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**Moments of State Mindfulness: Development of an online tool and its  
application to social judgements.**

Lynsey Aisha Mahmood

Centre for the Study of Group Processes

School of Psychology

University of Kent

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## Overview and Hypotheses

The overall aim of this thesis is to investigate the effectiveness of a 5-minute online mindfulness practice, and test its applications to social judgements including attribution and decision-making. The seven experiments (N = 959) presented in this thesis address an important gap in the current literature on mindfulness. Specifically: 1) the empirical test of the effectiveness of a 5-minute, single-session, online mindfulness manipulation and; 2) the impact of a brief mindfulness manipulation on social judgements.

At present, the majority of mindfulness research has focused on multiple sessions of practice over a number of weeks as part of a course, usually aimed at clinical populations, and at enhancing trait mindfulness (Brown & Ryan, 2003). There is evidence that such courses can be effectively delivered online (Allexandre, Neuman, Hunter, Morledge, & Roizen, 2012; Krusche, Cyhlarova, King, & Williams, 2012; Krusche, Cyhlarova, & Williams, 2013; Morledge et al., 2013) and emerging evidence for the use of single-session mindfulness with non-clinical samples (Erisman & Roemer, 2010; Heppner et al., 2008; Hong, Lishner, & Han, 2014; Hooper, Erdogan, Keen, Lawton, & Mchugh, 2015a; Jordan, Wang, Donatoni, & Meier, 2014; Kiken & Shook, 2011; Papiés, Barsalou, & Custers, 2012; Weger, Hooper, Meier, & Hopthrow, 2012) that aims to increase state mindfulness (Bishop et al., 2004; Lau et al., 2006). In addition, although mindfulness exercises are readily available online and via smartphone apps, there has yet to be an empirical investigation of the effectiveness of self-help online practices, and whether brief, single-session practices actually enhance levels of mindfulness.

Based on evidence that some people prefer to complete such practices in their own surroundings (Beattie, Shaw, Kaur, & Kessler, 2009; Cavanagh et al., 2013), and that a smartphone app was preferred to an in-person and web-based mindfulness practice, it is expected that a short (5-minute) single-session, online mindfulness manipulation will effectively increase state mindfulness, measured by the Toronto Mindfulness Scale (TMS, Lau et al., 2006).

Mindfulness is thought to be effective in slowing automatic responding (Jordan et al., 2014; Kiken & Shook, 2011; Papies et al., 2012) and may reduce reliance on previously learnt associations (Langer & Moldoveanu, 2000b), allowing attention to be refocused on aspects of the environment that usually go unnoticed. As such, it has the potential to reduce errors in attribution. Reliance on automatic processes in social judgements can be detrimental for social harmony. For example, the mindless use of heuristics and stereotypes in person judgement can lead to prejudice and discrimination (Abrams, 2010). Furthermore, dysfunctional group dynamics can lead to poorly made decisions (Berger & Zelditch, 1998; Larson, Foster-Fishman, & Franz, 1998; Stasser & Stewart, 1992; Stasser, Taylor, & Hanna, 1989). With this in mind, the beneficial effects that mindfulness can have on interpersonal relationships (e.g. increased empathy; Block-Lerner, Adair, Plumb, Rhatigan, & Orsillo, 2007) should also help to improve group decision-making.

The core aim of this thesis is to test whether a 5-minute, single-session, online mindfulness manipulation effectively increases state mindfulness, and then apply this to social judgements. Specifically, whether the mindfulness manipulation is effective in reducing attribution errors, and improving group decision-making. It is expected that after the mindfulness manipulation, participants will be less likely to

respond in an automatic way when asked to attribute another individual's behaviour, or the cause of a situation based on limited information. Moreover, this is expected to improve the social experience of individuals working in groups and therefore increase decision-making accuracy.

This thesis presents seven experiments in which a 5-minute mindfulness manipulation is tested in different settings (Chapter 4), applied to two attribution errors (Chapters 5 and 6), and used before a group decision-making task (Chapter 7). A summary of the findings, and the theoretical and practical implications of the findings are presented alongside limitations and avenues for future research in the final chapter of this thesis (Chapter 8).

## **Chapter 1: Mindfulness: Definitions, Measurement and Application**

This chapter provides an overview of the literature on mindfulness. There is a particular emphasis on three aspects: 1) differentiating trait from state mindfulness; 2) exploring measurement tools to assess individual mindfulness levels; and 3) considering the potential applications of mindfulness in social psychology. Research using mindfulness exercises delivered online is also considered.

### **Defining Mindfulness**

As a construct, mindfulness has been examined empirically for over four decades (Black, 2011). Despite its origins in Buddhist and other contemplative traditions that place significance on conscious attention and awareness (Brown & Ryan, 2003), mindfulness research has proliferated the psychology literature in both religious and secular terms, particularly for clinical therapies and mental health treatments. Whilst the origins of mindfulness lie in contemplative traditions, there is a distinction between mindfulness and absorption (Holzel & Ott, 2007), where the latter refers to entering a trance like state of consciousness, losing touch with what is presently occurring, commonly associated with meditative states (Brown & Ryan, 2003). Although there are a number of definitions of mindfulness, it is largely focussed on present moment awareness (Kabat-Zinn, 1990), and so by definition opposes the tenet of absorption.

Some of the more widely used definitions of mindfulness include the following aspects: facets of consciousness, defined as enhanced attention and moment-by-moment awareness (Kabat-Zinn, 1990; Walsh, Balint, Smolira, David, Fredericksen, & Madsen, 2009), a heightened state of involvement, wakefulness and

being in the present (Langer & Moldoveanu, 2000a). Here, attention refers to the process of focussing conscious awareness and providing heightened sensitivity to a limited range of experience (Westen, 1996). As well as this, mindfulness definitions include maintaining open and non-judgemental consciousness of self and environment, by being in touch with what is occurring (Brown & Ryan, 2003). Langer and Moldoveanu (2000b) suggest that this also encompasses greater sensitivity to one's environment, openness to new information, the creation of new categories for structuring perception, and enhanced awareness of multiple perspectives.

Despite the variety of definitions, there are common elements to almost all definitions of mindfulness. These include: enhanced attention to present moment awareness (Kabat-Zinn, 1990; Langer & Moldoveanu, 2000a); maintenance of an open and non-judgemental consciousness of self and environment, whilst being in touch with what is occurring in that moment (Brown & Ryan, 2003); and observing thoughts and feelings without over-identifying with them in an automatic, reactive way. The last of these facets involves introducing a 'space' between one's own perception and response (Bishop et al., 2004). Mindfulness is also considered an acceptance strategy, in that individuals higher in mindfulness are more open and receptive to ideas and emotions; a contrast to the idea of refusing to acknowledge or attend to a thought, feeling or emotion, known as mindlessness (Brown & Ryan, 2003).

### **Mindlessness and Mind-Wandering**

Although seemingly antithetical to mindfulness, it is important to note some of the key features of mindlessness. This allows for a better understanding of how



the two constructs differ, what is particularly unique about mindfulness, and whether being mindful is merely the same as not being mindless. As mentioned above, Brown and Ryan (2003) define mindlessness as an absence of mindfulness. That is, a blunted form of consciousness that is characterised by habitual or automatic functioning; and attention that is taken away from the present (i.e. in rumination, absorption and concern with the past or future); similar to mind-wandering (Mrazek, Smallwood, & Schooler, 2012). Both are in direct opposition with the definition of mindfulness given above, which emphasises openness to new experiences and non-judgemental attention to thoughts and experiences. Mindlessness, on the other hand, would be more closely associated with refusal or rejection of certain thoughts and emotions, for example unpleasant or painful thoughts.

Mrazek, Smallwood and Schooler (2012) tested the hypothesis that mindfulness and mindlessness are opposing features of attention, and found that participants who reported more mindfulness also reported less daydreaming and less mind-wandering (less task unrelated thoughts). This suggested that mindfulness and mind-wandering are inversely related, and as such, detrimental effects of mind-wandering could be reduced through mindfulness practice. Mrazek, Phillips, Franklin, Broadway, and Schooler (2013) found that this was the case, and mindfulness training improved performance on measures of working memory capacity and graduate academic exams (GRE scores), as mediated by reduced mind-wandering.

Langer, Blank, and Chanowitz (1978) suggested that many social psychological theories assume that individuals process current incoming information, but in fact, much cognitive processing may be based on previously

learned or habitual information. Langer's (1989) definition of mindlessness refers to not paying attention to relevant information that would allow for the successful resolution of a problem, so when novel information is included, for which habit does not suffice, more thoughtful responding is required. In this respect, mindlessness is characterised by a lack of attention to details and regarding information as if it had only one meaning, for example, learning one solution to a problem and then having difficulty seeing alternative solutions (Langer & Piper, 1987).

Across three studies Langer et al. (1978) made requests to participants that either included relevant or placebo information, or varied the congruence of the request to the participant. The results showed that regardless of whether information was semantically sound or senseless, if the communication method is congruent with past experience an individual is more likely to respond in a mindless way. For example, participants approached at a photocopier were equally likely to let the researcher jump ahead of them when the reason stated was that they “needed to make copies” as when the reason was because they were “in a rush”. Both requests elicited more compliance than merely asking to jump ahead, despite the former request adding no new information, the inclusion of a reason was sufficient for participants to respond mindlessly, suggesting they had not processed the reason and had just responded automatically.

In an attempt to overcome mindless responding, Langer and Piper (1987), conducted a series of experiments in which participants were shown objects that were described in absolute ways (this is an X) or conditional ways (this could be an X). The simple manipulation of the description was thought to draw attention to the novel aspects of the objects, and following the previous experiments by Langer et al.

(1978), it was assumed that the linguistic command used in the description would alter the participants' mindful responding. In support of their hypotheses, the researchers found that participants in the conditional description groups were more likely to generate mindful responses to potential uses of the objects outside of their generic use (e.g. using a rubber band or dog chew toy as an eraser). That is, when other alternatives were not available but the need arose, participants who were given conditional descriptions were more able to realise the potential flexibility in use of the objects than participants who were given absolute descriptions of the objects. Langer and Piper (1987), argue that this cognitive flexibility means that participants are likely to be more mindful and less mindlessly relying on rigid, pre-learned categories and uses for the objects.

Langer argues that reliance on pre-existing categories is fixed in the past, and is therefore also a form of mindless responding; the view that re-categorisation brings attention back to the present and is more mindful differs somewhat from the definition of mindfulness that stems from traditional Buddhist contemplative traditions. As Singh notes, definitions of mindfulness "really depend on whether the interest is from a social psychological, clinical or spiritual context; and whether the perspective is of a researcher, practitioner or clinician" (Singh, Lancioni, Wahler, Winton, & Singh, 2008, p. 661).

In a slightly different view, Baird et al. (2012), argue that mind-wandering (thinking about task unrelated thoughts) increases creative thinking on unusual uses tasks. These tasks are similar to that used by Langer and Piper (1987), and ask participants to list as many unusual uses for each stimulus object. Baird et al. (2012) found that participants engaged in an undemanding task experienced greater levels of

mind-wandering than those engaged in a demanding task, and that this difference was also predictive of improved performance on the unusual uses task. There was also a positive correlation between individuals' creativity and propensity to mind-wander in daily life. Zedelius and Schooler (2015) found that being mindful was negatively correlated with creative problem solving. The researchers argue that this provides preliminary evidence for a positive use for mindless thought, in respect that it is not present moment or task- focused, and that mind-wandering may be useful under certain circumstances. There is also evidence to suggest that mind-wandering can be beneficial for autobiographical planning (prospective, self-related, plans or goals) (Baird, Smallwood, & Schooler, 2011).

However, the evidence that mind-wandering or mindlessness can be damaging outweighs that which suggests it is beneficial. Research has therefore focused on efforts to reduce the propensity for mindlessness, or increase mindfulness. For example, experiencing stereotype threat increased propensity for mind-wandering, which in turn impaired performance on maths tests (Mrazek et al., 2011), fear-then-relief (a sudden retraction of the external source of fear) also induced a state of mindlessness which increased participants compliance and reduced cognitive functions (Dolinski, Ciszek, Godlewski, & Zawadzki, 2002). Therefore, whilst reducing mindless thought could reduce creativity and creative problem solving (Baird et al., 2012), increasing mindfulness should have a number of beneficial effects (e.g. on cognitive processing or in health related outcomes), and developing techniques for different situations would be optimal (Schooler et al., 2014).

There have been a number of attempts to offer a conclusive explanation of what mindfulness is, and the process by which it affects individual cognition (Bishop et al., 2004; Erisman & Roemer, 2012; Shapiro, Carlson, Astin, & Freedman, 2006) which will be discussed throughout this chapter. However, as noted above, the context and chosen definition greatly impact how mindfulness is viewed and used in psychology research. For the purpose of this thesis, the definition of mindfulness used includes present moment, non-judgemental awareness. Mindfulness is considered a secular form of the traditional meditative approaches that originated in Buddhist philosophy. With this in mind, there are a number of distinctions made throughout this chapter which highlight the specific use of mindfulness for the experiments that are described in the following chapters. First, it is important to note that mindfulness can be viewed as both a disposition and a state. That is, it can be a relatively stable trait in individuals' daily life (Anicha, Ode, Moeller, & Robinson, 2012; Brown & Ryan, 2003; Reb, Narayanan, & Chaturvedi, 2014), or as a process, skill or state (Bishop et al., 2004) that can be elicited or enhanced by practice.

### **Trait vs. State Mindfulness**

#### Trait Mindfulness

Brown and Ryan (2003) argue that mindfulness is a naturally occurring attribute that varies both between, and within individuals. It is inherently a state of consciousness and individuals may differ in the frequency with which they deploy attention and awareness, but that there may also be intra-individual differences in the capability to do so (Brown & Ryan, 2003). Shao and Skarlicki (2009) also view mindfulness as an individual difference variable, represented by the extent to which an individual is in the present moment. In addition, Thompson and Waltz (2007)

refer to ‘everyday mindfulness’ in which individuals maintain an open, accepting and non-judgemental focus on the present, in day-to-day activities. All of these, despite minor variations, refer to mindfulness as a dispositional trait that perhaps lies on a continuum from being highly mindful, whereby one exhibits mindfulness in high frequencies, daily and in all tasks, to highly mindless, where individuals behaves in an automatic, non-aware way, showing less frequent mindful states over time.

### Measuring Trait Mindfulness

The varying definitions of mindfulness make it difficult to measure the extent to which an individual is mindful, whether this is as a trait or a state, and the chosen definition plays a part in the development of the measurement tool. There are a number of trait measures of mindfulness, some comprising of a single construct like the Mindfulness Attention Awareness Scale (MAAS; Brown & Ryan, 2003) and Freiburg Mindfulness Inventory (FMI; Walach, Buchheld, Buttenmüller, Kleinknecht, & Schmidt, 2006), two factors (awareness and acceptance) like the Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008), four factors as in the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007) and the Kentucky Mindfulness Inventory (KIMS; Baer, Smith, & Allen, 2004) as well as a five factor structure in the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006).

The MAAS was developed to measure variations in awareness of, and attention to, actions, interpersonal communication, thoughts, emotions, and physical states. That is, the day-to-day fluctuations in levels of mindfulness, or the frequency

of mindful states throughout an individual's day, it measures mindfulness as an individual difference variable (Brown & Ryan, 2003). The scale items focus on mindless situations, which the authors argue are more accessible to the general population since engaging in mindless activity is far more common than mindful activity (McIntosh, 1997). In order to assess the usefulness of the MAAS, Brown and Ryan (2003) compared scores of regular meditators with a matched sample of non-meditators. They found a significant difference in scores, with the group of meditators scores reflecting significantly more mindfulness. This was more pronounced when comparing those actively meditating with their matched sample. They also found that scores correlated with the extent to which the meditators felt that they brought their practice into daily life, and with years of practice.

A key facet of the construct of mindfulness is the capacity for self-awareness. It is expected that highly mindful individuals will be more attentive and aware of internal constructions, events, and processes (Brown and Ryan, 2003). To test this assumption, the researchers compared scores of implicit and explicit emotional states, hypothesising that concordant scores on these two measures indicate a greater level of self-awareness. The research found evidence for this, in that those scoring higher on the MAAS also showed more self-awareness and awareness of their implicit emotional state, which was then reflected in the explicit self-descriptions. The MAAS also correlated with various measures of self-regulation and indicators of psychological well-being (Brown & Ryan, 2003) which have since been investigated in other studies of the effectiveness of mindfulness in maintaining positive mental health. These are discussed below.

### State Mindfulness

By contrast, other researchers view mindfulness as a state (Bishop et al., 2004; Lau et al., 2006; Tanay & Bernstein, 2013; Weger et al., 2012), or a psychological process that can be developed with practice (Bishop et al., 2004). In this way, Bishop and colleagues argue that mindfulness is maintained only as long as attention is brought purposefully to the experience. This suggests that once an individual has learnt how to focus his/her attention on the present moment, he/she can then elicit a mindful state as and when desired; the individual can choose to become mindful in that moment (Lau et al., 2006).

Brown and Ryan (2003) view state mindfulness differently. As mentioned above, they suggest that there may be differences in the individual level of mindfulness, which fluctuates above and below the average level of mindfulness (or the day-to-day level of mindfulness, as a trait). From this point of view, state mindfulness is the level of mindfulness at any given time point, or momentary mindfulness, as predicted by the individuals' trait level mindfulness. This suggests that mindfulness as a state is the ability to become mindful at a given time point, rather than the extent to which individuals are purposefully maintaining attention at a given time point.

### Measuring State Mindfulness

Bishop et al. (2004) proposed an operational definition of mindfulness as a state. This measures the extent to which individuals become mindful at a given time, and the extent to which they maintain the mindful state as long as they are actively cultivating their present moment awareness. Lau et al. (2006) developed the Toronto Mindfulness Scale (TMS) as a means of measuring mindfulness in this manner. The



TMS, a self-report measure, is aimed at retrospectively assessing individuals' level of mindfulness **immediately following practice** (Lau et al., 2006). The TMS is comprised of two subscales, decentering and curiosity. Curiosity is defined as reflecting "awareness of present moment experience with a quality of curiosity" (Lau et al., 2006, p1452). Decentering relates to awareness of one's own experience with distance and dis-identification, without being carried away or personally identifying with thoughts and emotions (see also Teasdale et al., 2002). Both curiosity and decentering were suggested to be related to the second component in the definition offered by Bishop et al. (2004).

Following a slightly different definition of mindfulness, Tanay and Bernstein (2013) developed the State Mindfulness Scale (SMS), which is context specific and incorporates the Buddhist origins of mindfulness, including bodily sensations. The SMS is divided into two subscales, mindfulness of body and mindfulness of mind, both of which correlate with the TMS subscales, decentering and curiosity. The SMS was used to measure mindfulness after a 60 minute guided practice carried out weekly by participants who were enrolled on a four week programme (Tanay & Bernstein, 2013). However, the four week course also asked participants to practice mindfulness at home as well as giving them additional information about mindfulness practice and its benefits. The researchers found that this also increased trait mindfulness over the course. So it is possible that, whilst the SMS shows raised scores after each session, the continued practice was in fact increasing trait mindfulness, which in turn increased the ability of the participants to elicit a mindful state during the guided practice. This best suits the definition of state mindfulness proposed by Brown and Ryan (2003). Additionally, the view that state mindfulness measures should measure both mind and body sensations is not supported by

Desbordes et al. (2015), who suggest that although traditional Buddhist practice involves some aspects of bodily awareness, mindfulness is more focussed on sensory, affective and cognitive experiences which relate to the mind, and an awareness of inner experience rather than physical sensation.

Brown and Ryan (2003) also adjusted the MAAS to measure state mindfulness as the ability to become mindful at a given time. Since they theorised that mindfulness is inherently a state, they argued that state effects identify systematic fluctuations above and below each person's average level of mindfulness. In order to measure this, they asked participants to state what they were mainly doing at a specified time in the study, and to state the extent to which they were having the experiences they outlined in the previous question. Participants then answered five, slightly rephrased items from the original MAAS measure of trait mindfulness. They found that the effects of state and trait mindfulness were independent. Having higher levels of trait mindfulness had beneficial effects on self-regulated activity and emotional well-being, but so did momentary experiences, independent of disposition. Results showed that mindful individuals were acting autonomously, in ways that were concordant with their own values and interests. Brown and Ryan, however, do not go on to disentangle the potential difference between state and trait mindfulness. They posited that those scoring higher for trait mindfulness were more likely to show higher levels of state mindfulness as well, but by their definitions, this would seem intuitive, since if an individual scores higher for trait mindfulness, then they should also experience more momentary mindfulness.

Do trait and state mindfulness influence each other?

Differing views of mindfulness have recently led researchers to empirically investigate the relationship between state and trait mindfulness. Kiken, Garland, Bluth, Palsson, and Gaylord (2015) argue that increases in state mindfulness over repeated sessions contribute to increases in trait mindfulness, which opposes the view outlined above, that more trait mindfulness predicts a greater propensity for brief states of mindfulness. The researchers tested the notion that repeated practice (during an eight-week course) increases individuals' level of state mindfulness, which in turn increased their trait level mindfulness. State mindfulness was induced with a 10-minute practice after each weekly class, and the TMS was used to measure state mindfulness. State mindfulness was found to increase linearly over the seven weekly assessments, and predicted post-intervention trait mindfulness. Baseline trait mindfulness did not predict the increases in state mindfulness. This suggests that state mindfulness may act as a top-up or means of enhancing trait levels of mindfulness, but that trait mindfulness is not necessarily indicative of a greater ability to evoke a mindful state.

In developing a measure of state mindfulness, Tanay and Bernstein (2013) also found that, over a 6-week period, increases in state mindfulness predicted development of dispositional mindfulness. However, in their study participants were specifically asked to “monitor how mindful they were in their daily activities and to integrate mindful attention and awareness as a way of being into their daily lives” (Tanay & Bernstein, 2013, p1294), so they were asked to continue the practice outside of any intervention or state mindfulness practice. The effects of each type of mindfulness on the other could have been confounded by the instructions that

encouraged the participants to increase their trait level of mindfulness. In addition, the questions on the MAAS measure ask participants to consider day-to-day activities and general aspects of mindfulness, and so they may have induced demand characteristics.

The opposite effect was pointed to in Brown and Ryan's (2003) studies that explored the relationship between trait mindfulness and affect, and used measures adapted from the MAAS measure of trait mindfulness. The results, although correlational, did indicate that being momentarily mindful was more likely among participants who reported higher levels of trait mindfulness. However, states of mindfulness were not induced, so this only suggested that this was seen among people who were more mindful at that moment, which is likely in those with a more mindful disposition.

Similarly, Garland, Hanley, Farb, and Froeliger (2013) measured trait mindfulness at the start of a study in which participants completed a 13-minute mindfulness induction in the lab and were then asked to repeat it twice more during a week long period, immediately followed by the TMS measure of state mindfulness. Participants then completed the trait measure again. The results showed that trait mindfulness at Time 1 was positively associated with state measures of mindfulness during the week-long induction. However practicing the state induction for the week had no effect on trait mindfulness at Time 2. This contradicts the research outlined above; suggesting that individuals with a greater propensity for dispositional mindfulness are more likely to show higher levels of state mindfulness, but that practicing mindfulness (state inductions) does not necessarily increase the trait level.

The extant literature is therefore mixed, and more investigation is required to understand whether trait and state mindfulness are separate constructs or reliable predictors of each other. There is a general notion in research on mindfulness that the two influence each other, and many studies include trait mindfulness as a covariate when investigating state mindfulness. However, most research considers the two separately, and focuses on one or the other. In this thesis, the primary focus is on state mindfulness, and how mindfulness inductions influence social judgements.

### **Models/Processes of Mindfulness**

As outlined previously, the different definitions of mindfulness, and whether it is viewed as a state or trait, have prompted researchers to consider how mindfulness works, and the processes by which outcome effects are elicited. Below, the three axiom model (Shapiro et al., 2006) is described, and the process by which decentering elicits mindfulness effects is discussed along with an alternative view of mindfulness as a social process (Langer & Moldoveanu, 2000a; Langer, 1989).

#### Three axiom model

Shapiro, Carlson, Astin, and Freedman (2006) described a model of mindfulness that accounts for Intention, Attention, and Attitude (3 axiom model). This, fits with the Kabat-Zinn, (1990) definition of mindfulness: “paying attention (attention) in a particular way (attitude): on purpose (intention), in the present moment, and non-judgementally (attitude)”. This model postulates that a state of mindfulness arises when intentions, attitudes and attention are cultivated simultaneously.

Intentions relate to the ‘why’ of practicing mindfulness, and are taken from the original Buddhist definitions of mindfulness meditation which emphasise an

intention to reach enlightenment and compassion (Shapiro et al., 2006). In mindfulness based interventions, intentions may relate to reducing clinical symptoms, or to changing the way emotions are interpreted. This highlights the relevance of context in the practice of mindfulness, as Dorjee (2010) suggested, mindfulness training may take different forms, depending on the context in which it is practiced. Gethin (2011) also suggested that the adaptation of Buddhist practice into the modern, secular use of mindfulness as treatment will depend on the context and perspective of the practitioner. Together this suggests that the context of mindfulness practice is key in understanding its process and outcomes.

Attention is a key aspect of mindfulness, relating to the ability to pay attention to the present moment without over-identifying with thoughts, feelings or emotions. This is a particular kind of attention specific to mindfulness (Shapiro et al., 2006). In addition, attitude, the third axiom of this model, refers to how attention is used. The researchers suggest that a person can learn to attend to their own internal and external experiences, without evaluation or interpretation. This would lead to the practice of acceptance and openness, even when what is occurring in the field of experience is contrary to deeply held expectations. That is, when practicing mindfulness one is impartial and non-judgmental of what is being experienced at the present moment (Shonin & Gordon, 2014), and one is not 'trapped by categories'. As Langer (1989) described, thinking mindfully allows for the creation of new categories by which to define phenomena, rather than relying on previously held ideologies.

Being free from rigid categories is also linked to the shift in perspective that Shapiro et al. (2006) term *reperceiving*. They argue that *reperceiving* is an outcome

of mindfulness practice in which a process of dis-identification occurs. Dissociation takes place, from one's own thoughts or emotions, and the moment-by-moment experiences are viewed with greater objectivity (Shapiro et al., 2006). This process is similar to decentering (Safran & Segal, 1996) or de-automatisation (Kang, Gruber, & Gray, 2012). This is thought to be the ability to step outside of one's immediate experience and thereby change the nature of the experience, or the undoing of automatic processes that control perception. In other words, the shift in perception is from subjective to objective. The greater the extent we are able to observe our thoughts, the less we are embedded in or attached to the content- it is this process of dis-identifying with our own thoughts, feelings or emotions and simply noticing them, but not being defined by them, that is thought to enable to positive effects of therapy such as MBSR (Dorjee, 2010; Gecht et al., 2014).

Gecht et al. (2014) argued that mindfulness and decentering (or re-perceiving) are two distinct, rather than overlapping, constructs. Carmody, Baer, Lykins and Olendzki (2010) suggested that mindfulness and decentering are the same because of their high overlap. However, Hayes-Skelton and Graham (2014) suggest that decentering reflects a mechanism underlying the effects of mindfulness. They found, across two studies, that both mindfulness and decentering were negatively correlated with good psychological well-being. Correlations between mindfulness and decentering were not strong enough to consider them a one-dimensional construct. This suggests that decentering actually acts as the process by which mindfulness works. The authors found indirect effects of mindfulness on reports of depressive symptoms, via decentering. However, Gecht and colleagues did not use a mindfulness practice in this study. They measured trait mindfulness using the KIMS, and measured depression amongst undergraduate students, making it difficult to

assess whether these results are a true representation of the effects of mindfulness.

Context is an important aspect of mindfulness practice, and this study lacks the context to make the mindfulness practice relevant.

### Social Mindfulness

An alternative view to mindfulness as a Buddhist technique is that of social mindfulness (Langer & Moldoveanu, 2000; Van Doesum, Van Lange, & Van Lange, 2013). Langer and Moldoveanu (2000b) proposed a definition of mindfulness that related to drawing novel distinctions between known categories. Langer (1989) argued that being mindless was characterised by thoughts trapped by categories, automatic behaviour and acting from a single perspective. That is, ideologies are used to justify and rationalise thoughts, but these are based on previously learnt categories or habits, and are accepted as if there are no alternatives. This leads to narrow, unquestioning and automatic behaviour that Langer described as mindlessness. In order to overcome this, and to behave in a more mindful way, Langer and Moldoveanu (2000b) suggested that creating novel distinctions between categories keeps individuals focussed on the present and makes them more aware of the context of their actions and more open to new information. This seems to fall in line with the previously described definitions of Buddhist type mindfulness, but is much more specific to the context of social interactions. They argued that mindlessness may be the cause of a number of human errors in complex situations such as prejudice and stereotyping since negative intergroup attitudes may be the result of mindless categorisation.

One area considered within the health domain is aging and control.

Perceived control is seen to be positively related to reduced stress and health. When



a person behaves mindlessly, perception of control is not possible. Langer and colleagues found that increasing elderly people's control over things like their schedule had positive effects and that increased mindfulness led to reduced health problems such as pain, and increased longevity. In work settings, mindfulness has been associated with increased creativity, decreased burnout, and increased productivity (Langer & Moldoveanu, 2000b). Mindlessly relying on previously learnt behaviour when new systems are introduced could lead to negative or damaging consequences. Within education changes to language, such as saying 'could be, or perhaps' have been linked to increases in creative uses for ordinary objects, more so than when concrete terms such as 'this is, or can only be' are used. Additionally, 'mindfully noticing new things' rather than focus on one specific (small) aspect of a task or stimulus, was found to increase attention, liking for the task, and improve memory. Consideration of multiple perspectives in learning was also found to increase the effectiveness with which students learnt new information, even though they had to learn more information.

In a similar vein, Van Doesum, Van Lange and Van Lange (2013) suggest that social mindfulness is allowing other people control over their own behavioural options in an interpersonal interaction. This is in line with prosocial behaviour and being other-oriented, as opposed to self-oriented. In a computer generated social decision-making task, participants were offered the choice of three objects, two identical and one unique object. Participants were told that they would have first choice and their "partner" would then choose between the two items they had left. The researchers argued that individuals who chose one of the identical objects, and thus left their partner the choice between two different objects, were expressing greater social mindfulness. This seems to fit well with the notion of perspective

taking and context dependent mindfulness, but is distinct from the more traditional focus on present moment awareness. As outlined above, the differences in definitions of mindfulness can create confusion in what exactly is being investigated, but as Singh et al. (2008) pointed out, the definition is relevant to the context in which mindfulness is being researched. In the case of this thesis, and from the perspective of a social psychological intervention, the definition preferred is that mindfulness is a skill or inherent ability which can be maintained or cultivated over time. This is in relation to attentional awareness and consciousness.

### **Outcomes of mindfulness practice**

There has been great interest in the beneficial outcomes of mindfulness for stress, depression and anxiety, especially courses such as Mindfulness Based Stress Reduction (MBSR) and Mindfulness Based Cognitive Therapy (MBCT; for reviews see: Bishop, 2002; Bohlmeijer, Prenger, Taal, & Cuijpers, 2010; Carmody et al., 2010; Kabat-Zinn, 2003; Khoury et al., 2013; Piet & Hougaard, 2011; Piet, Würtzen, & Zachariae, 2012). In addition to these mental health benefits, mindfulness practice has also been investigated in relation to, but not limited to, aggression and anger (Heppner et al., 2008; Singh, Wahler, Adkins, & Myers, 2003), stereotype threat (Weger et al., 2012), negative attributions (Hafenbrack, Kinias, & Barsade, 2014) and individual academic performance in adults (Shao & Skarlicki, 2009) and children (Bakosh, Snow, Tobias, Houlihan, & Barbosa-Leiker, 2016).

As outlined above, the chosen definition of mindfulness will dictate the measurement used in research. For example, Shao and Skarlicki (2009) used a definition similar to that of Brown and Ryan (2003) that mindfulness is an individual difference variable and so used the MAAS to measure participant's levels of

mindfulness in everyday activities. This assumed that mindfulness is inherent and measured the individual variations in mindful activity. They found that trait mindfulness interacted with gender to predict performance, whereby this association was stronger for women than men. Similarly, Hafenbrack, Kinias and Barsade (2014) found that a trait measure of mindfulness predicted a greater resistance to the sunk-cost bias (a tendency to continue an endeavour once an investment in money, effort, or time has been made).

These correlational studies show support for the notion that mindfulness may be a trait that varies between individuals; however, some studies suggest that the trait level of mindfulness can also be increased through practice. Tacón, Caldera and Ronaghan (2004) investigated the effect of practicing mindfulness over a period of eight weeks, in a similar format to many MBSR and MBCT courses. They found that greater practice led to internalisation of control in a sample of female cancer patients, which in turn led to a decrease in anxiety. This study did not include a measure of mindfulness and so assumed that the act of practicing mindfulness techniques was responsible for these changes. This was also the case in a case study where Singh et al. (2003) administered a specific mindfulness training technique to an individual suffering with learning disabilities, who was also institutionalised for high levels of uncontrollable aggression. After learning the mindfulness technique, the individual was integrated back into the community and was able to continue practicing the technique when feelings of aggression or anger were detected. These studies view mindfulness as a disposition, but also consider it to be stable once practiced.

A shorter mindfulness course (3 days) was shown to reduce experimentally induced pain (Zeidan, Gordon, Merchant, & Goolkasian, 2010). In this research,

participants completed three days of mindfulness training, a math distraction task or a relaxation exercise. The mindfulness training included 20 minutes of meditation per day, which participants were then asked to use to practice mindfulness for 13-minutes in the testing session. Participants experienced electrical stimulations at pre-determined high vs. low intensities, and were found to experience less pain after meditation compared to the math distraction and the relaxation conditions, as measured by subjective pain ratings and pain sensitivity. The researchers argue that mindfulness may have the same analgesic effects after only brief practice as has been shown for experienced meditators (Grant & Rainville, 2009).

As a means to investigate differences in dispositional and induced mindfulness, one study compared experienced meditators with naïve, first-time meditators and found that experienced meditators showed significantly less cognitive rigidity. That is they were able to disengage from their previous experience and more easily find a novel solution to a problem. Similarly, after an 8-week course, those with meditation training performed significantly better at the problem solving tasks than a wait list control group (Greenberg, Reiner, & Meiran, 2012).

In a slightly different view other research has considered the impact of trait mindfulness on the outcomes of naïve samples. Heppner et al. (2008) found that higher mindfulness, measured with and without a mindfulness practice, leads to less aggressive behaviour, both in general and specifically following a social rejection. Kabat-Zinn (1990) defines an aspect of mindfulness that enhances openness to experience the present in a non-evaluative manner, allowing both positive and negative experiences to be taken at 'face value' and not attached to the sense of self, and as outlined above, mindfulness is thought to elicit decentering (Shapiro et al.,

2006). That is, positive and negative emotions can be experienced without the weight of social value attached to the individual's self-esteem and can pass through consciousness without being anchored to the self. Since research suggests that a major instigator of aggressive behaviour is threats to self-esteem, such as personal insults or social rejection (Baron & Richardson, 1994) it is possible that mindfulness worked here to detach the insults from the self. Although in this study mindfulness was manipulated, the researchers adopted the definition of trait mindfulness that the practice of mindfulness increases the frequency of mindful behaviours. In other words, it increases the trait level of mindfulness.

Petter, McGrath, Chambers, and Dick (2014) also considered the impact of trait mindfulness on the outcomes of brief mindfulness practice. They found that adolescents taking part in the cold pressor task, who completed a 10-minute mindfulness induction, scored lower on pain intensity only if they were regular meditators. For naïve meditators who completed the 10-minute induction there were no differences on perceived pain intensity compared to the control group. This suggested that the brief mindfulness induction was only effective for those who already practiced mindfulness regularly and therefore were more likely to have higher levels of trait mindfulness before the induction.

This has also been tested in relation to eating behaviour and calorie consumption (Jordan et al., 2014). The researchers first established that trait mindfulness was negatively correlated with uncontrolled eating. That is, individuals who showed higher levels of dispositional mindfulness were less likely to report uncontrolled eating than those with lower dispositional mindfulness. Following this, the researchers used a 15-minute mindfulness induction, compared to a relaxation

task, and then asked participants to taste any of three food items. Those who completed the mindfulness task consumed significantly fewer calories than those in the relaxation condition, indicating that increased mindfulness leads to reduced calorie intake. In an attempt to establish the process by which this change occurred, the researchers carried out a study in which participants completed a self-control depletion task before being offered a snack of fruit or sweets. Despite the prediction that mindfulness would counter the effect of self-control depletion, the researchers did not find any effect of self-control between the mindfulness groups. However, this study relied on measures of self-reported trait mindfulness, rather than using the induction. Using a state mindfulness practice would provide more control over the mindfulness level and may be better in predicting whether mindfulness attenuates the effects of self-control depletion.

Other research has shown that after two weeks of practice, elementary and secondary school teachers reported a reduction in perpetrated ostracising behaviours. When mindfulness was then manipulated in the lab by using a 5-minute raisin eating task, the research showed that mindful participants were less likely to ostracise during an online ball-tossing game, but not during team picking for the game (Ramsey & Jones, 2015). This suggests that the longer practice of mindfulness was effective in the field (within a teaching environment), but was only partially effective in the lab with just 5-minutes of practice. Perhaps this was due to the length of mindfulness practice, or the difference in the context of the outcome measures. For example, Ostafin and Kassman (2012) found that trait mindfulness predicted improved problem solving for problems requiring a creative response, but not for logic problems. They then replicated this finding with participants who completed a 10-minute mindful breathing exercise. Similarly to previous research the relationship

was not explained by trait levels of mindfulness (Kiken & Shook, 2011), suggesting that the brief mindfulness practice was responsible for the improvement in creative problem solving.

Although this may be due to the longer mindfulness practice having a greater effect, it is also possible that the familiarity of the problem solving context to students helped to maintain the positive effects of the mindfulness practice. In the ostracism example above, the cyberball team picking may have been too abstract or unfamiliar to participants and increased cognitive load, countering the effects of the mindfulness practice. For the main part of the game, it would have been interesting to account for participants' use of online games to see whether the context impacted the results.

Taken together these studies might stand to suggest that only through longer mindfulness practices, such as courses, or with greater dispositional mindfulness are any real positive outcomes found. Some of the studies suggest that brief mindfulness practices are only effective when combined with ongoing practice or for regular meditators and those with greater dispositional mindfulness. That is, that state and trait mindfulness must go hand-in-hand to achieve any changes in behaviour. However, correlational research has shown that there is little relationship between measures of trait (MAAS, CAMS-R and FFMQ) and state mindfulness (TMS) (Thompson & Waltz, 2007). In fact, the only relationship found was between the observe facet of the FFMQ and the TMS in naïve meditators. The relationship was non-significant even for experienced meditators, although caution is taken when viewing these results as the sample of experienced meditators was very small (N=31) and comprised of students with prior experience of Buddhist meditation or current

practice of meditation. In addition, a growing body of literature is emerging which suggests that even one session of mindfulness practice alone can have some positive behavioural outcomes.

### **Single-session mindfulness**

From the perspective that mindfulness is a state that can be induced momentarily and is maintained only with purposeful attention (Bishop et al., 2004), some research has considered whether a single-session of mindfulness can also be effective in the same way that courses are. Johnson, Gur, David, and Currier (2013) compared 25-minutes of mindfulness meditation, 25-minutes of sham meditation (less detailed) and a book reading control, and found that only in the meditation group ratings of tension, anger, fatigue and confusion were reduced. However, in this study, the researchers found that scores on the TMS measure of state mindfulness did not differ between sham and mindfulness meditation, and that only the mindfulness meditation group scored higher for decentering than the control group. This may have been due to the similarity of the instructions between the two meditation conditions. There may not have been any real difference in what the participants were experiencing between the mindfulness and sham meditation groups, and thus the outcomes on the mood scales would need further investigation.

Mindfulness has been found to reduce the negativity bias; or the tendency to weight negative information more heavily than positive, including moods and emotions. Kiken and Shook (2011) found that a 15-minute mindfulness practice may reduce this bias and increase positivity. The researchers measured participants trait mindfulness using the MAAS (Brown & Ryan, 2003) to ensure that trait mindfulness did not account for the between group differences. The scores did not differ across



conditions, suggesting that the 15-minute induction was responsible for the between group differences. Mindfulness was seen to attenuate the negativity bias and elicit increased accuracy in positive responding compared to the control condition. This was tested using an objective measure of negativity bias, the BeanFest. This is a computerised categorising task which requires participants to associate the beans appearance with a positive or negative outcome. In a different study, similar results were obtained for memory of positive and negative valence words, wherein participants recalled significantly fewer negative words after a 12-minute mindfulness practice compared to a control group. Although the difference was not significant for positive words this does suggest a reduction in negativity bias as seen in Kiken and Shook's (2011) experiment (Alberts & Thewissen, 2011).

Mindfulness was also a significant predictor of increased optimism, but not a decrease in pessimism, indicating a reframing of responses in a less habitual way (Kiken & Shook, 2011). This corresponds to Langer's (1989) theory that mindlessness results from automatic responding. The researchers postulate that this may be due to mindfulness freeing cognitive resources to notice information that would normally be missed due to habitual responding. However, this was a self-report measure and more objective measures of attitudinal response may be more useful.

Physiological markers of stress may be a more objective way to assess the real impact of mindfulness. These have been shown to decrease when meditation is practiced before or after a stressor, such as a stressful computer game (Mohan, Sharma, & Bijlani, 2011). The mindfulness practice in this research differed from many single-session mindfulness inductions as a trained instructor was used to guide

the mindfulness practice. Whilst it appears that this had an improved effect on the outcome measures compared to the previous study, the problem with this is the feasibility of applying this. It is not likely that a trained meditator can be available in stressful situations, and therefore the value in positive outcomes from single-session practice that can be done individually must not be downplayed. In addition, this study used only a very small sample of adolescent males who were asked to play a stressful computer game. It is important to consider the context in mindfulness research and therefore this may be unique to this very specific context and not applicable to other stressful situations.

Even very brief mindfulness practices have been shown to elicit positive outcomes. Ten minutes of mindful eating practice was found to increase enjoyment in sampling unpleasant foods compared to a non-mindful group (Hong et al., 2014). As mentioned above, context is also important in the usefulness of mindfulness in reducing negative behaviours. With this in mind, a different type of mindfulness induction was shown to reduce mindless impulses towards attractive vs. neutral foods (Papies et al., 2012). Participants were asked to view a series of pictures, including five of attractive foods and five of neutral foods, to which they would experience different emotions, and were instructed to observe their thoughts as transient states of mind which was designed to induce a state of mindfulness. Compared to a control condition, participants who were more mindful showed less spontaneous approach reactions to attractive foods on an implicit approach bias measure. The finding was also found to persist after a 5-minute distraction period and when accounting for participants dieting goals. Although this may suggest that being mindful reduces automatic approach bias to food stimuli, it is important to note that participants' levels of mindfulness were not measured.

Hooper, Davies, Davies and McHugh (2011) used a 9-minute focussed breathing exercise to induce mindfulness and found that this was more successful than thought suppression in reducing fear of spiders. However, a 13-minute induction was not more effective in increasing cognitive reappraisal than thought suppression or mind-wandering (Garland et al., 2013). Although, this may be due to the measure of cognitive reappraisal which was a dispositional level asking participants to rate general reappraisal rather than in relation to a specific outcome as above (spider fear). A 10-minute mindful breathing exercise was found to enhance positive affect and reduce negative affect immediately after positive and affectively mixed film clips (Erisman & Roemer, 2010). A similar 10-minute mindful breathing exercise was found to intensify the relationship between disgust and network size in a bowel health context, but did not affect the behavioural outcomes or disgust scenario decisions of healthy participants (Reynolds, Lin, Zhou, & Consedine, 2015). Furthermore, research has shown that a 10-minute mindfulness exercise increased participants' perceptions of time, relative to an audiobook listening control group. That is, in a temporal bisection task, mindful participants were more likely to classify duration as more similar to a long than a short stimulus (R.S. S. Kramer, Weger, & Sharma, 2013).

Other researchers have used a 5-minute raisin eating task (Heppner et al., 2008; Hopthrow, Hooper, Mahmood, Meier, & Weger, 2016; Weger et al., 2012) which is designed to focus attention on the present moment experience of eating the raisin (Kabat-Zinn, 2003). Following this task, Weger et al (2012) measured state mindfulness using the TMS and found that an increase in state mindfulness reduced the negative impact of stereotype threat on female participants' performance in a maths test. Similarly to the idea outlined above, that mindfulness is successful in

reducing aggressive behaviours, the researchers here suggested that these effects may be a result of refocusing attention away from the threat, which reduces the drain on cognitive resources and thus does not impair performance. However, the process by which mindfulness elicits its positive effects has yet to be empirically tested.

These studies show that the outcomes of brief mindfulness practice are mixed, with some producing expected positive results, and others showing unexpected differences or a lack of positive change. They also highlight the importance of the definition and context chosen for the study of mindfulness and the outcomes of practice. Trait mindfulness is viewed as a stable, enduring disposition, which in some cases is measured as an individual difference, or is seen to be inherent and thus increased through regular practice. On the other hand, there is the view that mindfulness can be induced momentarily and is therefore a state of conscious awareness that can be manipulated. Despite these differences, research has shown that the practice of mindfulness has an array of positive outcomes. It is, however, important to continue the investigation of these differences with the aim of understanding the process by which mindfulness works, and in turn how it can best be utilised in different social situations. A further step in this investigation is the use of computer mediated mindfulness practice.

### **Online mindfulness practice**

Traditional mindfulness courses have been adapted to meet the needs of certain clinical populations (e.g. sufferers of MS who cannot sit for long periods, Bogosian, 2014; Hope, n.d.; Fibromyalgia patients who may not be able to leave their own homes, Davis & Zautra, 2013), in order to try and meet the needs of as many individuals as possible, whilst keeping costs down. This has led to a number of

courses becoming available online to treat the symptoms of depression, anxiety and stress (Beattie et al., 2009; Christensen, Griffiths, Mackinnin, & Brittliffe, 2006; M. C. Davis & Zautra, 2013; Kemper & Yun, 2015; Krusche et al., 2012, 2013; Proudfoot et al., 2004) or via smartphone applications (Chittaro & Vianello, 2014). An online version has also been trialled in the workplace as a means to achieve the therapeutic positive outcomes, such as stress reduction, but without requiring employees to commit so much time to the course (Aikens et al., 2014).

Online courses tend to follow a similar format to the traditional face-to-face courses and include learning about the principles of mindfulness and meditation, reading additional material to supplement practice, and undertaking various forms of meditation practice over the period of the course (Boettcher et al., 2014; Krusche et al., 2013; Morledge et al., 2013). The outcomes of online courses have been compared to the traditional courses and have been found to produce similar positive effects. Evaluations of online courses have found that participants who are more familiar with computers, more comfortable in their surroundings and prefer therapy to be anonymous seem to benefit most from online courses (Beattie et al., 2009; Christensen et al., 2006).

Beattie et al. (2009) surveyed participants of an online CBT course and found that participants who accessed the CBT in other settings than their own home (e.g. relatives pc, at work, local library) found it harder to engage with due to concerns about privacy and being interrupted, but that face-to-face therapy can be 'too intense' and so the anonymity offered by online therapy may be useful. Cavanagh et al. (2013) suggest that this may be of particular relevance to the younger, computer-literate population. In addition, Chittaro and Vianello (2014) found that the

smartphone application was perceived to be more pleasant, and less difficult to use than two other comparable thought distancing tasks, ‘cloud imagery’ and ‘card-tossing’. All three tasks were similar in practice, asking students to record three worries they have, and then to either imagine them attached to clouds floating away, write them on cards to then throw away or using the app to visually watch the thought disappear on a simulated parchment in water. The smartphone app was perceived to be enjoyable to use, and thought to be easy due to the ability to concretely manipulate the worries (i.e. see them disappear). However this was a one-off practice, and a within participants design, so participants completed all three of the tasks in the 45-minute session.

Online courses are not without problems though. Although they would seem to reduce attrition rates compared to traditional courses, online courses also face high attrition. In a two-week online mindfulness course, Cavanagh et al. (2013) reported that 50% of their participants completed pre- and post-intervention questionnaires, and that only 42.6% of their intervention group completed the whole course and post-intervention questionnaire. Shorter courses (5-module open access) experienced 0.5% completion, and longer courses (12-weeks) were completed by 1% of participants, as well as frequency and continuation of online materials declining sharply after 12 months (see Eysenbach, 2005 for review). This suggests that the length of the course did not greatly affect the rate of completion, but that there may be a need to reconsider the time commitment involved in courses. This creates an opportunity to test whether single-session online mindfulness practice elicits the same beneficial outcomes as longer practices.

## Summary

This review of the literature highlights the number of approaches to mindfulness that exist within psychology research. Whilst many researchers focus on distinguishing between trait (Brown & Ryan, 2003) and state (Bishop et al., 2004) mindfulness, others have focused on uncovering the underlying processes that lead mindfulness to affect change, and others have focused on different contexts for mindfulness ranging from traditional Buddhist meditation (Kabat-Zinn, 1990), to social categorisation (Langer & Moldoveanu, 2000a). Depending on the approach taken, outcomes of mindfulness include reduced reliance on pre-existing social categories (Langer & Piper, 1987), decreased stress and anxiety (Bohlmeijer et al., 2010; Carmody et al., 2009; Khoury et al., 2013), reduced anger (Heppner et al., 2008; Singh et al., 2003) and increased performance (Shao & Skarlicki, 2009). However, many of these investigations have relied on the use of mindfulness courses.

The development of measurement scales to assess state mindfulness (e.g. TMS, Lau et al., 2006) means that it is possible to deliver a single-session of mindfulness practice and directly test any changes in individuals' level of mindfulness at that time. In addition, it allows for a more rigorous investigation of whether positive outcomes following single-session mindfulness practice can be attributed to the practice itself, rather than assuming that practice definitively leads to increased mindfulness and therefore affects changes in behaviour (e.g. Johnson et al., 2013; Jordan et al., 2014; Weger et al., 2012). Emerging evidence for the use of online mindfulness courses suggests that these can be as effective as face-to-face courses, but may be more popular for service users who prefer anonymity (Beattie et

al., 2009) and more practical for patients who are unable to attend face-to-face sessions (Bogosian, 2014; M. C. Davis & Zautra, 2013). To date, there is little evidence to suggest that these approaches, combined, effectively induce a state of mindfulness and then can be applied to social contexts.

The first three experiments in this thesis are designed to establish a reliable method of manipulating state mindfulness in a quick and online single-session. The following four experiments apply this practice in social contexts such as attributions and making inferences about others' behaviour, and group decision-making. The following chapter will review the literature in this area, detailing theoretical areas in which mindfulness is expected to change individual and group performance.



## **Chapter 2: Social Judgements: Attribution Theory and Decision-Making**

This chapter provides an overview of the literature on social judgements, specifically focussing on attribution and decision-making. This discussion focusses on four key areas: 1) the automatic processes that feed into social judgements, 2) attribution errors, specifically the Correspondence Bias (CB) and the Fundamental Attribution Error (FAE), 3) correcting attribution errors, considering the role of perspective taking and locus of control, and 4) group decision-making. Attribution and decision-making form the focus of the review of social judgement literature, since there is good reason to believe that mindfulness could impact outcomes in these domains. An emerging body of research has begun to consider the applications of mindfulness practice outside of clinical populations, but very little, as yet, has focussed on social judgements and whether mindfulness could be used as a tool to improve social relations. Some research, which shows that mindfulness slows automatic and habitual responding (Jordan et al., 2014; Kiken & Shook, 2011; Mohan et al., 2011; Papiés et al., 2012), suggests that mindfulness could be useful in the context of automatic attributions by reducing the automatic response in favour of a more deliberative one. Furthermore, there is a limited amount of research that shows mindfulness has a positive impact on individual (Hafenbrack et al., 2014; Shao & Skarlicki, 2009) and group (Cleirigh & Greaney, 2015) decision-making, but little is known about the role of the social context in this relationship.

### **Social Judgements**

Errors in social judgment have become the focal point of social judgement research, likely because misjudgements are often the basis of prejudice and discrimination or other detrimental outcomes for human interaction (Funder, 1987).

Social judgment is how we perceive people, form impressions of others, and think about social interactions. For example, people perceive and evaluate others according to social categories such as gender or race (M. B. Brewer, 1988). The cognitive processes leading to social judgement are mostly automatic and unconscious and often result in ‘errors’ of social judgement. Bruner (1957) proposes that the process of perception involves other practices, such as inference, categorisation, judgment, and prediction. An individual ‘knows’ the world only in terms of previously formed categories or concepts. In particular, this chapter focuses on the reliance on heuristics and the automatic processes of categorisation and stereotyping in producing judgemental errors in attribution (correspondence bias and fundamental attribution error) and in influencing decision-making.

### **Categorisation**

Social schemas are cognitive structures that contain knowledge of the social world that individuals have learned through experience and socialisation, and which allow individuals to organise experiences to simplify the complexity of the social world. Schemas guide what we attend to, remember and infer (Augoustinos & Walker, 1995). Social schemas often consist of information about people or situations such as social roles, how to behave in different contexts and expectations about the behaviour of others. New information is categorised by similarity to the existing knowledge in these schemas, allowing for some level of prediction (of behaviour), simplification and control over the social world (McGarty, Mavor, & Skorich, 2015). This means that individuals have quickly accessible mental short cuts to help organise and make sense of an otherwise overwhelming amount of incoming sensory information (Van Bavel & Cunningham, 2008).

Categorisation is functional in that it allows categorisation of objects (e.g. knowing the use of objects) or social roles (e.g. uniforms to indicate members of emergency services). In addition, categorisation applies to people, including ourselves. That is, our sense of self is derived from how we categorise our own and others group membership, and where there are similarities and differences between ourselves and others (Banaji, Lemm & Carpenter, 2004; McGarty et al., 2015), and categorisation with identities shifts from one situation to another. Categorisation is a two-way process, whereby others and outgroups can influence judgements of the self, and self-evaluation can influence views of others (M. B. Brewer & Hewstone, 2004). Self-schemas derive from experience (Markus, 1977), whereas trait prototypes, or person schemas (about others) are first categorised and then fit to existing schemas (Cantor & Mischel, 1979) which carry affective information to allow the judgement or evaluation of the 'other' (M. B. Brewer & Hewstone, 2004; Haddock & Zanna, 1993).

Categorisation of both objects and social stimuli is centred on prototypical objects or members. That is, some stimuli are more representative of the category than others, and those that are more prototypical are more easily and quickly identified (Fiske & Taylor, 1991). Within social categorisation, intergroup dynamics affect the use of prototypicality in categorisation in that outgroups are seen as more homogeneous than ingroups (Brauer, 2001; Judd & Park, 1988; Messick & Mackie, 1989; Park & Rothbart, 1982). This means that members of outgroups are seen as being very similar to one another and all typical of that group. By contrast, ingroup members are viewed as more individual and prototypicality varies more. Categorisation therefore provides a reference point, or a quick and easy way to decide if another person is friend or foe, how to anticipate their behaviour and

interact with them, based on group membership. Attribution is also affected by perceptions of outgroup homogeneity (Quattrone & Jones, 1980) as well as group decision-making, where shared category membership and increased identity lead to more cooperative outcomes in negotiation tasks (Kramer, Pommerenke, & Newton, 1993) and dilemma situations (Dawes, Van De Kragt, & Orbell, 1988; Kramer & Brewer, 1984).

Associations between categories are often so well learned that they are automatically activated when encountering members of these groups (Devine, 1989; Fazio, Jackson, Dunton, & Williams, 1995; Greenwald et al., 1998). Categorisation is therefore a relatively effortless process that is thought to be the default way of processing information if humans are cognitive misers (Taylor & Fiske, 1978) and to avoid cognitive overload from the amount of incoming information (Van Bavel & Cunningham, 2008). Individuation, on the other hand, is a more effortful process that requires a perceiver to take into account the target's individual level characteristics rather than group memberships when making an evaluation of them (McGarty et al., 2015). On a continuum, categorisation anchors one end as an effortless, automatic process, and the other end is anchored by individuation, requiring effortful thought and deeper processing. Cognitive load results in reliance on the effortless process of categorisation and stereotypes for informing judgment (McGarty et al., 2015). This is one area where mindfulness may be particularly helpful - managing cognitive load in order to allow for a less automatic evaluation of others (Mrazek et al., 2015; van Vugt & Jha, 2011).

Allport (1979) emphasised the role of categorisation in the development and maintenance of stereotypes, where the category enables us to quickly identify a

related object. Stereotypes are schemas or mental representations that organise information about different social groups and its members (Cantor & Mischel, 1979). Schemas about people, social roles (role schemas), and objects provide a default solution to missing information or ambiguity. This can be problematic, especially in the case of stereotypes, which are specific schemas about social categories (Augoustinos & Walker, 1995).

### **Stereotypes**

Stereotypes place individuals in categories according to some easily identifiable, salient characteristic such as gender, race or age; and then attribute to them qualities that have become subjectively associated with that group/category (M. B. Brewer & Hewstone, 2004; Pettigrew, 1979; Tajfel, 1969). Race, in particular, affects categorisation within milliseconds (Ito & Urland, 2003) and is highly salient and difficult to suppress (Park & Rothbart, 1982). Attempts to suppress racial bias often lead to mental exhaustion (Richeson & Shelton, 2003) and an increased use of stereotypes (Macrae, Bodenhausen, Milne, & Jetten, 1994) creating a loop in behaviour whereby trying to reduce reliance on heuristics about race, actually increases the use of heuristics.

As well as serving descriptive functions, automatic categorisation and stereotypes can become prescriptive and lead to discrimination (for review of how categorisation leads to discrimination see Abrams, 2010). For example, people who hold strong automatic racial bias are also more likely to engage in discriminatory behaviour (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). Stereotypes associated with a particular group lead to labelling of all members of that group, despite individual differences. For example, stereotypes typically associated with

Black people include being impulsive and disposed to crime and violence (Duncan, 1976), this influences the judgements of Black individuals, regardless of their behaviour. Duncan (1976) showed this through attribution error (reviewed below); where it was found that the threshold for labelling an act as violent was lower when viewing a Black person than a White person doing the same act.

Category associations can be enhanced by the fact that schema or stereotype consistent behaviour is expected, and therefore is not processed at a deep level, it is processed automatically (Augoustinos & Walker, 1995). This means that exposure to Black criminal or impulsive behaviour (e.g. through news and media) is processed shallowly using stereotypes, and individuals are more likely to accept information at face value rather than evaluate it more carefully.

Personnel decision-making is a key area where the ambiguity and uncertainty of the situation leads to a heavy reliance on stereotypes and heuristic processing. Occupational stereotyping specifically refers to “a preconceived attitude about a particular occupation or people employed in that occupation” (Lipton, O’Connor, Terry, & Bellamy, 1991, p.129). In this respect, stereotypes about certain groups can bias the selection process, and influence the attribution of competence and ability to perform in a role (King, Madera, Hebl, Knight, & Mendoza, 2006). Status characteristics theory suggests that expectations of others competence are formed based on the societal status assigned to that group (Berger, Cohen, & Zelditch, 1972; Wagner & Berger, 1993). This means that certain jobs will be more readily associated with certain groups, for example, management roles associated with White men.

Race has been of particular interest in research because Black individuals are hired at a rate lower than Caucasian individuals (Bertrand & Mullainathan, 2003). A study in the UK labour market found that CVs sent out to real job advertisements were significantly more likely to receive a positive response when the applicant had a White sounding name, compared to a name associated with a BME group. This effect was found across higher and lower status occupations almost equally (Wood, Hales, Purdon, Sejersen, & Hayllar, 2009). A similar evaluation of CV's conducted in a laboratory setting in America, showed that White participants evaluated a Black applicant negatively, regardless of strong credentials and judged Black applicants as most suitable for low status jobs (King et al., 2006). Further research with a similar design showed that ambiguous information negatively affected Black candidates success, but not White candidates (Dovidio & Gaertner, 1995), suggesting that ambiguous information has a detrimental impact for an already stereotyped group. A similar association will be tested in this thesis, using race as a group category and unemployment as a stereotypical anchor for judgement (Experiment 5 and 6), whereby mindfulness would be expected to reduce the reliance on the stereotype.

### **Heuristics**

Heuristics can be described as mental shortcuts that people use to assess probability in solving complex problems (in decision-making) and making judgements. People employ a limited number of heuristics to reduce judgements to simpler ones, and they manifest due to relative neglect of possible alternatives (Tversky & Kahneman, 1983). Tversky and Kahneman (Tversky & Kahneman, 1973a) investigated a number of heuristics including representativeness, availability

and judgement heuristics, which are discussed below in relation to attributions and decision-making.

The **representativeness** heuristic refers to judging an event probable to the extent that it represents the essential, salient features of the more general category. It is a too heavy reliance on predictor variables (e.g. stereotypes of a group or individual) and not enough to the average in the population of that group (Ross, Greene, & House, 1977). Likely or common occurrences are more easily imagined than unlikely ones, and associative connections are strengthened when two events often co-occur. For example, both naïve (undergraduates with little knowledge or training in probability and statistics) and trained (PhD students with advanced knowledge of probability, statistics and decision theory) participants were equally likely to evaluate the probability that an individual would have a certain occupation by the degree to which they appeared representative of the stereotype of that occupation (Kahneman & Tversky, 1973).

The **availability** heuristic is similar to the representativeness heuristic in that it refers to judging behaviours that are easily recalled, common or easy to imagine (Tversky & Kahneman, 1973a). For example, one's own actions may be thought of as typical of others, and using the availability heuristic would then lead to unrealistic expectations for the behaviour of others (I wouldn't do it so I expect most others wouldn't either). Lepper, Greene & Nisbett (1973) found that children overestimated the influence of rewards on their decision to play with certain toys, thereby underestimating their dispositional interest in the toy. Similarly, Strickland (1958) found that participants overestimated the extent to which a watchful supervisor was



responsible for an employee's honest performance and [mistakenly] underestimated the employee's dispositional honesty.

The representativeness and availability heuristic can lead to an error known as the conjunction fallacy (Tversky & Kahneman, 1983), in which people tend to believe that a conjunction is more probably than its constituents. For example, given the statement "Elizabeth buys groceries at the farmers market, including tofu, vegetables and meatless lasagne", what is more likely? A) Elizabeth is a woman, or B) Elizabeth is a woman and a vegetarian? With such limited information, it is most probable that A is definitely true, Elizabeth is most likely to be the name of a woman. It is not possible to say whether B is also true, but the additional information given draws us to the conclusion that Elizabeth must be a vegetarian as well, and thus that B is probably true. We tend to assume that the additional information is representative of the person's disposition, and we can easily join the food choices with the notion of being vegetarian. This type of fallacy can also hinder decision-making, but may be mitigated by decisions made in groups (O'Leary, 2011).

Another similar heuristic is the **judgmental** heuristic. This is used to evaluate the frequency or probability of events by the relative ease with which it comes to mind (Tversky & Kahneman, 1973b). Judgmental heuristics can lead to systematic bias since a judgement or decision is made without careful consideration of alternative options, but rather by reliance on salient categories and easily accessible stereotypes. In this respect it is more aligned with person judgement, but may also affect decision-making where there is a solution that appears suitable, and thus alternatives are not considered. A particular type of heuristic process that affects

judgements of others is attribution. This is the automatic process of inferring behaviour based on personality or environment (Heider, 1958).

### **Attribution Theory**

When we see a person act, we immediately reach conclusions far beyond sensory information (Griffin, 1994). Individuals will try to identify causes of behaviour that they witness in order to increase their understanding of the behaviour, and increase their ability to predict future instances of behaviours; they will then expect similar behaviour under similar conditions (Ross, 1977; Shaver, 1975). This process, known as attribution, is the drawing of inferences, for example on human behaviour to try to simplify incoming stimulus. Heider (1958) defined attribution as an effort to predict and control the world by assigning momentary behaviours to relatively unchanging/stable dispositions. Attributions are often based on moral blame, or whether the individual should have been acting in such a way. This form of perception is an act of categorization (Bruner, 1957), often influenced by stereotypes and automatic processing. Intergroup behaviour becomes associated with a causal locus, which helps individuals to attribute causes and consequences of behaviours based on quickly accessible schemas. Judging and categorising occurs via the process that requires least effort (heuristics and stereotypes; Kahneman & Frederick, 2005) and thus may be linked to mindlessness (Langer et al., 1978).

Shaver (1975) suggested that attribution is a three-step process in which we assume that a person is how they behave. First, we perceive an act or behaviour; second, the act is judged as either intentional or unintentional; finally, through inferential processing the act is attributed to disposition. For example, if we witness a person speeding through traffic we perceive the behaviour and judge whether it

was intentional, often assuming that the person driving knew the speed limit and was aware they were breaking it. We therefore attribute their actions to a disposition for carelessness or dangerous driving, rather than the possibility that there may be a contextual explanation such as an emergency or external factor causing the person to speed. There is a quick jump from a possible external cause of the behaviour, to a probable internal causality.

A person's behaviour can be predicted, in large part, by knowledge of the social circumstances in which it occurs (Gilbert & Malone, 1995). When people observe behaviour more extreme than the situation leads them to expect, they tend to make dispositional attributions. In addition, behaviour that directly affects, or has consequences for, the perceiver is more likely to be attributed to dispositions than actions that do not personally affect the attributer, and perceivers are more likely to attribute negative behaviours to dispositions (Nisbett, Caputo, Legant, & Marecek, 1973). This is more pronounced for group attributions.

#### Group attribution

Allison and Messick (1985) found that the attitudes of group members are inferred based on the group's decision-making. That is, individuals assume that the attitudes of group members primarily influence the group's decision-making, ignoring the impact of decision-making rules and group norms. A particularly important distinction that Allison and Messick (1985) made was that this effect was amplified for outgroups compared to ingroups. This highlights the different approaches taken to making judgements of situations and actions, depending on the target of the judgement.

The process of separating and categorising human groups is enough to trigger the psychological processes that lead to intergroup prejudice (Allport, 1979). Therefore, the attributions made to members of outgroups compared to ingroups is likely to be motivated by different factors. For example, participants in Northern Ireland who were shown news footage of intergroup violence between Catholics and Protestants attributed the cause of the violence differently depending on their own group membership. Catholics rated Catholic violence towards Protestants as situational, but Protestant violence towards Catholics as dispositional. The opposite was found for Protestant participants (Hunter, Stringer, & Watson, 1992). Similar patterns of results have also been observed in relation to media coverage of violent conflicts between other groups (Israeli-Arab; Vallone, Ross, & Lepper, 1985), evaluations of evidence on capital punishment (Lord et al., 1979) and between supporters of football teams (Hastorf & Cantril, 1954). Furthermore, attributions are generalised from a group member to the whole group when the group is seen as more homogenous, as is the case for ingroup members perceptions of outgroups (Quattrone & Jones, 1980).

In addition, race is a particularly pervasive intergroup category that informs attributions. Duncan (1976) questioned whether individuals would attach more or less weight to dispositions than situational factors when attributing the behaviour of Black and White others. The results showed that an ambiguous 'shove' was labelled more violent when performed by a Black person than by a White person. Situation attributions were preferred when the harm-doer was White, and personal/dispositional attributions were used when the harm-doer was Black, suggesting that violence was more accessible when thinking about a Black than a White perpetrator. More recent research has shown that White participants high in

implicit prejudice were more prone to categorise a racially ambiguous angry face as Black than those low in implicit prejudice (Hutchings & Haddock, 2008). This highlights the association between race and a negative emotion, fuelled by implicit prejudice.

In addition, status characteristics of the target affect attributions, and race is associated with status. Thibaut and Riecken (1955) found that a high status target's choice to comply in an influence task was attributed to dispositions, compared to a low status individual whose decision was attributed externally. That is, the high status target was considered to comply out of choice, and the low status target was considered to have succumbed to force. Race and class status were also found to influence attribution. Howard and Pike (1986) asked students to read transcribed interviews about a man who had been arrested for disorderly conduct, and a man who was unemployed and unable to obtain work. In both cases the lower status target (Black or working class) was attributed with more blame and more negative evaluations than the higher status target (White or middle class). Furthermore, race was more important to the evaluations in the arrest scenario, and social class was more important in the unemployment scenario, suggesting that status may interact with the situation to affect attribution. This also supports the findings that race categorisations are associated with certain behaviours, in particular crime or violence and lower socio-economic class (Berger et al., 1972; Duncan, 1976; King et al., 2006; Wagner & Berger, 1993), and provides a context in which to examine the use of mindfulness to buffer against these automatic associations.

As mentioned above, one's own group membership also affects how outgroups are viewed. For example, public opinion research after Hurricane Katrina

revealed that 71% of African-Americans, compared to 32% of White Americans felt that the events surrounding Hurricane Katrina highlighted the existence of racial inequality. Furthermore, 17% of African-Americans thought that the job market was equal, compared to 53% of White Americans (Plaut, 2010). This highlights how different perceptions of ingroup vs. outgroup advantage and disadvantage are viewed depending on own group membership, which in-turn, can influence attribution through assignment of status and category membership. Using such categories, heuristics and mental short cuts to attribute behaviour often leads to errors or misattributions where there is an incorrect balance made between the extent that the person's disposition or their environment can be held responsible for their experiences or behaviours.

### **Attribution bias and Misattribution**

In attribution theory, there is a distinction between overestimating and ignoring the role of dispositions in explaining behaviour. The Fundamental Attribution Error (FAE; Heider, 1958; Ross, 1977) postulates that perceivers tend to overestimate dispositional factors, and underestimate the role of the situation in controlling or explaining behaviours. In contrast to the FAE, the Correspondence Bias (CB) refers to a tendency to infer a person's dispositions from their behaviour, even when the behaviour is entirely constrained by the situation (Gawronski, 2004; Gilbert & Malone, 1995). That is, ignoring the role of the situation and assuming that the observed behaviour is distinctive of features of the targets enduring personality traits. Perceivers tend to draw the same correspondent dispositional inferences regardless of whether the observed behaviour is constrained by situational factors or

not (Gawronski, 2004). Both types of attributional error are investigated in this thesis (see Chapter 5 and Chapter 6).

The correspondence bias is a robust and replicable finding in social psychology. Bauman and Skitka (2010) showed that the effect was not unique to student samples and was in fact generalisable to the U.S population, across demographics. Although, a minority of their sample also exhibited no bias, in fact, exhibiting the opposite of the CB and attributing the opposite attitude to essay valence. Importantly, this shows that individual differences can affect the prevalence of the CB. Gilbert & Malone, (1995) highlighted that the person-situation distinction is central to attribution theory. Although the terms FAE and CB are often used interchangeably, Ross (1977) suggests that the FAE is the outcome of underestimating situational influences whilst overestimating dispositional influences and misbalancing the cause of behaviour, rather than ignoring situational factors completely. In both cases, the outcome is often a misattribution or an error in judgement.

The FAE and the CB are therefore qualitatively different, and usually measured in different ways within research. For example, in this thesis, Chapter 5 measures the CB using the attitude-attribution paradigm, which asks participants to infer a targets attitude based on the content of an essay ostensibly written by the target with no choice of topic. This paradigm gives participants the situational information required to avoid the CB, and thus assumes that those who make the CB have ignored the situational information. In Chapter 6, the FAE is measured by asking participants the extent that they believe a target is responsible (dispositional attribution) for their position or not (situational factors influenced their position). In

this respect, participants estimate the degree with which they feel the targets circumstances were influenced by situational or dispositional factors, without giving concrete information about either factors.

The attitude-attribution paradigm was developed to test the boundary conditions of attribution (Jones & Harris, 1967). Jones and Harris (1967) postulated that under conditions of free choice participants who chose a certain view would be perceived as more likely to hold that view, and thus attribution of their attitude to disposition was expected. However, a consistent finding in attribution research is that even when participants are fully aware that the writer had no choice in their position, they still tend to attribute their attitude to dispositions, and ignore the situational constraints.

Jones and Harris (1967) investigated this by asking participants to read an essay that was either in support of, or opposed to, a topic on which participants were expected to have strong opinions (Castro's Cuba and Segregation in the US). In addition, the topics were expected to evoke a prior probability evaluation of the other person. That is, participants would expect another person to hold certain views (e.g. that an American citizen would be anti-Castro, or that someone from a Southern state would be more in favour of segregation than someone from a Northern state- see availability heuristics above). Participants were told that the writer of the essay was assigned by an authority figure (no choice), or was free to choose their position (free choice). The findings consistently showed that whilst participants were aware of the choice conditions, there was still a tendency to attribute the attitude of the essay writer dispositionally, ignoring the influence of the situational factor of choice.



The false consensus effect (Ross et al., 1977) may, in part, account for this. The false consensus effect is that perceivers view their own opinions on a subject as relatively common among their peers, and this perception of commonness can influence their attributions of others. Ross et al. (1977) asked students on a university campus to walk around for half an hour wearing a sandwich board encouraging people to “Eat at Joe’s”. Forty-eight of the 80 participants asked agreed. They then asked those participants to estimate the proportion of other people they thought would accept or decline the request. The results showed that those who declined thought that around two thirds of others would also decline. Likewise, those who accepted thought that around two thirds of others would accept. Counter-normative behaviour also led participants to make stronger dispositional inferences about the other. That is, those who agreed to wear the sign made stronger trait inferences about another person who declined, and those who declined made stronger trait inferences about another person who agreed. This suggests that perceivers use their own views on a topic as a measure of the views of others, which leads to an assumption about the disposition of the other, even when the target's behaviour is constrained (Alicke, Zerbst, & LoSchiavo, 1996). That is, the tendency to attribute our own behaviour to situations, but attribute the behaviour of others to stable dispositions. Ross et al. (1977) argued that attitude-attribution biases in part, might be the cause of perceivers’ misconceptions about the degree to which their own response aligns with the response of peers. Therefore, consensus estimates can be used as covariates to assess whether perceivers own opinion influences their ratings of the target.

Another possible factor that influences attribution is the persuasiveness of the essay content. Snyder and Jones (1974) investigated whether dispositional inferences

were artefacts of the essay being standardised and written by the researchers (e.g. high persuasiveness). They used a similar methodology to Jones and Harris (1967), using assigned or chosen essays on topics such as free medical care (in the US), legalisation of marijuana and abortion laws. In order to make the choice conditions more salient and to emphasise the role of situational factors, participants completed the task of essay writing themselves before reading another participants essay and evaluating the writer. Despite experiencing the same conditions of essay assignment, participants were still more likely to attribute the writer's real attitude to dispositions, ignoring the influence of the situation (Snyder & Jones, 1974). This confirmed that the attributional bias was not a feature of the essay, but more likely a systematic bias.

It seems logical that participants may have inferred the disposition of the essay writer based on the persuasiveness of the essay; assuming that a persuasive essay could only have been written by a person with expert knowledge of, or a keen interest in, the topic (Gawronski, 2003). Highly persuasive essays have high diagnostic value for inferring a corresponding attitude, whereas low persuasive essays have low diagnostic value. However, studies using authentic essays showed that participants were unable to detect the true attitude of the author (Miller, Ashton, & Mishal, 1990), suggesting that perceivers underestimate people's ability to write a counter-attitudinal essay, and overestimate the causal influence of assignment conditions on the resulting quality of the essay.

Quattrone (1982) was able to reverse this effect by asking participants to judge the strength of situational factors rather than infer the personal attitude of the author. Participants were given information about the attitude of the author with an

opinion questionnaire ostensibly completed by the writer. Even with clear information about the attitude of the author, participants attributed free choice essays that were consistent with the writers' attitude to situational factors rather than the personal attitude of the author. In other words, the attribution error diminished. This suggests that it is possible to reduce or reverse attribution errors.

### **Correcting attribution errors**

There are a number of alternative routes to correcting attribution errors, including awareness and cognitive capacity, perspective taking and locus of control.

#### **Awareness and Cognitive Capacity**

Gilbert and Malone (1995) categorise lack of awareness in two ways, a situational constraint and a construal problem. As a situational constraint, lack of awareness refers to invisibility of the situational factors. The perceiver is unable to see the situation as influential and so does not notice subtle cues in the environment that lead to behaviour. As a construal problem, the perceiver does not consider the magnitude of the situational factors as the actor does, and cannot see the situation from the actors' point of view. Moreover, the perceiver may not be aware of the existence of situational factors (Gawronski, 2004). This is particularly important for invisible factors like social roles or psychological constraints (Jones, 1990), and those with low salience (Gawronski, 2004). Although perceivers must be aware that the situational factor exists, they must also consider the situational factors a precondition for the behaviour in order to apply situational theory to the observed behaviour. That is, they must consider the situation an important factor in influencing the behaviour, or else they will not adjust their judgement. This suggests that if participants are aware of constraints, they should be able to correct before

making a judgement. This thesis postulates that mindfulness would enhance awareness of the present situation, thus enhancing the situational constraints and increase the ability to consider the situation from the target's perspective. As well as being aware of situational factors, attribution error is more easily corrected when the situational information is made salient to the perceiver, and when the perceiver is able to focus on the task, without distraction (Trope & Gaunt, 2000). Reduced cognitive capacity attenuated the application of situational factors, only when the salience of situational factors was low but not when it was high. Weary, Vaughn, Stewart, and Edwards (2006) supported the notion that perceivers can correct attribution errors when they have the cognitive resources to do so. They found that people with high causal uncertainty had a greater focus on individuating factors, relying less on stereotypes in person judgements, only if they had the cognitive resources to do so. In one study the researchers found that regardless of causal uncertainty scores, participants under cognitive load (carrying out a competing task during the experiment) committed the CB, however without cognitive load, only those low in causal uncertainty made the CB, whereas higher scorers corrected the bias. In a second study, the researchers also manipulated the strength of the situational constraint information and found that when situational constraint information was weak participants made the CB regardless of their casual uncertainty score. However, with strong situational constraint information (a compelling alternative to a dispositional cause), only low causal uncertainty scorers made the CB.

Gilbert (1989) suggested that dispositional inference follows a three-step process: behavioural categorisation, dispositional characterisation and situational correction. In other words, the perceiver categorises the behaviour, decides what

disposition the behaviour suggests and then infers what situational constraints might influence the behaviour. Whilst categorisation and characterisation are thought to be automatic processes, situational correction requires effortful thought and evaluation of the possible situational alternatives. Therefore, the correspondence bias is more likely when a perceiver lacks the cognitive capacity to carry out the third and final step in this process. This is supported by findings that suggest those higher in need for cognition, that is those who enjoy engaging in effortful thought, are less likely to make the CB, but cognitive busyness (through multitasking) increased the CB (D'Agostino & Fincher-kiefer, 1992). The effect of reduced cognitive capacity also increases reliance on stereotypes and heuristic processing in order to free up cognitive resources to complete the other tasks (Macrae, Milne, & Bodenhausen, 1994).

In addition, research into the effects of mood on cognitive capacity has shown that participants assigned a negative mood induction before engaging in an attitude-attribution task were less likely to make the CB than participants assigned a positive or neutral mood induction (Forgas, 1998). This indicated that the increased levels of cognitive processing associated with a negative (versus a positive or neutral) mood reduced the CB. This can also impact decision-making, where inducing a negative mood in people leads to deeper and more complex processing of information, and less reliance on heuristics (Bless, Bohner, Schwarz, & Strach, 1990; Sinclair, 1988). The opposite effect occurs for people induced into a positive mood (Isen & Means, 1983).

### Perspective taking

Changing the focus of attention, or one's perspective, toward or away from the self and thereby increasing objective self-awareness can affect attribution. For example, perspective taking can increase the salience of situational factors that participants are exposed to, increasing the likelihood that they correct for situational factors (Storms, 1973). Perspective taking ability is an individual difference variable - some people are better able to take another perspective and may even have a greater capacity to do so, which is known as dispositional empathy (Davis, 1983), but is something that may be enhanced by mindfulness practice (Block-Lerner et al., 2007). Perspective taking has been shown to de-bias social thought; increasing positive evaluations of others, and decreasing use and accessibility of stereotypes (Galinsky & Moskowitz, 2000). This occurs due to an increase in self-other overlap, facilitated by increased perspective taking. Self-other overlap involves changing representations of the other (or group) to be more like the self, as well as seeing the self as more like the other and increasing the number of features that the self and other have in common (Galinsky, Ku, & Wang, 2005; Galinsky & Moskowitz, 2000). Galinsky and Moskowitz (2000) found that group based judgements of an outgroup (the elderly) by the ingroup (students) improved even when stereotypes about the outgroup were unknown. Since accessibility of the stereotypic content is reduced, it is less likely to influence perception and judgement, therefore making it a useful tool in reducing attribution error.

A slightly different view of perspective taking is changing the orientation through which a situation or target is viewed which may also alter the attribution. Duval and Wicklund (1973) found that when engaged in an unrelated task, and under

conditions of reduced objective self-awareness (less focus on the self), participants were less likely to attribute blame to themselves in hypothetical, negative situations. Under conditions of heightened objective self-awareness, by looking at one's own reflection, participants were more likely to attribute blame to the self, regardless of whether the hypothetical situations were positive or negative. This suggests that the valence of the situation is not as important a factor in determining the locus of attribution as the individuals' focus of attention toward or away from the self.

Similarly, this type of attention re-orientation has been found to affect first offer effects in negotiator dyads (Galinsky & Mussweiler, 2001). A negotiator who made a first offer benefitted from going first in the outcome, however this anchoring effect was attenuated when the opponent's attention was directed towards the first negotiator's lower bound reservation price, but not when attention was directed to their outcome. This highlighted that when the opponent's perspective was focused on inconsistent information the first negotiator did not always benefit from a greater outcome.

Furthermore, Storms (1973) showed that reorienting participants visual perspective so that they viewed themselves, rather than the other participants (the original view) on a video of the experiment were more likely to attribute the actors behaviour to situational than dispositional factors, compared to no video, or a video from their original perspective. This supports the research above by Duval and Wicklund (1973) that reorienting self-awareness impacts attribution, and suggests that altered perspectives influence attribution of person-situation factors. In a similar way, a person's own locus of control can affect attribution.

### Locus of Control

People with an external locus of control tend to attribute the behaviour of others to external factors, and vice versa for internal locus of control (Shaver, 1975). That is, those who believe they have little control over actions and believe fate is responsible for their situation are more likely to attribute the behaviour and situation faced by others to external influences such as fate. Those with an internal locus of control believe far more that they are responsible for their own situation and thus believe others are for theirs. We generalise from our own circumstances and assume that others have similar control over their lives as we do over our own (Shaver, 1975). Locus of control therefore can measure the direction of one's attributional tendency.

However, there is a propensity to attribute own success to personal disposition whilst attributing own failure to environmental factors, more than observers of the behaviour do (Beckmann, 1970; Ross, 1977). In 'other' perception, it is more likely that a target will be held more personally responsible for acts that lead to negative outcomes. This means that negative behaviours are attributed to a targets disposition, or to internal factors, and positive behaviours are attributed to luck, chance or other external causes (Griffin, 1994). This self-serving bias preserves self-esteem. However, when a target is a member of the ingroup or someone with whom we strongly identify, it is more likely that self-serving attributions will be made. For example, Shtudiner, Klein and Kantor (2016) found that just after the 2015 Israeli national elections participants who identified with the ruling government attributed blame for socio-economic problems on external or 'other' causes, however



those who did not identify with the ruling party were significantly more likely to blame the socio-economic problems on the prime minister and the ruling party.

The interplay of categorisation and intergroup dynamics is evident in other social judgements such as decision-making. In particular, the automatic processes detailed above affect group decision-making. Mindfulness is expected to improve the social experience of group members in a decision-making group, which would lead to an improved outcome on the decision task itself. This forms the focus of the remaining discussion of social judgements and provides the basis for Experiment 7 in this thesis.

### **Decision-making**

Group decision-making shares some of the features of social judgements, for example, evaluating group members to assess effectiveness may rely on processes such as categorisation and attribution, and relying on heuristics to make a decision (Azar, 2014; Gigerenzer & Gaissmaier, 2011; Messick & Schell, 1992). However, there is an important difference. Whereas person judgements are primarily automatic processes, outside of conscious awareness, most decision-making is a mainly conscious, deliberative and non-automatic process that requires effortful thought. The process of making a decision requires a number of stages, including defining the problem, weighing alternatives, considering the advantages and disadvantages of a course of action and reaching a conclusion (Johnson & Johnson, 2003). Nonetheless, automatic processes may still underlie the non-automatic process of decision-making, especially in group decisions, where group dynamics are also at play.

Decision-making groups do not have to be true groups, which is often not the case in person judgement. This means that the typical features of the group (e.g.

norms, Bettenhausen & Murnighan, 1985; social identity and accountability, Kramer, Pommerenke & Newton, 1993) are not necessarily present. For example, nominal group decision-making uses minimal groups, or a collection of people brought together specifically to make a decision. Some researchers believe that temporary or ad-hoc decision-making groups do not have time to develop enough maturity to function with full effectiveness. Kramer & Brewer (1986) suggest that increased group identity facilitates effective decision-making, which arguably minimal groups do not have.

Although, even minimal groups can quickly create a group identity, which tends to elicit ingroup bias (rather than outgroup derogation) (M. B. Brewer, 1979). Even temporary, or arbitrarily formed groups develop a sense of identity, but this creates a feeling of ingroup positivity rather than outgroup negativity which may foster cooperative decision-making. This may be due to the need to perceive themselves as a group, and the nature of the group relying on interaction and achieving a shared goal (Baron & Kerr, 2003). However, this is based on the process of categorising and evaluating the other group members, and thus the automatic processes detailed above influence this in the minimal group context. Despite this, nominal group decision-making has been found effective due to requiring less time to set up the group, and reducing pressure to conform because the group has not had time to create a sense of identity (Delbecq, Van de Ven, & Gustafson, 1975).

Psychology research has investigated the difference between individual and group performance on decision-making and problem-solving tasks. This has shown that groups often outperform individuals, depending on features of the group and the nature of the task (Hill, 1982). The early work of Shaw (1932), found that groups

were more successful than individuals at solving ‘eureka tasks’ (a puzzle where once the correct answer is made apparent, it is immediately clear that it is the solution, Lorge et al., 1958). Laughlin, Bonner and Miner (2002) found that groups perform better than their best individuals on highly intellectual problem-solving tasks, and at the level of the best of an equivalent number of individuals on tasks where they are given detailed information to help solve the problem (Laughlin, VanderStoep, & Hollingshead, 1991).

In two different types of economic judgement task, Blinder and Morgan (2000) found that five person groups did not make slower decisions than individuals, but were able to make better quality decisions than individuals. They also found that the average, median and best group member’s performance did not significantly predict the group performance, suggesting that the group performed better than the sum of its parts. In different decision-making problems, O’Leary (2011) showed that groups were less likely than individuals to make probability fallacies, and outperformed individuals on decision-making tasks by pooling the knowledge of the members, rather than reaching a consensus. What has concerned researchers more recently is why, and under what conditions, groups perform better than individuals (for a review see Hill, 1982).

### **Features of the group**

One possible explanation is that groups benefit from process gain (Johnson, Skon, & Johnson, 1980; Skon, Johnson, & Johnson, 1981) through the ability to pool resources, share ideas, insights and strategies and build upon ideas through discussion, supported by O’Leary (2011). However, this relies on complimentary member resources. These are the knowledge, ability and skills that each member of

the group can contribute, which allow groups to process more information than individuals, particularly for complex tasks (Hinsz, Tindale, & Vollrath, 1997). Bottger & Yetten (1988) found that groups performed better when they utilised their members task knowledge, especially if two or more members held high quality knowledge (know the correct solution or insightful information about the problem). In the study detailed above (O'Leary, 2011) participants all had an advanced knowledge of the subject, which would then have meant that the individual groups members all had the ability to effectively solve the problem, and this may account for the superior performance of the group. In other group situations, the level of ability and knowledge of members may vary.

The mere presence of others can impact individual and group decision-making differently. In groups, shared identity and cohesion provide higher motivation to achieve (Abrams & Hogg, 1988), whereas for individuals the presence of others may increase competition, fear of embarrassment and evaluation apprehension. This is particularly problematic for complex tasks (Bond & Titus, 1983). In groups, the presence of similar others encourages motivation gain, facilitation through arousal (Zajonc, 1965) and heightens self-consciousness, making self-aware group members try harder to project a positive image to other group members (Duval & Wicklund, 1973). Groups are thought to moderate arousal produced by the presence of others, reducing the negative affects others have on individuals, such as reduced competitiveness (because everyone is working towards the same goal), reduced evaluation apprehension and less fear of embarrassment. Additionally, facilitation should occur in competitive or evaluative situations due to stronger association with reward and punishment in the past.

A significant hindrance to most groups performing optimally is something Steiner (1972) termed 'process loss'. This refers to a group's failure to act in the most efficient, or potentially productive, way. Steiner argued that this generally occurred due to coordination loss, where the group did not organise their efforts optimally, and motivation loss, where members did not work as hard in a group as when alone. One example of coordination loss is the sharing of information. Decision-making groups are more likely to focus on shared information, and overlook novel or unshared information (Stasser et al., 1989). In addition, groups are less likely to repeat and recall unshared information (Larson et al., 1998). Further, if one group member does have a solution, or key skills to help the group achieve the correct solution, then that group member must share the information, and the group must accept that information as useful.

A problem that occurs in groups is that the group member that has the best information is not always heard, or does not feel able to contribute. Low status and a lack of confidence in their solution can amplify this problem. Low status group members may not feel able to share their ideas, and those who do may not be taken seriously (Berger & Zelditch, 1998). A lack of confidence in the answer can lead to groups with members who know the correct solution, still making an incorrect answer, where the member who knows the solution is unable to convincingly persuade the rest of the group. This may be particularly relevant in tasks that fall between the purely intellectual and judgement based since those with the relevant knowledge would be required to not only put forward the correct solution, but also to defend it and refute counter-arguments. This suggests the potential benefit of improving the social experience of group members to facilitate effective group decision-making, which is the key hypothesis of Experiment 7.

**Nature of the task**

As well as features of the group and the individuals that make up the group, the task itself can impact a group's ability to produce an effective solution/decision. Research has suggested that decision tasks lie on a continuum ranging from highly cognitive (e.g. math problems) to physical (e.g. moving furniture). Furthermore, tasks can be defined as ranging from competitive (e.g. negotiation) to cooperative, with collective choice or group decisions falling somewhere in the middle of this (Baron & Kerr, 2003). Another distinction that can be made is between intellectual (tasks with a demonstrably correct answer) and judgement (tasks with no clear demonstrable answer) tasks. A task falls somewhere between these anchors depending on the demonstrability of correctness of the task solution (Laughlin & Ellis, 1986). Task structure can be defined as whether the task can be subdivided (divisible) or not (unitary); whether the outcome is maximising, and success is measured by how much is achieved versus optimising, where the outcome is a function of achieving a correct or optimal solution; and by how the member contributions are used (disjunctive, conjunctive, additive or discretionary, Baron & Kerr, 2003).

Survival tasks have been used to investigate a variety of decision-making contexts (Bottger & Yetten, 1988; Cleirigh & Greaney, 2015; Haslam et al., 1998; Sundstrom, Busby, & Bobrow, 1997), and ask participants to imagine themselves in a survival situation with a limited number of resources. Participants are asked to rank order the items in order of importance to their survival, and then compare the ranking to the order of a survival expert, whereby lower scores are indicative of a better decision. This type of task then, has a demonstrably correct solution, but

requires a judgement of the items use, placing survival tasks somewhere between intellectual and judgement tasks. They are useful in measuring decision quality, because there is a 'correct' solution against which individuals and groups' solutions can be compared, and since a correct answer is the main aim, they can be described as optimising. They are cognitive (rather than physical) and require greater cooperation within groups than competition between groups. The overall task requires the group members to work together to decide the ranking of the items and thus means the task is unitary, and additive. Taken together this suggests that a group should perform better on survival tasks than individuals by pooling the resources of each individual and is thus ideal for testing the hypothesis that improving the social experience of the group would lead to better group decisions (Experiment 7).

### **Decision-making methods**

Johnson and Johnson (2003) detail ten methods of reaching a decision, the most effective of which is consensus. This is where groups arrive at a decision through discussion. Discussion happens under conditions that permit communications to be sufficiently open, and supportive enough for all members to feel able to contribute and have a fair chance of influencing the decision. Perhaps unsurprisingly, consensus is the most time consuming decision-making method. The most commonly used method for group decision-making is vote or majority rule (Fujishin, 2008; Johnson & Johnson, 2003). This quite simply relies on the group using the decision with the support of most of its members, determined through vote. However, this type of decision-making process may split the group and lead to either/or, us/them, type thinking, encouraging less rational discussion (Johnson & Johnson, 2003). In many decision-making groups, individual ratings can be averaged

and a compromise made in order to reach a decision. An alternative is the use of nominal group decision-making. This requires the group to make an individual decision, share the answers with the group, then discuss the possible decisions as a group before ranking them to decide which decision the group will make.

In reaching consensus or group decision, Social Interaction Sequence (SIS) views uncertain participants as potential converts, but for those who are certain more effort is needed to change their mind (Stasser & Davis, 1981). This may be particularly relevant in judgment or survival tasks since those who are more certain are not necessarily correct and those who have greater status in the group or confidence in their ability may be able to change the mind of a more knowledgeable other.

### **Summary**

Automatic processes underlie social judgements such as attributions. In fact, category membership and intergroup processes can also influence non-automatic processes, like decision-making, in certain contexts (e.g. groups). Categories and stereotypes provide easily accessible information about people and situations that is accepted at face value and is not processed deeply. Using such heuristics to make judgements of others or to make decisions often leads to neglecting alternative options (Tversky & Kahneman, 1983), which in turn leads to errors or misattributions.

Errors in judgement can be reduced through increasing awareness (Gawronski, 2004), increasing cognitive capacity (Trope & Gaunt, 2000; Weary et al., 2006) altering a perceivers perspective (Galinsky & Moskowitz, 2000), and understanding perceivers locus of control (Shaver, 1975). Decision-making accuracy



may be improved by better understanding the features of the group (e.g. group members and their relationships) and nature of the task. The focus in this thesis is on two particular attribution errors: the Fundamental Attribution Error (Chapter 6) (Heider, 1958; Ross, 1977) and the Correspondence Bias (Chapter 5) (Gawronski, 2004; Gilbert & Malone, 1995) and on decision-making in groups (Chapter 7). Chapter 3 draws together the theory discussed in Chapters 1 and 2 to provide a framework for the current research presented in this thesis, detailing the aims and hypotheses.

### **Chapter 3: Framework for the current research**

This chapter explicitly develops and links the aims of the thesis. First, the rationale is laid out for the development of a single-session, online mindfulness manipulation. A connection is made between the emerging evidence for mindfulness' salutary effects on cognitive processing and the potential benefits this may have for social judgements in terms of automatic responding. On the basis of the analysis of evidence in Chapters 1 and 2, hypotheses are put forward regarding the potential usefulness of mindfulness specifically for attributions and decision-making.

The experiments presented in this thesis address an important gap in the current literature on mindfulness. They are the first to empirically test the effectiveness of brief, single-session, online mindfulness, and then apply this in the area of social judgement. Although there is research to suggest that mindfulness has positive effects with non-clinical populations, very few have directly tested the effectiveness of the mindfulness manipulation. Furthermore, the research that has applied mindfulness in social contexts has not considered attributions and has not used such a brief mindfulness manipulation to affect change. This is important because: 1) mindfulness practices can be easily accessed online so anyone is able to carry out a mindfulness task, 2) if positive outcomes can be obtained from as little as 5-minutes of mindfulness there are a number of practical applications of the manipulation, and 3) having positive effects in the areas of attribution and group decision-making may have positive ramifications for social cohesion and reducing negative judgements.

**Single-session, online mindfulness practice**

Despite a body of research focusing on the benefits of mindfulness courses, there is a developing interest in single-session mindfulness and whether the same benefits can be achieved with only a fraction of the time commitment. Single-session practice in research ranges from 5-minutes (Weger et al., 2012) up to (and sometimes above) 30-minutes (Johnson et al., 2013). In many of these studies, mindfulness is either measured at the end of the study (Hopthrow et al., 2016; Weger et al., 2012), or is not measured at all (Frewen, Lundberg, MacKinley, & Wrath, 2011; Mohan et al., 2011; Mrazek et al., 2013). Therefore, changes in mindfulness levels from pre- to post- practice have not yet been assessed. The experiments presented in this thesis are the first to empirically investigate whether mindfulness increases from pre- to post-mindfulness in a brief, single-session manipulation.

In a similar way to single-session practice, online mindfulness practice has begun to proliferate. The majority of the literature has focused on online courses that provide an effective alternative for people who are unable to commit to face-to-face courses (e.g. Aikens et al., 2014; Davis & Zautra, 2013). Evaluations of online courses suggest that they are more effective for people who seek anonymous therapy, and are more familiar with computers (Beattie et al., 2009; Christensen et al., 2006). However, such courses still require some level of effort and commitment by both participants and clinicians. This, combined with the ease of access to self-help meditation and mindfulness practice in books (for adults e.g. Chaskalson, 2014; Orsillo & Roemer, 2011; Williams & Penman, 2011, and children e.g. Kluge, 2014), flashcards (for children e.g. Rudd, Rudd, & Wilson, 2013) and websites or mobile

phone apps (e.g. Headspace) has increased interest in whether non-practitioner guided practice is effective.

Chittaro and Vianello (2014) compared mindfulness practice via a smartphone app with two different types of practice; an imagination practice and a physical practice. They found that the smartphone app was rated as more enjoyable and easier to use than the other two types of practice. Although, mindfulness was not measured in this study, seven questions, taken from the TMS, measured decentering. This showed that participants' decentering scores were higher after using the app and after carrying out an imagination mindfulness task compared to a physical mindfulness practice. This suggests that practitioner input may not necessarily be essential for participants to practice mindfulness effectively, and adds support to the notion that single-session, online practice may be a viable alternative to courses. However, participants completed the mindfulness practice in laboratory settings, which still leaves the question of whether a brief practice delivered entirely online would be as effective.

A further question that remains unanswered is whether online and single-session practice can be combined. The research presented in Chapter 4 will directly address these questions by delivering a 5-minute mindfulness practice entirely online with no other information, no input from a practitioner and no follow-up practice. The experiment will also measure state mindfulness just before and immediately after the mindfulness practice in order to ascertain whether such a brief, single-session, online practice effectively increases individuals state mindfulness.

### **Mindfulness and automatic responding**

As explained in Chapter 2, many social judgements are underpinned by automatic associations. In particular, the categorisation of objects and people to pre-existing schemas or stereotypes of behaviour is an automatic process that helps people to effortlessly make sense of incoming sensory information. Categorisation is thought to lie at the opposite end of a continuum from individuation, a more effortful process that considers individual level characteristics rather than group membership in making judgements (McGarty et al., 2015).

Categorisation and individuation fit well with Langer and Moldoveanu's (2000a) definition of mindfulness and mindlessness. That is, mindless behaviour characterised by not paying attention to relevant information and ignoring novel information that would require more effortful analysis, corresponding to categorisation or stereotyping (Langer, 1989). By contrast, mindful behaviour includes creation of new categories for structuring perception and enhanced awareness of multiple perspectives, akin to individuation.

Furthermore, mindfulness as a form of present-moment awareness, or attention on the here and now, reduces rumination on the past which in turn reduces clinical symptoms such as depression and anxiety (Baer, 2003; Brown & Ryan, 2004; Diaz, 2011). In addition, mindful focus on the present moment has also been found to reduce attentional focus on the past and future which also reduces negative affect, and in turn reduced susceptibility to the sunk cost bias (Hafenbrack et al., 2014). In a social context, reduced focus on the past may reduce reliance on previously learnt associations and therefore reduce reliance on heuristics, thereby reducing judgemental errors.

In addition, the view of mindfulness as a form of attentional awareness that is characterised by moment by moment awareness (Kabat-Zinn, 1990), and maintenance of open and non-judgemental consciousness (Brown & Ryan, 2003) suggests paying attention to features of the environment that are usually not noticed. For example, Kiken and Shook (2011) found that mindfulness significantly predicted increased optimism, but not decreased pessimism that indicated a reframing of responses in a less habitual way. This was thought to be the result of mindfulness freeing cognitive resources that allowed participants to notice novel information that would usually be missed in habitual responding.

Another process that is thought to moderate the relationship between mindfulness and positive outcomes is cognitive capacity and attention. In order to carry out the more effortful process of evaluating various aspects of the person-situation context, individuals need sufficient cognitive resources. Gilbert and Hixon (1991) found that cognitive busyness prevented the activation of stereotypes, but when a stereotype was already activated, cognitive busyness led to greater reliance on that stereotype. This suggests that cognitive load may increase the reliance on automatic processes when there is not enough capacity to carry out the more effortful process. This effect was also evident in attributions, where multi-tasking participants were more prone to making the correspondence bias (Weary et al., 2006).

In addition, individual differences in need for cognition were found to affect judgements of others who were described in terms of warmth and competence (Aquino, Haddock, Maio, Wolf, & Alparone, 2016). Individuals with higher need for cognition were more positive towards targets described in terms of competence

compared to warmth. Higher need for cognition also reduces the propensity to make the correspondence bias (D'Agostino & Fincher-kiefer, 1992).

Mindfulness training has been found to increase working memory capacity, which in turn has positive effects on attention and cognitive capacity (Chambers, Lo, & Allen, 2008; Jha, Krompinger, & Baime, 2007; Mrazek et al., 2013). To date, a limited amount of evidence has considered this impact in a social psychology context. Weger et al. (2012) suggest that increased working memory capacity after mindfulness practice may be responsible for their findings that showed a decrease in detrimental impacts of stereotype threat on women's math performance, but little further research has been undertaken in this area.

A key hypothesis of this thesis is that mindfulness will have a positive effect on evaluations of others by slowing the processes associated with responses to categorisation and stereotyping that lead to attribution errors. Well-learned category associations are processed automatically and are difficult to suppress, such as for race (Augoustinos & Walker, 1995; Ito & Urland, 2003; Park & Rothbart, 1982). Therefore, this thesis will use group membership as a social context in which attributions and decisions are made. Chapters 5 and 6 present experiments in which mindfulness is applied to attributions as a means to reduce errors in person judgement. Specifically, the present research investigates the use of mindfulness to alter perceptions of the person-situation interaction in the correspondence bias and the fundamental attribution error.

### **Mindfulness, groups, and non-automatic processes**

In a similar vein to automatic associations, non-automatic processes such as decision-making rely on cognitive capacity and flexibility. Particularly within group

situations, dividing attention between the group and the task can hinder performance by increasing stress and arousal (Baron, Moore, & Sanders, 1978). Shao and Skarlicki (2009) suggest that mindfulness attenuates arousal by increasing emotional regulation, which they found translated into better individual academic performance for women. This could therefore be applied to the arousal produced within group decision settings, enhancing the performance of the group.

Furthermore, mindfulness is thought to enhance empathy and perspective taking (Block-Lerner et al., 2007), but has yet to be empirically tested. Increased perspective taking reduces attributional errors by increasing focus on the situation (Regan & Totten, 1975; Storms, 1973; Vescio, Sechrist, & Paolucci, 2003), and improved judgements of outgroups (Galinsky & Moskowitz, 2000) by increasing self-other overlap (Galinsky et al., 2005). Increasing positive relations within and between groups may also enhance group cohesion. Mindfulness has also been found to increase group cohesion (Cleirigh & Greaney, 2015), and therefore is a viable strategy to improve group performance.

For decision tasks that require creative solutions mindfulness may be beneficial in reducing cognitive rigidity. Greenberg, Reiner and Meiran (2012) found that experienced meditators showed significantly less cognitive rigidity than naïve meditators. The experienced meditators were more able to disengage from their habitual responses in order to find novel solutions to problems, which was increased among naïve meditators after an 8-week course compared to a control group. This suggests that mindfulness practice may increase cognitive flexibility. This may also enable individuals to overcome some of the negative outcomes of automatic behaviours (e.g. eating behaviour, Jordan, Wang, Donatoni & Meier, 2014).



Although not the focus of their research, this may have been a mediating factor in Cleirigh and Greaney's (2015) findings that mindfulness practice significantly improved group performance on a survival-type decision-making task. This type of decision-making task requires both cooperation among group members and flexible thinking in order to develop a rank order of item uses in a survival situation. The experiment showed that mindful groups were significantly better at this task than control groups, and that mindful groups were more cohesive (Cleirigh & Greaney, 2015).

Taken together, research suggests that mindfulness is a potentially useful intervention to improve group dynamics and intergroup evaluations, in particular for group decision-making where group cohesion and flexible thinking is a requirement of superior performance. Chapter 7 presents an experiment in which participants work in groups to complete a survival decision-making task after practicing a 5-minute mindfulness induction. The expectation is that mindful groups will make better decisions than non-mindful groups.

## **Conclusions**

The research presented within this thesis links various theoretical aspects of previous research on mindfulness and social judgements. Taking mindfulness as a form of present moment, non-judgemental awareness, the experiments within this thesis are among the first to test whether this type of attentional focus influences the person-situation interaction and apply this to group decision-making.

Previous research on social judgements expresses the importance of attention, cognition and empathy in reducing attributional errors (D'Agostino & Fincher-kiefer, 1992; Gilbert & Hixon, 1991; Weary et al., 2006). Mindfulness has been

shown to increase empathy and cognitive capacity and refocus attention (Chambers et al., 2008; Jha et al., 2007; Mrazek et al., 2013; Weger et al., 2012) and the research within this thesis combines these two theoretical standpoints to develop this area of research.

This chapter provides a link between the research on mindfulness and that on attribution and decision-making. The thesis aims to develop this research further, first, by testing the effectiveness of the 5-minute mindfulness task, which has not been done before, and then applying this manipulation to attribution errors, and group decision-making. Specifically, the aim is to investigate whether the brief mindfulness manipulation will reduce the likelihood of attribution errors being made, and improve the social experience of group members who are tasked with making a decision. The hypotheses have been outlined, and will be tested in each of the empirical studies presented within this thesis. The final chapter summarises the findings in terms of the central hypotheses and concludes by specifying limitations of the present research and suggestions for future research directions.

## **Chapter 4: Brief, single-session mindfulness increases state mindfulness**

### **Chapter Summary**

This chapter reports the initial studies set up to develop a reliable and short online method of manipulating state mindfulness. Three experiments<sup>1</sup> tested the use of a 5-minute, computer-mediated mindfulness manipulation in increasing levels of state mindfulness. In Experiment 1, 54 high school students completed the computer-mediated mindfulness practice in a lab setting and Toronto Mindfulness Scale (TMS) scores were measured before and after the practice. In Experiment 2 (N = 90) and Experiment 3 (N = 61), the mindfulness practice was tested with an entirely online sample to test the delivery of the 5-minute mindfulness practice via the internet. In Experiments 2 and 3, we found a significant increase in TMS scores in the mindful condition, but not in the control condition. These findings highlight the impact of a brief, mindfulness practice for single-session, computer-mediated use to increase mindfulness as a state.

### **Brief, single-session mindfulness increases state mindfulness**

Mindfulness intervention techniques traditionally have been delivered by a training program of several sessions, often requiring participants to invest a number of hours over the span of several weeks (Singh et al., 2003; Tacón et al., 2004). A limitation to this method is that people may be unwilling or unable to invest this level of time, and indeed mindfulness may be beneficial in situations that arise spontaneously as part of everyday life (e.g., encountering a situation that may elicit

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<sup>1</sup> These studies are reported in a manuscript accepted for publication. Mahmood, L. Hopthrow, T., & Randsley de Moura, G. (2016). A moment of mindfulness: Computer-mediated mindfulness practice increases state mindfulness. PLOS ONE

stereotype threat, Weger, Hooper, Meier, & Hothrow, 2012). It would be impractical to expect, and unlikely to occur, that everyone who could benefit from mindfulness would engage in ongoing mindfulness practice. As such, it is important to determine whether a short mindfulness task can provide positive benefits for participants. Indeed, recent empirical research has shown positive effects of short 5-minute style mindfulness tasks on behaviour and attitudes (e.g., Friese, Messner, & Schaffner, 2012; Heppner et al., 2008; Hothrow, Hooper, Mahmood, Meier, & Weger, 2016; Weger et al., 2012).

Previous research has largely focused on the efficacy of mindfulness courses and their impact on health outcomes (for reviews see: Bishop et al., 2004; Bohlmeijer, Prenger, Taal, & Cuijpers, 2010; Carmody, Baer, Lykins, & Olendzki, 2010; Kabat-Zinn, 2003; Khoury et al., 2013; Piet & Hougaard, 2011; Piet, Würtzen, & Zachariae, 2012). Evidence suggests that courses in mindfulness have a positive impact on outcomes for mental health, over long periods of time (such as stress, anxiety, depression, and aggression; Keng, Smoski, & Robins, 2011; Krusche, Cyhlarova, King, & Williams, 2012; A. Krusche, Cyhlarova, & Williams, 2013; Singh et al., 2003; Tacón et al., 2004), but in some cases there is little or no evidence for positive effects (see Goyal et al., 2014). Traditionally, mindfulness based stress reduction (MBSR) and mindfulness based cognitive therapy (MBCT) courses have been run over 8-weekly, one-hour, face-to-face sessions. They often include the use of tutorials and additional materials to guide meditators through practice, and are overseen by a professional practitioner (Boettcher et al., 2014; Greenberg et al., 2012; Krusche et al., 2013; Morledge et al., 2013).

Although often beneficial, these prolonged sessions are not always feasible, and to combat this many courses are now accessible online, recognising that it is important to make the positive potential benefits of mindfulness interventions accessible to a wider audience and to reduce costs (Aikens et al., 2014; Allexandre et al., 2012; Boettcher et al., 2014; Glück & Maercker, 2011; Krusche et al., 2012, 2013; Wolever et al., 2012). Nonetheless, existing online courses still require a time commitment and some form of specialist input from therapists or practitioners. This type of practice may not be suitable for everyone, and the level of commitment required may not suit all situations. Our research takes a novel approach in that we are testing the effect of a 5-minute computer mediated mindfulness practice on state mindfulness.

Mindfulness is defined as enhanced attention and moment-by-moment awareness (Kabat-Zinn, 1990), a heightened state of involvement and wakefulness, being in the present (Brown & Ryan, 2003), and maintenance of an open and non-judgmental consciousness. There are two views of mindfulness; one as a stable disposition or trait, which can be seen as an enduring aspect of personality and that can be maintained or enhanced through practice (Brown, Ryan, & Creswell, 2007; Hanley et al., 2013; S. L. Shapiro et al., 2006). The other view is mindfulness as a skill or state. State mindfulness is viewed as purposeful attention. That is, only whilst the individual purposefully brings their attention to the practice of mindfulness, are they able to step outside of automated perceptual processing and focus their attention on minute details of mental activity that would not be noticed usually (Bishop et al., 2004). In other words, a mindful state is only maintained while attention is intentionally cultivated, and when attention is no longer regulated in this way, the mindful state will cease (Bishop et al., 2004). Although separate

constructs, it is likely that individuals will have a stable level of trait mindfulness and altering levels of state mindfulness (e.g. as is for anxiety, anger etc., Spielberger & Sydeman, 1994).

The TMS (Lau et al., 2006) is based on Bishop et al.'s (2004) two-component definition of state mindfulness, comprising of self-regulation of attention and orientation to experience. The TMS is a measure of *an individual's level of* mindfulness at a single point in time (i.e. the current mindful state) rather than as a stable individual difference measure or as the ability to evoke a mindful state (Lau et al., 2006). This chapter outlines experiments which test whether a short 5-minute mindfulness practice is sufficient to increase levels of state mindfulness using the TMS measure, which assesses curiosity and decentering (Lau et al., 2006).

Single-session mindfulness practice has been applied outside of clinical settings, and has been shown to reduce the negative effects of stereotype threat on women's mathematics performance (Weger et al., 2012), reduce aggressive responses to social threat (Heppner et al., 2008), and reduce the likelihood of committing the correspondence bias when judging other people's behaviour (Hopthrow et al., 2016). This suggests that mindfulness practice could be beneficial in social settings and have applications beyond clinical and health psychology. With the proliferation of accessing mindfulness practice online (including via smartphones), it is important to understand whether brief mindfulness practice increases levels of state mindfulness, and thus whether such salutary effects are the result of mindfulness itself.

Johnson et al. (2013) highlighted the importance of disentangling the effects of one-session mindfulness from those of multiple sessions of mindfulness. They

outlined that brief mindfulness formats, including three to five sessions of mindfulness meditation, can have beneficial effects (Mohan et al., 2011; Tanay, Lotan, & Bernstein, 2012; Tang et al., 2007; Zeidan, Gordon, Merchant, & Goolkasian, 2010), but that mindfulness has only been measured once all of the mindfulness sessions have been completed (Johnson et al., 2013). In addition, studies that have used only one session of brief (< 30 minutes) mindfulness practice either measure mindfulness at the end of the study (Hopthrow et al., 2016; Weger et al., 2012), did not measure state mindfulness at all (Frewen et al., 2011; Mohan et al., 2011; Mrazek, Franklin, Phillips, Baird, & Schooler, 2015) or supplemented practice with further information about mindfulness practice and the positive outcomes it can elicit (Erisman & Roemer, 2010). Methodologically, this means that there is no pre-practice baseline marker with which to compare any improvements or changes in mindfulness. It is also not possible to attribute any changes in outcome behaviours, or measured mindfulness levels, to the practice itself. There is the potential here that these positive outcomes are artifacts of the information participants have learned about the benefits of mindfulness, or a result of demand characteristics, rather than the practice itself.

In order to better understand whether changes in behavioural outcomes are likely to be the result of mindfulness, research is required to test whether state mindfulness is higher after a brief mindfulness practice delivered via computer software, in a short time period, without additional information or support. Here, three experiments are reported which test the effect on state mindfulness of a 5-minute mindfulness practice versus a control, in a laboratory environment (Study 1), and via online software (Studies 2 & 3). To address the limitations of previous research as detailed above, participants are not given any information about

mindfulness practice or its effects. State mindfulness is measured before and immediately after practice to show any changes in levels of state mindfulness.

It is expected that those who completed the mindfulness exercise will report a greater increase in scores on the TMS compared to those in the control condition, suggesting an increase in state mindfulness after a 5-minute practice.

## **Experiment 1**

### **Method**

#### **Materials**

**Mindfulness Practice.** The mindfulness audio file consisted of a 5-minute mindfulness body scan, in which participants were asked to use their breath as an anchor to help focus on the present moment (adapted from Mindful, 2012). Participants were guided through focusing on the sensations in their body sequentially from foot to head. For example, “shifting attention up from there now into the torso, being aware of the back region, the chest, the abdomen” (see Appendix B). Similar body scan mindfulness techniques have been used in previous research as part of a six to eight week mindfulness course (Aikens et al., 2014; Boettcher et al., 2014; Greenberg et al., 2012; Kiken et al., 2015; Morledge et al., 2013) and in one off laboratory sessions (Cropley, Ussher, & Charitou, 2007; Jordan et al., 2014; Kramer et al., 2013; Ostafin & Kassman, 2012). The body scan practices used in previous research have typically ranged in length from 10 to 45 minutes.

Here, a 5-minute version was developed for two reasons. First, we were interested in whether as little as 5-minutes of mindfulness practice has any effect on levels of state mindfulness. Second, we were interested in developing a practice that



could be applied as practically as possible to everyday settings such as the classroom or workplace, where pausing to practice mindfulness for longer periods may not be feasible. The audio was purposefully developed excluding any mention of mindfulness. This was to try and avoid any demand characteristics in participants who may have some knowledge of the beneficial effects of mindfulness practice.

In the control condition, participants were asked to take a few deep breaths and await further instructions, there was then a 4-minute silence before these instructions were repeated and participants were able to continue the questionnaire (see Appendix B). This control condition was chosen since it allowed us to control the length of the audio files that participants were listening to, and keep the timing as similar as possible for all participants. Although Wilson et al. (2014) suggest that individuals do not like to be left with their own thoughts, even for short periods of time, the authors do also point out that those who were left with nothing to do reported a far greater amount of mind-wandering, which may also be inversely related to mindfulness (Mrazek et al., 2012). In addition, Hoptrow et al. (2016) compared a 5-minute mindfulness practice to the same type of control condition. Other research has utilised listening to audio book excerpts as a control condition (Cropley et al., 2007; Johnson et al., 2013; Kramer et al., 2013), but these are for longer periods of time than 5-minutes. We were also particularly interested in practical applications of the brief mindfulness practice, and so attempted to use a control condition that would be comparable to individuals' daily experience- for example, being at work and losing focus on the present task for a short period may involve doing nothing, but not necessarily listening to an audio book.

To ensure that all participants experienced as similar conditions as possible, the questionnaire software was programmed so that the audio files played for the full five minutes and participants were not able to move away from this page until the audio was finished. In addition, the audio files for both the mindfulness and control conditions in all studies were recorded using the same male voice to ensure consistency.

**State Mindfulness Measure.** The TMS scale (Lau et al., 2006) was presented before and after the mindfulness (vs. control) exercise (see Appendix A). All items were randomised to try and reduce the likelihood that participants recognised the questionnaire and responded based on their previous answers. All items were measured on a 5-point scale (1= not at all, 5= very much), with higher scores indicating higher levels of state mindfulness.

### **Participants and Design**

An opportunity sample of fifty-four<sup>2</sup> students (51 females, two males, and one undisclosed,  $M_{\text{age}} = 17$ , ranging from 16 to 18 years) from a local high school, attending an introductory psychology visit day at the University of Kent, took part in the study. Participation was voluntary, and no incentives were given as the students were attending demonstrations and lectures as part of the visit. The TMS was measured before and immediately after the mindfulness (vs. control) exercise. Participants were allocated randomly to either the mindfulness (N= 27) or control (N= 27) conditions, allocation was double blind so neither the participant nor the experimenters were aware which condition any participant was in.

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<sup>2</sup> The sample size was pre-determined by the number of students attending the open day who gave consent to take part.

## **Procedure**

Participants were gathered in large computer room and each seated at a computer station with headphones. Participants, were seated next to one another with no dividers between the computer stations. Participants were told that they would be asked to listen to audio files that might contain some pauses of varying lengths, but that the survey software was programmed to move to the next page when the audio had finished, so participants would be required to keep their headphones on for the duration of the study. This also ensured that participants were unaware of the length of audio, and both participants and researchers were blind as to who was in which condition.

A brief introduction to the session was given by the researchers, outlining what the participants could expect in the study and relevant ethical considerations. Once logged into the survey software, participants first received a written information sheet and were asked to indicate their consent. The TMS was then presented, followed by either the mindfulness or control audio file. After the 5-minute audio, participants were presented with the TMS again. Participants were then given a written debrief and thanked before having the opportunity to ask the researchers any questions about the study or methodology.

## **Results and Discussion**

Descriptive statistics for the TMS at time 1 and time 2 are presented in Table 1. A 2 (Condition: mindfulness vs. control) x 2 (Time: time 1, time 2) mixed ANOVA was run with Time entered as within-participants. There were 27 participants in each condition.

**Table 1.**

T1 and T2 Mean (SD) scores for the TMS by condition

	T1 TMS	T2 TMS
Mindful	2.67 (0.69)	2.87 (0.66)
Control	2.73 (0.56)	2.67 (0.78)

There were no significant main effects of Condition,  $F(1, 52) = 0.18, p = .68, \eta^2 < .01$ , or Time,  $F(1, 52) = 0.60, p = .44, \eta^2 = .01$ . The interaction of Condition x Time was non-significant,  $F(1, 52) = 2.17, p = .15, \eta^2 = .04$ .

Although differences were expected, there were some limitations in Experiment 1 which may have impacted the results. Firstly, the full TMS scale was completed by participants before and immediately after the mindfulness (vs. control) audio files. Therefore, it is possible that participants remembered questions and responses at T2 and answered in line with their T1 responses. In addition, the sample comprised of students seated in an open-plan space where there was the opportunity to distract each other, or for enhanced evaluation apprehension where peers could see whether participants had followed instructions, for example to keep their eyes closed. The results may have been weakened by extraneous methodological factors.

Experiment 2 addresses these issues by allowing participants to complete the survey in their own choice of surroundings, and by separating the TMS into two subscales and counterbalancing the order in which they were completed.

## Experiment 2

### Method

#### Participants and Design

Ninety participants recruited from Amazon's Mechanical Turk (MTurk), who were residents of the U.S.A, took part in the study in return for a small monetary payment<sup>3</sup>. This is a suitable recruitment platform as it provides a wider age range than student samples (Behrend, Sharek, Meade, & Wiebe, 2011). The survey software allocated participants randomly to either a mindfulness (N= 51) or control condition (N=39) and also randomly to complete either the decentering TMS subscale first, followed by the curiosity TMS subscale (N= 35), or the curiosity subscale first, followed by the decentering subscale (N= 55).

#### Materials and Procedure

Experiment 2 used the same materials as in Experiment 1, and the procedure differed in only two ways. First, Experiment 2 was delivered entirely online, meaning that participants were able to log in and complete the survey at any time and in any location with internet access. Second, the TMS subscales were separated and one was presented before the audio file, and the other after (presentation order was counterbalanced), meaning that participants only saw each subscale of the TMS at each time point. This was done to ensure that the questions in the TMS subscales were not in themselves weakening the effects of the intervention. Separating the

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<sup>3</sup> Due to an oversight, participant age was not recorded for Experiment 2, however owing to the restrictions in signing up to MTurk, it is assumed that all participants are aged 18 years or older.

TMS subscales provided a mechanism to reduce the chances that the wording of the questions was influencing state mindfulness.

### Results and Discussion

A 2 (Condition: mindfulness vs. control) x 2 (Presentation Order: decentered pre-audio vs. curiosity pre-audio) x 2 (TMS subscale: decentering vs. curiosity) mixed ANOVA was conducted, with TMS subscale as a within-participants factor.

There was no main effect of Presentation Order,  $F(1, 86) = 0.37, p = .54, \eta^2 < .01$ . There was no main effect of TMS subscale,  $F(1, 86) = 3.03, p = .09, \eta^2 = .03$ . There was a significant main effect of Condition,  $F(1, 86) = 9.85, p = .002, \eta^2 = .10$ , whereby overall TMS scores from the mindful condition ( $M = 3.17, SD = 1.10$ ) were significantly higher than those in the control condition ( $M = 2.61, SD = 1.06$ ). None of the two way interactions were significant, condition x presentation order:  $F(1, 86) = 0.28, p = .60, \eta^2 < .01$ ; TMS subscale x condition:  $F(1, 86) = 0.88, p = .35, \eta^2 < .01$ ; TMS subscale x presentation order:  $F(1, 86) = 2.42, p = .12, \eta^2 = .03$ . There was a significant three way interaction of Condition x Presentation Order x TMS subscale,  $F(1, 86) = 4.49, p = .04, \eta^2 = .05$ .

**Table 2.**

T1 and T2 Mean (SD) scores for TMS by condition

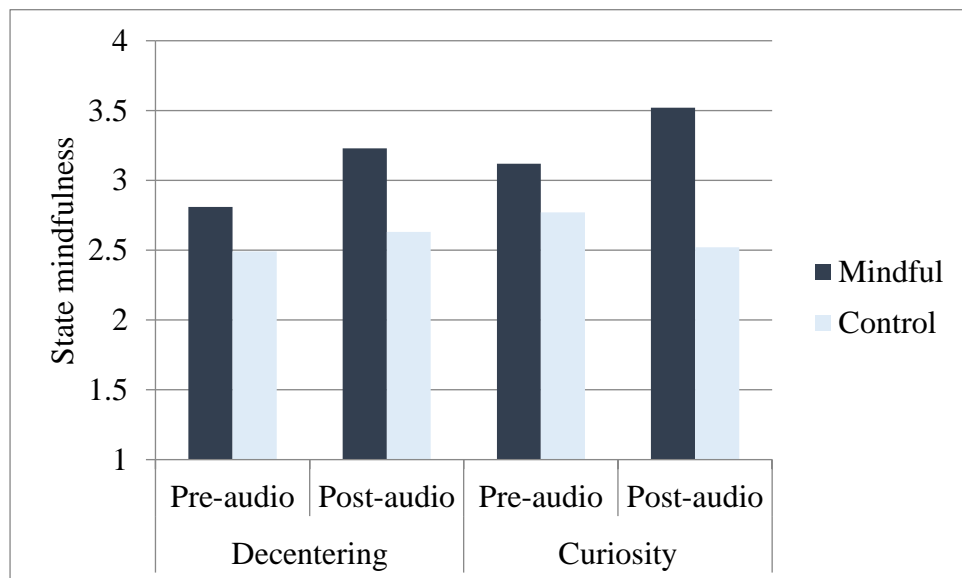
	Decentered T1	Curious T1	Decentered T2	Curious T2
Mindful	2.81 (1.12)	3.12 (1.20)	3.23 (0.74)	3.52 (0.86)
Control	2.49 (0.75)	2.79 (1.01)	2.63 (0.79)	2.52 (1.12)

#### Simple Effects Analysis

Pairwise comparisons using Bonferroni adjustments showed that participants who completed the decentering subscale first, scored significantly higher on the

curiosity subscale post-audio in the mindful condition ( $M= 3.52$ ,  $SD= 0.86$ ) than the control condition ( $M= 2.52$ ,  $SD= 1.12$ ),  $F(1, 86)= 8.21$ ,  $p = .01$ ,  $\eta^2= .09$ . This was also true for those who completed the curiosity subscale first, although the effect was slightly weaker, with scores on the decentering subscale post-audio were significantly higher in the mindful condition ( $M= 3.23$ ,  $SD= 0.74$ ) than in the control condition ( $M= 2.63$ ,  $SD= 0.79$ ),  $F(1, 86)= 6.69$ ,  $p = .01$ ,  $\eta^2= .07$ . Table 2 and Figure 1 show that the mindfulness condition did increase levels of state mindfulness compared to the control.

**Fig 1.** The effect of mindfulness condition on decentering and curiosity as a function of presentation order.



There were no significant differences across either the mindfulness or control conditions in mean scores of decentering and curiosity between the groups who completed the decentering subscale first and those who completed the curiosity subscales first (all  $p$ 's  $> .09$ ). This shows that there were no significant differences in mean levels of the two subscales between participants at pre-or post-audio, and across both mindfulness and control conditions. This suggests that the results from Study 1 were not simply the result of memorised responses.

Taken together, this supports the hypothesis that state mindfulness would be significantly increased after the brief mindfulness practice, but would not after no practice, and suggests that delivery of the mindfulness practice via the internet would be feasible. The finding that the two subscales did not differ between participants suggests that when combined, the online sample showed an increase in both curiosity and decentering. However, the separation of the two TMS subscales means that it is not possible to see the differences in scores between pre- and post-intervention in the online sample. With this in mind, Experiment 3 extends these findings by asking participants to complete the full TMS scale before, and immediately after, the condition but unlike Experiment 1 using the online methodology.

### **Experiment 3**

#### **Method**

##### **Participants and Design**

Sixty-one participants (37 male and 24 female,  $M_{\text{age}} = 33.56$ , ranging from 18 to 70 years) were recruited via MTurk. Participants were residents of the U.S.A and received a small monetary incentive for participation. The study was a 2 (Condition: mindfulness vs. control) x 2 (Time: 1, 2) mixed factor design, with Time as a within-participants factor. There were 28 participants in the control condition and 27 in the mindfulness condition.

##### **Materials and Procedure**

The same materials were used as in Experiments 1 and 2. The whole TMS was presented to participants before and immediately after the audio (as in Experiment 1) and the survey was delivered entirely online (as in Experiment 2).



## Results and Discussion

Descriptive statistics for the TMS at time 1 and time 2 are presented in Table 3. Data was analysed with a 2 (Condition: mindfulness vs. control) x 2 (Time: time 1, time 2) mixed ANOVA, with the Time as a within-participants factor.

**Table 3.**

T1 and T2 Mean (SD) scores for TMS by condition

	TMS T1	TMS T2
Mindful	3.17 (0.91)	3.49 (0.82)
Control	2.81 (0.86)	2.71 (0.96)

There was a significant main effect of Condition,  $F(1, 59) = 7.33$ ,  $p = .01$ ,  $\eta^2 = .11$ , showing that those in the mindful condition scored significantly higher on state mindfulness ( $M = 3.33$ ,  $SD = 0.82$ ) than those in the control condition ( $M = 2.76$ ,  $SD = 0.96$ ). The main effect of Time was non-significant,  $F(1, 59) = 1.78$ ,  $p = .19$ ,  $\eta^2 = .03$ . The interaction of Condition x Time was significant,  $F(1, 59) = 5.56$ ,  $p = .02$ ,  $\eta^2 = .09$ .

### Simple Effects Analysis

The simple effects (using Bonferroni adjustments) of the interaction between condition and time show that, in the control condition, there were no significant differences in the state mindfulness scores at T1 compared to T2,  $F(1, 59) = 0.55$ ,  $p = .46$ ,  $\eta^2 = .01$ . As expected, for participants in the mindfulness condition, the reported state mindfulness was significantly higher at T2 than at T1,  $F(1, 59) = 6.49$ ,  $p = .01$ ,  $\eta^2 = .10$ .

Importantly, there were no significant differences in TMS scores at T1 between the mindfulness and control conditions,  $F(1, 59) = 2.50$ ,  $p = .12$ ,  $\eta^2 = .04$ . The scores at T2 did differ between the mindfulness and control conditions,  $F(1,$

59)= 11.51,  $p = .001$ ,  $\eta^2 = .16$ . This showed that at T2 those in the mindful condition scored significantly higher on state mindfulness as measured by TMS ( $M = 3.49$ ,  $SD = 0.82$ ) than those in the control condition ( $M = 2.71$ ,  $SD = 0.96$ ).

The results from Experiment 3 extend those of Experiment 1 and Experiment 2, showing that as little as five minutes of computer-mediated mindfulness practice elicits an increase in state mindfulness.

### **General Discussion**

The current research suggests that 5-minutes of mindfulness practice is enough to elicit increases in state mindfulness, when delivered online. To our knowledge this is the first study to empirically test the use of a 5-minute mindfulness exercise in terms of changes to state mindfulness levels pre- and post-practice, and to investigate this in the context of delivering the practice online, with no other information or specialist input. A 5-minute mindfulness task has been used in previous research in the laboratory (Heppner et al., 2008; Hoptrow et al., 2016; Weger et al., 2012), however this utilised a mindful raisin eating practice. Since the purpose of this research was to empirically assess the use of computer-mediated practice, it was not possible to use the mindful raisin eating practice, and so a body scan was adapted for use as a 5-minute practice.

Previous research has shown that brief mindfulness practices have been used without measuring levels of mindfulness (Frewen et al., 2011; Friese et al., 2012; Mohan et al., 2011; Mrazek et al., 2015) or with the use of additional materials (Erismann & Roemer, 2010), thus assuming that practice leads to increased mindfulness. However, none have looked at changes to levels of mindfulness after

the use of a brief practice and whether as little as 5-minutes would be enough to elicit these changes.

Experiment 1 did not show an impact of the brief mindfulness intervention in the laboratory setting, although the trend was in the right direction. The findings from Experiments 2 and 3 suggest that this is likely to be due to the experimental conditions, the nature of the mindfulness condition being delivered in a group laboratory setting.

When the 5-minute mindfulness practice was delivered via the internet, Experiment 2 showed that there were differences in state mindfulness between a mindfulness and control condition. On refining the paradigm, Experiment 3 showed that computer-mediated mindfulness practice elicited an increase in TMS scores. This provides evidence that the use of a brief mindfulness practice with a non-clinical sample, and without any specialist input is effective in increasing levels of state mindfulness. Although a number of mindfulness practices exist that are readily available to the general population through smartphone apps and websites, this is the first study to examine whether such practices are effectively increasing state mindfulness.

The findings from the present research suggests that allowing participants to carry out interventions in their own surroundings, with greater anonymity, may be the cause of increases in the effectiveness of interventions (Beattie et al., 2009; Christensen et al., 2006) and that this is true even when the practice is very brief, and the participants are not using the practice to alleviate clinical symptoms. Taken together the studies presented in this research show that 5-minutes of mindfulness

practice effectively increase levels of state mindfulness, and that delivering practice online so that participants can practice in their own time/surroundings is effective.

Further behavioural measures were not included in the present research since previous research has suggested brief mindfulness practice has beneficial effects in social domains such as stereotype threat, social rejection, and judging others behaviour (Heppner et al., 2008; Weger et al., 2012). However, this is the first empirical investigation of whether mindfulness practice itself is increasing state mindfulness, something that previous research has assumed. However, the present findings suggest that 5-minute mindfulness practices, delivered online could be applied to different research questions, and practical contexts, and also have a positive impact on the number of individuals who can access mindfulness practice, without the requirements for costly expert training and reliance on individuals' motivation to commit to long courses.

The studies presented are not without limitations. Participants in the online samples were not asked about their chosen surroundings and were assumed to be alone at the time of practicing the mindfulness exercise. In the context for which it is thought that a brief, computer-mediated mindfulness practice would be beneficial (such as organisations or classrooms), background noise and some slight distractions in the environment are likely to be unavoidable, and may in fact increase the strength of these findings. However, future studies could ask participants the extent to which they were focused on the task or perhaps use mouse tracking to see whether participants are clicking elsewhere, perhaps viewing other webpages during the audio. In particular this could shed light on what participants are doing in the control condition, where they are left in silence for the duration of the 5-minute audio file.

Alternative control conditions may also provide greater insight into the process by which mindfulness is having an effect.

The Mindfulness Attitudes Scale (Cleirigh & Greaney, 2015) has also been used to control for participants openness to mindfulness practice, which indicates the level to which participants were willing to engage in the practice. However this relies on participants understanding what mindfulness is, which may be particularly varied depending on the context in which mindfulness is applied (Singh et al., 2008). In addition, the present research relied on self-reported levels of state mindfulness, which may also have been influenced by participants' level of understanding or contextual knowledge of mindfulness and meditation. Although Experiment 2 separated the TMS subscales to ensure participants levels of state mindfulness were not being impacted by memory of questionnaire items, future research should consider more innovative ways to measure mindfulness and also consider previous mindfulness experience.

Furthermore, splitting the TMS into its subscales may, in itself, have been problematic. Decentering and curiosity, as facets of mindfulness, could be measuring different features of mindful attention and thus are both dependent variables. Therefore presenting one subscale before and one after the mindfulness manipulation may not have shown a true reflection of the increase in mindfulness levels. A better approach may be to randomly split the TMS scale so as to keep a mixture of decentering and curiosity questions in both pre- and post- measures. This would also buffer any learning/memory effects because participants would not see the same questions at both time points.

Age is another factor to consider since Cavanagh et al. (2013) point out that the privacy and anonymity of online practice is particularly appealing to younger individuals. This is pertinent to the sample in Study 1, since anonymity was reduced by the fact that although the practice was individual, they were still sat in a large open room amongst peers. Participants in Experiments 2 and 3 were generally older than those in Experiment 1, so future research could consider the use of the online mindfulness practice with a younger sample. However, age was not a key factor in the current research and despite the possible limitations of the younger sample, the findings support the notion that a 5-minute, computer-mediated mindfulness exercise, with no practitioner input increased participants' state mindfulness.

In conclusion, the current research addresses an important gap in the current literature on mindfulness. That is, empirically measuring changes to state mindfulness and testing the effectiveness of a brief mindfulness practice. The studies presented show that as little as 5-minutes of mindfulness is enough to elicit increased state mindfulness. In addition, in the context of computer-mediated practice, the 5-minute mindfulness practice can be delivered effectively with no specialist input, and is effective when delivered online where the participant is able to choose their own surroundings to carry out the practice. This has implications for being able to apply mindfulness into individuals' daily lives. A 5-minute practice can be used alone to increase state mindfulness, without the additional time and resources that mindfulness courses require. The next step is to investigate whether this brief practice has positive behavioural outcomes, in the same way that mindfulness courses can have.

## **Chapter 5: Mindfulness and the Correspondence Bias**

### **Chapter Summary**

In Chapter 4, three experiments showed that as little as 5-minutes of mindfulness practice, delivered online, can increase levels of state mindfulness. This chapter presents one experiment that aims to address three key limitations identified in the previous studies. Namely, using a mindful eating task to test whether the effects in Experiments 1-3 were unique to the body scan practice, comparing the mindfulness and control conditions to an attention to detail condition to investigate whether mindfulness is merely increasing attention, and including an attitude-attribution task to investigate the effect of mindfulness on the correspondence bias as an outcome measure. The results of Experiment 4<sup>4</sup> showed that the mindful eating task did increase participants' levels of state mindfulness, and that mindfulness had a unique attenuating effect on the correspondence bias that was not found in the attention to detail or control conditions.

### **Mindfulness and the Correspondence Bias**

The correspondence bias (CB) is the tendency to make correspondent dispositional inferences about an individual's behaviour, even when the behaviour is highly, if not completely, constrained by situational factors (Gawronski, 2004; Gilbert & Malone, 1995). In trying to increase our understanding of the behaviour of others, and increase the ability to predict future instances of behaviours, we are often forced to infer intangible aspects of individuals, such as beliefs, intentions and

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<sup>4</sup> This study forms part of a manuscript accepted for publication. Hoptrow, T., Hooper, N., Mahmood, L., Meier, B., & Weger, U. (2016). Mindfulness Reduces the Correspondence Bias. *Quarterly Journal of Experimental Psychology*

desires, from visible aspects of their person (e.g. language or actions) (Gilbert & Malone, 1995). However, this is prone to perceptual mistakes. Especially since the least cognitively demanding way to infer behaviour is to rely on pre-existing schemas and automatic associations. This means that individuals have quickly accessible mental short cuts to help organise and make sense of an otherwise overwhelming amount of incoming sensory information (Van Bavel & Cunningham, 2008), but do not give effortful thought and attention to the details of the wider context of the others behaviour.

When observing the behaviour of others, it is often concluded that the person who performed the behaviour is predisposed to do so. In other words, the person is how they behave. Therefore, encountering a person who drives fast, passing through a red light, we may think that s/he is reckless and ignorant of other road users, rather than rushing to get to hospital in an emergency situation. Although this occurs in ambiguous situations, it is also prevalent in situations when logical analysis of the situation would suggest the behaviour is not dispositional (Gilbert & Malone, 1995) and is constrained by the situation (Jones & Harris, 1967). Gawronski (2004) argues that situational factors have low salience, particularly for invisible factors such as social roles or psychological elements, and thus perceivers may not be aware of the magnitude of the impact they have on behaviour. Logically then, when aware of situational factors, perceivers should correct attributional biases before making person judgements. The fact is that perceivers do not. The correspondence bias is a replicable and pervasive finding in social psychology, and has been found to generalise to the U.S. population (Bauman & Skitka, 2010).



Using the attitude-attribution paradigm, Jones and Harris (1967) showed a consistent finding of dispositional causal inference, even when the situational factors were made salient to participants, and when they acknowledged them. The experiments required participants to read an essay either in support of, or opposed to, a topic on which participants were expected to have strong opinions (Castro's Cuba and Segregation in the US), and for which participants would expect another person to hold certain views (e.g. that an American citizen would be anti-Castro, or that someone from a Southern state would be more in favour of segregation than someone from a Northern state). Participants were told that the writer of the essay was either assigned by an authority figure, or was free to choose their position. The findings consistently showed that whilst participants were aware of the choice conditions and held expectations of the essay writer, there was still a tendency to attribute the attitude of the essay writer dispositionally, ignoring the influence of situational factors (Jones & Harris, 1967).

Furthermore, Snyder and Jones (1974) investigated whether such effects were artefacts of the essay having been written by the researchers (e.g. high persuasiveness). Yet, even when participants wrote essays themselves, assigned by the researcher, and then subsequently evaluated essays written by another participant, (i.e. they followed the instructions themselves first, and then evaluated another person who had done the same task, increasing the salience of the situational information) the correspondence bias remained. It was expected that under conditions of free choice participants who chose a certain view would be more likely to hold that view, and thus attribution of their attitude to disposition is expected. However, a consistent finding in attribution research, is that even when participants

are fully aware that the writer had no choice in their position, they still tend to attribute their attitude to dispositions, and ignore the situational constraints.

A possible reason for this is the false consensus effect (Ross et al., 1977). This theory postulates that perceivers view their own opinions on a subject as relatively common among their peers, and this perception of commonness can influence their attributions of others. This would suggest that perceivers use their own views on a topic as a measure of the views of others, which suggests a disposition in the other, compared to a situational influence in the self. That is, the tendency to attribute our own behaviour to situations, but attribute the behaviour of others to stable dispositions. Ross et al. (1977) argued that attitude-attribution biases may, in part, be the cause of perceivers' misconceptions about the degree to which their own response aligns with the response of peers. Therefore consensus estimates can be used as covariates to assess whether perceivers own opinion influences their ratings of the target.

Alternative factors that may influence the correspondence bias include perspective taking, and orientation of attention. Perspective taking is defined as adopting another person's viewpoint (Davis, 1983; Parker, Axtell, Academy, Dec, & Parker, 2001). Instructions to take the perspective of another, or perspective taking training have been shown to reduce the Fundamental Attribution Error (FAE), another form of attribution bias (Galper, 1976; Hooper, Erdogan, Keen, Lawton, & Mchugh, 2015b). This is thought to be the result of perspective taking increasing empathy for the other (Regan & Totten, 1975) and increasing self-other overlap, so that the views of the target are seen as closer representations of one's own thoughts, feelings or behaviours (Davis, Conklin, Smith, & Luce, 1996). Thus, in line with the

false consensus effect, perceivers would be expected to make more situational inferences with increased perspective taking. Perspective taking is thought to increase the salience of situational factors, increasing the likelihood that participants will correct for situational factors, and thus reduce the correspondence bias (Storms, 1973). Additionally, mindfulness is closely linked with empathy, in particular the ability to see another perspective (Block-Lerner et al., 2007), so increased mindfulness could have the potential to more easily take another perspective, and in turn reduce attribution error.

Attention may alter the occurrence of the correspondence bias. In particular, three cognitive networks of attention; alerting, orienting, and conflict monitoring (Posner & Petersen, 1989) have been shown to vary with mindfulness experience and/or practice (Jha et al., 2007). For example, experienced meditators show enhanced conflict monitoring at baseline. That is, the ability to prioritise among competing tasks. Experienced meditators also showed enhanced alerting after a mindfulness retreat, that is, the ability to achieve and maintain alertness. On the other hand, naïve meditators showed an increase in orienting after an MBSR course, which is the process of directing attention to specific inputs (Jha et al., 2007). Importantly, this finding suggests that after mindfulness practice naïve meditators should be able to focus their attention on specific inputs, which in turn means that they may be better able to attend to the situational information after practice.

Voluntary attention- guided by goals or explicit instructions (such as in this experiment) – can be used to improve behavioural accuracy (Maclean et al., 2010) and can be directed to various moments in time (Correa, Lupianez, Madrid, & Tudela, 2006). This type of attention requires sustained focus, which is limited and

leads to vigilance decrement (Maclean et al., 2010). With this in mind, mindfulness and attention to detail both involve sustained focus on a particular feature (i.e. breath or task) but may lead to different behavioural outcomes.

There is evidence to suggest that mindfulness practice might be beneficial to cognitive performance, freeing up space in working memory to allow for further cognitive processing (Mrazek et al., 2013) and reducing emotional reactivity (Arch & Craske, 2006). In addition, mindfulness practice may alter individuals' attention (Semple, 2010; Tang et al., 2007) and increase the ability to focus ones attention on a single task (Valentine & Sweet, 1999). On the other hand, attentional control (the ability to focus attention, avoid distraction and switch attentional focus) has been shown to predict trait mindfulness (Walsh, Balint, Smolira, Fredericksen, & Madsen, 2009). To our knowledge, the nature of the relationship between state mindfulness and attention is yet to be empirically tested. However, Valentine and Sweet (1999) suggest that the effects of mindfulness on changes to awareness and affect are distinct from other types of attentional focus.

A possible explanation of this may be that mindfulness does not merely increase an individual's focus on the details of a situation, but in fact increases their awareness of the content of it. Since mindfulness is specifically an intentional focus on the present moment, it is possible that those in a mindful state are better able to consider all aspects of the person-situation context more deliberately than automatically, reducing the likelihood of committing the CB. In contrast, being instructed to pay attention to the task may increase efficiency in absorbing the details of the situation, but have little to no effect on the automaticity of responding to contextual information and thus still cause the individual to commit the CB.

This would then suggest that whilst mindfulness and paying attention to detail in a task might both make individuals more attentive to the details of a subsequent task, any behavioural outcomes may be affected differently by the two processes. In Experiment 4, this may mean that in both conditions the participants will be more aware of the particulars of the task (such as the detail that the essay writer had no choice), but will respond differently in evaluating the essay writer. In order to test this hypothesis, we compared mindfulness to attention to detail.

In the control condition, a larger difference in the rating of the writer's attitude toward nuclear power between 'for' and 'against' positions was expected, with the difference in the mindfulness condition being significantly reduced. Importantly, it was further expected that the attention to detail condition would show similar results to the control condition, showing the unique influence of mindful attention. Therefore, a significant interaction between condition and essay position was expected.

## **Experiment 4**

### **Method**

#### **Participants and design**

Participants were an opportunity sample of 187 undergraduates at the University of Kent who were taking part in the experiment in return for course credit. Nineteen participants were removed from the original data set. One participant reported having not heard the 5-minute audio file, four were removed for having failed embedded attention checks throughout the questionnaire and 14 were removed for scoring more than 2SD from the mean number of arrows reported on the

attention to detail task. This left 169 participants (141 female and 28 male,  $M_{\text{age}} = 19.27$ , ranging from 18 to 42 years) in the analysis.

The experiment involved a 2 (Essay Position: for vs. against nuclear power) x 3 (Condition: mindfulness vs. attention to detail vs. control) between participants design, and participants were randomly assigned to condition via the survey software. These were either a mindfulness (N= 61), control (N=61), or attention to detail (N= 47) condition, and either for (N= 81) or against (N=88) essay position.

## **Materials**

**Mindfulness practice.** Mindfulness was manipulated using a 5-minute mindful eating raisin task via a pre-recorded audio file (see Appendix C). Experiments 1-3 in Chapter 4 showed that 5-minutes of mindfulness practice successfully induced a state of mindfulness, using a mindful body scan exercise. Part of the aim of using the mindful eating task in this experiment is to test whether the effects are unique to the body scan, or whether other 5-minute mindfulness tasks can also be effective. The raisin task has been used successfully in previous research to induce a state of mindfulness (e.g. Heppner et al., 2008; Jordan et al., 2014; Ostafin & Kassman, 2012; Weger, Hooper, Meier, & Hopthrow, 2012). Participants are asked to eat two raisins over the 5-minute period, paying attention to particular sensations and experiences while doing so. Participants were first asked to pick up a raisin, feel its texture, and hold the raisin for a few moments to take in the smell, shapes and contours of the raisin. They were then asked to hold the raisin in their mouth to feel the texture on their tongue before biting into the raisin to experience the sensations of flavour and physiological response such as salivation. The

instructions guide participants through eating the first raisin, and then allow a further few minutes for participants to do the practice again unguided.

**Control condition.** In the control condition, participants were merely asked to eat two raisins over the period of five minutes, with no other instructions. The instruction to eat a raisin was given at the start, and then again after 4-minutes (see Appendix C).

**Attention to detail.** The attention to detail task asked participants to count the number of arrows in a particular orientation, within a grid of 228 arrows (e.g. see Appendix D), which was repeated over five trials. To ensure consistency with the other conditions, participants were also given the audio instruction to eat a raisin before the first trial and then again before trial four. Each trial lasted approximately 50-seconds, with 10 seconds to input an answer, ensuring the attention to detail task lasted 5-minutes, in line with the other audio files. All audio instructions were recorded using the same male voice to ensure consistency. Participants who scored more than 2SD from the mean number of arrows reported were excluded from the final analysis (N=14).

**Attitude-Attribution paradigm.** The correspondence bias was assessed using a task adapted from the attitude-attribution paradigm developed by Jones and Harris (1967). Participants read a paragraph in favour or opposed to the use of nuclear power (see Appendix E). Before reading the paragraph, participants were given written instructions that explicitly stated that the writer of the paragraph was assigned to the position by coin flip (i.e. not freely chosen) as part of a class.

### Dependent measures

**Correspondence Bias.** A single item assessed the correspondence bias.

Participants were asked “To what extent does the writer favour or oppose the use of nuclear power?” This was measured on a 7-point scale (1 = ‘*very opposed*’ to 7 = ‘*very favourable*’). In terms of participants rating the writer’s attitude, scores closer to the scale endpoints were seen as indicative of the classic correspondence bias finding (Jones & Harris, 1967).

Participants were asked their own views on the use of nuclear power (“To what degree do you favour or oppose the use of nuclear power?”) since individuals tend to attribute their own personal views to social targets, known as the false consensus effect (McArthur, 1972; Moore & Kim, 2003). This was answered on a 7-point scale (1 = very opposed, 7 = very favourable), see Appendix F.

**Perspective taking.** The nine-item perspective taking scale (taken from the Empathy Scale; Davis, 1980) was used to measure the extent to which participants were able to take the perspective of another person (see Appendix G). Questions such as “I believe that there are two sides to every question and try to look at them both” and “When I’m upset at someone, I usually try to “put myself in his shoes” for a while” were measured on a 7-point scale (1 = ‘*does not describe me well*’, 7 = ‘*describes me very well*’). Higher scores therefore reflect a greater ability to take the perspective of another person,  $\alpha = .76$  (M= 5.02, SD= 0.91).

**State mindfulness.** The TMS scale (Lau et al., 2006), was used as in Chapter 4, Experiments 1-3. Questionnaire items were randomised and all items were measured on a 5-point scale (1 = not at all, 5 = very much), with higher scores indicating higher levels of state mindfulness,  $\alpha = .92$  (M= 2.53, SD= 0.77).



**Embedded Attention Checks.** A single item was embedded within the perspective taking scale to test whether participants were paying attention to the questions and instructions (see Appendix F). This item read “I am paying attention to this questionnaire- select only 'strongly agree'”. Therefore any participants who failed to notice the instruction and selected a response other than strongly agree were excluded from the analysis (N= 4).

### **Procedure**

Participants were gathered in a large computer room and each seated at a computer station with headphones, and two raisins. The room was open, and computer stations were not separated with dividing partitions. A brief introduction to the session was given by the researchers, outlining what the participants could expect in the experiment and some ethical considerations, such as the right to withdraw. Participants were told that they would be asked to listen to audio files that might contain some pauses of varying lengths, but that the survey software was programmed to move to the next page when the audio had finished, so participants would be required to keep their headphones on for the duration of the experiment. This also ensured that participants were unaware of the length of audio, and both participants and researchers were blind as to who was in which condition.

Once logged into the survey software, participants first received a written information sheet and were asked to indicate their consent. The start of each recording asked participants to pick up or eat a raisin. Those assigned to the mindfulness condition received their 5-minute mindful eating instructions, whilst those assigned to the attention to detail task completed the five trials and those in the control condition just ate two raisins either side of a 4 minute silence. After the five

minute audio, participants completed the dependent measures and were then debriefed and thanked.

## Results and Discussion

### State mindfulness manipulation check

A one-way ANOVA showed that there was a significant difference in levels of state mindfulness between the conditions,  $F(2, 168) = 3.64, p = .03$ . See Table 4 for descriptive statistics. Post-hoc analysis using Bonferroni adjustments showed that participants in the mindfulness condition reported significantly higher levels of state mindfulness than those in the control condition,  $p = .03$ . There was no significant difference in levels of state mindfulness between those in the mindfulness condition compared to the attention to detail condition,  $p = .51$ , or those in the control condition compared to the attention to detail condition,  $p = .77$ . Although the difference between the attention to detail condition and both mindfulness and control conditions was non-significant, the pattern of means is in the expected direction, with those in the mindfulness condition exhibiting the highest levels of state mindfulness.

**Table 4.**

Mean (SD) of TMS scores by condition

	TMS Mean (SD)
Mindfulness	2.62 (0.80)
Attention to detail	2.41 (0.72)
Control	2.23 (0.91)

### Correspondence bias

A 3 (Condition: Mindfulness vs. Control vs. Attention) x 2 (Essay: For vs. Against nuclear power) ANCOVA was conducted on the degree to which participants considered the writer to be 'for' or 'against' nuclear power, with participants' own view as a covariate. Table 5 shows the means. The main effect of mindfulness condition was not significant,  $F(2, 161) = 1.04, p = .34, \eta^2 = .01$ . The covariate of participants own view was significant,  $F(1, 161) = 10.76, p = .001, \eta^2 = .06$ , and the main effect of essay position was significant,  $F(1, 161) = 330.40, p < .001, \eta^2 = .67$ . The participants who read an essay in favour of nuclear power considered the writer to be more in favour of nuclear power ( $M = 5.88, SD = 1.36$ ) than participants who read the essay opposing nuclear power ( $M = 1.75, SD = 1.32$ ). In support of the hypothesis, there was a significant interaction between condition and essay position,  $F(2, 161) = 3.07, p = .05, \eta^2 = .04$ . As shown in Table 5, the interaction revealed that mindfulness attenuated the CB, whereby the difference in ratings was smaller in the mindfulness condition (3.70) than in both the control (4.15) and attention conditions (4.78).

In order to investigate whether this effect was attributed to a unique aspect of mindfulness, rather than merely increasing attention, a second analysis was carried out, removing participants in the control condition. A 2 (Condition: Mindfulness vs. Attention) x 2 (Essay: For vs. Against nuclear power) ANCOVA was conducted, with participant's own view as a covariate. The main effect of condition was not significant,  $F(1, 103) = 0.83, p = .37, \eta^2 = .01$ . The covariate of participants own view was significant,  $F(1, 103) = 5.22, p = .02, \eta^2 = .05$ , and the main effect of essay position was significant,  $F(1, 103) = 236.70, p < .001, \eta^2 = .70$ . The participants who

read an essay in favour of nuclear power considered the writer to be more in favour of nuclear power ( $M= 6.00$ ,  $SD= 1.09$ ) than participants who read the essay opposing nuclear power ( $M= 1.83$ ,  $SD= 1.42$ ). Most importantly, there was a significant interaction between condition and essay position,  $F(1, 103)= 6.19$ ,  $p = .01$ ,  $\eta^2= .06$ . This showed that the difference in the mindfulness condition was significantly smaller than the difference in the attention to detail condition, suggesting that the judgements of the writer's position were less extreme after the mindfulness task.

**Table 5.**

*Means (SD) for participants' judgements of the essay writer's opinion on the use of nuclear power.*

	Mindfulness	Control	Attention
For	5.64 (1.04)	5.71 (1.66)	6.45 (1.00)
Against	1.94 (1.53)	1.56 (1.00)	1.67 (1.27)
Difference	3.70	4.15	4.78

### **Perspective taking**

A 2(Essay: for vs. against) x 3 (Condition: mindfulness vs. control vs. attention to detail) ANOVA was conducted on perspective taking. The main effect of condition was not significant,  $F(2, 163)= 0.24$ ,  $p = .79$ ,  $\eta^2 < .01$ . The main effect of essay position was not significant,  $F(1, 163)= 0.36$ ,  $p = .55$ ,  $\eta^2 < .01$ . The interaction of mindfulness x essay position was not significant,  $F(2, 163)= 1.17$ ,  $p = .31$ ,  $\eta^2 = .01$ .

Previous research suggests that perspective taking can increase the salience of situational factors, increasing the likelihood that participants will correct for situational factors, and thus reduce the correspondence bias (Storms, 1973). Therefore, perspective taking was added as a covariate in analysing the extent that participants committed the correspondence bias.

A 2(Essay: for vs. against) x 3 (Condition: mindfulness vs. control vs. attention to detail) ANCOVA was conducted with perspective taking as a covariate. The main effect of condition was not significant,  $F(2, 162) = 1.45$ ,  $p = .24$ ,  $\eta^2 = .02$ . The covariate was not significant,  $F(1, 162) = 1.21$ ,  $p = .27$ ,  $\eta^2 = .01$ . There was a significant main effect of essay position,  $F(1, 162) = 408.49$ ,  $p < .001$ ,  $\eta^2 = .72$ . The interaction of Condition x Essay position did not reach significance,  $F(2, 162) = 1.96$ ,  $p = .14$ ,  $\eta^2 = .02$ , but the means showed a trend that suggests a possible reduction in correspondence bias in the mindfulness compared to the control and attention to detail conditions. In line with the attitude-attribution paradigm, the difference score was lower in the mindfulness condition compared to the control and attention to detail conditions, suggesting that perspective taking may require further investigation.

**Table 6.**

Means (SD) for participants' judgements of the essay writer's opinion on the use of nuclear power with perspective taking as a covariate

	Mindfulness	Control	Attention
For	5.66 (1.02)	5.69 (1.61)	6.46 (1.45)
Against	1.92 (1.53)	1.57 (1.31)	1.68 (1.54)
Difference	3.74	4.12	4.78

## Discussion

Experiment 4 addressed some of the key limitations arising from Experiments 1-3 in Chapter 4. First, the use of a different mindfulness induction showed that 5-minutes of mindful eating was effective in increasing state mindfulness compared to the control condition, but not the attention to detail condition. Second, whilst the difference in state mindfulness between mindful and attention conditions was not significant, the results did show a difference in

correspondence bias between these two conditions, showing that effects were not the result of increased attention to detail. Finally, the inclusion of a behavioural outcome measure highlights the application of a brief mindfulness practice for social judgements. The results showed that mindfulness practice reduced the correspondence bias in relation to a control condition and an attention to detail task, when accounting for the false consensus effect. The results suggest that mindfulness alters the correspondence bias in a way that is qualitatively different from simply sustained attention, which may suggest that mindfulness does not merely increase awareness of the situational factors in the essays.

Snyder and Jones (1974) found that when students were asked to write their own essays on a topic for an attitude-attribution task and then swap them with another participant, they still made correspondent dispositional inferences. That is the correspondence bias persisted. Snyder and Jones argue that students employed a tactic of writing what they believed, regardless of their assigned position, and then assuming that the other essay writer had done the same, and therefore the essay reflected their true attitude. Although the essay topic might not have aligned with personal attitude, students attribute the essay to situational factors- the writer had no choice- but do not afford the other writer the same attribution. In attribution, there is a tendency to attribute our own successes to disposition (effort, ability) and our own failures to situations (bad luck, fate) (Bernstein, Stephan, & Davis, 1979), especially depending on the locus of control of the outcome (Weiner, 1985).

In addition, attributions are often based on moral culpability, or whether the person should have behaved in a certain way. This leads to holding the person responsible for a bad outcome, but attributing a positive outcome to luck or chance

(Griffin, 1994). Therefore, the correspondence bias should be more evident when the essay matches the students' own opinion. In Experiment 4 this effect was present in the control and attention conditions, but was attenuated in the mindfulness condition. This means that after the mindfulness induction, participants were less extreme in their judgements of the essay writer, and were less likely to assume the writers' disposition aligned with their essay, despite their own views.

When accounting for participants' perspective taking, the interaction of Condition x Essay position did not reach significance. The difference in means were in the expected direction though, showing a reduction in the correspondence bias. Although perspective taking is considered to influence the prevalence of attribution error (Hooper et al., 2015b), the results from Experiment 4 showed that including perspective taking as a covariate did not have a significant effect on the CB. In addition, there was no significant effect of Condition or Essay position on participants' perspective taking ability. The simple effects analysis showed that for mindfulness the effect approached significance, whereby participants' perspective taking ability was higher when they read the essay 'against' nuclear power than 'for' nuclear power.

A possible explanation for non-significant effects on perspective taking is that the participants were unable to consider the essay writers perspective with such limited information about the writer. The essay content is that it is assumed to give away the writer's opinion (Snyder & Jones, 1974), however there are contextual details that are not given in the instructions used for the present experiment. For example, the instructions are fairly ambiguous and tell participants that the writer was assigned to their essay position via coin flip in a class. It does not suggest

whether they were given time to research the topic, what the writers own views were or whether their essay was marked or evaluated. This may have led to the construal problem (Gilbert & Malone, 1995), where the participant is unable to see the other perspective because they cannot imagine what the situation would have been like for the essay writer. This theory postulates that the observer (participant) cannot understand that they may hold additional information that the actor (essay writer) did not have. For example, once people know the solution to a difficult problem they are instantly unable to appreciate how difficult the problem would be for someone who did not know the solution (Fischhoff et al., 1975).

Alternatively, nuclear power may not have evoked a particularly strong response from participants about the essay writer, or the participants may not have had particularly strong opinions or knowledge of the subject before reading the essays. Perspective taking stems from increased empathy for another person's point of view (Regan & Totten, 1975) and increases self-other overlap (Davis et al., 1996). The essay content in the present experiment was described as being allocated to the essay writer (no choice), and so if mindfulness made this fact more prominent to participants it may have been more difficult to consider it their point of view or relate to their opinions since there were no consequences for the writer, nor were the opinions necessarily in line with their actual views. Furthermore, the essay content could then have had a stronger impact on their knowledge of nuclear power use, than on their opinions of the essay writer. Gawronski (2003) found that assigned counter attitudinal essays were expected to be less persuasive, but that a highly persuasive essay was taken as an indicator of disposition. This suggests that the perceived persuasiveness of the essay could also influence participants' attribution judgements. Perspective taking, in relation to mindfulness and attributions, requires further



investigation, and therefore Experiment 5 uses a scenario ostensibly written by a person who is struggling to get a job. This may be a situation in which participants would more easily be able to imagine themselves in, and thus may be more able to consider their perspective.

Whilst this shows a positive impact of mindfulness for reducing the correspondence bias, the process by which this happens remains unclear. One possible explanation for these results is an increase in cognitive capacity. Cognitive capacity has been found to underlie the occurrence of the CB (Gilbert, 1989; Trope & Gaunt, 2000; Weary et al., 2006). In addition, mindfulness has been shown to enhance cognitive processes, including working memory and executive functioning (Zeidan, Johnson, Diamond, David, & Goolkasian, 2010), as well as attention (Jha et al., 2007).

These particular aspects of cognitive function are important in two ways. First, if mindfulness enhances working memory, then the negative effect of cognitive load on the correspondence bias could have been reduced after mindfulness practice. In this respect, mindfulness may have allowed deeper processing of the information provided to access schemas for the situational factors, rather than relying on the automatically accessible schemas relating to dispositional judgement. This would allow participants to simultaneously attend to multiple pieces of information in working memory (Paas, Renkel, & Sweller, 2003), potentially avoiding the need to discount the effortful process of attending to situational information. Second, enhanced attention may have encouraged participants to use all of the available, relevant information when informing their judgement of the target, which may have meant that the situational instruction was more salient (Trope & Gaunt, 2000). This

would be easier under conditions of enhanced working memory, since the relevant pieces of information can be stored in an active and quickly retrievable state (Engle, 2002), and may suggest an explanation for why the correspondence bias was not attenuated in the attention to detail task.

In sum, the results from Experiment 4 support the use of a 5-minute mindfulness task, and suggest that mindfulness attenuates the correspondence bias, an effect that is not achieved in control and attention to detail conditions. The inclusion of perspective taking did not result in significant changes in the dependent variables, but is worth further examination. The limitations of the present experiment, specifically the use of the essay in the attitude-attribution paradigm will be addressed in Experiments 5 and 6. A different form of attribution bias will be evaluated, using a scenario that it is expected that participants will be able to relate to more easily, and thus may elicit perspective taking. An intergroup element will be added to test the effect of mindfulness on attribution error in relation to ingroup vs. outgroup members.

## **Chapter 6: Mindfulness, Attributions and Perspective taking**

### **Chapter Summary**

This chapter presents two experiments in which the online mindfulness practice was applied to a different attribution task, the fundamental attribution error. In addition, the experiments presented in this chapter tested the impact of perspective taking on the relationship between mindfulness and the fundamental attribution error. Experiment 5 showed that mindfulness attenuated the tendency to commit the FAE. Experiment 6 revealed a complex relationship between mindfulness, perspective taking and group membership. The results showed that in the control condition, participants who considered the other perspective were equally likely to commit the fundamental attribution error, regardless of the target's group membership. On the other hand, for those considering their own perspective, the target's group membership influenced the likelihood of making the fundamental attribution error. The opposite pattern of results was observed for participants in the mindful condition where those who read the scenario from their own perspective were equally likely to commit the fundamental attribution error, regardless of group membership. However, considering the other perspective led to participants making the fundamental attribution error for the outgroup target but not for the ingroup target. These findings are discussed in relation to theory in the general discussion.

### **Mindfulness, Attributions and Perspective taking**

Being able to dis-identify from thoughts and emotions may suggest that mindfulness could be useful in reducing reliance on pre-learned information and automatic responding through dis-identification with pre-existing schema, thus

reducing the propensity for attribution errors. For example, mindfulness has been shown to reduce implicit age and race bias as measured by IAT (Lueke & Gibson, 2015), weaken the relationship between automatic alcohol motivation and drinking behaviour (Ostafin, Bauer, & Myxter, 2012; Ostafin & Marlatt, 2008), reduce uncontrolled eating (Jordan et al., 2014), and improve insight problem solving (Ostafin & Kassman, 2012). An important theoretical framework in the field of social judgement is attribution theory. The studies presented in this chapter test whether mindfulness can attenuate attribution bias in social judgement.

Attribution is the process of making inferences based on categorisation, stereotypes, and automatic processing (e.g. Bruner, 1957). The behaviour of individuals becomes associated with a causal locus, which helps to attribute the causes and consequences of behaviours based on quickly accessible schemas. Judging and categorising occurs via the process that requires least effort (heuristics and stereotypes; Kahneman & Frederick, 2002) and thus may be linked to mindlessness (Langer et al., 1978). With this in mind, Experiment 5 aims to test whether inducing mindfulness through a brief body scan exercise will reduce participants' propensity to attribute blame to an individual for a situation in which there may be a number of other possible causes. That is, to reduce the fundamental attribution error.

### **Attribution Errors**

Heider's (1958) Fundamental Attribution Error (FAE), suggests that individuals have a tendency to underestimate or ignore the impact of situational (environmental) factors and overestimate the role of dispositions in controlling behaviour. This also extends to groups (Allison & Messick, 1985), where individuals

have the tendency to infer the attitudes of an entire social group based on individual group members' behaviour. For example, Allison and Messick (1985) found that individuals tend to assume that the attitudes of group members primarily influence the group's decision-making, ignoring the impact of decision-making rules and group norms. A particularly important distinction that Allison and Messick (1985) made was that this effect was amplified for outgroups compared to ingroups, and in particular, for negative events. This means that not only can causal evaluations towards groups in general be misattributed, but when evaluating an outgroup member's behaviour, attitudes may be even more skewed towards dispositional attributions and individual blame, especially when the behaviour is negative. Furthermore, that outgroups are perceived to be more homogenous and therefore, group members behaviour is attributed more similarly than for ingroup members (Quattrone & Jones, 1980).

The group attribution error is relevant to our understanding of prejudice, and how individuals evaluate members of ingroups and outgroups, as well as global evaluations of groups (Corneille, Yzerbyt, Rogier, & Buidin, 2001; Pettigrew, 1979). The process of separating and categorising human groups is enough to trigger the psychological processes that lead to intergroup prejudice (Allport, 1979). Therefore, the attributions made to members of outgroups compared to ingroups is likely to be motivated by different factors. For example, race affects categorisation within milliseconds (Ito & Urland, 2003). As race is highly salient, race categorisation is difficult to suppress (Park & Rothbart, 1982). Attempts to suppress racial bias often lead to mental exhaustion (Richeson & Shelton, 2003) and an increased use of stereotypes (Macrae, Bodenhausen, et al., 1994) creating a loop in behaviour whereby trying to reduce reliance on heuristics about race, actually increases the use

of heuristics. Race is also a visually salient category, for example, Black vs. White skin colour, which means race is often used to denote category membership before other cues.

### **Group membership**

Race is a particularly pervasive intergroup category that informs attributions. For example, Duncan (1976) questioned whether individuals would attach more or less weight to dispositions than situational factors when attributing the behaviour of Black and White others. The results showed that White participants labelled an ambiguous 'shove' more violent when performed by a Black person than when performed by a White person. Situation attributions were preferred when the perpetrator was White, and personal/dispositional attributions were used when the perpetrator was Black, suggesting that violence was more accessible when thinking about a Black than a White perpetrator. In part, attributing an ambiguous act by an ingroup member to situational factors serves to protect the ingroup identity, thus protecting the individual's sense of self. On the other hand, associations between racial groups and certain behaviours, for example Black men and a propensity for violence, implicit association of Black faces with negative words (more so than White faces and with positive words) (Cunningham, Preacher, & Banaji, 2001; Van Bavel & Cunningham, 2008) or more intense anger (compared to the same face categorised as White) (Hutchings & Haddock, 2008) are automatic and well-established (Quillian & Pager, 2001).

Similar effects have also been shown to pervade organisational and personnel decision-making. Selection decisions are notoriously uncertain, and are made with very limited information, thus relying heavily on stereotypes and pre-existing

categories. Negative stereotypes about racial groups may bias the selection process. For example, King, Madera, Hebl, Knight, & Mendoza (2006) found that occupational stereotyping, a preconceived attitude about a particular occupation or people employed in that occupation (Lipton, O'Connor, Terry, & Bellamy, 1991, p.129) mediated the relationship between race and evaluations of job applicants. Black applicants were evaluated the least positively, and did not benefit from a better quality resume as much as White applicants did. For low quality resume's, Black applicants were judged the most suitable for low status jobs. This further emphasises how the automatic associations between a group and certain behaviours or contexts can have detrimental consequences for members of that group.

Furthermore, attributions about racial groups have been shown to affect perceptions of responsibility for natural disasters (Ben-Porath & Shaker, 2010) and influence self-reported racial bias in political contexts (Gomez, Carolina, Wilson, & Methodist, 2006). Modern racism theory encompasses why automatic associations can lead to minority racial groups facing bias in organisational settings (e.g. Brief, Dietz, Cohen, Pugh, & Vaslow, 2000). It postulates that racism against minority groups still exists but is unrecognisable because it is more subtle than traditional forms of racism and therefore influences decisions such as personnel selection by devaluing the high credentials of racial minorities. This poses difficulties in trying to reduce bias in personnel decision-making since the process is both automatic and unrecognisable as discrimination. It is therefore not possible to examine the nature of bias based on overt prejudices. In addition, the social undesirability of prejudice means that individuals are not likely to openly admit their prejudiced attitudes.

Using attribution theory as a framework, assessing the tendency to make dispositional attributions for outgroups overcomes the problem of social desirability since there is a less overt evaluation of the target's specific traits, and rather, a more global evaluation of their disposition being more influential on their behaviour than the situation. However, it is still possible to see the effect of bias in the tendency to make more dispositional attributions for the outgroup than the ingroup, especially if the target's behaviour is undesirable. Furthermore, it allows for a direct evaluation of the causes of the target's behaviour. Whilst stereotypes may exist about a group, it is more difficult to assess whether they form the basis of the evaluation of a target, whereas attribution allows us to test the extent to which the target is seen as personally responsible for behaviour or actions.

Bertrand and Mullainathan (2003) conducted a field experiment in which applications were sent to real job advertisements, and applications differed only in the racial stereotypicality of the name. White names (e.g. Emily, Sarah, Brad, Neil) received 50% more call backs for interview than Black names (e.g. Latoya, Ebony, Leroy, Tyrone). The methodology used, in changing only the name on the applications is also useful in uncovering bias as it suggests that the associations made with the name was the primary reason for differences in call back rates. Experiment 5 uses a similar methodology to investigate whether mindfulness may reduce the automaticity of responding to stereotypically Black or White sounding names in attributing the cause of a situation. Specifically a fictitious statement is used that ostensibly details a target's struggle to obtain employment, despite good qualifications and previous experience.



**Mindfulness, Perspective Taking and Locus of Control**

Mindfulness is expected to be particularly useful in reducing attribution bias in this context since mindfulness has been shown to reduce habitual responding (Jordan et al., 2014; Kiken & Shook, 2011). Based on Langer's (1989) notion that mindful judgement involves less reliance on previously learnt information, and more creation of new categories, mindfulness is expected to reduce the reliance on heuristic thought and therefore reduce the likelihood of making an attribution error. This is of interest because mindfulness is likely to make category membership more salient, but reduce negative social judgement. Two further variables that are considered in Experiments 5 and 6 are perspective taking and locus of control, both of which are known to reduce attribution errors, but are not empirically tested in relation to mindfulness.

Galinsky and Moskowitz (2000) found that increased perspective taking increased the expression of positive attitudes of a target and reduced the use of stereotypes when evaluating them. This was thought to be the result of increasing overlap between the self and the target group (Galinsky et al., 2005). Attribution theory postulates that an individual is more likely to attribute personal success to disposition, and failure to situation (Beckmann, 1970; Ross, 1977), therefore by increasing self-other overlap, perspective taking should increase the situational attributions of the outgroup target who is unsuccessful in getting a job. In addition, since mindfulness is thought to be positively associated with perspective taking, it would be expected that increases in individuals' mindfulness would also increase their perspective taking ability.

Individuals with an external locus of control tend to attribute the behaviour of others to external factors, more so than those with an internal locus of control (Shaver, 1975). It is likely that an individual will attribute their own success to personal disposition and own failure to environmental factors (Beckmann, 1970; Ross, 1977). With this in mind, locus of control can measure the direction of one's attributional tendency. However, group membership can also affect this. Outgroup members are more likely to be evaluated by dispositional attributions for a negative act, and situational factors are seen as responsible for a positive act (Griffin, 1994). This means that how a target is evaluated may depend on the degree of the perceiver's own locus of control. As yet, research has not considered the effect of mindfulness on locus of control, but theoretically, it is expected that if mindfulness enhances perspective taking and concern for others, and increases self-other overlap, there may too be an effect on locus of control.

### **Hypotheses**

It is expected that in the control condition participants will be more likely to make the fundamental attribution error, and will attribute the outgroup target's position to dispositions, and the ingroup target's position to situation. It is expected that this effect will be attenuated in the mindfulness condition. That is, evaluations should be less extreme, and participants are expected to be less susceptible to attribution error.

It is expected that participants in the mindfulness condition will be more aware of the target's group membership, and therefore be more aware of potential situational biases and use this as a factor in explaining their situation, rather than relying on stereotypic associations with their group membership. Furthermore,

mindfulness is expected to enhance perspective taking when evaluating the outgroup target, but not the ingroup target, and should have an effect on perceivers' locus of control.

## Experiment 5

### Method

#### Participants and Design

One hundred and eighty-three participants recruited from Amazon's Mechanical Turk (MTurk), who were residents of the U.S.A, took part in the experiment in return for a small monetary payment. Forty-three participants were removed from the original data set who reported race as other than White/Caucasian (N= 39) or failed embedded attention checks (N= 4). This left 140 White participants (90 women and 50 men,  $M_{\text{age}} = 39.69$ , ranging from 22 to 75 years) in the analysis. In a 2 (mindfulness: mindful vs. control) x 2 (group: ingroup vs. outgroup) experimental design, the survey software randomly allocated participants to condition. These were either a mindfulness (N= 71) or control (N=69) condition, and evaluation of either an ingroup (N= 65) or outgroup (N=75) member.

#### Materials

**Mindfulness practice.** The same mindfulness audio files, consisting of a 5-minute body scan, and 5-minute control was used as in Chapter 4, Experiments 1-3.

**Ingroup vs. Outgroup Scenario.** Participants were asked to read a statement made by a 29-year-old man named Jamie (ingroup) or Jamal (outgroup), designed to convey a high achieving graduate (see Appendix H). The statement informed participants that Jamie/Jamal was a 'Dental Practice Management' graduate with a

high Grade Point Average (GPA), having studied at the University of California<sup>5</sup>. A similar procedure for creating candidate profiles has been used in previous research (see e.g. Gaddis, 2015).

The statement outlined the work experience that Jamie/Jamal had gained since graduating, and the skills he felt he had developed. The statement explained that having applied for in excess of 50 new positions Jamie/Jamal had been consistently unsuccessful. The statements were identical, apart from the name given at the start. Stereotypical sounding names have successfully been used to manipulate race in applicant evaluation studies previously (e.g. Bertrand & Mullainathan, 2003; King et al., 2006; Wood, Hales, Purdon, Sejersen, & Hayllar, 2009). Previous research has shown that Jamal is seen as a stereotypically African-American sounding name (Bertrand & Mullainathan, 2003; King et al., 2006) so this was chosen to represent the outgroup member. King et al. (2006) used James as the stereotypically White-American sounding name, however in the interests of keeping the two names as similar sounding and looking as possible, this experiment adopted the use of Jamie as a variant of James to represent the ingroup member.

### **Dependent measures**

**State Mindfulness.** The TMS scale (Lau et al., 2006), was used as in Chapter 4, Experiments 1-3. Questionnaire items were randomised and all items were measured on a 7-point scale (1= not at all, 7= very much), with higher scores indicating higher levels of state mindfulness,  $\alpha = .94$  (M= 4.70, SD= 1.07).

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<sup>5</sup> It was not specified which University of California college was attended, however according to the US News and World Report (US News, n.d.), all of the University of California colleges rank between 20<sup>th</sup> and 42<sup>nd</sup> in the U.S.A, of 199 rankings.

**Fundamental Attribution Error.** A single item assessed the extent to which participants felt that Jamie/Jamal had control over his situation with regards to finding a new job. This was measured on 7-point bi-polar scale (1= the situation was *'entirely [Jamie/Jamal]'s own fault'* to 7= *'entirely out of [Jamie/Jamal]'s control'*). In addition, participants were asked to indicate the three most important reasons they thought explained why Jamie/Jamal was unable to get a job. These were left open-ended and participants were free to write any reason they felt was a primary contributing factor to the targets lack of success in the job market, see Appendix H.

**Perspective Taking.** The same perspective taking scale was used as in Experiment 4 (taken from the Empathy Scale; Davis, 1980). Items were measured on a 5-point scale (1= *'does not describe me well'* to 5= *'describes me very well'*). Higher scores therefore reflect a greater ability to take the perspective of another person,  $\alpha = .83$  (M= 3.71, SD= 0.64), see Appendix G.

**Locus of Control.** The five-item scale was adapted from Bright, Kane, Marsh and Bishop, (2012) and consisted of questions such as "A great deal of what happens to [Jamie/Jamal] is probably just a matter of chance" and "Life is controlled by outside actions and events". Items were measured on a five-point scale (1= *'strongly disagree'* to 5= *'strongly agree'*) with good reliability,  $\alpha = .80$  (M= 2.96, SD= 0.75), see Appendix H. Higher scores reflected a more external locus of control.

**Attention check questions.** In order to ensure that participants were paying attention to the instructions and questions, an attention check question was embedded within one of the scales (see Appendix F). The question was worded so that it did not obviously differ from the other questions in the scale, but specifically asked participants to select only the answer corresponding to the 7<sup>th</sup> point on the

scale. Participants who selected any other answer were assumed to not be paying close attention and were removed from analysis.

### **Procedure**

The experiment was delivered online and participants indicated informed consent within the software. They were then able to complete the items in their own time and in any location with internet access. Participants first listened to either the mindfulness or control audio and were then automatically directed to the TMS (Lau et al., 2006). After this, participants read the statement about Jamie or Jamal. They were then asked the open ended question about the reasons they thought Jamie/Jamal could not get a job, followed by the FAE question. Participants completed the perspective taking scale, locus of control scale, and some demographic questions such as age, gender and race, before being thanked and debriefed.

## **Results & Discussion**

### **State Mindfulness manipulation check**

A 2 (condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) ANOVA was conducted on the TMS measure of state mindfulness. There was a main effect of condition,  $F(1, 136) = 12.77, p < .001, \eta^2 = .09$ . This showed that participants in the mindfulness condition scored higher on the TMS ( $M = 4.68, SD = 1.07$ ) than those in the control condition ( $M = 3.90, SD = 1.48$ ). There was no main effect of group,  $F(1, 136) = 2.75, p = .10, \eta^2 = .02$ . There was no significant interaction of condition x group,  $F(1, 136) = 0.32, p = .57, \eta^2 < .01$ . This confirms that the mindfulness manipulation had worked effectively. Those in the mindfulness

condition were more mindful than participants in the control condition. This was not affected by the group manipulation.

### Fundamental Attribution Error

A 2 (condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) ANOVA was conducted on the FAE. Descriptive statistics can be found in Table 7. There was no main effect of condition,  $F(1, 136) = 0.30, p = .58, \eta^2 < .01$  or group,  $F(1, 136) = 0.74, p = .39, \eta^2 = .01$ . There was a significant condition x group interaction effect,  $F(1, 136) = 4.43, p = .04, \eta^2 = .03$ .

**Table 7.**

*Means (SD) for participants' attributions to the target*

	Ingroup	Outgroup
Mindful	4.63 (1.61)	4.26 (1.60)
Control	3.91 (1.13)	4.65 (1.40)

Simple effects analysis, using Bonferroni adjustments showed that in the control condition participants made a more dispositional attribution for the ingroup member ( $M = 3.91, SD = 1.13$ ) than the outgroup member ( $M = 4.65, SD = 1.40$ ),  $F(1, 136) = 4.36, p = .04, \eta^2 = .03$ . In the mindfulness condition, the difference was non-significant. Participants attribution of the ingroup member ( $M = 4.63, SD = 1.61$ ) was not significantly different to the outgroup member ( $M = 4.26, SD = 1.60$ ),  $F(1, 136) = 0.78, p = .38, \eta^2 = .01$ . This showed that, as expected, participants made the fundamental attribution error in the control condition, but that this effect was attenuated in the mindfulness condition.

For the ingroup, participants in the control condition ( $M = 3.91, SD = 1.13$ ) made a slightly more dispositional attribution than those in the mindfulness condition ( $M = 4.56, SD = 1.61$ ), although this did not reach statistical significance,

$F(1, 136) = 3.29, p = .07, \eta^2 = .02$ . For the outgroup, participants did not differ in the attributions made of the target in the control condition ( $M=4.64, SD= 1.40$ ) compared to the mindfulness condition ( $M= 4.26, SD= 1.60$ ),  $F(1, 136) = 1.30, p = .26, \eta^2 = .01$ .

### Locus of Control

A 2 (condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) ANOVA was run on the locus of control scale. There was no main effect of condition,  $F(1, 136) = 0.07, p = .79, \eta^2 < .01$ . There was no main effect of group,  $F(1, 136) = 0.85, p = .36, \eta^2 = .01$ . The interaction of condition x group was not significant,  $F(1, 136) = 1.03, p = .31, \eta^2 = .01$ .

Attributions are affected by locus of control (Shaver, 1975), so a 2 (condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) ANCOVA was run on the FAE, with locus of control as a covariate. Descriptive statistics are shown in Tabel 8. There was no main effect of condition,  $F(1, 135) = 0.23, p = .63, \eta^2 < .01$ . The covariate, locus of control was significant,  $F(1, 135) = 30.58, p < .001, \eta^2 = .19$ . There was no main effect of group,  $F(1, 135) = 0.26, p = .61, \eta^2 < .01$ . Most importantly, there was a significant condition x group interaction,  $F(1, 135) = 7.81, p = .01, \eta^2 = .06$  that was followed up by pairwise comparisons with Bonferroni adjustments, presented below.

**Table 8.**

Means (SD) for participants' attributions to the target, with locus of control as a covariate

	Ingroup	Outgroup
Mindful	4.66 (1.61)	4.15 (1.60)
Control	3.92 (1.13)	4.66 (1.40)



When accounting for participants locus of control, those in the control condition were significantly more likely to make a dispositional attribution of the ingroup target ( $M=3.92$ ,  $SD= 1.13$ ) than the outgroup target ( $M= 4.66$ ,  $SD= 1.40$ ),  $F(1, 135)=5.45$ ,  $p =.02$ ,  $\eta^2 =.04$ . However, in the mindful condition there was no significant difference in the attribution when evaluating the ingroup target ( $M=4.66$ ,  $SD= 1.61$ ) compared to the outgroup target ( $M= 4.15$ ,  $SD= 1.60$ ),  $F(1, 135)=2.62$ ,  $p = .11$ ,  $\eta^2 =.02$ .

For the ingroup, participants in the control condition ( $M= 3.92$ ,  $SD= 1.13$ ) made a more dispositional attribution than those in the mindfulness condition ( $M= 4.66$ ,  $SD= 1.61$ ),  $F(1, 136)= 5.03$ ,  $p = .03$ ,  $\eta^2 =.04$ . For the outgroup, participants did not differ in the attributions made of the target in the control condition ( $M=4.66$ ,  $SD= 1.40$ ) compared to the mindfulness condition ( $M= 4.15$ ,  $SD= 1.60$ ),  $F(1, 136)= 2.89$ ,  $p = .09$ ,  $\eta^2 =.02$ .

### **Perspective Taking**

A 2 (condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) ANOVA was conducted on perspective taking. Descriptive statistics are presented in Table 9. There was a main effect of condition,  $F(1, 136)= 4.12$ ,  $p = .04$ ,  $\eta^2 = .03$ . This showed that participants in the mindfulness condition scored lower for perspective taking ( $M= 3.61$ ,  $SD= 0.60$ ) than participants in the control condition ( $M=3.82$ ,  $SD= 0.66$ ). There was no main effect of group,  $F(1, 136)= 1.89$ ,  $p = .17$ ,  $\eta^2 = .01$ . There was a significant condition x group interaction,  $F(1, 136)= 6.26$ ,  $p = .01$ ,  $\eta^2 = .04$ .

**Table 9.**

Means (SD) for perspective taking

	Ingroup	Outgroup
Mindful	3.55 (0.63)	3.67 (0.58)
Control	4.02 (0.50)	3.62 (0.74)

Simple effects analysis, using Bonferroni adjustments, of the interaction showed that in the control condition participants perspective taking ability was higher for the ingroup target ( $M=4.02$ ,  $SD= 0.50$ ) than the outgroup target ( $M= 3.62$ ,  $SD= 0.74$ ),  $F(1, 136)=7.44$ ,  $p = .01$ ,  $\eta^2 = .05$ . This is to be expected based on social identity theory, which suggests that the ingroup is seen as more similar to ourselves than the outgroup. In the mindfulness condition there was no significant difference in participants perspective taking ability for the ingroup target ( $M= 3.55$ ,  $SD= 0.63$ ) compared to the outgroup target ( $M=3.67$ ,  $SD= 0.58$ ),  $F(1, 136)=0.64$ ,  $p = .43$ ,  $\eta^2 = .01$ .

In the ingroup condition, participants perspective taking ability was significantly lower in the mindfulness ( $M= 3.55$ ,  $SD= 0.63$ ) compared to the control condition ( $M= 4.02$ ,  $SD= 0.50$ ),  $F(1, 136)=9.59$ ,  $p = .01$ ,  $\eta^2 = .07$ . In the outgroup condition there was no significant difference in perspective taking ability between the mindfulness ( $M= 3.67$ ,  $SD= 0.58$ ) and control conditions ( $M= 3.62$ ,  $SD= 0.74$ ),  $F(1, 136)=0.12$ ,  $p = .73$ ,  $\eta^2 < .01$ . This suggests that the mindfulness practice reduces the ability to consider an alternative perspective when thinking about an ingroup member.

### **FAE with perspective taking covariate**

Research has shown that perspective taking reduces the fundamental attribution error (Hooper et al., 2015b) and so this was included as a covariate in a 2

(condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) ANCOVA.

Descriptive statistics are shown in Table 10. The covariate, perspective taking, was not significant,  $F(1, 135) = 2.30, p = .13, \eta^2 = .02$ . There was no main effect of condition,  $F(1, 135) = 0.65, p = .42, \eta^2 = .01$ , and no main effect of group,  $F(1, 135) = 1.08, p = .30, \eta^2 = .01$ . There was a significant condition x group interaction,  $F(1, 135) = 5.69, p = .02, \eta^2 = .04$ .

**Table 10.**

Means (SD) for participants' attributions to the target, with perspective taking as a covariate

	Ingroup	Outgroup
Mindful	4.61 (1.61)	4.27 (1.60)
Control	3.81 (1.13)	4.67 (1.40)

Simple effects analysis using Bonferroni adjustments revealed that in the control condition a more dispositional attribution was made of the ingroup target ( $M = 3.81, SD = 1.13$ ) compared to the outgroup target ( $M = 4.67, SD = 1.40$ ),  $F(1, 135) = 5.70, p = .02, \eta^2 = .04$ . Thus participants had made the FAE. In the mindfulness condition there was no significant difference in the attributions made to the ingroup target ( $M = 4.61, SD = 1.61$ ) compared to the outgroup target ( $M = 4.27, SD = 1.60$ ),  $F(1, 135) = 0.98, p = .32, \eta^2 = .01$ . Therefore, when accounting for participants' level of perspective taking, the attenuating effect of mindfulness on the FAE remained.

In the ingroup condition, participants in the control condition made a significantly more dispositional attribution ( $M = 3.81, SD = 1.13$ ) than participants in the mindfulness condition ( $M = 4.61, SD = 1.61$ ),  $F(1, 135) = 4.63, p = .03, \eta^2 = .03$ . In the outgroup condition there was no significant difference in the attributions made in

the control condition ( $M= 4.67$ ,  $SD= 1.40$ ) compared to the mindfulness condition ( $M= 4.27$ ,  $SD= 1.60$ ),  $F(1, 135)= 1.42$ ,  $p = .24$ ,  $\eta^2 = .01$ .

### **Open ended questions measuring the FAE**

In order to analyse the open ended question asking participants to state the three most important reasons that Jamie/Jamal<sup>6</sup> could not get a job, answers were first coded by mention of race. Answers which included race as a reason were coded as 1 and those with no mention of race coded as 0. A second researcher also coded the answers, and since many of the responses were either one word or very short sentences there was 100% agreement in the coding between the researcher and primary investigator. A loglinear analysis was conducted to test for differences between conditions in the number of reasons that included race. The three-way log linear analysis produced a model that retained the second order effects. The likelihood ratio for this model was  $\chi^2(2)= 0.33$ ,  $p = .85$ . This indicated that the two second order interactions (condition x race mentioned and group x race mentioned) were significant,  $\chi^2(1)= 7.23$ ,  $p = .01$  and  $\chi^2(1)=21.76$ ,  $p <.001$  respectively.

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<sup>6</sup> It was noted that some participants had assumed the gender of the target to be female, whilst it was intended that the targets be assumed male. In the outgroup condition  $N= 4$  participants referred to Jamal as 'she' in their answers, in the ingroup condition  $N= 25$  referred to Jamie as 'she'.

**Table 11.**

Number of participants in each condition mentioning race as a reason for *target's* situation

Condition	Group	Race mentioned		Total mentioned (%)
		Yes	No	
Mindful	Ingroup	0	32	0
	Outgroup	26	13	67%
Control	Ingroup	0	33	0
	Outgroup	3	33	8%

To break down this effect, separate chi-square tests on groups were performed independently for mindfulness and control conditions. In the mindfulness condition there was a significant association between group and whether race was mentioned,  $\chi^2(1) = 13.06$ ,  $p < .001$ ; this was not true for the control condition  $\chi^2(1) = 2.88$ ,  $p = .09$ . In the outgroup condition there was a significant relationship between condition and whether race was mentioned,  $\chi^2(1) = 6.97$ ,  $p = .01$ . Race was mentioned by only one participant (of 65) in the ingroup condition. Tests of effect sizes were carried out by calculating the odds ratio for the ingroup vs. outgroup, showing that when participants had read the outgroup members statement the odds that race was mentioned as a reason for being unsuccessful in the job market were 5.56 times higher in the mindful condition than in the control condition.

### Discussion

Experiment 5 showed that mindfulness attenuated the tendency to make the FAE, this effect remained when the participants own locus of control and ability to take another perspective were included as covariates. In addition, a significant

interaction was observed for the effect of condition and group on participants' perspective taking, showing that in the mindful condition participants were equally able to take another perspective, regardless of group. A log linear analysis of coded open-ended questions showed that participants in the mindful condition were more than five times more likely to mention race as attributing to the target's situation than those in the control condition.

This provides support for the hypothesis that mindfulness influences the attribution of behaviour of others and reduces the tendency to automatically ascribe dispositional attributions to an outgroup member and situational attributions to an ingroup member. This suggests that mindfulness may be useful in reducing automatic responding, as is the case for implicit bias (Lueke & Gibson, 2015), drinking behaviour (Ostafin et al., 2012; Ostafin & Marlatt, 2008), uncontrolled eating (Jordan et al., 2014) insight problem solving (Ostafin & Kassman, 2012), but may also have applications to attribution theory. In addition, the hypothesis that mindfulness would make participants more aware of racial bias as a situational attribution was supported, and thus may have implications for increasing awareness of bias.

The results indicated that mindfulness and intergroup dynamics may also influence participants ability to take the perspective of another person, in that mindful participants, compared to control participants, were equally able to consider the perspective of an outgroup member, but perspective taking ability was reduced when considering an ingroup member. This contradicts previous findings that suggest mindfulness is positively associated with perspective taking ability (Beitel, Ferrer, & Cecero, 2005; Johns, Allen, & Gordon, 2015), and that perspective taking

ability should be higher for ingroup members. Experiment 6 therefore explored the effect of manipulating participants' perspective taking, by explicitly asking them to consider either their own or another perspective when reading the scenario, to see whether this produced the same attenuating effect on the FAE.

### **Experiment 6**

Previous research has shown that perspective taking training reduces individuals propensity to make the FAE (Hooper et al., 2015b) and also decreases the use of stereotypes in evaluating others (Galinsky & Moskowitz, 2000). In addition, mindfulness has been shown to positively correlate with perspective taking (Beitel et al., 2005; Johns et al., 2015). This would suggest that an increase in mindfulness would increase perspective taking, and therefore reduce the FAE. However, the results from Experiment 5 showed that, in the mindfulness condition, perspective taking was reduced when evaluating an ingroup target, compared to an outgroup target. This is the opposite effect to that seen in the control condition, and showed that mindfulness interacts with group membership to influence perspective taking ability. Therefore, Experiment 6 extends this and directly manipulates perspective taking so that half of the participants will be asked to read the target scenario considering how they would feel in that position (own perspective) and the other half asked to read the scenario considering the target's perspective (other perspective).

Attributions about racial groups can influence racial bias (Gomez et al., 2006). Modern racism theory suggests that most racial bias goes unnoticed because it is not recognisable as explicit bias (Brief et al., 2000). Therefore, in addition to attributions, Experiment 6 includes a measure of hostile and benevolent racism

(Ramasubramanian & Oliver, 2007). This provides a more explicit measure of bias as well as the FAE measuring automatic associations which may provide a proxy for bias. The results of Experiment 5 revealed that participants in the mindfulness condition were more likely to highlight that the outgroup member (Jamal) was experiencing difficulty finding work due to his race. With this in mind the present experiment includes a measure of racist attitudes to see whether there is an interaction of mindfulness, perspective and group. It is expected that scores on the racism scales will be reduced for the outgroup target in the mindfulness condition when considering the other perspective.

### **Hypotheses**

It is expected that participants in the mindfulness condition who are explicitly asked to consider the ‘other’ perspective will be least likely to demonstrate the FAE and make dispositional attributions. It is expected that there will be an interaction effect between perspective taking and mindfulness in the ingroup condition.

Participants in the control condition are expected to exhibit the effects shown in previous research, that is, perspective taking will reduce the FAE. Participants considering the ‘other’ perspective will be expected to attribute less dispositionally than those in the own-perspective condition.

## **Method**

### **Participants and Design**

Three hundred and forty-three participants recruited from Amazon’s Mechanical Turk (MTurk), who were residents of the U.S.A, took part in the study in return for a small monetary payment. Ninety-two participants were removed from



the original data. Eighty for having reported race as other than White/Caucasian and 13 who had failed embedded attention checks, which is below the average of 5% (according to Hauser and Schwarz, 2016). This left 251 White participants (163 female and 86 male,  $M_{age} = 38.75$ , ranging from 19 to 77 years) in the remaining analysis.

The experiment employed a 2 (mindfulness: mindful vs. control) x 2 (perspective: own vs. other) x 2 (group: ingroup vs. outgroup) between-participants design. The survey software randomly allocated participants to either a mindfulness (N=142) or control (N=109) condition, to read the statement considering their own perspective (N= 124) or the perspective of the other (the target; N=127), and to evaluate either an ingroup (N= 129) or outgroup (N=122) member.

## **Materials**

**Mindfulness manipulation.** The 5-minute mindful body scan exercise used in Experiment 5 was used again in Experiment 6, along with the same control audio file.

**Perspective taking.** Before being given the Jamie/Jamal statements to read, participants were instructed to read the statement considering either their own perspective, or that of the individual who made the statement (based on similar previous manipulations, e.g Davis et al., 2004; Galinsky & Moskowitz, 2000). Participants were asked to think about how they/the target would feel in that situation, how they thought others might view themselves/the target and how they thought it might affect their own/the target's future job applications, see Appendix I.

**Ingroup vs. Outgroup scenario.** The same statements as in Experiment 5 were used. The names Jamie and Jamal remained. Some of the open question

responses in Experiment 5 suggested that a minority of the participants perceived the name Jamie to be a female target<sup>7</sup>, so to control the perceived gender of the target, the statement “he says...” was added to the start of the scenario.

### **Dependent measures**

The same measures of perspective taking, FAE, state mindfulness and locus of control were used as in Experiment 5. All items were measured on a 7-point scale. Descriptive statistics for each measure are presented in Table 12.

**Hostile and benevolent racism.** A measure of hostile and benevolent racism was adapted from Ramasubramanian and Oliver (2007). A list of eight traits was presented to participants, who were asked to state how much they felt each when in the presence of African-Americans ( $\alpha = .92$ ). This included hostile traits such as anger and dislike, and benevolent traits such as pity and guilt, see Appendix I.

**Attention check questions.** As in Experiment 5 an attention check question was embedded into one of the scales and asked participants to select only the answer corresponding to the 7<sup>th</sup> point on the scale (see Appendix F). Participants who selected any other answer were assumed to not be paying close attention and were removed from analysis.

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<sup>7</sup> It was noted that, in Experiment 5 open ended question, some participants had assumed the gender of the target to be female, whilst it was intended that the targets be assumed male. It was not explicitly asked what gender participants thought the target was. In the outgroup condition N= 4 participants referred to Jamal as ‘she’ in their answers, in the ingroup condition N= 25 referred to Jamie as ‘she’.

**Table 12.**

Means, standard deviations and alpha scores for perspective taking, FAE, state mindfulness and locus of control dependent measures.

	Mean (SD)	$\alpha$
Perspective taking	5.01 (0.86)	.81
FAE (single item)	4.67 (1.30)	-
State mindfulness	4.58 (0.92)	.89
Locus of control	3.77 (1.13)	.81

### Procedure

The procedure was the same as in Experiment 5, with the exception that after listening to the mindfulness audio, and before reading the statements, participants were given instructions to either consider the statements from their own perspective, or from the perspective of Jamie/Jamal. The TMS measure of state mindfulness was also moved to the end of the questionnaire. State mindfulness was measured at the end of the questionnaire as a manipulation check, but was not measured immediately after the practice since Experiment 3 shows that the 5-minute online mindfulness task increased state mindfulness.

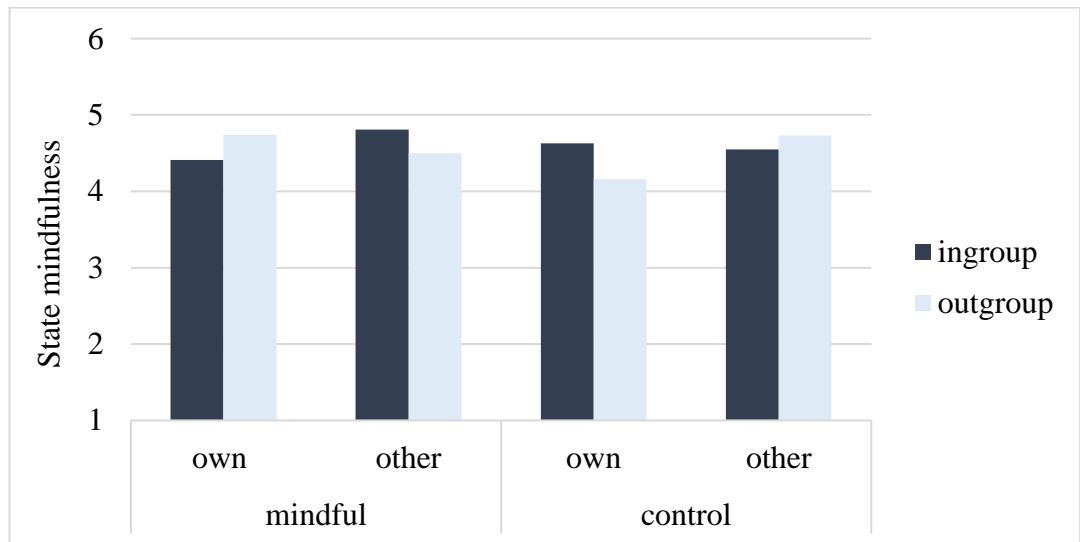
## Results and discussion

### Manipulation checks

**Mindfulness.** A 2 (condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) x 2 (perspective: own vs. other) ANOVA was run on the TMS. There were no significant main effects of condition,  $F(1, 243) = 0.69$ ,  $p = .41$ ,  $\eta^2 < .01$ , perspective,  $F(1, 243) = 1.91$ ,  $p = .17$ ,  $\eta^2 = .01$ , or group,  $F(1, 243) = 0.33$ ,  $p = .57$ ,  $\eta^2 < .01$ . The two-way interactions of condition x perspective, condition x group and group x perspective were non-significant,  $F$ 's  $< 1$ . There was a significant three-way

interaction of condition x perspective x group,  $F(1, 243)= 7.65$ ,  $p = .01$ ,  $\eta^2 = .03$ , see Figure 2. The analysis of simple effects using Bonferroni adjustments is detailed below.

**Figure 2.** The effect of condition and group on mindfulness levels as a function of perspective



Effect of perspective within group and condition. In the control, ingroup condition there was no significant difference in TMS scores between the own ( $M= 4.63$ ,  $SD= 0.90$ ) and other ( $M= 4.55$ ,  $SD= 0.84$ ) perspective conditions,  $F(1, 243)= 0.11$ ,  $p = .74$ ,  $\eta^2 < .01$ . In the control, outgroup condition participants in the other perspective condition ( $M= 4.73$ ,  $SD= 1.07$ ) scored significantly higher on the TMS than participants in the own perspective condition ( $M= 4.16$ ,  $SD= 1.02$ ),  $F(1, 243)= 5.00$ ,  $p = .03$ ,  $\eta^2 = .02$ . In the mindfulness, ingroup condition, there was a marginally significant difference in TMS scores between the own ( $M= 4.41$ ,  $SD= 0.74$ ) and other perspective ( $M= 4.81$ ,  $SD= 0.96$ ) conditions,  $F(1, 243)= 3.53$ ,  $p = .06$ ,  $\eta^2 = .01$ . This showed that participants reported higher mindfulness scores in the other perspective condition than in the own perspective condition. In the mindfulness,

outgroup condition there was no significant difference in TMS scores between the own ( $M= 4.74$ ,  $SD= 0.86$ ) and other ( $M= 4.50$ ,  $SD= 0.94$ ) perspective conditions,  $F(1, 243)= 1.19$ ,  $p = .28$ ,  $\eta^2 =.01$ .

Effect of group within condition and perspective. In the control, own perspective condition there was no significant difference in TMS scores between the ingroup ( $M= 4.63$ ,  $SD= 0.90$ ) and outgroup ( $M= 4.16$ ,  $SD= 1.02$ ) conditions,  $F(1, 243)= 3.16$ ,  $p = .08$ ,  $\eta^2 =.01$ . In the control, other perspective condition there was no significant difference in TMS scores between the ingroup ( $M= 4.55$ ,  $SD= 0.84$ ) and outgroup ( $M= 4.73$ ,  $SD= 1.07$ ) conditions,  $F(1, 243)= 0.61$ ,  $p = .44$ ,  $\eta^2 <.01$ . In the mindfulness, own perspective condition there was no significant difference in TMS scores between the ingroup ( $M= 4.41$ ,  $SD= 0.74$ ) and outgroup ( $M= 4.74$ ,  $SD= 0.86$ ) conditions,  $F(1, 243)= 2.48$ ,  $p = .12$ ,  $\eta^2 =.01$ . In the mindfulness, other perspective condition there was no significant difference in TMS scores between the ingroup ( $M= 4.81$ ,  $SD= 0.96$ ) and outgroup ( $M= 4.50$ ,  $SD= 0.94$ ) conditions,  $F(1, 243)= 1.94$ ,  $p = .17$ ,  $\eta^2 =.01$ .

Effect of condition within perspective and group. In the own perspective, ingroup condition there was no significant difference in TMS scores between the mindfulness ( $M= 4.41$ ,  $SD= 0.74$ ) and control ( $M= 4.63$ ,  $SD= 0.90$ ) conditions,  $F(1, 243)= 0.84$ ,  $p = .36$ ,  $\eta^2 <.01$ . In the own perspective, outgroup condition participants in the mindfulness condition ( $M= 4.74$ ,  $SD= 0.86$ ) scored significantly higher on the TMS, and thus were more mindful, than participants in the control condition ( $M= 4.16$ ,  $SD= 1.02$ ),  $F(1, 243)= 6.06$ ,  $p = .02$ ,  $\eta^2 =.02$ . In the other perspective, ingroup condition there was no significant difference in TMS scores between the mindfulness ( $M= 4.81$ ,  $SD= 0.96$ ) and control ( $M= 4.55$ ,  $SD= 0.84$ ) conditions,  $F(1, 243)= 1.48$ ,  $p$

= .23,  $\eta^2 = .01$ . In the other perspective, outgroup condition there was no significant difference in TMS scores between the mindfulness ( $M = 4.50$ ,  $SD = 0.94$ ) and control ( $M = 4.73$ ,  $SD = 1.07$ ) conditions,  $F(1, 243) = 0.92$ ,  $p = .34$ ,  $\eta^2 < .01$ .

**Perspective taking.** A 2 (condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) x 2 (perspective: own vs. other) ANOVA was run on perspective taking. There were no significant main effects of condition,  $F(1, 243) = 2.70$ ,  $p = .10$ ,  $\eta^2 = .01$ , perspective,  $F(1, 243) = 1.59$ ,  $p = .21$ ,  $\eta^2 = .01$ , or group,  $F(1, 243) = 0.57$ ,  $p = .45$ ,  $\eta^2 < .01$ . The two-way interactions of condition x perspective, condition x group and group x perspective were non-significant,  $F_s < 1$ . The three-way interaction of condition x perspective x group was not significant,  $F(1, 243) = 0.12$ ,  $p = .73$ ,  $\eta^2 < .01$ .

### **Fundamental attribution error**

Experiment 5 found that participants in the mindful condition were less extreme in their evaluations of the target and why he had been unsuccessful in getting a job, and the FAE was attenuated. In contrast, in the control condition participants made more dispositional attributions of the ingroup target than the outgroup target. The same question was asked of participants in Experiment 6 to test whether manipulating perspective taking influenced this effect.

A 2 (condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) x 2 (perspective: own vs. other) ANOVA was run on the FAE item. There was no significant main effect of condition,  $F(1, 243) = 0.82$ ,  $p = .37$ ,  $\eta^2 < .01$ , or of perspective,  $F(1, 243) = 1.10$ ,  $p = .29$ ,  $\eta^2 = .01$ . There was a significant main effect of group,  $F(1, 243) = 4.37$ ,  $p = .04$ ,  $\eta^2 = .02$ , showing that the ingroup target ( $M = 4.52$ ,  $SD = 1.26$ ) was evaluated with a more dispositional attribution than the outgroup

target ( $M= 4.86$ ,  $SD= 1.32$ ). The two-way interactions between mindfulness x perspective, mindfulness x group and perspective x group were all non-significant,  $F's < 1$ . The three-way interaction of mindfulness x group x perspective was significant,  $F(1, 243)= 4.23$ ,  $p = .04$ ,  $\eta^2 = .02$ , see Figure 3. Analysis of simple effects using Bonferroni adjustments is detailed below.

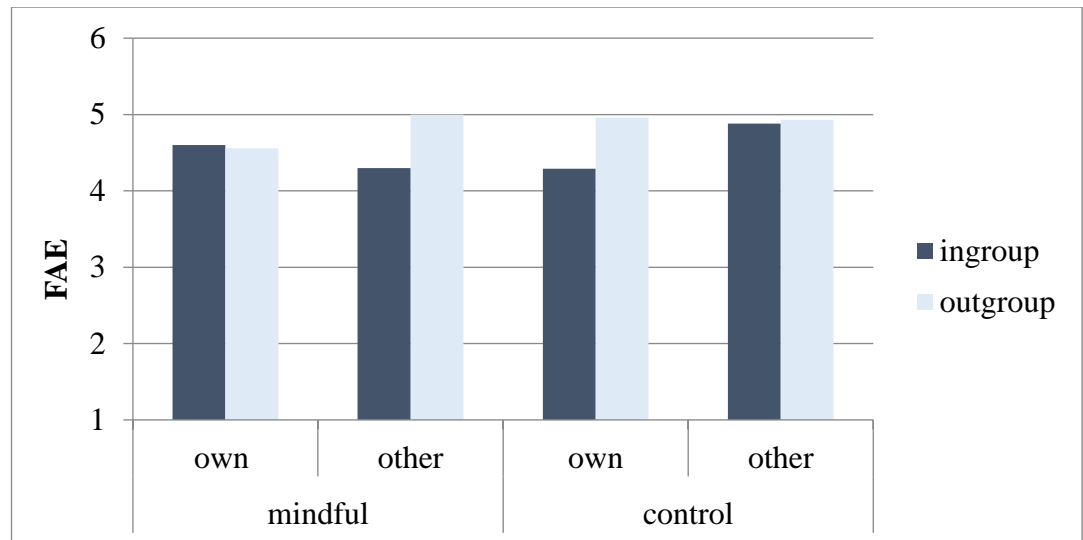
Effect of group within condition and perspective. In the control, own perspective condition there was a marginally significant difference in the FAE between the ingroup ( $M= 4.29$ ,  $SD= 1.30$ ) and outgroup ( $M= 4.96$ ,  $SD= 1.20$ ) conditions,  $F(1, 243)= 3.23$ ,  $p = .07$ ,  $\eta^2 = .01$ . This showed that more dispositional attributions were made in the ingroup condition than the outgroup condition. In the control, other perspective condition there was no significant difference in the FAE between the ingroup ( $M= 4.88$ ,  $SD= 1.14$ ) and outgroup ( $M= 4.93$ ,  $SD= 1.39$ ) conditions,  $F(1, 243)= 0.02$ ,  $p = .88$ ,  $\eta^2 < .01$ . In the mindfulness, own perspective condition there was no significant difference in the FAE between the ingroup ( $M= 4.60$ ,  $SD= 1.19$ ) and outgroup ( $M= 4.56$ ,  $SD= 1.40$ ) conditions,  $F(1, 243)= 0.02$ ,  $p = .90$ ,  $\eta^2 < .01$ . In the mindfulness, other perspective condition there was a significant difference in the FAE between the ingroup ( $M= 4.30$ ,  $SD= 1.35$ ) and outgroup ( $M= 5.00$ ,  $SD= 1.25$ ) conditions,  $F(1, 243)= 4.86$ ,  $p = .03$ ,  $\eta^2 = .02$ . This showed that participants made the FAE and made more dispositional attributions in the ingroup condition than in the outgroup condition.

Effect of perspective within condition and group. In the control, ingroup condition there was no significant difference in the FAE between the own ( $M= 4.29$ ,  $SD= 1.30$ ) and other ( $M= 4.88$ ,  $SD= 1.14$ ) perspective conditions,  $F(1, 243)= 2.89$ ,  $p = .09$ ,  $\eta^2 = .01$ . In the control, outgroup condition there was no significant difference

in the FAE between the other perspective condition ( $M= 4.93$ ,  $SD= 1.39$ ) and the own perspective condition ( $M= 4.96$ ,  $SD= 1.20$ ),  $F(1, 243)= 0.01$ ,  $p = .93$ ,  $\eta^2 <.01$ . In the mindfulness, ingroup condition, there was no significant difference in the FAE between the own ( $M= 4.60$ ,  $SD= 1.19$ ) and other perspective ( $M= 4.30$ ,  $SD= 1.35$ ) conditions,  $F(1, 243)= 1.00$ ,  $p = .34$ ,  $\eta^2 <.01$ . In the mindfulness, outgroup condition there was no significant difference in the FAE between the own ( $M= 4.56$ ,  $SD= 1.40$ ) and other ( $M= 5.00$ ,  $SD= 1.25$ ) perspective conditions,  $F(1, 243)= 1.98$ ,  $p = .16$ ,  $\eta^2 =.01$ .

Effect of condition within perspective and group. In the own perspective, ingroup condition there was no significant difference in the FAE between the mindfulness ( $M= 4.60$ ,  $SD= 1.19$ ) and control ( $M= 4.29$ ,  $SD= 1.30$ ) conditions,  $F(1, 243)= 0.82$ ,  $p = .37$ ,  $\eta^2 <.01$ . In the own perspective, outgroup condition there was no significant difference in the FAE between the mindfulness ( $M= 4.56$ ,  $SD= 1.40$ ) and control ( $M= 4.96$ ,  $SD= 1.20$ ) conditions,  $F(1, 243)= 1.45$ ,  $p = .23$ ,  $\eta^2 =.01$ . In the other perspective, ingroup condition there was a marginally significant difference in the FAE between the mindfulness ( $M= 4.30$ ,  $SD= 1.35$ ) and control ( $M= 4.88$ ,  $SD= 1.14$ ) conditions,  $F(1, 243)= 3.57$ ,  $p = .06$ ,  $\eta^2 =.01$ . This showed that more dispositional attributions were made in the ingroup control condition than in the ingroup mindfulness condition. In the other perspective, outgroup condition there was no significant difference in the FAE between the mindfulness ( $M= 5.00$ ,  $SD= 1.25$ ) and control ( $M= 4.93$ ,  $SD= 1.39$ ) conditions,  $F(1, 243)= 0.04$ ,  $p = .83$ ,  $\eta^2 <.01$ .





### Locus of Control

A 2 (condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) x 2 (perspective: own vs. other) ANOVA was run on locus of control. There were no significant main effects of condition,  $F(1, 243) = 0.62, p = .43, \eta^2 < .01$ , perspective,  $F(1, 243) = 1.87, p = .17, \eta^2 = .01$ , or group,  $F(1, 243) = 0.05, p = .82, \eta^2 < .01$ . The two-way interactions of condition x perspective, condition x group and group x perspective were non-significant,  $F_s < 1$ . The three-way interaction of condition x perspective x group was not significant,  $F(1, 243) = 0.004, p = .95, \eta^2 < .01$ . However, it was expected that locus of control might affect attributions, so locus of control was used as a covariate, as in Experiment 5.

A 2 (condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) x 2 (perspective: own vs. other) ANCOVA was run on the FAE, with locus of control as a covariate. The covariate was significant,  $F(1, 242) = 34.29, p < .001, \eta^2 = .12$ . There was no main effect of mindfulness condition,  $F(1, 242) = 0.45, p = .50, \eta^2 < .01$ , or perspective taking condition,  $F(1, 242) = 0.37, p = .55, \eta^2 < .01$ . There was a significant main effect of group,  $F(1, 242) = 4.60, p = .03, \eta^2 = .02$ . This showed

that more dispositional attributions were made in the ingroup condition ( $M= 4.52$ ,  $SD= 1.26$ ) than the outgroup condition ( $M= 4.86$ ,  $SD= 1.32$ ). There were no significant two-way interactions of mindfulness x group, perspective taking x group or mindfulness x perspective taking ( $F's < 1$ ), however the 3-way interaction of mindfulness x perspective taking x group was significant,  $F(1, 242)= 4.63$ ,  $p = .03$ ,  $\eta^2 = .02$ . Analysis of simple effects using Bonferroni adjustments is detailed below.

Effect of group within condition and perspective. In the control, own perspective condition there was a marginally significant difference in the FAE between the ingroup ( $M= 4.35$ ,  $SD= 1.30$ ) and outgroup ( $M= 4.99$ ,  $SD= 1.20$ ) conditions,  $F(1, 242)= 3.35$ ,  $p = .07$ ,  $\eta^2 = .01$ . This showed that more dispositional attributions were made in the ingroup condition than the outgroup condition. In the control, other perspective condition there was no significant difference in the FAE between the ingroup ( $M= 4.80$ ,  $SD= 1.14$ ) and outgroup ( $M= 4.84$ ,  $SD= 1.39$ ) conditions,  $F(1, 242)= 0.02$ ,  $p = .90$ ,  $\eta^2 < .01$ . In the mindfulness, own perspective condition there was no significant difference in the FAE between the ingroup ( $M= 4.64$ ,  $SD= 1.19$ ) and outgroup ( $M= 4.60$ ,  $SD= 1.40$ ) conditions,  $F(1, 242)= 0.02$ ,  $p = .88$ ,  $\eta^2 < .01$ . In the mindfulness, other perspective condition there was a significant difference in the FAE between the ingroup ( $M= 4.31$ ,  $SD= 1.35$ ) and outgroup ( $M= 5.00$ ,  $SD= 1.25$ ) conditions,  $F(1, 242)= 5.38$ ,  $p = .02$ ,  $\eta^2 = .02$ . This showed that participants made more dispositional attributions in the ingroup condition than in the outgroup condition.

Effect of perspective within condition and group. In the control, ingroup condition there was no significant difference in the FAE between the own ( $M= 4.35$ ,  $SD= 1.30$ ) and other ( $M= 4.80$ ,  $SD= 1.14$ ) perspective conditions,  $F(1, 242)= 1.90$ ,  $p = .17$ ,  $\eta^2 = .01$ . In the control, outgroup condition there was no significant difference

in the FAE between the other perspective condition ( $M= 4.84$ ,  $SD= 1.39$ ) and the own perspective condition ( $M= 4.99$ ,  $SD= 1.20$ ),  $F(1, 242)= 0.20$ ,  $p = .66$ ,  $\eta^2 < .01$ . In the mindfulness, ingroup condition, there was no significant difference in the FAE between the own ( $M= 4.64$ ,  $SD= 1.19$ ) and other perspective ( $M= 4.31$ ,  $SD= 1.35$ ) conditions,  $F(1, 242)= 1.34$ ,  $p = .25$ ,  $\eta^2 = .01$ . In the mindfulness, outgroup condition there was no significant difference in the FAE between the own ( $M= 4.60$ ,  $SD= 1.40$ ) and other ( $M= 5.00$ ,  $SD= 1.25$ ) perspective conditions,  $F(1, 242)= 1.94$ ,  $p = .17$ ,  $\eta^2 = .01$ .

Effect of condition within perspective and group. In the own perspective, ingroup condition there was no significant difference in the FAE between the mindfulness ( $M= 4.64$ ,  $SD= 1.19$ ) and control ( $M= 4.35$ ,  $SD= 1.30$ ) conditions,  $F(1, 242)= 0.83$ ,  $p = .36$ ,  $\eta^2 < .01$ . In the own perspective, outgroup condition there was no significant difference in the FAE between the mindfulness ( $M= 4.60$ ,  $SD= 1.40$ ) and control ( $M= 4.99$ ,  $SD= 1.20$ ) conditions,  $F(1, 242)= 1.57$ ,  $p = .21$ ,  $\eta^2 = .01$ . In the other perspective, ingroup condition there was no significant difference in the FAE between the mindfulness ( $M= 4.31$ ,  $SD= 1.35$ ) and control ( $M= 4.80$ ,  $SD= 1.14$ ) conditions,  $F(1, 242)= 2.82$ ,  $p = .09$ ,  $\eta^2 = .01$ . In the other perspective, outgroup condition there was no significant difference in the FAE between the mindfulness ( $M= 5.00$ ,  $SD= 1.25$ ) and control ( $M= 4.84$ ,  $SD= 1.39$ ) conditions,  $F(1, 242)= 0.28$ ,  $p = .60$ ,  $\eta^2 < .01$ .

### **Hostile and benevolent racism.**

Two separate 2 (condition: mindfulness vs. control) x 2 (group: ingroup vs. outgroup) x 2 (perspective: own vs. other) ANOVA's were run with benevolent and hostile racism as dependent variables. For benevolent racism there were no

significant main effects of mindfulness,  $F(1, 243) = 0.06$ ,  $p = .81$ ,  $\eta^2 < .01$ , perspective,  $F(1, 243) = 0.83$ ,  $p = .36$ ,  $\eta^2 < .01$ , or group,  $F(1, 243) = 0.05$ ,  $p = .95$ ,  $\eta^2 < .01$ . There were no significant two-way interactions of condition x perspective,  $F(1, 243) = 0.004$ ,  $p = .83$ ,  $\eta^2 < .01$ , condition x group,  $F(1, 243) = 1.99$ ,  $p = .16$ ,  $\eta^2 = .01$ , or perspective x group,  $F(1, 243) = 0.43$ ,  $p = .51$ ,  $\eta^2 < .01$ . The three-way interaction did not reach significance,  $F(1, 243) = 0.08$ ,  $p = .78$ ,  $\eta^2 < .01$ .

For hostile racism, there were no significant main effects of mindfulness,  $F(1, 243) = 1.74$ ,  $p = .19$ ,  $\eta^2 = .01$ , perspective,  $F(1, 243) = 2.43$ ,  $p = .12$ ,  $\eta^2 = .01$ , or group,  $F(1, 243) = 1.64$ ,  $p = .20$ ,  $\eta^2 = .01$ . The mindfulness x perspective, and perspective x group two-way interactions did not reach significance ( $F$ 's  $< 1$ ). There was a significant two-way interaction of mindfulness x group condition,  $F(1, 243) = 4.28$ ,  $p = .04$ ,  $\eta^2 = .02$ . The three-way interaction was not significant,  $F(1, 243) = 0.08$ ,  $p = .78$ ,  $\eta^2 < .01$ .

**Table 13.**

Means (SD) for hostile racism scores for the condition x group interaction

	Ingroup	Outgroup
Mindful	1.81 (1.09)	1.37 (0.68)
Control	1.71 (1.07)	1.81 (1.22)

Simple effects analysis of the significant two-way interaction, using Bonferroni adjustments, revealed that in the control condition there was no significant difference in hostile racism scores between the ingroup ( $M = 1.71$ ,  $SD = 1.07$ ) and outgroup conditions ( $M = 1.81$ ,  $SD = 1.22$ ),  $F(1, 243) = 0.27$ ,  $p = .60$ ,  $\eta^2 < .01$ . In the mindfulness condition there was a significant difference in hostile racism scores between the ingroup ( $M = 1.81$ ,  $SD = 1.09$ ) and outgroup ( $M = 1.37$ ,  $SD = 0.68$ )

conditions,  $F(1, 243) = 6.46$ ,  $p = .01$ ,  $\eta^2 = .03$ . This showed that hostile racism scores were lower for mindful participants who were evaluating the outgroup target.

Comparing the group conditions showed that there was no significant difference in hostile racism scores in the ingroup condition between the control ( $M = 1.71$ ,  $SD = 1.07$ ) and mindfulness ( $M = 1.81$ ,  $SD = 1.09$ ) conditions,  $F(1, 243) = 0.29$ ,  $p = .59$ ,  $\eta^2 < .01$ . In the outgroup condition, hostile racism scores were significantly lower in the mindfulness condition ( $M = 1.37$ ,  $SD = 0.68$ ) compared to the control condition ( $M = 1.81$ ,  $SD = 1.22$ ),  $F(1, 243) = 5.55$ ,  $p = .02$ ,  $\eta^2 = .02$ . Taken together this shows that mindfulness significantly reduced scores of hostile racism in the outgroup condition.

### **Discussion**

The results from Experiment 6 showed that in the control condition, participants who were asked to consider the other perspective made similar attributions of the ingroup and outgroup target. In the own perspective condition, participants in the control condition made more dispositional attributions of the ingroup target than an outgroup target. The opposite pattern of results was observed for participants in the mindfulness condition. Participants in the own perspective condition made similar attributions of the ingroup and outgroup target. In the other perspective condition, participants in the mindfulness condition made more dispositional attributions of the ingroup target compared to the outgroup target, suggesting that the FAE was still present.

The results in the control condition support those of Hooper et al. (2015b), that showed perspective taking reduced the fundamental attribution error. However, in the mindfulness condition the effect is reversed, and participants in the other

perspective condition made the FAE, whereas those in the own perspective condition did not. This may be due to the use of race as the group category, since perceptions about race are particularly difficult to alter (Ito & Urland, 2003; Park & Rothbart, 1982), and affect strongly held judgements such as transgression credit offered to leaders (cf. Abrams, Travaglino, Randsley de Moura, & May, 2014). Furthermore, Hooper et al. (2015b) used a different measure of the FAE and manipulated perspective taking through a training task, and thus differed from the present research.

Taken together the results showed that the effect mindfulness has on the FAE towards different group members is qualified by perspective taking, although further research is needed to fully understand this effect. It would be of interest to investigate the relationship between mindfulness and perspective taking more directly to better understand these results. Previous research suggests a positive correlation (Beitel et al., 2005; Johns et al., 2015), however, this has not yet been empirically tested.

Another possible area to follow up is the impact of mindfulness on direct measures of hostile racism. Although the results showed that participants generally scored below the mid-point for hostile racism, there was a mindfulness x group interaction which showed that mindfulness reduced perceptions of hostility towards the outgroup target. This has implications for reducing explicit racist attitudes towards outgroup members, and could also be compared to implicit measures, where mindfulness has been shown to reduce racial bias (Lueke & Gibson, 2015).

### **General discussion**

Two experiments investigated the effect of mindfulness on the FAE when evaluating ingroup and outgroup targets. Experiment 5 showed that mindfulness attenuated the FAE and attributions were less extreme to outgroup members, compared to ingroup members. For perspective taking, mindfulness reduced the ability to take another perspective in the ingroup condition. Experiment 6 developed this further by manipulating perspective taking. The results of Experiment 6 showed that in the control condition, participants taking their own perspective made the FAE and made more dispositional attributions of the ingroup member compared to the outgroup member, but in the other perspective condition this was attenuated. In contrast, the opposite effect was found in the mindfulness condition. More research is needed to further unpack this interaction and to fully understand the relationship between mindfulness and perspective taking.

One possible explanation for the different effect in the mindfulness condition is that mindfulness may increase introspection (Fox et al., 2012) thus making perspective taking more difficult in the outgroup condition. If the mindfulness condition is increasing participants' introspection, then considering another person's perspective may be too cognitively demanding. Although other research has suggested that a benefit of mindfulness practice is enhanced working memory capacity and more efficient management of cognitive load (Mrazek et al., 2015; van Vugt & Jha, 2011) it is possible that introspection and perspective taking clash and cause cognitive dissonance preventing the benefits of mindfulness for attenuating attribution bias.

In particular, in the outgroup condition, participants are asked to consider not only another perspective, but one of a less similar other (than the ingroup). This may be too cognitively depleting and causes a fall back to reliance on heuristics. Based on stereotypes and heuristic schemas some associations are more easily accessible, for example, the association between Black men and violence (Duncan, 1976) or anger and Black faces (Hutchings & Haddock, 2008). Thus stereotypes associating Black individuals with lower status or unemployment may mean that it is easier to imagine the outgroup member being unsuccessful in the labour market than the ingroup member. This association may be relied upon in the case of cognitive dissonance since an easily accessible resolution to the dissonance would be preferred than effortful thinking of alternative explanations or associations.

A possible limitation of these experiments is the ambiguity of the scenario. Participants were purposefully given limited information about the target and their background so that differences in responses could be attributed to the target's group membership (ingroup vs. outgroup). However, ambiguity can also affect judgements of others. Dovidio (1995) found that when White students were asked to select the most suitable candidate for a role as resident advisors, a prestigious and honourable role at US colleges, unambiguous (highly positive or uniformly negative) information led to equal selection of Black and White candidates. However, when the information was ambiguous (both positive and negative) White applicants were endorsed more than Black applicants. The same may therefore be true in the employment context used in the present research. In addition, the intergroup context was similar to the present experiment in that participants were all White and evaluating ingroup (White) vs. outgroup (Black) others.



Another potential problem in Experiment 6 could be the perspective taking manipulation. Participants were asked to consider the target's scenario considering how they would feel in that position (own perspective) or to consider how the target would be feeling (other perspective). However, the own perspective condition may also have enhanced perspective taking to some extent since participants were thinking about the scenario in third person. The task may also have been too cognitively depleting in the outgroup condition. Previous research (Hooper et al., 2015b) used brief perspective taking training to enhance participants' ability to consider the other perspective. Whilst this may not be feasible for all situations, it may be more effective in enhancing perspective taking, which it may not be possible to achieve through simple instructions to think about another person's situation/feelings.

Taken together, the results from Experiments 5 and 6 suggest that mindfulness is useful in reducing the fundamental attribution error for outgroup members, but is altered by explicitly trying to take the perspective of another person. In addition, Experiments 4-6 combined show that mindfulness has positive effects in attribution, and is beneficial to reducing attributional biases. In sum, these experiments add to an emerging body of literature on the positive effects of mindfulness on social judgements. It also lends to support to the notion that mindfulness has salutary effects in reducing automatic associations when evaluating others. A next logical step is to consider the effect of mindfulness on non-automatic cognitive processes within a social context. With this in mind, Experiment 7 aims to apply the brief mindfulness practice in the domain of group decision-making, since the decision process is based on non-automatic cognition.

## **Chapter 7: Mindfulness and group decision-making**

### **Chapter Summary**

So far the experiments presented in this thesis have focused on automatic biases in person-judgement. The focus of Chapter 7 is on the non-automatic process of decision-making. This chapter presents a face-to-face group experiment in which participants were randomly assigned to a mindfulness vs. control condition, before working in groups to complete a problem decision task. Specifically, the experiment investigated the interaction of mindfulness and anxiety on group cohesion, group efficacy, and decision accuracy. The results revealed that groups did not make superior decisions compared to individuals, and that cohesion and efficacy were not significantly altered by mindfulness and anxiety, but trends suggest both were reduced after mindfulness practice compared to control groups. These results are inconsistent with recent literature that suggests mindfulness improves group performance in decision-making tasks and increases group cohesion. Possible explanations for these results are considered in the discussion.

### **Mindfulness and group decision-making**

Groups tend to outperform individuals on decision-making tasks (Blinder & Morgan, 2000; Hill, 1982; Pavitt, 1994; Van & Delbecq, 1974; Vollrath, Sheppard, Hinsz, & Davis, 1989), especially when the features of the group and the nature of the task are optimally balanced (Hill, 1982). In practice, it is not always possible to identify suitable task features and group attributes ahead of time, and in many cases decision-making groups are made up of an ad hoc group of individuals. These groups differ from “true” or naturally occurring groups (Horn, 2008), in that decision-

making groups often exhibit different attributes and experience the decision process differently to “true” groups (Bettenhausen & Murnighan, 1985; Kramer et al., 1993).

One key difference between groups and individuals is that the presence of others can be intimidating for individuals and thus decreases performance. In contrast, the presence of others in a group situation sometimes increases arousal, motivation to perform well, and self-awareness (Duval & Wicklund, 1973; Zajonc, 1965) leading to enhanced performance. In addition, groups are able to attenuate the negative aspects of arousal and mitigate cognitive fallacies (O’Leary, 2011). However, an important feature that groups rely on for enhanced performance is the cohesiveness and mutual respect of group members. In other words, in order to achieve optimal performance, the group must also get along well.

In a cohesive group, motivation gains are attained through being in the presence of others which enhances the desire to perform well for the good of the group, and can further increase group cohesion (Guzzo & Dickson, 1996). Even temporary minimal groups can quickly form a group identity, which in turn can foster a sense of cohesion among ingroup members (Brewer, 1979) and help the group to perform efficiently. As is the case for attributional judgements, intergroup dynamics also affect this relationship, in that intergroup competition should further increase the ingroup’s cohesion and identity, strengthening their ‘groupness’ and therefore the group members desire to perform well for the good of the group. In sum, groups who share a positive experience tend to be made up of members who are willing to contribute more to the group to ensure its success, leading to further positive experience and group efficacy.

This experiment specifically investigates whether mindfulness and anxiety (through intergroup evaluations) affect group decision performance. It is expected that mindfulness will increase group cohesion, and enhance performance on the decision-making task. Furthermore, increased anxiety within the group is expected to hinder decision-making performance (Aiken, Kim, Hwang, & Lu, 1995; Bordia, Irmer, & Abusah, 2006), but increased intergroup anxiety is expected to heighten the ingroup identity (Oakes & Turner, 1980), and improve group performance and cohesion. Mindfulness has been shown to decrease individuals' anxiety and improve group-decision making, but as yet it is not known whether the two constructs interact, and whether mindfulness is only effective in improving decision-making when there is anxiety in the group. The hypothesis for Experiment 7 is that groups who are mindful and are put under anxiety inducing conditions should perform better than non-mindful groups and those who are not expecting to be evaluated.

### **Features of the Group**

Group members that are trying to accomplish something typically interact, influence one another, and perceive themselves to be a group with shared goals and objectives (Baron & Kerr, 2003). Such a sense of shared purpose fosters group efficacy, thus it is unsurprising that groups tend to perform better than individuals. An advantage that groups have over individuals is the ability to pool their group members' resources, which leads to superior decision-making (O'Leary, 2011). This allows for errors to be noticed and corrected, ideas and solutions to be shared and steps to be built upon through discussion. For example, in eureka tasks (intellective puzzles where there is a unique answer that once found becomes immediately clear; Lorge, Fox, Davitz, & Brenner, 1958), Shaw (1932) found that three of 21

individuals were able to solve the problem (approximately 14%) compared to three of five groups (60% of the four person groups). In fact, groups have been found to perform better than, or at least as well as, the best individual members of the group (Laughlin et al., 2002, 1991), suggesting that many heads are better than one.

Nonetheless, it is important to recognise that groups face problems that can hinder their ability to make optimal decisions. For example, decision-making groups are more likely to discuss information that they all share or have in common than unique or new information (Lu, Yuan, & McLeod, 2012; Stasser & Stewart, 1992; Stasser et al., 1989; Stasser & Titus, 1985) and when unshared information does arise its impact is given less attention. This suggests that groups can only really benefit from the input of more individuals, if the information and expertise of those individuals is utilised. Bottger and Yetten (1988) found that groups carrying out the 'Moon Landing' survival task were more effective when member resources were utilised effectively, especially when at least two members held high quality information. Unsurprisingly, groups with low member resource quality performed poorly.

This also highlights how social judgements influence the group and how group member attributes can hinder the decision-making process, for example, status and ability. The research above, suggests that group members with better quality information, or the skills to make a correct decision (or solve a problem) help the group to achieve a high quality decision or solution. However, this relies on two things: the group member sharing their information, and the group accepting and using that information. As discovered by Stasser and Titus (1985), group members are more likely to discuss information that they all have in common, so if a group

member stands alone with correct or useful information, the information may be overlooked, not shared, or not considered useful by the rest of the group. The group member with the best information is not always heard, especially if that member is of low status, or does not have confidence in their answer, and is unable to convince the other group members (Berger & Zelditch, 1998). This may suggest that intergroup dynamics can affect minimal groups' ability to work effectively. For example, arbitrary groups made up of members from other known groups may be affected by group members superordinate group memberships. However, this may be overcome by increased cohesion among group members.

### **Group Cohesion and Efficacy**

Increased group cohesion significantly predicts improved job satisfaction (Steinhardt, Dolbier, Gottlieb, & McCalister, 2003) and performance (Mullen & Copper, 1994). In addition, working as part of a group increases cohesion (Guzzo & Dickson, 1996). Therefore, the relationship between group work and cohesion may be two-way. As highlighted above, even temporary and minimal groups form cohesive groups (Brewer, 1979). Furthermore, Chin, Salisbury, Pearson, & Stollak, (1999) found that groups who were put together for the sole purpose of solving a single problem, and were therefore only together for a short time, still formed a cohesive relationship.

Similarly, successful group performance increases group efficacy, and vice versa (Ilgen, Hollenbeck, Johnson, & Jundt, 2005). This means that merely being placed in a group to perform a task could foster cohesion and perceived group efficacy. Furthermore, making a shared group identity salient was shown to increase negotiators concern for what others had obtained, and led to more equal outcomes

for both parties. By contrast a salient individuating, or personal, identity increased self-focus and reduced concern for others performance, leading to less equal outcomes (Kramer et al., 1993). Therefore a salient group identity, rather than salient personal identity, should be beneficial to group performance and improve perceptions of the social experience for group members, although the effect may be different in bigger groups, or with a different decision task.

### **Anxiety in Groups**

Decision-making groups do not need to be “true” groups with established norms and identity. In fact, Baron and Kerr (2003) suggest that established groups are more likely than nominal groups to suffer evaluation apprehension, which leads to reduced performance. Members of established groups, with a shared identity, may fear embarrassment or rejection from how other members evaluate their input, and therefore not contribute as much to the discussion. This was found in organisations where knowledge exchange can take place through either interpersonal interactions or in a shared database or intranet style system. Employees were found to be less likely to share information when apprehensive, and were more apprehensive about their input being evaluated when sharing this publicly in the database-style system (Bordia et al., 2006). This was thought to be the result of sharing the information with a number of people, and the information not being anonymous. This was supported by research that showed 85% of participants who communicated through an anonymous system felt little or no evaluation anxiety (Aiken et al., 1995).

Other research suggests that evaluation apprehension is less likely to be a problem for a temporary nominal group, and thus a nominal group may suffer less adverse effects to productivity than an established group. Camacho & Paulus (1995)

found that groups with low interaction anxiety performed as well as nominal groups, but those with high anxiety experienced process loss and underperformed. Therefore, a means to reduce evaluation anxiety should work to counter the negative effects and improve the group decision quality. One such intervention is mindfulness.

### **Mindfulness**

Mindfulness has been found effective in reducing trait and state anxiety through both face-to-face (Dam, Hobkirk, Sheppard, Aviles-Andrews, & Earleywine, 2013; Tanay et al., 2012) and online courses (Boettcher et al., 2014; Krusche et al., 2013; Proudfoot et al., 2004). Although not directly related to evaluation anxiety, this suggests that mindfulness may be a promising intervention to reduce the negative effects of the heightened state of anxiety produced by intergroup evaluation. Moreover, mindfulness reduces emotional arousal, which has been shown to increase individual performance in academic settings (Shao & Skarlicki, 2009), and thus mindfulness may attenuate the emotional arousal induced by intergroup evaluation.

In addition, mindfulness has been found to increase empathy (Edwards, Adams, Waldo, Hadfield, & Biegel, 2014), is thought to increase empathic concern for others (Block-Lerner et al., 2007), and have a positive effect on group cohesion (Cleirigh & Greaney, 2015). Taken together, these findings advocate that mindfulness should have a positive effect on group performance. In particular, by improving the intragroup dynamics so that group members are able to work cohesively and effectively, giving consideration to each other's position. In turn, this should enhance perceptions of group efficacy. As noted above, cohesive groups tend to share a more positive social experience and are able to work more efficiently.



Therefore mindfulness may also be beneficial to group members' social experience when working in a group.

Alongside the positive effects that mindfulness is thought to elicit among group members, there is emerging evidence that mindfulness is also beneficial to decision-making per se. For example, Hafenbrack et al. (2014) found that both trait and state mindfulness (after a 15 minute induction) were associated with reduced sunk-cost bias. The sunk-cost bias is the tendency to continue an endeavour after a commitment (e.g. time, effort or money) has been made, even though the outcomes may be negative. The research showed that mindfulness reduced this propensity through a reduced temporal focus on the past and future, which in turn decreased negative affect and led to less sunk-cost bias.

Another investigation of individual decision-making showed that mindfulness improves insight problems, but not non-insight problems. Insight problems are those where finding a solution is hindered by past experience, and restructuring the problem helps to overcome this and see the solution more easily (e.g. having an 'aha!' moment). In contrast, non-insight problems are those where logic can be used to solve the problem through a series of incremental steps, and are helped by past experience or knowledge of the problem. Ostafin and Kassman (2012) found that more mindful participants were better able to solve the insight problems, but that mindfulness had no effect on performance in non-insight problems. This was thought to be the result of mindfulness enabling participants to overcome habitual responding in the insight problems, and consider the problem from alternative perspectives, and with more creativity. Additionally, experienced meditators showed significantly less cognitive rigidity than naïve meditators, which

helped experienced meditators to find novel solutions to problems more easily (Greenberg et al., 2012). These studies, taken together, point to a positive effect of mindfulness in decision-making across different types of task. In particular, tasks that benefit from non-automatic responding and increased creative or flexible thinking.

There is a hypothesised link between mindfulness and decision-making in other areas. For example, mindfulness enables decision-makers to sort relevant from non-relevant information more easily (Karelaia & Reb, 2014). This adds weight to the theory that mindfulness would aid decision-making for particular tasks, such as those that require some element of judgement as well as knowledge and skill. One such task that would therefore be useful to test in this context is a survival task (e.g. winter survival, desert survival, Johnson & Johnson, 2003). This type of task has a correct answer (items ranked by the expert), but relies on some level of judgement as to the use and importance of the items. Therefore it falls somewhere in the middle of the continuum from intellectual tasks, or those with a demonstrably correct outcome, and judgmental tasks that do not have a correct answer (Laughlin & Ellis, 1986). Consequently, a degree of flexible thinking is required, and group members with knowledge of survival situations or atypical uses for the 15 available items should be better equipped to make an accurate decision.

At present, very little empirical research has investigated the influence of mindfulness on group performance and decision-making. However, Cleirigh and Greaney (2015) found that mindfulness increased group cohesion, and improved decision-making performance on a survival task. They delivered a brief (10 minute) mindfulness induction, followed by an introduction to the benefits of mindfulness on

emotional experience and an awareness themed poem to half of their participants. The other half (control group) listened to two educational excerpts from a radio show. Thirty-two participants then worked in groups of four to complete the ‘Winter Survival’ task (Johnson & Johnson, 2003) where participants completed the task individually and then as a group. Using openness to the concept of mindfulness (Mindfulness Attitudes Scale, MAS) as a covariate, the researchers found that group scores in the mindfulness condition were significantly higher, and thus more accurate, than group scores in the control condition.

Although this research shows promise for the use of mindfulness to improve group performance, and is a good preliminary investigation, the design means that we still do not know whether the groups performed better than individuals. The results show that mindful groups perform better than non-mindful groups, but not whether this also represents an increase from individual performance. Furthermore, the study is based on a very limited number of participants and is statistically underpowered. In addition, although the researchers included a measure of group cohesion, they did not take into account other group level factors, such as intergroup evaluations.

The aim of the present experiment is to test the use of the 5-minute mindfulness task in a face-to-face group setting to investigate whether mindfulness improves the outcome on a non-automatic task, specifically a group decision-making task. Furthermore, the experiment will test the effect of mindfulness on group performance compared to individual performance on decision-making, as well as whether mindfulness impacts evaluation anxiety, group cohesion and group efficacy. Groups of four will be used as in the original study (Cleirigh & Greaney, 2015), and

because fostering identity and belonging to improve cooperative decision-making has been found easier in small groups (M. B. Brewer & Kramer, 1986). A smaller group is also expected to benefit from reduced production blocking. In bigger groups, since only one person can speak and be heard at a time, group members have to take turns. This can decrease efficiency as waiting can lead to ideas being skipped, missed or forgotten (Johnson & Johnson, 2003). It is expected that this will create optimal group conditions. Furthermore, the same type of survival task will be used as in the original study since this type of task requires skills that mindfulness is expected to enhance.

### **Hypotheses**

Experiments 4-6 revealed that a single-session 5-minute mindfulness practice improved evaluations of others through reducing the automatic process of attribution. The hypothesis for Experiment 7 is that mindfulness will also have an effect on the non-automatic process of decision-making. Based on the previous findings, it is expected that mindfulness will have a positive effect on group performance, increasing decision accuracy, group cohesion, and group efficacy.

Furthermore, it is expected that increased anxiety will lead groups to perform worse on the decision-making task, but that their group identity will be stronger. Mindfulness is expected to attenuate this group performance decrement, and therefore, it is expected that participants in the mindfulness condition, and experiencing anxiety will perform better than participants in control conditions with low anxiety. Furthermore, mindfulness and increased anxiety are expected to enhance the group performance, relative to the individual group members' performance.

## Experiment 7

### Method

#### Participants and Design

An opportunity sample of two hundred and forty undergraduate students voluntarily participated in the experiment, in return for course credit. Forty-eight participants were excluded due to a technical problem with the audio file for 12 groups, leaving 192 participants in the analysis (150 women, 28 men and 14 not specified,  $M_{\text{age}}=18.81$  years, ranging from 16-63). A 2 (mindfulness vs. control) x 2 (high vs. low anxiety) between participants design was employed. Participants were randomly allocated to groups of four using playing cards, which also assigned them to condition. These were mindfulness (N= 108), control (N= 84), high anxiety (N= 100) and low anxiety (N= 92).

#### Materials

**Mindfulness Manipulation.** The same mindfulness audio file, consisting of a 5-minute body scan, was used as in Experiments 1-3.

**Anxiety Manipulation.** Anxiety was manipulated by telling participants in the high anxiety condition that after the experiment they would be asked to “*stand up in front of the class to present your scores to the rest of the groups and evaluate your performance, and your group’s performance to see which group achieved the most accurate answer*”. In the low anxiety condition, participants were told that “*The scores on the decision-making task will not be compared to other individuals or other groups and the outcomes will not be evaluated*”.

**Decision-making Task.** Participants were asked to complete ‘The Desert Survival Situation’ task, which is a group decision-making task for examining individual and team effectiveness (see Appendix J). Similar tasks such as the ‘Winter Survival’ task (Johnson & Johnson, 2003, p.309) have been used in previous group decision-making research (Cleirigh & Greaney, 2015; Haslam et al., 1998; Sundstrom et al., 1997). The task required participants (working in groups of four) to imagine that their plane had crash landed in the Sonora desert in the South-West United States in mid-August, and gives some information about their last known location and the conditions in their current location. They are given a list of 15 items (e.g. magnetic compass, cosmetic mirror and jack knife) which were salvaged from the plane wreckage, and told to rank these items in order of importance to the groups’ survival. Participants were given 5-minutes to complete this ranking individually, without discussing with other group members. They were then given 10-minutes to work collectively and rank the items as a group. Groups were then given the list with the order of importance as decided by a real survival expert and asked to calculate the difference between their individual ranking and the expert ranking, and the group ranking compared to the expert ranking.

### **Dependent Measures**

**Decision.** Error scores were used to reflect decision quality. Both individuals ranking, and group ranking scores were subtracted from the expert ranking to provide an error score ranging from 0 (perfect match to expert) to 95 (inverse ranking). This provided two scores, an individual and group performance score. Scores closer to the expert’s (lower scores), which represented a smaller error were indicative of a better performance on the task.

**Anxiety.** After receiving the instructions and the anxiety manipulation, participants were asked three manipulation check questions to assess how anxious they felt (see Appendix J). These were measured on a 7-point, bi-polar scale (calm - tense, anxious - relaxed (reverse scored) and confident - unsure),  $\alpha = .74$  ( $M= 3.60$ ,  $SD= 1.11$ ).

**Group identification.** Two items were adapted from a larger group identification scale (Randsley de Moura, Abrams, Retter, Gunnarsdottir, & Ando, 2009) and asked participants how strongly they identified with the group they were assigned to for the experiment (e.g. “I feel strong ties with this group”). Items were measured on a 7-point scale (1= not at all, 7= very much), with higher scores indicating stronger identification,  $r = .67$  ( $M= 4.58$ ,  $SD= 0.99$ ), see Appendix K.

**Group Cohesion.** A 10 item scale was created to measure group cohesiveness. Six items (e.g. “I see myself as part of this group”) were taken from the perceived cohesion in small groups scale (Chin et al., 1999) and a further four were added, asking participants how much they liked the group (e.g. “I felt that I was similar to other members of the group”, “I enjoyed being part of this group”). Items were measured on a 7-point scale (1= not at all, 7= very much), with higher scores indicating stronger cohesion,  $\alpha = .91$  ( $M= 4.88$ ,  $SD= 0.88$ ), see Appendix K.

**Group Efficacy.** Two items assessed how well participants perceived that their group had worked effectively in the decision-making task (“All members of the group contributed to the discussion and worked well together”, “The group came up with the best decisions possible”). Items were measured on a 7-point scale (1= not at all, 7= very much),  $r = .39$  ( $M= 5.34$ ,  $SD= 1.07$ ), see Appendix K.

**Mindfulness Attitudes Scale.** The mindfulness attitudes scale (Cleirigh & Greaney, 2015) was included to assess participants openness to the concept of mindfulness. One question asked participants to rate their attitude towards mindfulness on a 7-point scale (*1= wouldn't be open to the concept, 7= would be open to the concept*) ( $M= 5.26$ ,  $SD = 1.16$ ), see Appendix K.

**Mindfulness knowledge.** Two questions asked participants how familiar they were with mindfulness practice ( $M= 3.06$ ,  $SD= 1.76$ ), and how focused they were on the decision-making task ( $M= 5.51$ ,  $SD= 1.07$ ). Both items were measured on a 7-point scale (*1= not at all, 7= very much*). These were analysed separately as single items (see Appendix K).

### **Procedure**

Participants initially reported to a large computer room in groups of 40-50, where they were given an information sheet and were verbally introduced to the experiment and given details of ethical considerations by the researchers. Random allocation to group was achieved by playing card, whereby the value of the card represented a group number (e.g. Queen = group number 12). Participants then divided into their groups of four in small group laboratories set up with group members sat around a table where they could listen to the audio. The 5-minute audio files were played via tablets placed in the middle of the tables, and lab doors were kept closed to ensure the groups could not hear the audio for other conditions. After the audio file had finished, a researcher entered the lab and gave each participant an instruction sheet for the decision-making task (see Appendix J). This contained the anxiety manipulation and manipulation check questions, along with the scenario about the task. Participants were given approximately 5-minutes to read this



information, after which a researcher presented the participants with the individual ranking form. Lab doors were kept open during the 5-minutes for individual ranking to ensure participants were not discussing the task. Following this, the researcher gave each group one copy of the group ranking form and allowed the groups 10-minutes to discuss and decide on a rank order. Participants were told to alert the researcher when they had reached a decision if this was done in under 10-minutes. The groups were then given time to work out difference scores for their individual and group rankings. Approximately 10-minutes before the end of the session participants were given the questionnaire pack and asked to complete them individually, without discussing the questions or their answers. After this participants were thanked and debriefed.

## Results and Discussion

### Decision-making

#### Group score

Since participants were assigned to their groups at the beginning of the experiment, the scores were aggregated by group for analysis. After excluding those who experienced the technical fault with the audio file, 48 groups (N= 192) remained for the analysis. A 2(condition: mindfulness vs. control) x 2(anxiety: high vs. low) ANOVA was conducted on group score<sup>8</sup>. There was no main effect of condition,  $F(1, 44)= 0.01$ ,  $p = .97$ ,  $\eta^2 <.01$  or of anxiety,  $F(1, 44)= 0.30$ ,  $p = .59$ ,  $\eta^2 =.01$ . The

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<sup>8</sup> MAS was added as a covariate, as in Cleirigh and Greaney's (2015) study, but this did not change the overall pattern of results and so MAS was not included in further analysis. The covariate was not significant,  $F(1, 43)= 0.21$ ,  $p= .65$ ,  $\eta^2 =.01$ , There was no main effect of condition,  $F(1, 43)= 0.01$ ,  $p= .95$ ,  $\eta^2 <.01$ , or of anxiety,  $F(1, 43)= 0.34$ ,  $p= .56$ ,  $\eta^2 =.01$ . The interaction of mindfulness condition x anxiety was not significant,  $F(1, 43)= 1.20$ ,  $p= .28$ ,  $\eta^2 =.03$

interaction of condition x anxiety was not significant,  $F(1, 44) = 1.20$ ,  $p = .28$ ,  $\eta^2 = .03$ .

#### Individual vs. Group score

A 2 (condition: mindfulness vs. control) x 2 (anxiety: high vs. low) mixed ANOVA was run with score as a within participants factor. There was no main effect of condition,  $F(1, 44) = 0.03$ ,  $p = .87$ ,  $\eta^2 < .01$ . There was no main effect of anxiety,  $F(1, 44) = 0.05$ ,  $p = .83$ ,  $\eta^2 < .01$ . The interaction of condition x anxiety was not significant,  $F(1, 44) = 0.69$ ,  $p = .41$ ,  $\eta^2 = .02$ . There was no effect of score,  $F(1, 44) = 0.15$ ,  $p = .70$ ,  $\eta^2 < .01$ . The two-way interaction of score x condition was not significant,  $F(1, 44) = 0.09$ ,  $p = .76$ ,  $\eta^2 < .01$ , and the two-way interaction of score x anxiety condition was not significant,  $F(1, 44) = 1.97$ ,  $p = .17$ ,  $\eta^2 = .04$ . The three-way interaction of score x condition x anxiety was not significant,  $F(1, 44) = 1.04$ ,  $p = .31$ ,  $\eta^2 = .02$ .

**Table 14.**

Means (SD) for individual and group scores on decision-making task, by condition

	High Anxiety		Low Anxiety	
	Individual	Group	Individual	Group
Mindfulness	75.69 (8.57)	72.77 (8.27)	73.73 (5.12)	76.86 (9.57)
Control	75.21 (2.55)	75.58 (7.86)	72.89 (5.40)	74.22 (9.57)

#### Mindfulness manipulation check

A 2 (condition: mindfulness vs. control) x 2 (anxiety: high vs. low) ANOVA was conducted on the single MAS item. There was no significant main effect of condition,  $F(1, 190) = 3.37$ ,  $p = .07$ ,  $\eta^2 = .01$ , or of anxiety,  $F(1, 190) = 0.55$ ,  $p = .46$ ,  $\eta^2 < .01$ . There was no significant condition x anxiety interaction effect,  $F(1, 45) = 0.01$ ,  $p = .95$ ,  $\eta^2 < .01$ . Since there were no effects of mindfulness or anxiety

condition on the MAS, and it was measured at the end of the study, it was not included as a covariate in the analysis.

A further two 2 (condition: mindfulness vs. control) x 2 (anxiety: high vs. low) ANOVA's were run with familiarity (with mindfulness practice) and focus on the task as dependent variables. For focus, there was no main effect of condition,  $F(1,190)= 2.68$ ,  $p = .10$ ,  $\eta^2 = .01$ , or of anxiety,  $F(1,190)= 0.14$ ,  $p = .71$ ,  $\eta^2 < .01$ . The interaction of condition x anxiety was not significant,  $F(1,190)= 0.18$ ,  $p = .67$ ,  $\eta^2 < .01$ .

For familiarity, there was a main effect of condition,  $F(1,190)= 15.96$ ,  $p < .001$ ,  $\eta^2 = .08$ . This showed that those in the mindfulness condition ( $M= 3.46$ ,  $SD= 1.69$ ) reported significantly greater familiarity with mindfulness practice than those in the control condition ( $M= 2.51$ ,  $SD= 1.74$ ). There was a main effect of anxiety,  $F(1,190)= 15.26$ ,  $p < .001$ ,  $\eta^2 = .08$ , showing that those in the high anxiety condition ( $M= 3.47$ ,  $SD= 1.82$ ) reported significantly greater familiarity with mindfulness practice than those in the low anxiety condition ( $M= 2.52$ ,  $SD= 1.51$ ). There was no interaction of condition x anxiety,  $F(1,190)= 1.57$ ,  $p = .21$ ,  $\eta^2 = .01$ .

### **Anxiety**

A 2 (condition: mindfulness vs. control) x 2 (anxiety: high vs. low) ANOVA was conducted on anxiety scores. There was no main effect of condition,  $F(1, 190)= 0.70$ ,  $p = .41$ ,  $\eta^2 < .01$  or of anxiety,  $F(1, 190)= 1.21$ ,  $p = .27$ ,  $\eta^2 = .01$ . There was no significant condition x anxiety interaction effect,  $F(1, 190)= 0.84$ ,  $p = .36$ ,  $\eta^2 < .01$ .

### **Group identification**

A 2(condition: mindfulness vs. control) x 2(anxiety: high vs. low) ANOVA was conducted on group identification scores. The main effect of condition

approached significance,  $F(1, 190) = 3.71$ ,  $p = .06$ ,  $\eta^2 = .05$ . The means showed that those in the mindfulness condition reported lower group identity ( $M = 4.46$ ,  $SD = 1.06$ ) than participants in the control condition ( $M = 4.73$ ,  $SD = 0.86$ ). The main effect of anxiety was significant,  $F(1, 190) = 10.99$ ,  $p < .001$ ,  $\eta^2 = .06$ . The means showed that, as hypothesised, those in the high anxiety condition felt a stronger sense of identification with their group ( $M = 4.82$ ,  $SD = 1.04$ ) than those in the low anxiety condition ( $M = 4.36$ ,  $SD = 0.86$ ). There was no significant condition x anxiety interaction effect,  $F(1, 190) = 0.20$ ,  $p = .65$ ,  $\eta^2 < .01$ .

### **Group cohesion**

A 2(condition: mindfulness vs. control) x 2(anxiety: high vs. low) ANOVA was conducted on group cohesion scores. There was a significant main effect of condition,  $F(1, 190) = 6.00$ ,  $p = .02$ ,  $\eta^2 = .03$ . The means showed that those in the mindful condition showed less group cohesion ( $M = 4.74$ ,  $SD = 0.91$ ) than those in the control condition ( $M = 5.05$ ,  $SD = 0.81$ ). There was no main effect of anxiety,  $F(1, 190) = 0.52$ ,  $p = .47$ ,  $\eta^2 = .01$ . There was no significant condition x anxiety interaction effect,  $F(1, 190) = 0.11$ ,  $p = .74$ ,  $\eta^2 < .01$ .

### **Group efficacy**

A 2 (condition: mindfulness vs. control) x 2 (anxiety: high vs. low) ANOVA was conducted on group efficacy scores. Descriptive statistics are shown in Table 15. There was a significant main effect of condition,  $F(1, 190) = 8.23$ ,  $p = .01$ ,  $\eta^2 = .04$ . This showed that participants in the mindful condition evaluated the group as less effective ( $M = 5.14$ ,  $SD = 1.09$ ) than those in the control condition ( $M = 5.58$ ,  $SD = 0.99$ ). There was no significant effect of anxiety,  $F(1, 190) = 0.29$ ,  $p = .59$ ,  $\eta^2 < .01$ .

The condition x anxiety interaction approached significance,  $F(1, 190) = 3.54$ ,  $p = .06$ ,  $\eta^2 = .02$ .

**Table 15.**

Means (SD) for individual and group scores on decision-making task, by condition

	High anxiety	Low anxiety
Mindfulness	4.95 (1.28)	5.32 (0.84)
Control	5.68 (1.03)	5.47 (0.94)

Analysis of the simple effects using Bonferroni adjustments showed that in the low anxiety condition, there was no significant difference in perceptions of group efficacy between the mindfulness ( $M=5.32$ ,  $SD= 0.84$ ) and control ( $M=5.47$ ,  $SD= 0.94$ ) conditions,  $F(1, 190) = 0.46$ ,  $p = .50$ ,  $\eta^2 < .01$ . In the high anxiety condition, there was a significant difference in perceptions of group efficacy between the mindfulness and control conditions,  $F(1, 190) = 12.06$ ,  $p = .001$ ,  $\eta^2 = .06$ . Participants in the mindfulness condition perceived significantly less group efficacy ( $M= 4.95$ ,  $SD= 1.28$ ) than participants in the control condition ( $M= 5.68$ ,  $SD= 1.03$ ).

In the control condition there was no significant difference in perceptions of group efficacy between the high ( $M= 5.68$ ,  $SD= 1.03$ ) and low ( $M= 5.47$ ,  $SD= 0.94$ ) anxiety conditions,  $F(1, 190) = 8.23$ ,  $p = .01$ ,  $\eta^2 = .04$ . There was also no significant difference in perceptions of group efficacy in the mindfulness condition,  $F(1, 190) = 3.83$ ,  $p = .07$ ,  $\eta^2 = .02$ , comparing high ( $M= 4.95$ ,  $SD= 1.28$ ) and low ( $M= 5.32$ ,  $SD= 0.84$ ) anxiety conditions.

## Discussion

Experiment 7 aimed to investigate the use of the 5-minute mindfulness manipulation in the context of group decision-making. Extending previous research,

the results of Experiment 7 did not support those in Cleirigh and Greaney's (2015) investigation. The results of the present experiment show that there were no significant differences between groups' decision-making scores depending on mindfulness and anxiety conditions. Furthermore, the present experiment showed that groups did not perform significantly better than their individual members.

The finding that groups are more cohesive after a mindfulness induction was also not replicated. In fact, for both group cohesion and group efficacy, mindful groups perceived their group to be less cohesive and efficacious than non-mindful groups. Moreover, for participants in the high anxiety condition, group efficacy was perceived to be significantly lower after the mindfulness manipulation than the after the control. The present experiment showed that participants in the high anxiety condition did perceive greater group identification than those in the low anxiety condition, but that this was not affected by the mindfulness manipulation. In fact, the marginally significant main effect suggested that, akin to cohesion and efficacy, mindfulness reduced participants' group identity compared to the control condition.

Taken together these results suggest that, for group decision-making among student participants, mindfulness was not beneficial. Importantly for the social experience of group members, mindfulness had a negative effect, and significantly reduced the perceptions of group identity, cohesion and efficacy, irrespective of the decision. Although this experiment has some limitations, these results highlight a potential problem for the application of mindfulness in group settings, such as organisations.

A key explanation for the difference between the present findings and those in Cleirigh and Greaney's (2015) study is the increased statistical power in the

present experiment, through the use of a much larger sample size that was aggregated by group for the purposes of analysis. With only 32 participants, it is not possible to be sure that the previous results are reliable. Although the present experiment is not without limitations, the findings may more closely represent a true effect. For example, the inclusion of the anxiety manipulation will alter the effects slightly, but the present experiment found little to no effect of mindfulness on performance, and certainly not evidence of a positive effect.

Another possible explanation for the difference in results is the mindfulness practice. Cleirigh and Greaney (2015) used a 10-minute practice, followed by additional mindfulness induction materials. Therefore the practice was at least double the length of time used in the present experiment. In addition, the practices included a mindfulness task similar to that used in the present experiment, but also supplemented this with another practice and other information. As mentioned previously (see Chapter 4), additional information in mindfulness practice may lead to increases in positive outcomes without the increases in mindfulness per se (Eberth & Sedlmeier, 2012). With this in mind, the present experiment did not include anything alongside the 5-minute practice. Although this has been shown to effectively increase state mindfulness, it was not measured in the present experiment, and so it is not possible to say whether the mindfulness manipulation worked. Furthermore, Cleirigh and Greaney (2015) found that mindful participants exhibited increased decentering and curiosity at time 2, which was after completing the survival task, although differences in mindfulness levels were not measured in the present experiment.

Moreover, the mindfulness practice was delivered to the groups, so participants were required to complete the practice in their groups of four, in the laboratory setting. There are a number of potential problems with this. First, as shown in Experiment 1, students in a lab setting did not show the same increase in levels of state mindfulness that were achieved with an online sample with a wider age range. This was hypothesised to be a result of apprehension in following the instructions in front of peers, which could also have been a problem in the current experiment. Particularly since the participants were seated around a table, and were therefore facing each other. As detailed previously, perspective taking orientation affects evaluations of the self and others (Duval & Wicklund, 1973; Storms, 1973).

The nature of the task could have impacted the results of the present experiment, not only because the decision was made as a group, but also because it was a task that relied less on automatic processes, and more on effortful thought. Some emerging research has shown that mindfulness increases individual decision-making quality (Hafenbrack et al., 2014; Ostafin & Kassman, 2012), but in previous work, the decision has been underlined by automatic processes (e.g. avoiding a sunk-cost and improving insight problem solving). As detailed above, the survival task used in this research lies between an intellectual and judgement task (Laughlin & Ellis, 1986). This means that some level of effortful thought is required to achieve the most accurate outcome. This may therefore suggest that mindfulness is not effective in altering performance on non-automatic tasks, or at least 5-minutes of practice is not long enough to affect change.

There may also be some limits to the effects of mindfulness in different decision contexts. For example, group decision-making requires different skills;



group-work skills that are needed to work effectively in a group, and task-work skills that are needed to be able to complete the task/solve the problem. Whilst it was expected that mindfulness would enhance both types of skill, it is likely that the effect on task-work skills is more limited. For example, mindfulness may have enhanced cognitive capacity and flexibility (Baird, Smallwood, Fishman, Mrazek, & Schooler, 2013; Chambers et al., 2008; Greenberg et al., 2012; Jha et al., 2007; Ostafin & Kassman, 2012) which may have led to more creative ideas for uses of the 15 items, but not necessarily correct or useful ideas in relation to the survival task. Mindfulness would not have made the correct solution any more apparent and so is limited in increasing task-work skills.

Additionally, it may be that the task-work skills are affected more in individual mindfulness practice (e.g. Hafenbrack et al., 2014; Ostafin & Kassman, 2012), but not in group situations. Alternatively, although the hypothesised increase in group cohesion was not found, this may have been a result of methodological problems, rather than mindfulness not having an effect. Nominal groups can form strong cohesive groups (Baron & Kerr, 2003; Chin et al., 1999), however these are usually made up of group members with no previous familiarity. The use of students in the present experiment meant that some groups may have comprised of people who had previously worked together, or in fact, knew each other very well. This may have limited the effectiveness of mindfulness on participants' group-work skills since intragroup dynamics may already exist, or previous knowledge of superordinate group membership may have influenced input. For example, that group members of low status or lacking confidence in their ability not contributing to the group decision (Berger & Zelditch, 1998).

In addition, the student sample were more likely to be aware of the artificial settings and the fact that there was limited time in which they were expected to take part in the experiment. This may have reduced the impact of the anxiety manipulation as participants were told they would be gathered in a larger room and would evaluate each other's performance. This instruction may not have seemed realistic given the time frame of the study which was to fit into 50-minutes. Furthermore, this time restriction meant that both individuals and groups were limited in how much time they had to make a decision. This was around half the time given in Cleirigh and Greaney's (2015) study, and therefore may also explain the difference in the findings. Furthermore, the time restrictions may have increased cognitive load and weakened the effect of the mindfulness practice.

Additionally, this may have affected the decision-making methods employed by the groups. Johnson and Johnson (2003) detail ten methods of reaching a decision. Two that are particularly pertinent to the decision-making task used in this experiment. They are: vote, or majority rule, and consensus. Consensus is the most effective, but requires the most time to work effectively, and thus the time constraint imposed here may have hindered the group's ability to carry out full rational discussion of all possible options. Groups may therefore have opted for majority rule as a quicker method, however, since majority rule can create a divide within the group, using this method could have impeded the creation of group identity and cohesion.

Aside from mindfulness, the anxiety manipulation may have been problematic in the current methodology since individual participants were within groups whose performance was to be evaluated, rather than personal evaluations,

which may have diffused some of the responsibility for performing well, particularly among the groups who were less cohesive. In addition, the anxiety manipulation stated groups would be compared to other groups, so this may have increased intergroup competition, rather than, or more so, than evaluation apprehension. This would be an interesting avenue for future research since mindfulness may have impact on competitiveness and intergroup performance. For example mindfulness is beginning to be researched in sports contexts (Blecharz et al., 2014), and therefore understanding the effect of mindfulness on intergroup competition could have wider applications than group decision-making.

Together, the findings of the present experiment showed that there were no significant interactions of anxiety and mindfulness for decision-making, group cohesion or group efficacy. Although this contradicts the hypotheses, and does not support previous research, it adds to the literature on mindfulness effects in group contexts. The effect of mindfulness on non-automatic decision tasks and the effect in group settings merits further investigation. It is possible that the present research has begun to uncover a boundary condition for the positive effects of mindfulness. Although it is known that mindfulness is not a cure-all and is not effective in all situations (e.g. Goyal et al., 2014), more research is needed to investigate contexts in which mindfulness is not beneficial, or may even have negative effects. A wealth of literature theorises that mindfulness should improve decision-making but as yet little empirical research has been produced to support such hypotheses. The present research suggests two possible avenues to pursue; the difference between individual and group decision-making, and different decision tasks and their automaticity.

The remaining Chapter in this thesis draws together the findings of the seven experiments presented in the previous four chapters. A general discussion of the findings and their contribution to the literature on mindfulness and social judgements is presented, followed by an overview of limitations and the potential future directions derived from them.

## **Chapter 8: General Discussion**

This final chapter draws together the findings reported in the empirical chapters of this thesis and concludes what this adds to the emerging literature on mindfulness and social judgements. The research presented in this thesis has examined the use of a 5-minute, online mindfulness practice and found it effective for increasing state mindfulness. This practice was then applied to the automatic process of person judgement using attribution theory, and the non-automatic process of decision-making in a group context. Results suggest that a brief mindfulness induction is effective in altering attributions, but may be limited in the group decision-making context. Central findings are discussed in greater detail below, in view of the potential applications of the research. Limitations of the thesis are addressed, and avenues for future work are suggested.

### **Theoretical Approach**

Despite origins in Buddhist spirituality (Brown & Ryan, 2003), mindfulness research has proliferated psychology literature for over 40 years (Black, 2011). The focus of research, until recently, had been on the effect of mindfulness courses for clinical symptoms such as stress, anxiety, depression and chronic illness (for a review see Goyal et al., 2014). Attention then moved to courses that were delivered online for clinical populations (Beattie et al., 2009; Christensen et al., 2006; M. C. Davis & Zautra, 2013; Kemper & Yun, 2015; Krusche et al., 2012, 2013; Proudfoot et al., 2004; Spijkerman, Pots, & Bohlmeijer, 2016) and whether self-help courses, without the need for specialised, clinical-practitioner input, were effective (for review see Cavanagh, Strauss, Forder & Jones, 2014).

Only in the last ten years have researchers shifted focus away from prolonged courses and considered the use of single-session mindfulness and the use of online practice. As highlighted in the theoretical discussion in this thesis, to date, these approaches have either been considered separately, or without measuring their effect on individuals' levels of mindfulness. Furthermore, as detailed above, the majority of mindfulness research has concentrated on alleviating clinical symptoms. Relatively few papers have applied mindfulness in the context of social psychology (Erisman & Roemer, 2010; Greenberg et al., 2012; Hong et al., 2014; S. Johnson et al., 2013; Kiken & Shook, 2011; Papiés et al., 2012; Shao & Skarlicki, 2009), and of those even fewer have considered the impact of mindfulness on interpersonal or intergroup judgements (Cleirigh & Greaney, 2015; Hophthrow et al., 2016; Weger et al., 2012).

Combining single-session, online mindfulness provided one of the key aims of the empirical work in this thesis. Although brief ( $\leq 10$  minutes) mindfulness practices have been used in previous research (Erisman & Roemer, 2010; Heppner et al., 2008; Hong et al., 2014; Hooper et al., 2011; Reynolds et al., 2015; Weger et al., 2012) none had tested whether the practice had increase mindfulness from pre- to post-test, or in some cases had not measured mindfulness at all. This thesis therefore started by addressing this important gap in the literature, by testing whether a 5-minute mindful body scan, practiced via online software, effectively induced a state of mindfulness.

Another key hypothesis underpinning the research in this thesis is that present-moment, non-judgemental awareness (Kabat-Zinn, 1990) should prevent rumination on the past and anxiety about the future (Baer, 2003; Brown & Ryan,

2004; Diaz, 2011), and prevent habitual responding (Jordan et al., 2014; Kiken & Shook, 2011) based on heuristics. Heuristics are thought to be the basis of automatic responding in person judgement, such as attributions (Bruner, 1957; Heider, 1958; Kahneman & Frederick, 2002; Shaver, 1975), and particularly attribution biases (e.g. FAE, Heider, 1958; Ross, 1977; or CB, Gawronski, 2004; Gilbert & Malone, 1995). Furthermore, mindfulness has been shown to increase cognitive flexibility (Greenberg et al., 2012) which should enhance performance on problem-decision tasks. In combination with an increase in empathy and perspective-taking through more mindful attentional awareness this was expected to improve other person judgements and group cohesion in a decision-making task. This thesis draws together these ideas to investigate the use of mindfulness in the context of social judgement.

The application of a brief mindfulness practice to social psychology has underpinned the overall theoretical and empirical questions examined in this thesis. The aims of this thesis have been to test the effectiveness of a 5-minute online mindfulness practice in increasing state mindfulness, and then apply this to social judgements, specifically focusing on attribution bias and decision-making. Specifically, this thesis investigated whether a brief online mindfulness induction would prove beneficial in reducing attribution biases, and improve the accuracy of decision-making in small groups.

### **Summary of findings**

These hypotheses were tested across seven experiments, starting by investigating the effectiveness of the 5-minute online mindfulness practice. In Experiment 1, adolescent participants completed the mindfulness practice in a large

open-plan computer room. State mindfulness was measured using the TMS (Lau et al., 2006) just before, and immediately after the mindfulness practice. The 5-minute mindful body scan practice was compared to a 5-minute control condition in which participants received instructions in the first and last 30 seconds of the audio, but were asked to listen to silence for the rest of the 5-minute audio clip. This approach was used throughout the thesis in all of the experiments.

The findings of Experiment 1 revealed no significant effects, but a trend in the expected direction, where means for participants in the mindful condition were higher at T2. The results were primarily thought to be a result of methodological problems, such as participants in different conditions being sat next to one another and not focusing on the task, as well as the age of the participants. Research has shown that younger people taking part in practices such as mindfulness prefer privacy and anonymity during practice (Cavanagh et al., 2013). In Experiment 1 this was not possible, and participants may have been very aware of their peers, especially since half of the group were asked to close their eyes to complete the mindfulness practice, whilst the other half were left to let their mind-wander (and thus may have become bored and distracted others).

Experiments 2 and 3 built upon this, with the aim of addressing the limitations highlighted in Experiment 1. Experiment 2 tested the delivery of the mindfulness practice online where participants were able to complete the practice in their choice of surroundings and in their own time. In order to ensure that the questions in the TMS were not eliciting heightened mindfulness the two subscales of the TMS were separated and one presented pre-practice and the other presented post-practice (counterbalanced). The results of Experiment 2 showed that state



mindfulness was higher among participants in the mindfulness condition, compared to the control condition, and thus confirmed that the TMS was not eliciting the increase in mindfulness.

Experiment 3 further refined the paradigm, and showed that delivered online, mindfulness was significantly increased from pre- to post-practice in adult participants. This provides evidence that the use of a brief mindfulness practice with a non-clinical sample, and without any specialist input is effective in increasing levels of state mindfulness. This is important because a number of mindfulness practices already exist, and can be accessed for free through websites and smartphone apps, but until now it was unknown whether such online, self-guided practices were actually able to induce a state of mindfulness. These experiments suggest that they could be beneficial, in as little as 5-minutes.

Experiments 1-3 taken together support the hypothesis that a 5-minute mindfulness practice delivered online increases state mindfulness. In fact, the non-significant results in a laboratory setting support the notion that allowing participants the anonymity and privacy of carrying out mindfulness practices in their own surroundings facilitates the increase in mindfulness levels (Beattie et al., 2009; Christensen et al., 2006).

Experiment 4 built upon Experiments 1-3 and addressed some methodological issues that may have affected the results in Experiment 1. Experiment 4 aimed to test a different type of 5-minute practice and to investigate whether the 5-minute practice elicited any change in perception using the attitude-attribution paradigm, which can be used to measure the propensity for the correspondence bias. The correspondence bias is an attributional error characterised

by ignoring the situation in favour of dispositional explanations for behaviour (Gawronski, 2004). Furthermore, the correspondence bias can be influenced by participants own views on topics used in the attitude-attribution paradigm, or the false consensus effect (Ross et al., 1977). Therefore this was used as a covariate in the analysis of Experiment 4.

Mindfulness has yet to be applied in the context of social judgement and attribution, but previous theorising suggested a connection between mindful thinking and reduced reliance on categorisation (Langer & Moldoveanu, 2000b; Langer, 1989), and less habitual responding (Kiken & Shook, 2011). This was expected to reduce the automatic association of dispositional inference in explaining behaviour. Although this could be achieved through enhanced attention to detail, which would be expected to refocus attention on the situational instructions (Correa et al., 2006; Maclean et al., 2010), mindfulness was hypothesised to have an added benefit of increasing cognitive capacity to allow for more effortful thought (Chambers et al., 2008; Jha et al., 2007; Mrazek et al., 2013).

Based on this, the hypothesis for Experiment 4 was that mindfulness would reduce the propensity for the correspondence bias, and would have an effect above and beyond that of merely paying greater attention. The findings showed that a 5-minute mindful eating practice completed in laboratory conditions led to a greater decrease in making the correspondence bias than a control or attention to detail task, when controlling for participants own view on the topic. This showed that mindfulness altered the correspondence bias response in a way that was qualitatively different from simply sustained attention. Therefore, mindfulness may have achieved more than merely increased awareness of the situational factors in the instructions.

Moreover, it showed that after the mindfulness practice, participants were not only less extreme in their judgements of the essay writer, but were also less likely to make a dispositional attribution based on their own views.

In addition to participants' own views on the topic, participants' perspective taking was used as a covariate, which has been found to reduce attribution errors in previous research (Hooper et al., 2015b). The correspondence bias was not significantly attenuated by mindfulness when accounting for participants' perspective taking, but this may have been due to limited information about the target of the attitude inference. The means were in the expected direction, showing that the tendency for the correspondence bias was reduced in the mindfulness condition, and therefore suggested that perspective taking required further investigation.

With this in mind, Experiments 5 and 6 explored the role of perspective taking in the relationship between mindfulness and attribution bias, using the fundamental attribution error. This is the tendency to overestimate the role of dispositions in explaining behaviours, and underestimate the role of situation (Heider, 1958). This differs to the correspondence bias in that the situational influences are weighted in the process of making the evaluation, but the outcome favours dispositions as being more influential. Attributional errors have been shown to apply more broadly to groups (Allison & Messick, 1985) and can be influenced by a perceivers own locus of control (Shaver, 1975). This assumes that perceivers with an external locus of control (who believe fate and chance is primarily responsible for controlling behaviour) are more likely to make situational or external attributions, compared to those with an internal locus of control (who believe that they are

primarily responsible for their own behaviours). The aim of these experiments was to investigate the effect of mindfulness on the fundamental attribution error, taking into account locus of control and perspective taking.

The hypotheses of Experiment 5 were that mindfulness would attenuate the effects of the fundamental attribution error relative to a control condition, and in particular, participants would become more aware of situational factors that may affect the outgroup target. It was expected that mindfulness would reduce the automaticity of responding to the outgroup target. Participants were given a scenario about either an ingroup member or an outgroup member who detailed their struggle to gain employment. Participants were asked the extent to which they believed the target's situation was a result of their disposition, or environmental factors that were outside of their control.

The results of Experiment 5 supported the hypotheses. Mindfulness attenuated the tendency to make the fundamental attribution error, even when taking into account participants' locus of control and perspective taking. Furthermore, mindfulness also attenuated ingroup favouritism effects in perspective taking. This showed that in the control condition participants were better able to take the perspective of an ingroup member, as expected based on social identity. However, after the mindfulness manipulation, participants were equally able to take the perspective of an outgroup member as an ingroup member. Further supporting the hypotheses, Experiment 5 showed that when participants listed the main reasons they believed the target was unable to find employment, there was significantly more consideration of situational factors in the mindfulness condition, and for an outgroup target. This highlights the potential applications of a brief mindfulness practice in

reducing automatic responding in intergroup situations, which could prove beneficial to reducing implicit biases in person-judgements in a variety of contexts (as found for race, e.g. Lueke & Gibson, 2015). This could be particularly beneficial in job applications and personnel decision-making.

These results also suggest that intergroup dynamics and mindfulness may influence perspective taking, but may not support previous research that suggested mindfulness is positively associated with perspective taking (Beitel et al., 2005; Johns et al., 2015). Experiment 6 directly built upon Experiment 5. It used similar methodology, but with the addition of manipulating perspective taking (asking participants to consider their own or the target's perspective when reading the scenario) in order to try and better understand the role of perspective taking in relation to mindfulness and attribution. Based on previous research, the hypotheses in Experiment 6 were that mindfulness would increase perspective taking and reduce the fundamental attribution error for participants who are asked to consider the target's (other) perspective.

The results supported previous research that perspective taking reduces the fundamental attribution error (Hooper et al., 2015b). A significant 3-way interaction of mindfulness x perspective taking x group condition showed that perspective taking attenuated the fundamental attribution error in the control condition. In the own perspective condition, participants in the control condition attributed the ingroup target's position more dispositionally than the outgroup target. However, in the mindfulness condition, the opposite effect was found, in contradiction to the hypothesis. The fundamental attribution error was made more when participants

were asked to consider the 'other' perspective, but attributions did not differ by group when considering their own perspective.

This is the first empirical investigation of mindfulness with perspective taking, and suggests that the two constructs may be working in opposition, and thus contradicts the theory that they should be positively related (Beitel et al., 2005; Johns et al., 2015). The results point to a potentially conflicting relationship whereby mindfulness may have increased introspective ability (Fox et al., 2012) and in turn made taking the 'other' perspective more difficult. If this were the case, the opposing cognitive abilities of becoming more introspective and taking another perspective may have created cognitive dissonance and diluted the positive effects that mindfulness has on cognitive capacity (Mrazek et al., 2015; van Vugt & Jha, 2011; Weger et al., 2012). This could be particularly pertinent for non-automatic processes, which require more effortful cognition from the outset.

Experiment 7 therefore applied mindfulness to the non-automatic process of group decision-making. In group situations, dividing attention between the group and the task can hinder performance by increasing stress and arousal (Baron et al., 1978). Aside from group contexts, mindfulness attenuates emotional arousal and increases emotional regulation (Shao & Skarlicki, 2009). Consequently it was expected that practicing mindfulness before entering into a group decision task should mitigate the arousal of the group context, and thus improve the group decision quality. Furthermore, a group decision task was used that required some level of judgement and flexible thinking (Survival task, Johnson & Johnson, 2003), which mindfulness has been found to increase (Greenberg et al., 2012). Additionally, previous research has shown that mindfulness increased individual decision-making

accuracy (Hafenbrack et al., 2014; Ostafin & Kassman, 2012), and one study has found that mindfulness improved group decision-making, and increased group cohesion (Cleirigh & Greaney, 2015).

Experiment 7 aimed to investigate the relationship between mindfulness and evaluation anxiety on group decision-making in a survival decision task, to build upon the only known study of mindfulness in group decisions (Cleirigh & Greaney, 2015). The hypothesis was that mindfulness would attenuate the negative consequences of evaluation anxiety and help groups to make superior decisions and foster group cohesion. Participants in Experiment 7 completed the 5-minute mindfulness practice in groups of four and were given instructions that increased evaluation anxiety (vs. control). To increase evaluation anxiety, participants were given bogus information that they would present their group decision and be compared and evaluated against other groups. The groups of four then completed the decision tasks.

Contrary to the previous research, and the hypothesis for Experiment 7, the results showed that mindfulness and anxiety did not significantly affect group decision performance. The mindfulness and anxiety conditions did not have any effect on group cohesion either, therefore showing no support for the findings of previous group decision research (Cleirigh & Greaney, 2015). A key explanation for the difference in these results and those found in the previous study of group decision is the statistical power. In the present research, a much larger sample was used, and thus the results should be considered more reliable. In addition, the relationship with anxiety may be different in groups than for individuals. Although mindfulness reduces anxiety for individuals (Bohlmeijer et al., 2010; Carmody et al.,

2009; Khoury et al., 2013), there is less evidence that considers the effect of mindfulness on anxiety in group settings (Edwards et al., 2014). It is also possible that although Experiments 4-6 show that mindfulness had positive effects for the automatic process of attribution, that mindfulness may not be beneficial to the non-automatic process of decision-making.

### **Summary**

Overall the results of the experiments presented in this thesis show that 5-minutes of mindfulness practice elicits state mindfulness, and is particularly effective when participants are able to carry out the practice in their own surroundings (Experiments 1-3). Therefore, supporting the hypothesis that a brief, online mindfulness practice is effective for increasing state mindfulness.

This brief practice was then applied to social judgements where the findings revealed that mindfulness reduced attributional biases. Namely, mindfulness was more effective than a control and attention task in reducing the propensity for the correspondence bias (Experiment 4), and attenuated the fundamental attribution error for outgroups (Experiment 5), which supported the hypotheses. However, the results of Experiment 6 showed that mindfulness and perspective taking may work in opposition and cannot be used in conjunction to reduce the fundamental attribution error, which contradicted the hypothesis and previous research. Together the results from Experiments 4-6 showed that mindfulness is beneficial for the automatic process of attribution, even in intergroup contexts (Experiments 5 and 6), but cannot be further enhanced with perspective taking. The brief mindfulness practice was also applied to the non-automatic process of decision-making, but did not elicit the expected positive effects on group decision performance and group cohesion.



Overall the findings of this thesis provide good support that a 5-minute mindfulness practice can be used to elicit a state of mindfulness and be applied to automatic person judgements to reduce the tendency for attribution errors. Furthermore, the results support the use of mindfulness as a stand-alone practice. For the non-automatic process of decision-making mindfulness was not found to have salutary effects, and thus points to a possible area in which brief mindfulness may not be strong enough to elicit an effect, or may not work in a beneficial way that was found for automatic processes.

### **Theoretical and Practical Contributions**

The research presented in this thesis contributes to a growing body of literature on mindfulness. In particular it addresses an important gap in the literature by testing the single-session, online mindfulness practice. It also adds to an emerging area of mindfulness research that considers the effect of mindfulness in social psychology, namely social judgements. Specifically, the research contributes to literature considering automatic evaluative processes (attributions) and non-automatic decision processes.

#### **Single-session online mindfulness**

Mindfulness research has typically focused on face-to-face and online mindfulness courses for clinical populations that are trying to achieve positive health and well-being outcomes (Bohlmeijer et al., 2010; Carmody et al., 2009; Kabat-Zinn, 2003; Khoury et al., 2013; Krusche et al., 2012, 2013; Morledge et al., 2013; Piet et al., 2012; Singh et al., 2003; Tacón et al., 2004). Much less research has considered short, single-session, un-guided, practice (e.g. Erisman & Roemer, 2010b; Heppner et al., 2008; Hong et al., 2014; Kiken & Shook, 2011; Weger et al., 2012).

A meta-analysis investigating the usefulness of self-help mindfulness practices found that, across 15 studies, self-help courses ranging from 2-12 weeks that included a mindfulness component, and were mostly (11/15 studies) aimed at clinical populations, were successful at increasing mindfulness and reducing anxiety and depressive symptoms (Cavanagh et al., 2014). Furthermore, a meta-analysis of mindfulness outcomes in non-clinical populations showed small to medium effect sizes on psychological variables relating to emotional well-being, psychological health and personality (Eberth & Sedlmeier, 2012). Importantly, this meta-analysis highlighted a large difference in effect sizes between MBSR courses, where practice is supplemented with additional information, and pure meditation. This suggested that the additional information provided in MBSR courses may be responsible for some of the positive outcomes, rather than the practice itself.

Therefore, the findings from Experiments 1-3, that as little as 5-minutes of online mindfulness, with no further practice or information, increased state mindfulness, show the promise of this intervention. The increase in mindfulness was achieved without the additional information, and thus suggests that the mindfulness practice itself is reliable and effective for inducing a state of mindfulness. Moreover, the results supported the notion that practice may be enhanced by privacy and anonymity (Cavanagh et al., 2013). These experiments also provide the first empirical evaluation of brief, single-session, online mindfulness practice.

This has practical implications for the ease of access to, and use of, freely accessible mindfulness practices. For example, Chittaro and Vianello (2014) found that participants preferred a mindfulness practice that they completed on a smartphone compared to imagination and physical tasks, but did not show whether

this increased state mindfulness. The present research supports that such practices can elicit a state of mindfulness, and thus behavioural and emotional outcomes can be attributed to the mindfulness practice.

### **Automatic processes**

Although automatic cognitive processes help individuals to effortlessly process an otherwise unmanageable amount of incoming sensory information (Van Bavel & Cunningham, 2008), they often also lead to implicit cognitive biases that in turn can evoke prejudices (Allport, 1979; Funder, 1987). However, the opposite process to this is individuation, which requires far more effortful thought. Therefore, interventions that are able to reduce categorisation or enhance effortful thought are valuable in social psychology research on person-judgement.

Langer (1989) postulated that mindful thought is characterised by creation of new categories and enhanced awareness of multiple perspectives, but that this process is akin to individuation. Furthermore, mindfulness as a form of present-moment, non-judgemental awareness has been shown to reduce attentional focus on the past and future (Hafenbrack et al., 2014), which was thought to be useful in reducing the habitual use of previously learnt associations or heuristics.

Attributional biases are underpinned by automatic associations (Bruner, 1957; Kahneman & Frederick, 2002; Shaver, 1975), and pervade areas such as race, which can be particularly detrimental for perceptions and experiences of prejudice (Berger et al., 1972; Duncan, 1976; King et al., 2006; Kurzban & Leary, 2001; Plaut, 2010; Wagner & Berger, 1993). The results of the experiments in this thesis showed that as little as 5-minutes of mindfulness can attenuate attributional biases, and furthermore can do so in intergroup contexts, where attributions about outgroup

members are less extreme. This may suggest that mindfulness can beneficially alter the use of heuristics and previously learnt category associations and schemas.

Although to date there is no confirmatory evidence, mindfulness is not likely to be changing these schemas or heuristics. Previous research on cognitive bias interventions suggests that rather than changing a stereotype about a group, it is more likely that the perceiver is sub-typing the individual as being different or less typical of their superordinate group. This leads the perceiver to increase liking for the individual target, but still apply the stereotype to the wider group (see Hewstone, Hopkins & Routh, 1992). This may also be the case for mindfulness. Instead of changing the cognition, mindfulness may affect the process that leads to the judgement, such as altering the emotions felt when faced with typical members of different groups (Haddock & Zanna, 1993). Mindfulness may be freeing cognitive resources to access deeper information or draw from a wider range of schema and categories. It may allow for a more thorough processing of inconsistent information, which would be consistent with previous research that shows mindfulness increases cognitive flexibility and working memory capacity (Chambers et al., 2008; Greenberg et al., 2012; Jha et al., 2007; Mrazek et al., 2013).

This could have important implications for improving intergroup relations and reducing intergroup discrimination. The potential use of a 5-minute mindfulness practice to elicit such effects means that it is more likely to be able to fit into daily routines, and thus be used in a variety of contexts. In particular, this could have positive implications in employment contexts and personnel decisions, where limited information is used to form impressions and make judgements of others. Although Experiments 5 and 6 use a scenario about employment, it would be useful to test this

with human resources personnel or in a hiring decision context, where participants' would have to choose between targets as in a real organisational setting.

Another important contribution of the research in this thesis is that it sheds light on the relationship between mindfulness and perspective taking, which has yet to be empirically investigated. Perspective taking reduces attribution biases (Galper, 1976; Hooper et al., 2015b), which is thought to be achieved through increasing empathy for the target and self-other overlap (M. H. Davis et al., 1996; Regan & Totten, 1975). Furthermore, mindfulness was hypothesised to increase empathy and perspective taking (Block-Lerner et al., 2007), but this was not supported in the current research. In fact, the results of Experiment 6 suggest that mindfulness may even work in opposition to perspective taking. This is important for attribution research as it suggests that the two constructs will not supplement each other, as expected, in reducing attribution bias.

More importantly this uncovers a potentially negative outcome of mindfulness practice. Although some research suggests that sustained meditation can have harmful side effects for some people (Craven, 1989; Shapiro, 1992), little research has addressed potentially negative outcomes of mindfulness practice (Goyal et al., 2014), or areas in which mindfulness has no effect. Therefore the current research also adds new insight to the efficacy of mindfulness research, and may provide an area in which future research could consider interventions that clash, or where different cognitive abilities are not compatible.

### **Non-automatic processes**

Most decision-making and problem-solving tasks require deliberative, non-automatic cognition (Johnson & Johnson, 2003). The survival task used in the

research in this thesis requires some level of judgement and creativity, but has a demonstrably correct answer, and is thus situated between purely intellectual and judgemental tasks (Laughlin & Ellis, 1986). It is therefore a task that requires non-automatic processes and deliberation- a correct answer is unlikely to suddenly become clear to the solver, but rather effort is required to reach a best solution. Previous research showed that mindfulness increased cognitive flexibility for problem decisions (Greenberg et al., 2012) and thus it was expected that mindfulness would prove beneficial to this type of decision task. Furthermore, mindfulness reduces emotional arousal (Shao & Skarlicki, 2009), which is usually heightened during group decision-making (Baron et al., 1978), and therefore mindfulness should attenuate the negative effects of emotional arousal in group decision-making.

The impact of mindfulness in group decisions had only been tested in one empirical paper (Cleirigh & Greaney, 2015) prior to the research undertaken in this thesis. The results showed that mindfulness improved group decision-making on a survival task, and increased group cohesion. However, the study was underpowered, and so the present research aimed to extend this with a larger sample, and the inclusion of the evaluation anxiety manipulation to more closely investigate emotional arousal effects. Contrary to the hypothesised relationships, the present research did not show that mindfulness and an anxiety manipulation improved group decision-making, although means showed a trend in the expected direction. Furthermore, a marginal main effect of mindfulness condition on group cohesion showed that mindful groups were less cohesive, and a significant main effect of mindfulness condition on group efficacy showed mindful groups were lower in efficacy than control groups. This directly opposed the research by Cleirigh and Greaney (2015), although may be in part due to different mindfulness manipulations.

Other research has found that mindfulness has a positive effect on decision-making tasks which use a more automatic process to reach a decision or solution (Hafenbrack et al., 2014; Ostafin & Kassman, 2012). The present research adds to this literature by testing the effects in a group setting, with a more deliberative decision task. The results showed that mindfulness, or at least a brief single-session practice, may not be powerful enough to elicit an effect on non-automatic processes, despite successfully altering performance on automatic decision tasks. Taken together the findings suggest that brief, single-session mindfulness may not be useful in group decision settings, but in particular may detrimentally affect group cohesion and efficacy, which in turn may reduce performance by decreasing the group's ability to work cooperatively.

This has practical implications for the use of mindfulness practice in groups and teams, for example, within organisations. Although mindfulness is thought to be especially useful for organisational decision-making (Karelaia & Reb, 2014), as yet little empirical research has tested the hypotheses. The present research suggests that mindfulness in organisational contexts should be used with caution and may not be beneficial to working in groups and teams.

### **Limitations and Future directions**

The research presented in this thesis is not without limitations. Each empirical investigation presented was subject to some specific limitations that were discussed within each individual experiment. Wherever possible these limitations were addressed and built upon in subsequent experiments. Therefore, the discussion below considered some of the broader limitations of overall body of research in this thesis. This is followed by a discussion of the potential next steps research on

mindfulness and social judgements could take, based on the results presented in the current research.

## **Limitations**

### **Mindfulness**

A key problem that is faced in most research on mindfulness is the reliance on self-report measures of mindfulness among individuals. This is problematic since different individuals have varying degrees of understanding of mindfulness and may have experienced different types of practice. They then bring with them a variety of experiences and expectations that may influence their answers to self-report measures of mindfulness. In Experiment 2, TMS (Lau et al., 2006) was split into its two subscales, and one was presented before, and the other after practice. This showed that mindfulness was still higher among the mindful group compared to the control group, which suggests that the questions were not inducing mindfulness themselves. However, this may also have been problematic since the two subscales could be considered separate constructs in themselves, and thus the pre- and post-measures are capturing different things. On the other hand, it is still possible that upon hearing the mindfulness audio, participants in the mindfulness condition may have then been more aware of the construct, and thus answered the second subscale with mindfulness effects in mind. A more objective, behavioural measure of mindfulness would be useful to ensure this is not the case in future studies.

Although other methods have used neurophysiological changes to indicate differences in mindfulness (e.g. Brewer et al., 2011; Moyer et al, 2011), these generally rely on comparing experienced meditators brain activity with matched naïve samples. Additionally, the evidence is based on longer term practices such as



after an 8-week course or lifetime meditation practice. Such techniques are not practical for brief single-session mindfulness, and in fact, may not pick up any changes in such a short period, or changes may not occur in 5-minutes. Thus, these measures are not feasible in this type of research. This has led researchers to consider alternatives to both self-reports and neurophysiological testing.

Levinson et al (2014) developed and tested a breath counting task where participants are asked to count their breath for 18 minutes, in blocks of 9, where they press one button for breaths one to eight, and another on the ninth breath. This is compared to a respiratory monitor that also counts the number of breaths electronically. The researchers argue that the longer a person is able to sustain their attention on correctly counting their breaths, the more mindful they are. Furthermore, greater accuracy on the breath counting task positively correlated with self-reported levels of mindfulness, supporting their hypothesis. However, this is also problematic as the exercise of counting breaths is similar to many mindfulness practices that require participants to focus on their breath. Although participants were found to exhibit greater accuracy after a 4-week training period (trained in breath counting), this may only suggest that the act of counting breaths may have enhanced mindfulness itself, and was therefore confounding the measure.

Furthermore, the breath counting study compared breath counting to measures of trait mindfulness and was more focused on mindfulness as a disposition, or among trained meditators, rather than state mindfulness among naïve meditators. Whilst this suggests that steps are being made to develop behavioural measures of mindfulness, at present, self-report may be the most useful way of measuring state mindfulness after a brief, single-session practice. Given the results of Experiment 2,

self-report may not be detrimental to the outcomes, but could be strengthened with the support of a behavioural measure.

Another possible limitation in the present research is that participants' trait mindfulness was not measured. Although dispositional mindfulness was not the focus of the research in this thesis, it may still be useful to obtain a measure of individual trait mindfulness before completing the brief, single-session practice as a baseline. Furthermore, Kiken et al (2015) found that linear increases in state mindfulness after each session of an eight-week course contributed to increases in participants' trait mindfulness. This suggests that increases in state mindfulness, as achieved through brief practices like those used in the present research, may act as a top-up for individuals' overall disposition for mindful thought. Since the present research was primarily concerned with state mindfulness and its effects on changes in current behaviour or perception, a measure of trait mindfulness was not included. However, based on Kiken et al.'s (2015) findings, this does provide an avenue for future research, especially since there is no research to-date that shows how long a mindful state lasts after a brief or single-session practice.

A methodological issue with the use of online mindfulness is the relative lack of control over participants' surroundings. Although previous research suggests that mindfulness practice can be more effective when participants are able to practice in their own environment (Cavanagh et al., 2013), in online research those surroundings are unknown to the researchers. This means that it is not possible to control for any distractions, or to really know whether participants are fully focused on the study. The experiments in this thesis aimed to overcome this by using embedded attention

check questions to ensure that participants were properly reading instructions, and by using a control condition for comparison.

Furthermore, during the audio participants were unable to skip through to the questions in the survey software, although this did not prevent them from looking at another browser window during this period. It may be useful in future studies to use mouse tracking software to check whether participants are moving around their computer during the task. Alternatively, something like the breath counting task could be embedded into practice so that participants must perform a count or an attention check task during the practice to ensure they are still paying attention.

The control condition chosen for the experiments in this thesis was one in which participants were left with their own thoughts for 5-minutes. Although Wilson et al. (2014) found that participants did not like to be left with their thoughts, the study did show that those participants experienced enhanced mind-wandering. This suggests that the control condition in the present research may have been having the desired effect of creating a condition opposite to that of the experimental condition. Furthermore, although other studies have used book reading or audio book/educational recordings as control conditions, the practical implications of the present research are that a brief single-session practice could be used in day-to-day life and be used to enhance mindfulness before specific activities. Therefore, although it is unclear what online participants are doing during the audio, it was felt that this created a much more realistic environment, and even adds weight to the current findings.

A final limitation that could be addressed in future research is the difference in experience of mindfulness by age and group vs. individual practice. Although

these two factors were hypothesised to have influenced the results in the present research, an empirical investigation may be able to uncover possible costs and benefits for different groups of people practicing mindfulness, which in turn could aid our understanding of the different contexts in which mindfulness can and cannot be used. For example, mindfulness is now being used in schools (see Mindfulness in Schools Project), and in general practice is completed in classrooms (effectively in large groups). The present research found the effects of mindfulness to be limited in some group-practice scenarios, and thus it may be more effective to allow participants to practice individually before working in groups, but this may be specific to certain age groups (in the case of Experiment 2, 16-18 year olds).

### Social Judgements

A potential limitation for assessing the influence of perspective taking may have been the manipulation used in Experiment 6. The instruction was included just before participants read the scenario about the ingroup vs. outgroup member, and asked participants to consider either how they would feel in the target's position, or how the target would be feeling. This may not have been explicit enough in eliciting a change in perspective for participants, and perhaps further perspective taking training or more detailed instructions would be more effective (e.g. Hooper et al., 2015b). In addition, the instructions may have caused an increase in cognitive load in some of the conditions (especially taking the perspective of an outgroup member) which may have diluted further effects. As highlighted above, it is as yet unknown how powerful the effects of 5-minutes of mindfulness are, and as such, although mindfulness may increase cognitive capacity, this effect may be limited by the brevity of the practice.

A similar limitation could apply to the decision-making task that was used in Experiment 7. The task requires a number of steps, and for participants to complete the task individually, followed by as a group, which may increase cognitive load. On top of this, due to time constraints, participants were also required to complete the task in a very limited time. This may have been too cognitively demanding and weakened the effect of the mindfulness practice. The Experiment could be replicated with more time allowed to complete the decision task, or with a less complex task.

### **Future directions**

By combining some of the limitations addressed above, it may be possible to develop an entirely new avenue of research on mindfulness in social contexts. Given the results of Kiken et al.'s (2015) study that showed state mindfulness contributed to trait mindfulness, it would be interesting to consider whether the 5-minute practice alone has any effect on trait mindfulness, and whether a repeated 5-minute practice would elicit the same increases in trait mindfulness as the sessions included in an eight-week course. If the brief, single-session, online practice were able to elicit such effects it could effectively be used to top-up participants trait mindfulness, or would be effective as an individual practice before a group of individuals are required to complete a task. For example, an investigation into whether practicing mindfulness alone before joining a group mediates emotional arousal and is then beneficial to the group scenario. This may attenuate the negative effect on cohesion and efficacy that was found in Experiment 7, and would then provide further evidence for the use of mindfulness in groups.

With this in mind, it is also essential that future research begins to look at the length that a mindful state lasts. In order to better understand the limits and

boundaries of brief mindfulness it is first necessary to understand whether the effect is robust enough to last the duration of carrying out tasks. Furthermore, whether this is related to the length of the brief practice. That is, do the effects last longer as the practice time increases, or is the relationship less linear? Furthermore, other methods of measuring and/or inducing mindfulness may last different amounts of time, and this may also depend on the task.

First, it would be interesting to understand more about how different methods of mindfulness affect levels and durations of a mindful state. For example, the breath counting task (Levinson et al., 2014) may be inducing mindfulness, and having a more concrete activity like counting, this may have a stronger effect on individuals' mindful state. It may be easier to notice when the counting has lost sequence and therefore easier to return to than the more abstract task of focusing on the breath moving through the body (e.g. body scan practice). A new technique known as the Tetrad is thought to enable people to attain a state of mindfulness before beginning more traditional meditative mindfulness practice, by focussing attention on the physical task of balancing air bubbles in tubes (akin to balancing a spirit level). However, to date there have been no empirical investigations of this technique.

Second, since the present research showed that a 5-minute mindfulness practice effectively altered automatic perceptions in attribution, but was not effective in improving group decision performance the nature of the task merits further investigation. Based on the results of the studies in this thesis, further attention could be given to different types of automatic processes, such as whether mindfulness reduces the use, or activation of, stereotypes. In particular, since the present research found that this was effective for attributions in an intergroup context, using group

membership to investigate this effect would be very useful, as different group memberships have different strengths and effects on self-esteem (e.g. that one can have a stronger identity to one group than another). There is research to suggest that mindfulness reduced stereotype activation after mindfulness courses or social mindfulness tasks (Djikic, Langer, & Stapleton, 2008), but as yet research has not considered the effects of single-session practice.

More importantly, since the results are limited and mixed, future research could look to examine the effect in the context of different decision tasks. As highlighted previously, mindfulness has positive effects on individual automatic decisions (Hafenbrack et al., 2014; Ostafin & Kassman, 2012), so future research could consider group performance on automatic decision tasks (such as the sunk-cost bias or insight problems), and individual effects in a non-automatic decision tasks. Another area that is associated with this is the investigation of mindfulness on decision tasks and person judgements in an applied setting. For example, in organisations, human resource staff make decisions based on limited applicant information which is subject to automatic processes such as attribution and stereotyping. Furthermore, such decisions are often made in panels or groups, and so the influence of mindfulness in this setting could be important for reducing bias and enhancing equality in hiring decisions. Other types of more social decision-making have been shown to be affected by mindfulness (e.g. Reynolds et al., 2015), although not necessarily in a positive manner. Further study is needed to avoid mindfulness being used as a cure-all in situations where it may have negative effects.

Attention should be given to the different effects of mindfulness on different groups, such as across gender or age groups. Previous research has shown that

mindfulness reduces the negative effects of stereotype threat on women's math performance (Weger et al., 2012), however this was not compared to any changes in men's performance. Therefore, it would be interesting to test whether mindfulness alters performance for men under stereotype threat conditions. In addition, since children understand and apply stereotypes that lead to stereotype threat from a young age (Hartley & Sutton, 2013), an investigation of whether this also applies to children would be useful in educational contexts. In particular, this could have a great impact on educational attainment for groups who are stereotyped as underachievers (e.g. boys compared to girls or ethnic minority groups). Some research has already shown that mindfulness improves students grades at age eight and nine years (Bakosh et al., 2016), so mindfulness could have promising benefits for children's attainment in the approach to Key Stage 2 (taken at age 10 years) examinations.

Finally, given the limited empirical investigation of mindfulness and perspective taking, and the results of the present research that show a potentially conflicting relationship, a better understanding of how mindfulness relates to perspective taking is necessary. At present, it is assumed that enhanced mindfulness is associated with, or leads to, enhanced perspective taking and that this has a positive impact on psychological well-being and interpersonal relationships. However, this may not be such a clear link. Further investigation is required to disentangle the two constructs. In a broader sense researchers need to be able to understand the processes underlying mindfulness and how it elicits effects. However, this may not be feasible in one line of research, and as such understanding how it relates to other, better understood processes could help to advance our knowledge of



mindfulness. Bringing together research that investigates mindfulness and perspective taking with introspection (Fox et al., 2012) may assist this.

### **Conclusion**

Research on mindfulness continues to proliferate various areas of cognitive, health, applied, experimental and social psychology. At present, there is still a limited understanding of how mindfulness impacts social psychological processes such as social judgements, particularly in person-judgement and group settings. The aim of this thesis was to add to this emerging body of literature, first by testing the efficacy of a brief, single-session online mindfulness practice, and then applying it to attributions and decision-making.

The results of the experiments in this thesis showed that as little as 5-minutes of mindfulness practice is enough to elicit an increase in state mindfulness (Bishop et al., 2004) measured using the TMS (Lau et al., 2006). Furthermore, this increased level of state mindfulness was then found to reduce the propensity for the correspondence bias and the fundamental attribution error. This suggests that a brief, single-session mindfulness practice may be useful for attenuating negative automatic person judgements. The results from these experiments also uncovered a potentially conflicting relationship between mindfulness and perspective taking that merits further investigation.

When applied to the non-automatic process of group decision-making, the 5-minute mindfulness practice did not elicit an improvement in decision accuracy. Although there were methodological limitations to this experiment, the findings suggest that mindfulness may not have a positive impact on group dynamics and therefore may not be effective in group or team environments. It also highlighted that

there may be a difference in the effectiveness or usefulness of brief, single-session mindfulness for automatic vs. non-automatic processes. This is an area that would also benefit from further research.

The findings of this thesis explored the role of brief mindfulness in the context of social judgement, providing a starting point for future research to build upon. There is the potential for this brief, single-session practice to have beneficial applications to other contexts in which automatic processes underlie person judgement, but a lot of future research is still required to better understand how mindfulness works and in which situations it might have positive and/or negative effects.

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**Appendix A**

**Toronto Mindfulness Scale (Lau et al., 2006) (Experiments 1-6)**

We are interested in what you just experienced.

Below is a list of things that people sometimes experience.

Please read each statement and indicate the extent to which you agree with each statement.

In other words, how well does the statement describe what you just experienced, just now?

1      2      3      4      5      6      7

Not at all Very much

1	I experienced myself as separate from my changing thoughts and feelings
2	I was more concerned with being open to my experiences than controlling or changing them
3	I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations
4	I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the way things ‘really’ are
5	I was curious to see what my mind was up to from moment to moment
6	I was curious about each of the thoughts and feelings that I was having
7	I was receptive to observing unpleasant thoughts and feelings without interfering with them
8	I was more invested in just watching my experiences as they arose, than in figuring out what they could mean
9	I approached each experience by trying to accept it, no matter whether it was pleasant or unpleasant
10	I remained curious about the nature of each experience as it arose
11	I was aware of my thoughts and feelings without over-identifying with them
12	I was curious about my reactions to things
13	I was curious about what I might learn about myself by just taking notice of what my attention gets drawn to

Curiosity subscale: 3, 5, 6, 10, 12, 13\*

Decentering subscale: 1, 2, 4, 7, 8, 9, 11\*

\* Presented separately in Experiment 2

## Appendix B

### Transcript of 5-minute mindful body scan practice (adapted from Mindful, 2012), (Experiments 1-3 and 5-7).

Pause duration (s)	Instruction
1.0	Hi and welcome to the body scan practice.
1.0	You can either do this practice sitting or lying down, this is an internal practice as well and so you're welcome to either close your eyes while doing this practice or keep a dull gaze towards the floor, or if you're lying down, a dull gaze towards the ceiling.
12.0	So beginning by taking a few deep breaths
19.0	You can use this breath as an anchor in this moment to...
1.3	...just ground ourselves into the now
39.5	And so now bringing awareness to the feet
1.8	And noticing sensations in the soles of the feet, the toes, the top of the feet, and up into the ankle joints
1.5	And bringing a sense of curiosity to this practice, as if you've never noticed these sensations before
15.0	And shifting awareness up from the feet and ankles into the legs
21.0	And shifting up from there into the hips
21.0	And shifting attention up from there now into the torso
2.5	Being aware of the back region
1.5	the chest, the abdomen
18.0	And being aware of the, now arms and the hands, choosing to shift, awareness to these areas
21.0	And now in this space of awareness choosing to bring attention to the shoulders
7.0	The shoulders are often a place of tension and stress. So, just being aware of what's here
4.5	And up from there now to the neck
12.5	And from the neck to the face
3.0	Noticing sensations in the entirety of the face
12.5	And breathing in, breathing out, and releasing any awareness of the head and the face and the torso and arms
2.5	And the hips and the legs and the feet
1.5	And just coming back to the breath
26.0	Bell Chime
2.5	And as we come to the end of this practice
1.0	Just acknowledging the choice of taking, this time out to deepen your practice
1.5	Connecting with our bodies, is an act of self-care in this way

**Transcript of 5-minute control condition audio (adapted from Kabat-Zinn, 1990)  
(Experiments 1-3 and 5-7)**

Pause duration (s)	Instruction
1.0	Take a few deep breaths.
1.0	Wait for further instructions before continuing.
258.0	Take a few deep breaths.
1.0	Wait for further instructions before continuing.

### Appendix C

#### Transcript of 5-minute mindful eating practice (Experiment 4)

Pause duration (s)	Instruction
1.0	First, take a raisin and hold it in the palm of your hand or between your finger and thumb
6.0	Focussing on it, imagine that you have just dropped in from Mars and never seen an object like this before in your life
4.1	Take time to really <u>see</u> it, gaze and the raisin with care and full attention
4.0	Let your <u>eyes</u> explore every part of it Examining the highlights where the light shines, the darker hollows, the folds and ridges and any asymmetries or unique features
5.0	Turn the raisin over between your fingers, exploring its texture Maybe even with your eyes closed if that enhances your sense of touch
6.5	Now, holding the raisin beneath your nose, with each inhalation drink in any smell, aroma or fragrance that may arise, noticing as you do this, anything interesting that may be happening in your mouth or stomach
8.2	Slowly bring the raisin up to your lips, noticing how your hand and arm know exactly how and where to position it Gently place the object in the mouth
3.0	Without chewing, notice how it gets into the mouth in the first place Spend a few moments <u>exploring</u> the sensations of having it in your mouth, exploring it with your tongue
12.0	When you are ready, prepare to chew the raisin, noticing how and where it needs to <u>be</u> for chewing
2.0	Then then very consciously take on or two bites into it and notice what happens in the aftermath
3.0	Experience any waves of taste that emanate from it as you continue chewing
3.0	Without swallowing yet, notice the bare sensations of taste, and texture in the mouth and how these may change over time, moment by moment, as well as any changes in the object itself
5.0	When you feel ready to swallow the raisin, see if you can first detect the intention to swallow as it comes up, so that even this is experienced consciously before you actually swallow the raisin




7.0	Finally, see if you can feel what is left of the raisin moving down into your stomach, and sense how the body as a whole is feeling after completing this exercise in mindful eating
6.5	Please take another raisin and go through the same practice as before
4.6	Focus on what it looks like, what it feels like on your lips, what it feels like rolling around in your mouth, what it tastes like when you take a small bite of it
3.0	What it tastes and feels like chewing it slowly and thoroughly, and finally swallowing it

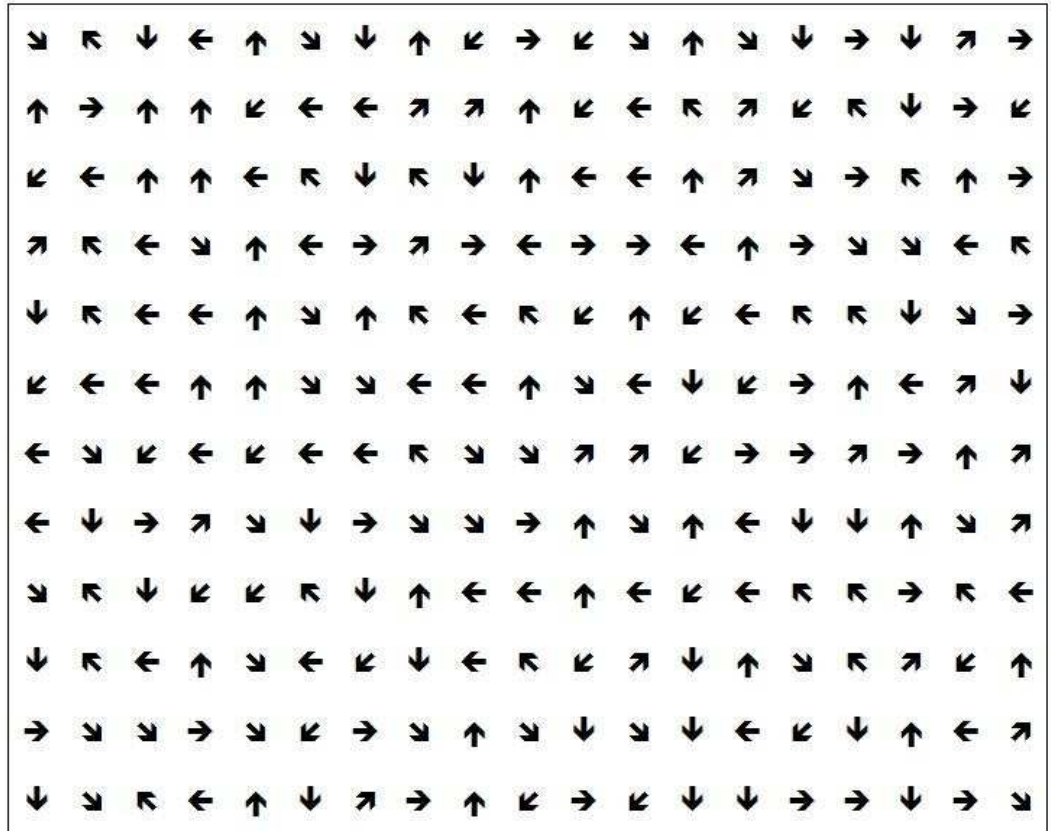
#### **Transcript of 5-minute control audio file (Experiment 4)**

Pause duration (s)	Instruction
1.0	Please take one raisin and eat it
1.0	Wait for further instructions before continuing.
258.0	Now take another raisin and eat it
1.0	Wait for further instructions before continuing.

Appendix D

Example of attention to detail task (Experiment 4)

Count how many  arrows there are in the following grid.



## Appendix E

### Attitude-Attribution paradigm essays (Experiment 4)

#### For Nuclear Power

A student in a speech class was assigned by a coin flip to write a paragraph in favour of the use of nuclear power. This is the resulting paragraph:

‘The use of nuclear power should be encouraged. There are many reasons for having this position. For example, earth has a limited supply of coal and oil; the two natural resources that currently supply us with energy. Nuclear power plants would play a major role in energy production when coal and oil become scarce. Coal and oil burning plants pollute the air with excess carbon dioxide emissions in comparison to nuclear power, which does not contaminate the environment in any way. Despite the popular misconception, the plants almost never experience any problems; if they do it is only via human error. And finally, significantly less fuel is required by nuclear power plants. For example one ton of Uranium will produce more energy than several million tons of coal and several million tons of fuel. For these reasons, the use of nuclear power plants should be encouraged.’

#### Against Nuclear Power

A student in a speech class was assigned by a coin flip to write a paragraph opposed to the use of nuclear power. This is the resulting paragraph:

‘The use of nuclear power should not be encouraged. There are many reasons for having this position. For example, nuclear power results in the expulsion of radiation. This radiation damages cells within the body causing effects from sickness to death; indeed people are susceptible to illness even years after they have been exposed. Accidents in nuclear power plants are much more devastating than in normal energy plants, as was the evident from the famous case of Chernobyl. Nuclear power is dependent on Uranium, however Uranium is a scarce source, expected only to last for the next 30 to 60 years depending on demand. And finally, not only do nuclear power plants take 20 to 30 years to build, but they would become an instant target for terrorist acts. For these reasons, the use of nuclear power plants should be discouraged.’

## Appendix F

### Correspondence bias (Experiment 4)

To what extent does the writer favour or oppose the use of nuclear power?

1	2	3	4	5	6	7
Very opposed						Very favourable

### False consensus effect (Experiment 4)

To what degree do you favour or oppose the use of nuclear power?

1	2	3	4	5	6	7
Very opposed						Very favourable

### Embedded attention check questions (Experiments 4-6)

I am paying attention to this questionnaire- select only 'strongly agree/very much'

1	2	3	4	5	6	7
Strongly disagree/ not at all						strongly agree/ very much



## Appendix H

### Scenario manipulating ingroup/outgroup (Experiments 5 & 6)

Please read the following information carefully:

The following statement was made by a 29-year-old graduate of the University of California, named [Jamie/Jamal].

[Jamie/Jamal/he says (Experiment 6 only)]:

“Since completing a degree in Dental Practice Management at the University of California (achieving a 3.80 GPA) I moved from strength to strength. I spent six months after University working as an intern, gaining vital experience. It wasn’t long before I became a team leader at the ‘Smile Centre’. After two years there I managed to secure the role of office manager at the ‘North Orange Dental Practice’, working there for a total of three years. Both of these roles gave me a fantastic opportunity to improve my leadership skills. I think that the latter in particular made me a much more responsible and employable person. After working at the ‘North Orange Dental Practice’, I then moved to ‘Western Dental’; a huge dental firm. My role here is of a business analyst, the pay is good and I am a valued member of a team.

Since working at ‘Western Dental’ I have developed skills outside of management experience, bolstering my CV. However, I have yearned to return to a more management orientated role. I think I am a natural leader, and I thrive off the responsibility. Therefore, for the last few months I have sent out my CV, with covering letters, for over 50 job vacancies. I carefully selected job titles that fit the role I desire, whilst making sure that the experience that I have had in the workplace matched that required to fulfil the position.

Although I feel that I am a great candidate for all of the positions I have applied for, I am yet to receive one reply from the employers. With my wealth of experience, I thought that I would have received some interviews for the positions, or at least replies to the emails I was sending. Not hearing from anyone has left me frustrated and confused; I don’t know why no one is responding.”

**Fundamental Attribution Error measure (Experiments 5 & 6)**

The situation was:

1      2      3      4      5      6      7

*'entirely [Jamie/Jamal]'s own fault'*

*'entirely out of [Jamie/Jamal]'s control'*

What do you think are the three most important reasons they thought explained why Jamie/Jamal was unable to get a job? **(Experiment 5 only)**

- 1.
- 2.
- 3.

**Locus of control scale (Bright, Kane, Marsh & Bishop, 2012) (Experiment 5)**

1                      2                      3                      4                      5

Strongly disagree

Strongly agree

1	A great deal of what happens to Jamie/Jamal is probably just a matter of chance
2	Everyone knows that luck or chance determines ones' future
3	Becoming a success is a matter of hard work, luck has little or nothing to do with it
4	Life is controlled by outside actions and events
5	People are victims of circumstance beyond their control





<b>Hostile traits</b>	<b>Benevolent traits</b>
Fear	Pity
Anger	Sadness
Nervousness	Guilt
Discomfort	
Dislike	

## Appendix J

### Group decision-making task (Experiment 7)

You will be completing a group task known as the desert island survival task.

When you receive the information pack **please read the instructions** carefully.

You will first be asked to complete the decision making task INDIVIDUALLY, without discussing your choice with your group members.

After this you will have the opportunity to work as a group to come up with a GROUP DECISION.

(High Anxiety condition) **At the end of the decision making task, you will go back to N1.04 where you will stand up in front of the class to present your scores to the rest of the groups and evaluate your performance, and your group's performance to see which group achieved the most accurate answer.**

(Low Anxiety condition) **At the end of the decision making task, you will go back to N1.04 to register before you leave the session. The scores on the decision making task will not be compared to other individuals or other groups and the outcomes will not be evaluated.**

**We are interested in how psychology students approach group work. How does this task make you feel?**

Calm	1	2	3	4	5	6	7	Tense
Anxious	1	2	3	4	5	6	7	Relaxed
Confident	1	2	3	4	5	6	7	Unsure

## **THE DESERT SURVIVAL SITUATION**

### **A GROUP DECISION MAKING EXPERIENCE FOR EXAMINING AND INCREASING INDIVIDUAL AND TEAM EFFECTIVENESS**

The situation described in this exercise is based on over 2,000 actual cases, in which men and women lived or died depending on the survival decisions they made. Your 'life' or 'death' will depend upon how well your group can share its present knowledge of a relatively unfamiliar problem, so that the team can make decisions that will lead to your survival.

When instructed, read about the situation and do STEP 1- WITHOUT DISCUSSING IT WITH THE REST OF THE GROUP.

#### **THE SITUATION**

It is approximately 10am, in mid-August, and you have just crash landed in the Sonora Desert in the south western United States. The light twin-engine plane, containing the bodies of the pilot and the co-pilot, has completely burned. Only the air frame remains. None of the rest of you has been injured.

The pilot was unable to notify anyone of your position before the crash. However, he had indicated before impact that you were 70 miles south-south-west from a mining camp, which is the nearest know habitation, and that you were approximately 65 miles off the course that was filed in your VRF flight plan.

The immediate area is quite flat, and except for occasional barrel and saguaro cacti, appears to be rather barren. The last weather report indicated that the temperature would reach 110 degrees that day, which means that the temperature at ground level will be 130 degrees. You are dressed in light-weight clothing, short-sleeved shirts, trousers, socks and street shoes. Everyone has a handkerchief. Collectively, your pockets contain \$2.38 in change, \$85 in bills, a pack of cigarettes and a ballpoint pen.

#### **YOUR TASK**

Before the plane caught fire, your group was able to salvage the 15 items listed on the next page. Your task is to rank these items according to their importance to your survival, starting with '1' as most important, to '15' at least important.

You may assume the following:

1. the number of survivors is the same number as on your team
2. you are the actual people in the situation
3. the team has agreed to stick together
4. all items on the list are in good condition

**STEP 1: Each member of the team is to INDIVIDUALLY rank each item**

**DO NOT DISCUSS THE SITUATION OR PROBLEM UNTIL EACH MEMBER HAS FINISHED THE INDIVIDUAL RANKING. YOU WILL HAVE 5 MINUTES TO DO THIS.**

**STEP 2: After everyone has finished the individual ranking, rank order the 15 items as a team. Once discussion begins you cannot change your individual ranking.**

**YOUR TEAM WILL HAVE 10 MINUTES TO COMPLETE THIS STEP.**

**STEP 1- YOUR INDIVIDUAL RANKING**

You will have 5 minutes to complete this.

Remember; **DO NOT DISCUSS** the task with other group members.

ITEMS	INDIVIDUAL RANKING
Flashlight (4 battery size)	
Jack knife	
Sectional air map of area	
Plastic raincoat (size: Large)	
Magnetic compass	
Compress kit with gauze	
.45 calibre pistol (loaded)	
Parachute (red & white colour)	
Bottle of salt tablets (1000 tablets)	
1 quart of water per person	
A book entitled 'Edible Animals of the Desert'	
Pair of sunglasses per person	
2 quarts of 180 proof vodka	
1 top coat per person	
1 cosmetic mirror	

**STEP 2- YOUR TEAM RANKING**

**Once discussion begins you cannot change your individual ranking.**

**YOUR TEAM WILL HAVE 10 MINUTES TO COMPLETE THIS STEP.**

ITEMS	TEAM RANKING
Flashlight (4 battery size)	
Jack knife	
Sectional air map of area	
Plastic raincoat (size: Large)	
Magnetic compass	
Compress kit with gauze	
.45 calibre pistol (loaded)	
Parachute (red & white colour)	
Bottle of salt tablets (1000 tablets)	
1 quart of water per person	
A book entitled 'Edible Animals of the Desert'	
Pair of sunglasses per person	
2 quarts of 180 proof vodka	
1 top coat per person	
1 cosmetic mirror	

BELOW IS THE OFFICIAL RANKING GIVEN BY A SURVIVAL EXPERT  
CALCULATE, AND RECORD BELOW, THE DIFFERENCE BETWEEN:

1. YOUR INDIVIDUAL SCORE AND THE EXPERT SCORE
2. YOUR TEAM SCORE AND THE EXPERT SCORE

(High Anxiety condition) **Remember; at the end of the decision making task, you will go back to N1.04 where you will stand up in front of the class to present your scores to the rest of the groups and evaluate your performance, and your group’s performance to see which group achieved the most accurate answer.**

(Low Anxiety condition) **At the end of the decision making task, you will go back to N1.04 to register before you leave the session. The scores on the decision making task will not be compared to other individuals or other groups and the outcomes will not be evaluated.**

Official expert ranking	Expert rank	1. DIFFERENCE BETWEEN INDIVIDUAL AND EXPERT SCORE	2. DIFFERENCE BETWEEN TEAM AND EXPERT SCORE
1 cosmetic mirror	1		
1 top coat per person	2		
1 quart of water per person	3		
Flashlight (4 battery size)	4		
Parachute (red & white colour)	5		
Jack knife	6		
Plastic raincoat (size: Large)	7		
.45 calibre pistol (loaded)	8		
Pair of sunglasses per person	9		
Compress kit with gauze	10		
Magnetic compass	11		
Sectional air map of area	12		
A book entitled ‘Edible Animals of the Desert’	13		
2 quarts of 180 proof vodka	14		
Bottle of salt tablets (1000 tablets)	15		
<b>TOTAL</b>			

**YOUR SCORE      TEAM SCORE**

### Appendix K

#### Individual measures of group Identity, cohesion and efficacy (Experiment 7).

##### Group Identity (adapted from Randsley de Moura, Abrams, Retter, Gunnarsdottir, & Ando, 2009) (Experiment 7)

	1	2	3	4	5	6	7
	Strongly disagree			Strongly agree			
1	I feel strong ties with this group						
2	I feel proud to be a member of this group						
3	Belonging to this group is an important part of my self-image						

##### Perceived group cohesion scale (adapted from Chin, Salisbury, Pearson, & Stollak, 1999) (Experiment 7)

	1	2	3	4	5	6	7
	Strongly disagree			Strongly agree			
1	I feel that I belong to this group						
2	I am happy to be part of this group						
3	I see myself as part of this group						
4	This group is one of the best anywhere						
5	I feel that I am a member of this group						
6	I am content to be part of this group						
7	I liked the group I was allocated to						
8	I had a lot in common with other members of the group						
9	I felt that I was similar to other members of the group						
10	I enjoyed being part of this group						



**Group Efficacy (Experiment 7)**

	1	2	3	4	5	6	7
Strongly disagree							Strongly agree
All members of the group contributed to the discussion and worked well together							
The group came up with the best decisions possible							

**Mindfulness Attitudes Scale (Cleirigh & Greaney, 2015) (Experiment 7)**

On this scale, please rate your attitude towards the concept of mindfulness.

	1	2	3	4	5	6	7
Wouldn't be open to the concept							Would be open to the concept

If you marked 4 or less, indicating that the concept of mindfulness doesn't interest you, please state reasons why below

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Before taking part in this study, what was your understanding of the concept of mindfulness?

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**Mindfulness knowledge (Experiment 7)**

How familiar are you with the concept of mindfulness meditation practice?

	1	2	3	4	5	6	7
Not at all							Very much

To what extent were you focused on the decision making task?

	1	2	3	4	5	6	7
Not at all							Very much