*, Vol. 84, Issue 4, pp. 822–848.
- Brown, K. W., Ryan, R. M. & Creswell, J. D. (2007), Mindfulness: Theoretical Foundations and Evidence for its Salutary Effects, *Psychological Inquiry*, Vol. 18, Issue 4, pp. 211–237.
- Calvo, M. G. & Eysenck, M. W. (2000), Early Vigilance and Late Avoidance of Threat Processing: Repressive Coping Versus Low/High Anxiety, *Cognition and Emotion*, Vol.14, Issue 6, pp. 763-787.
- Chambers, R., Gullone, E. & Allen, N. B. (2009), Mindful Emotion Regulation: An Integrative Review, *Clinical Psychology Review*, Vol. 29, pp. 560–572.
- Chiesa, A., Calati, R., & Serretti, A. (2011), Does Mindfulness Training Improve Cognitive Abilities? A Systematic Review of Neuropsychological Findings, *Clinical Psychology Review*, Vol. 31, pp. 449–464.
- Chiesa, A. & Serretti, A. (2010), A Systematic Review of Neurobiological and Clinical Features of Mindfulness Meditations, *Psychological Medicine*, Vol.40, pp. 1239–1252.

Cho, S., Heiby, E. M., McCracken, L. M., Lee, S. & Moon, D. (2010), Pain-Related Anxiety as a Mediator of the Effects of Mindfulness on Physical and Psychosocial Functioning in Chronic Pain Patients in Korea, *The Journal of Pain*, Vol.11, Issue 8, pp. 789-797.

Crowne, D. P. & Marlowe, D. (1960), A New Scale of Social Desirability Independent of Psychopathology, *Journal of Consulting Psychology*, Vol. 24, Issue 4, pp. 349-354.

Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. F., Urbanowski, F., Harrington, A., Bonus, K. & Sheridan, J. F. (2003), Alterations in Brain and Immune Function Produced by Mindfulness Meditation, *Psychosomatic Medicine*, Vol.65, pp. 564–570.

Derakshan, N. & Eysenck, M. W. (1997), Interpretive Biases for One's Own Behavior and Physiology in High-Trait-Anxious Individuals and Repressors, *Journal of Personality and Social Psychology*, Vol.73, Issue 4, pp. 816-825.

Derakshan, N. & Eysenck, M. W. (1998), Working Memory Capacity in High Trait-anxious and Repressor Groups, *Cognition and Emotion*, Vol.12, Issue 5, pp. 697-713.

Derakshan, N. & Eysenck, M. W. (2000), Repression and Repressors: Theoretical and Experimental Approaches, *European Psychologist*, Vol. 2, Issue 3, pp. 235-246.

Derakshan, N. & Eysenck, M. W. (2001a), Manipulation of Focus of Attention and its Effects in High Anxious, Individuals and Repressors, *Anxiety, Stress and Coping*, Vol.14, pp. 174-191.

Derakshan, N. & Eysenck, M. W. (2001b), Effects of Focus of Attention on Physiological, Behavioural and Reported State Anxiety in Repressors, Low Anxious, High Anxious and Defensive High Anxious Individuals, *Anxiety, Stress and Coping*, Vol.14, pp. 285-299.

Derakshan, N. & Eysenck, M. W. (2005), When the Bogus Pipeline Interferes with Self-deceptive Strategies: Effects on State Anxiety in Repressors, *Cognition and Emotion*, Vol. 19, Issue 1, pp. 83-100.

Derakshan, N., Eysenck, M. W. & Myers, L. B. (2007), Emotional Information Processing in Repressors: The Vigilance-Avoidance Theory, *Cognition and Emotion*, Vol. 21, Issue 8, 1585-1614.

Furnham, A., Petrides, K. V., Sisterson, G. & Baluch, B. (2003), Repressive Coping Style and Positive Self-Presentation, *British Journal of Health Psychology*, Vol. 8, pp. 223–249.

Furnham, A., Petrides, K. V. & Spencer-Bowdage, S. (2002), The Effects of Different Types of Social Desirability on the Identification of Repressors, *Personality and Individual Differences*, Vol. 33, pp. 119–130.

Gianaros, P. J., Jennings, J.R., Sheu, L. K., Greer, P. J., Kuller, L. H. & Matthews, K. A. (2007) Prospective Reports of Chronic Life Stress Predict Decreased Grey Matter Volume in *Neuroimage*, Vol. 35, pp. 795–803.

Green, S. M. & Bieling, P. G. (2012), Expanding the Scope of Mindfulness-Based Cognitive Therapy: Evidence for Effectiveness in a Heterogeneous Psychiatric Sample, *Cognitive and Behavioral Practice*, Vol. 19, pp. 174-180.

Grossman, P. (2008), On Measuring Mindfulness in Psychosomatic and Psychological Research, *Journal of Psychosomatic Research*, Vol.64, pp. 405–408.

Grossman, P., Tiefenthaler-Gilmer, U., Raysz, A., Kesper, U. (2007). Mindfulness Training as an Intervention for Fibromyalgia: Evidence of Postintervention and 3-year Follow-up Benefits in Well-being. *Psychotherapy and Psychosomatics*, Vol.76, Issue 4, pp. 226-233.

Holzel, B. K., Carmody, J., Vangel, M., Congleton, C., Yerramsetti, S. M., Gard, T. & Lazar, S. W. (2011), Gray Matter Density, *Psychiatry Research*, Vol. 191, pp. 36–43.

Mindfulness

Jung, Y., Kang, D., Jang, J. H., Park, H. Y., Byun, M. S., Kwon, S. J., Janga, E., Leed, U. S., An, S. C. & Kwon, J. S. (2010), The Effects of Mind–Body Training on Stress Reduction, Positive Affect, and Plasma Catecholamines, *Neuroscience Letters*, Vol. 479, pp. 138–142.

Lewis, S. E., Fowler, N. E., Woby, S. R. & Holmes, P. S. (2012), Defensive Coping Styles, Anxiety and Chronic Low Back Pain, *Physiotherapy*, Vol. 98, pp. 86–88.

Luders, E., Toga, A. W., Lepore, N., Gaser, C. (2009), The Underlying Anatomical Correlates of Long-term Meditation: Larger Hippocampal and Frontal Volumes of Gray Matter, *Neuroimage*, Vol. 45, pp. 672–678.

Ma, S. H. & Teasdale, J. D. (2004), Mindfulness-Based Cognitive Therapy for Depression: Replication and Exploration of Differential Relapse Prevention Effects, *Journal of Consulting and Clinical Psychology*, Vol. 72, Issue 1, pp.31–40.

Mendelson, T., Greenberg, M. T., Dariotis, J. K., Feagans Gould, L., Rhoades, B. L. & Leaf, P.J. (2010), Feasibility and Preliminary Outcomes of a School-Based Mindfulness Intervention for Urban Youth, *Journal of Abnormal Child Psychology*, Vol. 38, pp. 985–994.

Moore, A., Gruber, T., Deroose, J. & Malinowski, P. (2012), Regular, Brief Mindfulness Meditation Practice Improves Electrophysiological Markers of Attentional Control, *Frontiers in Human Neuroscience*, Vol. 6, Issue 18, pp.1-15.

Murakami, H., Nakao, T., Matsunaga, M., Kasuya, Y., Shinoda, J., Yamada, J. & Ohira, H. (2012), The Structure of Mindful Brain, *Plos One*, Vol. 7, Issue 9, pp. 1-4.

Myers, L. B. (2010), The Importance of the Repressive Coping Style: Findings from 30 Years of Research, *Anxiety, Stress and Coping*, Vol. 23, Issue 1, pp. 3-17.

Myers, L. B. & Derakshan, N. (2000), Monitoring and Blunting and an Assessment of Different Coping Styles, *Personality and Individual Differences*, Vol. 28, pp. 111-121.

Myers, L. B. & Reynolds, D. (2000), How Optimistic are Repressors? The Relationship between Repressive Coping, Controllability, Self-esteem and Comparative Optimism for Health-related Event, *Psychology and Health*, Vol.15, pp. 677-687.

Myers, L. B., Vetere, A. & Derakshan, N. (2004), Are Suppression and Repressive Coping Related?, *Personality and Individual Differences*, Vol. 36, pp. 1009–1013.

Newton, T. L. & Contrada, R. (1992), The Autonomic-verbal Response Dissociation: The Influence of Social Context. *Journal of Personality and Social Psychology*, Vol.62, pp.159-167.

Pauhlus, D. L. (1984), Two Component Models of Socially Desirable Responding, *Journal of Personality and Social Psychology*, Vol. 46, Issue 3, pp.598-609.

Pauhlus, D. L. (2002), Socially Desirable Responding: the Evolution of a Construct. In H. I. Braun, D. N. Jackson, D. E. Wiley (Eds.), *The Role of Constructs in Psychological and Educational Measurement*, (pp. 49-69), Mahwah, N. J., Erlbaum, L. Eds.,.

Rauch, A. V., Ohrmann, P., Bauer, J., Kugel, H., Englien, A., Arolt, V., Heindel, W. & Suslow, T. (2007), Cognitive Coping Style Modulates Neural Responses to Emotional Faces in Healthy Humans: A 3-T fMRI study, *Cerebral Cortex*, Vol. 17, pp. 2526-2535.

Schooler, J. W. (2002), Re-representing Consciousness: Dissociations between Experience and Meta-consciousness, *Trends in Cognitive Sciences*, Vol. 6, Issue 8, pp. 339–344.

Schwerdtfeger, A. & Derakshan, N. (2010), The Time Line of Threat Processing and Vagal Withdrawal in Response to a Self-threatening Stressor in Cognitive Avoidant Copers: Evidence for Vigilance-avoidance Theory, *Psychophysiology*, Vol.47, pp. 786-795.

Schwerdtfeger, A., Schmukle, S.C. & Egloff, B. (2006), Avoidant Coping, Verbal-autonomic Response Dissociation and Pain Tolerance, *Psychology and Health*, Vol. 21, Issue 3, pp. 367–382.

Seol, H. (2007), A Psychometric Investigation of the Marlowe-Crowne Social Desirability Scale Using Rasch Measurement, *Measurement and Evaluation in Counseling and Development*, Vol. 40, pp. 155-168.

Shapiro, S. L., Carlson, L. E., Astin, J. A. & Freedman, B. (2006), Mechanisms of Mindfulness, *Journal of Clinical Psychology*, Vol. 62, Issue 3, pp.373–386.

Spielberger, C. D., Gorsuch, R. L., Lushene, R. (1970), STAI Manual: for the State-Trait Anxiety Inventory Self-evaluation Questionnaire, *Consulting Psychologists Press*, pp.1-23.

Van Dam, N. T., Earleywine, M. & Danoff-Burg, S. (2009), Differential Item Function across Meditators and Non-meditators on the Five Facet Mindfulness Questionnaire, *Personality and Individual Differences*, Vol. 47, pp. 516–521.

Vendemia, J. M. C. & Rodriguez, P. D. (2010), Repressors vs. Low- and High-anxious Coping Styles: EEG Differences During a Modified Version of the Emotional Stroop Task, *International Journal of Psychophysiology*, Vol.78, pp. 284–294.

Vujanovic, A. A., Zvolensky, M. J., Bernstein, A., Feldner, M. T. & McLeish, A. C. (2007), A Test of the Interactive Effects of Anxiety Sensitivity and Mindfulness in the Prediction of Anxious Arousal, Agoraphobic Cognitions, and Body Vigilance, *Behaviour Research and Therapy*, Vol. 45, pp. 1393–1400.

Walsh, J. J., Balint, M. G., Smolira D. R., Kamstrup-Fredericksen, L. & Madsen, S. (2009), Predicting Individual Differences in Mindfulness: The Role of Trait Anxiety, Attachment Anxiety and Attentional Control, *Personality and Individual Differences*, Vol. 46, pp. 94–99.

Warnecke, E., Quinn, S., Ogden, K., Towle, N. & Nelson, M. R. (2011), A Randomised Controlled Trial of the Effects of Mindfulness Practice on Medical Student Stress Levels, *Medical Education*, Vol. 45, pp. 381–388.

Weinberger, D. A., Schwartz. G. E. & Davidson, R. J. (1979), Low Anxious, High Anxious, and Repressive Coping Styles: Psychometric Patterns and Behavioral and Physiological Responses to Stress, *Journal of Abnormal Psychology*, Vol. 58, pp. 369-380.

Weinstein, N., Brown, K. W. & Ryan, R. M. (2009), A Multi-method Examination of the Effects of Mindfulness on Stress Attribution, Coping, and Emotional Well-being, *Journal of Research in Personality*, Vol. 43, pp. 374–385.