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The Influence of Spatial Position on Affect

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Author Note

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Abstract

Conceptual metaphor theory posits that the physical domain (e.g. the vertical dimension) is used to understand abstract concepts (e.g. affect); creating expressions such as, “falling into a deep depression.” Previous research concerning vertical metaphors has found that people more rapidly process positive and negative words when the valence was metaphorically consistent with vertical position (Meier & Robinson, 2004) and that mood traits were metaphorically consistent with vertical attentional biases (Meier & Robinson, 2006). The purpose of the current study was to investigate the effects of vertical perceptual biases on mood; whether shifting perception could have an effect upon the emotional experience of an individual. In Experiment 1, vertical attention was manipulated by having university students move letters upwards or downwards on a computer screen, with measures of mood completed before and after the manipulation. In Experiment 2, participants completed the same task, but moved schematic faces that were either happy or sad. In both experiments vertical attention was biased; however a significant change in mood state was produced only when schematic faces were used as stimuli in the task. The results suggest that shifting an individual’s vertical perception can influence their mood, when the task is emotionally arousing.

Keywords: metaphor, vertical position, embodied emotion, attention, affect, mood

The Influence of Spatial Position on Affect

How would you interpret a colleague telling you how over the moon they are about being told their work was of the highest quality and that they feel they are going up in the world? Or a friend explaining why they are looking downcast by describing their life as having gone down the plug-hole and is now at an all-time low, putting them on the down and out? These are examples of common everyday metaphors; a method of linking two dissimilar concepts in order to aid understanding. These particular illustrations are of orientational metaphors; linking the vertical plane with affect or mood. Moods are affective states, distinct from emotions; which are generally in direct response to an event and persist for a much shorter length of time. Moods differ across time and tend to typify our emotional wellbeing at a given point. (Morris, 1989)

Conceptual Metaphor Theory

Conceptual metaphor theory is the idea of linking one concept with another to help make sense of it (Lakoff & Johnson, 1980b), for example, relationship quality and physical distance; if you have a friendly relationship with someone you might describe them as ‘near and dear’ to you, or the relationship as ‘close’. However if you do not communicate as much as you once did you might say you’ve ‘drifted apart’. Uses of metaphor in language are thought to be an outward expression of how we structure these concepts in the lexicon (Lakoff & Johnson, 1980a), thus the term conceptual metaphors. Lakoff and Johnson (1999) theorised that conceptual metaphors form links spanning across domains of thought from a source domain (the concept domain the metaphor is taken from, e.g. *spending* time) to a target domain (the concept being understood, e.g. *spending time*). In the aforementioned example the understanding of the abstract concept of time is assisted by linking it with the concrete concept of money usage.

Metaphorical links between affect and concrete physical concepts have been found with brightness (Meier, Robinson, & Clore, 2004); distance (Barsalou, Niedenthal, Barbey, & Ruppert, 2003); sound pitch (Gabrielsson & Lindström, 2001); size (Meier, Robinson, & Caven, 2008) and verticality (Meier & Robinson, 2004). These conceptual links have been observed across cultures and languages (Kövecses, 2005) and are considered to be universal. Light is thought of and spoken about as good, and dark as bad throughout twenty countries (Adams & Osgood, 1973). Anger has been found to be described as heat or fire through Japan, China and Hungaria (Kövecses, 2000).

Metaphors that link an abstract concept to a direction or an area of physical space are known as orientational metaphors. Metaphors spanning the abstract concept of affect and the concrete domain of vertical space are one type of orientational metaphor. Metaphors of this variety are prolific in everyday language. A few examples were mentioned previously, but there are many others. If an athlete is performing well they might be described as at their *peak*, or the *top* of their game ('up'/'positive'). When someone is insensitive you might describe what they said or did as *low*, or downright *underhanded* ('down'/'negative'). The term 'depression', which is a common term for experiencing a negative mood state, has a secondary meaning pertaining to a lower vertical position (i.e. a depression in ground-level) and measurements of mood are routinely described on a vertical scale (e.g. "the patient exhibited low mood").

One of the first experiments showing this conceptual relationship between vertical position and affect was back in 1921. Lundholm (1921) found that when participants were asked to draw lines representing positive and negative adjectives, they represented positive words with line at an upward angle and negative words with a downward sloping line. In a more recent piece of research, Meier and Robinson (2004) conducted an experiment testing this implicit association between positive affect and upward space, as well as negative affect

and downward space. They found that participants were more rapid in their recognition of positive words when these were displayed at the top of a computer screen in comparison to the bottom. They also found negative words were recognised faster when displayed at the bottom of the screen. Meier and Robinson theorised that this effect was driven by the implicit associations people hold between positive or negative emotions and the experience or perception of upward/downward space. Presenting positive words high and negative words low increases the processing speed of their meaning, as the position of the word is congruent with its affective association. This implicit association test has been replicated and broadened, finding that the effect is not obtained when the words are displayed on the left and right sides of a computer screen (along the horizontal plane), which would have been inconsistent with conceptual metaphor theory (Poole & Langston, 2008). These vertical associations with negative and positive have been found not only in language, but represented in gestures, architecture and sign posts (Schwartz, 1981).

The conceptual associations we hold are theorised to arise from childhood experiences (Lakoff & Johnson, 1999). From birth we find that good things come from above, such as food and affection. As toddlers we learn that moving to an upright posture (standing up) leads to greater reach, as well as explorative and interactional capacity through greater mobility. We also learn that falling-down is a painful sensation (Crawford, 2009). Those around us who are feeling sad are observed tilting their head downwards and those who are happy keep their backs straight and hold their heads high (LaFrance & Mayo, 1978; Waxer, 1976). As people and animals around us pass-on we may notice that dead things lie down on the ground and are buried. We associate death, and with it negative affect, with downward regions of space. In primary school especially we discover that physically larger and taller people can hold us down. This belief was demonstrated in a study by Montepare (1995) in which taller individuals were rated as stronger and more dominant by children.

Thus, these emotional concepts become represented vertically through the repeated pairing of positive and negative affect with experiences in a spatial context (Lakoff & Johnson, 1999).

In further research into the metaphorical links of vertical position, Meier, Hauser, Robinson, Friesen and Schjeldahl (2007) found that positive religious icons (e.g. God) were associated with higher vertical space and negative religious icons (e.g. the Devil) were associated with lower vertical space. They also found that memory of the location of images of these icons were biased upward for God-like pictures and downward for Devil-like pictures and that photos of people displayed higher in vertical space were rated as more spiritual.

In a novel experiment Meier, Hauser and Toburen (2008) observed that participants were significantly faster in their evaluation of positive words when using their fingers (i.e. a vertically higher method of responding) and evaluated negative words faster when using their feet (i.e. a vertically lower method of responding). They also discovered that participants judged that negative tattoos should be inked onto lower body parts while positive images should be placed higher; indicating that participants relate negative with lower on the body and positive with higher. Eder and Rothermund (2008) also found that perception and motor control can be influenced by the metaphorical representations we hold. They had participants respond to positive and negative words with a joystick. They either described the movement to the participants as pushing away and pulling towards, or as pushing up and pulling down. They found that participants responded to positive words more rapidly when they could respond to them by pulling the joystick towards themselves or pushing it upwards, which are both consistent with metaphoric conceptualisations of the positive (the reverse effect was found for negative words). However, the motor movements required for pulling the joystick towards themselves and pushing it upwards are opposites; demonstrating the powerful effects of metaphorical representations on the perception of motor movements.

In a more recent study (Meier, Moller, Chen, & Riemer-Peltz, in press), map locations were used as orientation stimuli. Northerly locations were rated as more desirable and Southern locations as less desirable to live in. Participants also indicated that wealthy individuals would be more likely to live in the north half of the city depicted on the map and poor individuals would be more likely to live in the south half. This effect disappeared when the map was reversed, with north pointing down and south pointing upwards.

Another study looking at spatial position and its effect on the semantic processing of words was carried out by Šetić and Domijan (2007). They found that participants exhibited a faster reaction to flying animal words (e.g. hawk) when displayed near the top of a computer screen and faster to non-flying animal words (e.g. cat) near the bottom. They conducted a similar second experiment with non-living things which are usually found higher (e.g. chimney) or lower (e.g. carpet) and found the same effect. This is similar to Meier and Robinson's (2004) study, with the exception that Šetić and Domijan used animals and objects which can be found in upper or lower vertical space in everyday life, while Meier and Robinson found the same effect with positive (e.g. trust) and negative words (e.g. ugly). Taken together this demonstrates a link, not only between physical objects and animals and an expectation of location, but of emotional evaluations as well.

Studies show support for the idea that participants create mental pictures when reading sentences, which facilitates their comprehension of the corresponding picture if its spatial orientation is congruent with the descriptive sentence, or inhibits their comprehension if the picture does not match the description. For example, participants who read the words "into the wall" respond faster to a picture of a nail depicted horizontally than one shown vertically (Speer, Reynolds, Swallow, & Zacks, 2009; Stanfield & Zwaan, 2001; Wassenburg & Zwaan, 2010; Zwaan, Madden, Yaxley, & Aveyard, 2004; Zwaan, Stanfield, & Yaxley, 2002). Kaschak and colleagues (2005) conducted an experiment to see if selective

interference of the language system involved in the comprehension of directional action would impede visual processing. They had participants listen to a narrative describing directional action being taken, while viewing a dynamic stimulus moving in the same or opposite direction as the auditory story. In previous studies, in which the congruent and incongruent stimuli are presented one after the other, comprehension is aided by the first stimuli matching the second (thought to be due to a neural priming effect of a conceptually linked area). However in Kaschak and colleagues' study, in which the congruent and incongruent stimuli were presented concurrently, the effect was reversed, with participants responding faster to a picture moving in the opposite direction to the narrative's description. This was taken as support for language comprehension being grounded in perception. The researchers in this study theorised that the neural mechanism for comprehending the direction of motion was already engaged with the visual stimulus and was less available for constructing a mental simulation of the narrative; slowing the rate of processing when the actions described were the same. Thus they reasoned that the neural mechanism used for simulating action described in language is the same mechanism used for visually perceiving action. A recent neuroimaging study looked at the brain areas activated during narrative processing (Speer, et al., 2009), and found that different brain regions were activated for different parts of the narratives. For instance, one area was activated when learning the goals of the hero of the narrative and a different area was activated when processing a character's spatial location. The researchers noted that some of the brain regions activated were the same as those involved when people imagine the corresponding actions, do them themselves or observe others doing them – inferring they mentally simulate aspects of the story as they process them.

According to Kövecses (2005) the repeated pairing of positive and negative affect with experiences in a spatial context is thought to have effects on our neuronal structure.

When the neural areas representing affect and vertical space are activated at the same time, connections are formed. These neural links (mappings) are strengthened as this pattern of activation is repeated during development and also throughout later life. The source concept (in this case vertical space) is located in the sensorimotor system (Kövecses, 2005) while the target concept (affect) is located throughout a number of areas including the limbic, dorsal and frontal areas (Phillips, Drevets, Rauch, & Lane, 2003). Due to this strengthened connection, when one of these neural areas becomes activated, the other is likely to become activated in response. This is thought to explain effects such as participants recalling the position of positive images as higher than negative images (Crawford, Margolies, Drake, & Murphy, 2006).

Embodied Cognition

The sensory, emotional and motor systems in the brain are highly interconnected. When we read about, hear about, or see someone expressing a particular emotion, we simulate the emotion on a micro-level, re-experiencing it perceptually, physically and neuronally in order to understand it, and this is known as embodied emotion (Niedenthal, 2007). This comes under the broader category of embodied cognition, which includes the perceptual, physical and neural simulation of past experiences in order to understand the semantic meaning of language in general. Recalling past knowledge gained from experience requires a partial simulation of the original experience, including activation of the sensory, emotional and motor systems used during the initial experience (Gallese, 2003). When having an experience, groups of neurons in the visual, auditory and affective systems are activated. Then when we recall our experience later, the neural state representing the memory is reactivated. This reactivation continues on to interconnected neurons (areas active during the original experience). Feeling an emotion such as anger may bring with it increases in blood pressure, skin temperature, and muscle tension as well as the facial muscles forming a scowl

(Niedenthal & Maringer, 2009). In keeping with this, Wilkowski, Meier, Robinson, Carter and Feltman (2009) found that when they had participants read words related to anger, those participants reported the room temperature as higher than the participants in the control group. Understanding the words required re-experiencing the emotion of anger and with it comes the physical sensation of increased body temperature.

In a neuroimaging study the same circuits were found to activate when participants were made to smell disgust-eliciting odours as when they observed footage of others displaying disgust (Wicker et al., 2003). This is evidence for a neurological simulation of the emotion expressed by others in order to comprehend or recognise the emotion they are eliciting. A similar result was found in experiencing pain. Hutchison, Davis, Lozano, Tasker and Dostrovsky (1999) found that when a participant received painful stimulation to their hand the activation of neurons was the same as when they observed this happening to the experimenter. Some researchers believe this process is extremely useful in feeling empathy for others (Jackson, Meltzoff, & Decety, 2005), while others insist that experiencing the emotion behind facial expressions, body postures, gestures and language expression (in other words, embodying them) is essential in recognising emotions (Adolphs, 2002). This theory was tested by Niedenthal, Winkielman, Mondillon and Vermeulen (2009). They found that participants had difficulty identifying disgust and joy related words as associated with emotion when their facial expressions were inhibited. This makes a case for a causal role in support of experiencing emotion in order to recognise it.

Crawford (2009) contends that metaphors are not required to understand emotions as we can re-experience them on a sensorimotor and neural level. However, Lakoff and Johnson (1980b) argue that emotional experience is difficult to define, describe and label without the use of conceptual metaphors. They enable us to express and process difficult and complex ideas in a way we can understand and have others understand (Froggatt, 1998; Shinebourne

& Smith, 2010; Stern, 2001). Without language, abstract concepts such as success, time and emotions are very difficult, if not impossible to explain and understand. Research concerning children with hearing impairments who do not learn sign language early in life has provided insight into the great difficulty they have in conceptualising and generalising abstract concepts (Haskins, 2004). Presumably this occurs as they do not have access to metaphors which they would draw upon to describe abstract concepts and to conceptually link them to more physical, concrete concepts. In other words, our ability to “grasp a concept” - another example of a metaphorical link between the physical word (which we can touch or “grasp”) and the abstract (a “concept”).

Conceptual Metaphor Theory within Embodied Cognition

Both of these two theories have support and merit, and are not necessarily contradictory. Conceptual metaphor theory can be placed within the broader framework of embodied cognition and can also contribute to it. One such way it can contribute is to assist in understanding the issue of neural links between bodily states and concepts, which are unlikely to be recurrently experienced together in everyday life. For example, Zhong and Leonardelli (2008) found that recalling an experience of social exclusion correlated with participants perceiving the temperature of the room as lower than the control group. Using embodied cognition theory this could be explained as the cold sensations being regularly paired with social exclusionary experiences in the past and thus the physical sensation is simulated when social exclusion is brought to mind. However, it is unlikely that this pairing is a regular occurrence (i.e. being criticised by members of one's group and then experiencing cold sensations). It is conceivable that a person might experience a time in their life when they were excluded by their peers and then exited a building at a time of year when it was cold outside, but would this be regular or salient enough to become paired? Furthermore, is it likely that the majority of the participants in this study have had this experience? This is

where conceptual metaphor theory could be used to help add explanatory depth. In this case, the embodied sensation of cold or warmth would be connected to the concepts of social exclusion or inclusion via a metaphorical link (Landau, Keefer, & Meier, 2011). We share conceptual links such as this commonly in language, for example, “The reception was a chilly one”. In keeping with this, Zhong and Liljenquist (2006) observed that when participants were asked to recall past wrongdoings they had done, they were more likely to use an antiseptic hand-wipe. While one could arguably commit offences requiring physical cleansing, this is unlikely to be the norm, and it is more probable that this effect is derived from the metaphorical connection between morality and cleanliness (e.g. “Cleanliness is next to godliness”).

The Current Study

Pleasant and unpleasant emotions are an important area of study and much research has been generated around depression, which affects a large proportion of the population (Daly, et al., 2010). The research as it stands on vertical orientational metaphors points to a conceptual link between pleasant words and higher vertical space and unpleasant words and lower vertical space. Positive emotions seem to be associated with up and negative with down, and thus are recognised more rapidly when the associated visual sensation is reproduced, priming the neural pathways for the respective emotion. However, the question remains as to whether shifting attention can have an effect upon the emotional experience of an individual, or if it only assists with processing emotionally toned stimuli.

Mood Consistent Biases

Sad moods are described with reference to downward space (e.g. “You look down about your break-up”) and upward for happy (e.g. “I’m on top of the world”). A clinician by the name of Waxer (1976) was one of the first to record the observation that depressed patients have their head tilted at a downward angle more often than non-depressed patients.

The converse observation has been noted across cultures with happy people often holding their heads high (LaFrance & Mayo, 1978). Recent research by Michalak and colleagues (2009) looked at posture and movement in inpatients with major depression and undergraduates after a mood induction procedure. They found that slumped posture and reduced upward vertical movement of the head were associated with low mood.

Individuals with depression do tend to show biases towards stimuli in keeping with their emotional experience. Rinck and Becker (2005) found that females with depression were more distracted by depressing words (e.g. lonely) than those without depression. Participants with depression have also been found to spend more time attending to sad facial expressions (Joormann & Gotlib, 2007). Furthermore, depressed participants showed a bias for sad sections of pictures (Matthews & Antes, 1992) and spend more time viewing negative images and less time looking at positive images (Kellough, Beevers, Ellis, & Wells, 2008).

Individuals higher in certain personality traits (dominance and submission) have also been shown to have vertical biases. Those scoring higher on a Dominance scale processed information in the top of a computer screen more quickly, while the opposite effect was found for more submissive individuals (Robinson, Zabelina, Ode, & Moeller, 2008). Research by Meier and Robinson (2006) found that participants rating high in depression or neuroticism (persistent negative emotional states, e.g. anger, anxiety, guilt) showed an attentional bias toward stimuli displayed lower down on a computer screen, and the opposite effect for participants rating low in depressive and neurotic symptoms.

Research on mood states, as opposed to traits, shows a similar effect concerning vertical bias. Wapner, Werner and Krus (1957) conducted an experiment in which they had university students bisect horizontal squares before and after receiving their examination grades. Students who received an A grade (and were assumed to be feeling positive emotions) showed an upward vertical bias when bisecting the square, while those who

received a fail grade displayed a downward vertical bias. Fisher (1964) obtained a rating of participants' mood by counting how many sad terms they used to describe neutral faces, then had them adjust a luminous rod until they felt it was horizontal. He found that participants rated as sad showed a downward bias and participants rated as not sad showed an upward bias. Negative affect appears to correlate with a bias towards attending downward in vertical space, as well as towards other mood congruent stimuli (such as sad faces and scenes) and people in more positive moods show an attentional bias upward, but is the opposite true? Can an individual's perception of vertical location affect their emotional experience (i.e. looking up improves their affect and looking down leads to a deterioration in affect)?

Manipulations Producing Changes in Mood

Strack, Stepper and Martin (1988) conducted an experiment involving the manipulation of facial expressions, in which smiling was facilitated with a pencil held between the teeth, and a frown with a pencil held between the lips. They found that participants evaluated mood congruent sentences faster (i.e. smiling-facilitated participants processed positive sentences more rapidly and frowning participants processed negative sentences more rapidly). It has been theorised that this effect is due to facial-feedback, whereby experiencing the physical manifestation of an emotion (in this case facial expression) leads to an embodiment of that emotion – which speeds comprehension of a sentence consistent with that emotion. Riskind and Gotay (1982) conducted a study looking at the effect of manipulating posture. Participants who were placed in a slumped posture, displayed helplessness in a persistence task; giving up earlier. Participants in a hunched posture reported more subjective stress than those who were in a relaxed posture. Other researchers have looked specifically at mood changes influenced by manipulating posture. They have found that when participants were placed in a slumped posture they reported more sadness than those placed in upright postures (Duclos et al., 1989) and those in upright

postures reported feeling more pride in their performance than those in slouched postures (Stepper & Strack, 1993). Physical manifestations of mood (erect posture, head held high when happy; slumped posture, downward eyes when sad or depressed; as well as facial expressions of mood) demonstrate feedback loops, in which a corresponding mood state is brought on by manipulating an individual's bodily state. Manipulating spatial perception may have a similar effect through a metaphorical source domain neural link to mood. As upward space demonstrates conceptual and neural links to positive mood states and traits, and downward space to negative, it may be that orientating an individual's perception upwards or downwards will affect their mood.

In a series of experiments Sanna, Chang, Miceli and Lundberg (2011) revealed that elevating people's height (via escalators, seating, flights or perspective) influenced their helping and donation-giving behaviour, as well as compassion and cooperation. Meier (2005) conducted research to see whether shifting participants' attention upwards or downwards would affect their mood and whether this would be in a metaphorically consistent direction. Meier conducted two experiments. In the first he had participants complete a number of mood measures, then discriminate letters either in the top, middle or bottom-half of the screen, and then complete the measures once more. The second experiment was similar, but involved participants attending to a video shown high, eye-level, or low. He did not find any interaction between attention in visual space and mood measurements, but believed this may have been due to the tasks lacking emotional relevance or psychological realism, as well as the possibility of the task being unsuccessful in biasing participants' attention towards upper or lower visual space (Meier, 2005). Another possible issue was the mood measures, which may not have been sensitive enough to detect small changes in mood over the course of the experiment.

The current study aimed to rectify these issues and examine whether manipulating vertical attention would lead to changes in mood. In Experiment 1, two of the possible limitations from Meier's (2005) study were addressed. Participants were asked to complete two measures of mood. One was the Zung Self-rating Depression Scale (Zung, 1965) and the other was a visual analogue sliding mood scale (Eastwood, Whitton, & Kramer, 1984). Using the sliding scale, participants could quickly rate their subjective mood. It was hypothesised that this would be a more sensitive measure of mood, in comparison with a clinical measure of depressed mood. The perceptual-attention manipulation task consisted of dragging characters from the middle of the screen to either the top or bottom half of the screen, depending on the experimental condition. This was hypothesised to bias attention more effectively by shifting participants' attention in the desired direction during each trial in the attention manipulation task. Studies focused on the correction of unilateral neglect have found that stimuli which direct attention to the left or right cause visual adaption, changing subsequent midpoint estimates (Berberovic & Mattingley, 2003; Rossetti et al., 2004). It was speculated that prolonged attendance to a particular location in Meier's (2005) study may have led participants to realign their perception with that point as spatially neutral; making upward or downward locations the new midpoint. It was also hypothesised that the current study would be more successful than Meier's (2005) task at biasing attention one way or the other, as attention was shifted upwards or downwards for each trial and this introduces a sensory aspect to the manipulation; following the stimuli as it is moved upwards or downwards, rather than passively attending in one direction or the other. This was evaluated during the course of the study by way of a line bisection task.

Experiment 1: Perceptual Manipulation

In Experiment 1, participants' mood was evaluated before and after completing a task designed to shift their attention towards upper or lower vertical space. It was expected that

having participants attend to higher regions of space would lead to a decrease in depressed mood scores and having participants attend to lower regions of space would lead to an increase in scores of depressed mood.

Method

Design

A between-subjects experimental design was used. The independent variable was vertical position (up and down). The dependent variables were mood (Zung SDS & Visual analogue mood scale) and spatial bias.

Participants

A total of 76 (29 male and 47 female) first year psychology students studying at Victoria University of Wellington volunteered to participate in this study. Participation was voluntary, with participants being recruited through the Introduction to Psychology Research Programme (IPRP) and receiving participation credit toward the completion of their course requirement. Participants were required to have English as their first language and possess normal or corrected vision. Participants were informed they could withdraw, without any penalty, at any point during the experiment.

Materials

Perceptual manipulation task. This task was used to bias the participants' attention towards lower or higher visual space. On each trial a fixation cue 'xxx' (300ms) appeared in the centre of the screen followed by either a 'p' or a 'q'. Participants assigned to the 'Up' condition were required to drag the letter upwards with the computer mouse. If it was a 'p' they were to drag it into the 'p' box (located top right of the computer screen) and if it was a 'q' then they were to drag it upwards into the 'q' box (located top left of the computer screen). The 'Down' group completed the reverse of this task, being directed downwards - they were required to drag the 'p' to the bottom right of the screen and the 'q' to the bottom left.

Participants completed 100 trials. Letters were presented in white, 16-point Times New Roman font on a black background.

Mood measures. The Zung Self-rating Depression Scale (Zung, 1965) was used as one measure of mood. The SDS was developed as a self-administered measure of depression severity. It consists of 20 items, 10 items worded positively and 10 negatively. Participants rate each item as occurring a little of the time, some of the time, a good part of the time, or most of the time. The Zung shows reasonable reliability, $\alpha = 0.79$ (Knight, Waal-Manning, & Spears, 1983), and correlates well with other measures of depression (Biggs, Wylie, & Ziegler, 1978; Brown & Zung, 1972; Zung, 1967, 1969; Zung, Richards, & Short, 1965). Along with the Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996), the Zung is one of the most widely used Depression scales, for both clinical use and research (Robinson, Shaver, & Wrightsman, 1991). The Zung SDS was translated onto digital format, so as to have it displayed in either the top or bottom half of the screen depending upon the experimental condition.

A 180mm computerised slider bar version of Eastwood, Whitton and Kramer's (1984) Visual analogue mood scale (VAMS) was used as a measure of participants' subjective mood. Participants were asked to rate their current mood on a slider bar using the computer mouse. The left side of the scale was labelled "saddest", the right side was labelled "happiest" and the middle was labelled "normal mood". The slider remained in the middle of the screen until the participants made a response.

Line bisection task. Participants were shown a vertical line and were asked to click the mouse where they believed the true centre-point to be. This was used as a measure of spatial bias.

Procedure

Participants were given an information sheet about the experiment, along with a consent form for them to sign (see Appendix B). Following this, they were seated at a computer. The computer programme randomly assigned participants to the 'Up' condition or 'Down' condition. The participants completed a Zung Self-Rating Depression Scale and visual analogue mood scale. They then completed the perceptual manipulation task. Participants assigned to the 'Up' condition completed their task by moving the 'p' or 'q' upwards into the corresponding boxes, and those in the 'Down' condition moved theirs downwards.

Participants then completed the Zung Depression Rating Scale and the visual analogue mood scale again, and also the line bisection task. The Zung SDS was displayed in the top half of the screen for participants in the 'Up' condition and displayed in the bottom half of the screen for those in the 'Down' condition. This was to prevent the loss of any spatial biases produced during the perceptual manipulation task. All measures were counterbalanced to eliminate order effects.

At the completion of the computer tasks participants were supplied with a debriefing sheet explaining the experiment in more detail (see Appendix C).

Results

Four participants were excluded from analysis as their results indicated that they had not attended to the instructions for the task. Changes in mood were calculated by subtracting mood scores at time two from mood scores at time one, for both the Zung SDS and the VAMS. Two independent-samples t-tests were conducted to compare changes in mood (Zung SDS and Visual analogue) in Up and Down positions.

The difference in mood change between vertical conditions was non-significant for both Zung SDS, $t(71) = -.553$, $p = .58$ and Visual analogue rated mood, $t(71) = .483$, $p = .48$.

These results indicate that vertical position did not have a significant effect on changing mood in this perceptual manipulation.

While the experimental conditions (Up and Down) did not produce statistically different changes in mood, both mood measures recorded a general trend of positive mood change in participants completing the upward perceptual manipulation in comparison to the downward condition (see Table 1 for means and standard deviations). The Zung SDS measures depressive symptoms and accordingly, lower scores indicate less depressed mood, whereas the VAMS measures mood from sad to happy and thus, higher scores indicate less depressed mood.

Table 1

Means and standard deviations for changes in mood scores by screen position

Measure	<u>Up</u>		<u>Down</u>	
	Mean	SD	Mean	SD
Zung SDS	-1.38	3.26	-0.97	3.01
VAMS	2.62	9.23	1.06	9.75

In order to assess whether participants had vertical biases induced (i.e. participants were inclined towards a region of space consistent with the vertical condition), analyses were carried out on the line bisection scores. An independent-samples t-test was conducted to compare vertical bias scores in the Up and Down vertical conditions. There was a significant difference in the scores for Up ($M=2.57$, $SD=2.23$) and Down ($M=1.11$, $SD=2.05$) conditions, $t(71)=2.90$, $p = 0.005$. These results showed that the upward perceptual manipulation task biased attention significantly higher vertically than the downward task.

Discussion

Experiment 1 was an attempt to establish if inducing vertical bias has an effect on mood. Two adjustments were made to that of Meier (2005), changing the method of inducing

vertical bias and introducing a subjective analogue mood scale to address the possible insensitivity of the mood measures. Rather than directing attention to a specific location for an extended period of time, the vertical perception manipulation task in the present study involved directing participants' attention from the middle of the screen to an upward or downward vertical position (depending upon the experimental condition) for each trial. This was done to introduce a sensori-motor aspect to the manipulation. It was theorised that actively following the stimuli as it is moved upwards or downwards, rather than passively attending in one direction or the other, would be more effective at biasing attention. The sensori-motor component was also posited as a more effective means of influencing mood. If, according to the conceptual metaphor view, affective experience becomes paired with a sensory or sensori-motor experience then, arguably, a sensory-based task would be more effective at activating a paired affective state. The results showed that while attention was biased by the differing vertical conditions, mood was not significantly altered.

The perceptual attention manipulation task involved having participants shift letters from the middle of a computer screen to a box in either of the corners at the top or bottom of the screen. Poole and Langston (2008) found that metaphorically consistent biases were not found with stimuli displayed across the horizontal plane. Considering this, it may be that requiring the participants to move the stimuli not exclusively upwards and downwards, but towards the left or right, produced horizontal, in addition to vertical biases. This may have interfered with the effectiveness of the vertical attention manipulation.

The Zung SDS was displayed in a vertical position consistent with the experimental condition so as to minimise the loss of any vertical bias induced in the manipulation task.

Vertical bias was assessed following the perceptual manipulation (counterbalanced with the other dependent variables) by way of a line-bisection task. The results indicate that the experiment was successful in producing vertical biases in participants. Attention was biased

on average in an upward direction through both conditions, although the upward condition biased attention significantly higher than the downward condition. A factor which was potentially problematic was that the mood measures were displayed in their respective positions for baseline as well as post-manipulation measurements. This could mean that participants' mood may have been influenced during the baseline measurement; thus lessening the difference between scores at time one and time two. However, analyses of the data showed that there was a non-significant difference between vertical positions in baseline mood measurements, suggesting that the initial vertical position of the mood measurement did not overly affect the baseline score.

Another possible issue from Meier's (2005) experiments was the potential insensitivity of the mood measurements. Being clinical assessments of depression and negative mood, they may have been too insensitive to detect mood changes in a non-clinical population. Additionally, these perceptual mood manipulations are expected to produce a change in mood state in a relatively short amount of time, while, as an example, the BDI-II (used by Meier, 2005) is designed to assess depressive symptomology which individuals have experienced over the past week. With these issues in mind, a visual analogue sliding mood scale, based on Eastwood, Whitton and Kramer's (1984) scale, was included to evaluate participants' current subjective mood before and after the manipulation. The results showed that neither the clinical measure of mood (Zung SDS) nor the measure of current subjective mood (VAMS) detected a significantly different change between experimental conditions. Manipulating perceptual-attention did not appear to influence mood to a significant degree.

The non-significant results may be reminiscent of past researchers investigating the manipulation of mood with posture or facial expression, who found that mood manipulations did not produce a significant result when the stimulus was not emotionally arousing. The results of the current study could have been found to be non-significant by reason of the letter

‘p’ and ‘q’ being emotionally irrelevant, and thus ineffective at activating the mood system. Consequently, the stimuli used in the perceptual manipulation task in Experiment 2 were selected to have greater emotional relevance.

Experiment 2: Emotional Stimuli

Experiment 2 involved more pronounced emotional stimuli (i.e. schematic faces) in the perceptual-attention manipulation task, making use of happy and sad faces to give the study more emotional and social relevance. The task was similar to Experiment 1, but required that participants categorise different faces rather than letters (‘p’ & ‘q’). It was expected that this would produce a greater effect in terms of change in mood state; as happy and sad human faces have been found to elicit an emotional reaction (Ekman, 1994; Hariri, Tessitore, Mattay, Fera, & Weinberger, 2002; Wright, Martis, Shin, Fischer, & Rauch, 2002). Thus, these would be more successful in activating the emotional system and producing significant changes in mood.

Past researchers looking into the manipulation of mood with posture or facial expression have found that mood manipulations did not produce a significant result when the stimulus was not emotionally arousing. Strack, Stepper and Martin’s (1988) facial manipulation study did not find a significant result until they had participants appraise cartoons as a part of the experiment. Likewise Stepper and Strack (1993) found that posture manipulations only influenced feelings of pride when participants were receiving positive or negative feedback from the experimenter.

Images of human faces have been found to evoke strong emotional reactions. In a neuroimaging study it was found that participants experienced stronger emotional reactions (measured by skin conductance) to images of facial expressions than scenes depicting threatening or fearful stimuli (Hariri, et al., 2002). Schematic faces were used in the current study as research has shown these to be as effective as photographic images of faces at

evoking emotional responses (Ekman, 1994; Wright, et al., 2002). They also contain fewer confounds than photographs of faces; such as race and gender. Additionally having faces as stimuli in the experiment should contribute to the psychological realism of the experiment, as evaluating faces and shifting perception in response is required for everyday social interaction (McIntosh, Reichmann-Decker, Winkielman, & Wilbarger, 2006). Using socially relevant stimuli may tap into avoidance or approach processes, which could be a function of the downward bias of individuals with low mood (Pettit & Joiner, 2006; Trew, 2011).

Method

Design

The experiment used a between-group experimental design. The independent variables were vertical position (up and down) and expression displayed on the schematic faces (happy and sad). The dependent variables were mood scores (Zung SDS & VAMS) and spatial bias, as measured in Experiment 1.

Participants

A total of 104 (40 male and 64 female) first year psychology students studying at Victoria University of Wellington volunteered to participate in this study. Participants were recruited through the Introduction to Psychology Research Programme (IPRP) and received participation credit toward the completion of their course requirement. Participants were required to have English as their first language and possess normal or corrected vision, and were informed they could withdraw, without any penalty, at any point during the experiment.

Materials

The vertical attention manipulation task was similar to the task in Experiment 1 except the stimuli, which were schematic faces. The task required coloured happy or sad faces to be categorised as either green or white (see Appendix A). The same mood measures from Experiment 1 were used in Experiment 2. These included the Zung SDS (Zung, 1965)

and the Visual analogue mood scale (Eastwood, et al., 1984). A measure of spatial bias was again assessed in Experiment 2. This measure was identical to Experiment 1.

Procedure

Participants were given an information sheet about the experiment, along with a consent form for them to sign (see Appendix B) and then seated at a computer. The computer programme randomly assigned participants to the 'Happy face' or 'Sad face' groups and then within those the 'Up' condition or 'Down' condition. The participants completed the Zung SDS and the VAMS, and then completed the main task. Participants assigned to the Happy-Up condition completed their task by moving the green or white happy faces upwards into the corresponding boxes, while those in the Happy-Down condition moved their stimuli downwards. Participants in the Sad-Up condition completed their task by moving the green or white happy faces upwards into the corresponding boxes, and those in the Sad-Down condition moved theirs in a downward direction.

Participants then completed the Zung SDS and the VAMS again and also the line bisection task. The Zung SDS was displayed in the top half of the screen for participants in the 'Up' condition and displayed in the bottom half of the screen for those in the 'Down' condition. This was to prevent the loss of any spatial biases produced during the perceptual manipulation task. All measures were counterbalanced to eliminate order effects.

At the completion of the computer tasks participants were supplied with a debriefing sheet explaining the experiment in more detail (see Appendix C).

Results

As in Experiment 1, changes in mood measured by the Zung SDS and the VAMS were calculated by subtracting mood scores at time two from mood scores at time one. A Multivariate analysis of variance (MANOVA) was conducted to compare changes in mood

(Zung SDS and VAMS) when the independent variables (vertical position and stimuli valence) were manipulated.

There was no significant effect of valence (happy/sad faces) on mood as measured by the Zung SDS $F(1, 100) = 2.78$, $p = 0.10$ and the VAMS $F(1, 100) = .01$, $p = .93$.

The difference in mood change between vertical conditions was non-significant for the VAMS, $F(1, 100) = .26$, $p = .61$. However, there was a significant difference in mood change between the vertical conditions as measured by the Zung SDS, $F(1, 100) = 4.34$, $p = .04$. Participant's baseline scores on the Zung SDS decreased following the vertical manipulation measure in the Up condition ($M = -0.58$, $SD = 6.23$) and increased in the Down condition ($M = 2.50$, $SD = 8.71$).

An assessment of participants' vertical biases post-manipulation was conducted, via analyses of participants' line bisection scores. There was a significant difference in the scores for Up ($M = 2.42$, $SD = 1.83$) and Down ($M = 1.58$, $SD = 2.03$) conditions, $F(1, 100) = 4.99$, $p = 0.03$. These results indicate that completing the perceptual manipulation task in the Up position biased participants' attention significantly higher vertically than completing the task in the Down position.

Discussion

In Experiment 2 the stimuli used in the perceptual manipulation were more emotional in nature (i.e. schematic faces) than in Experiment 1. It was hypothesised, based on previous research (Stepper & Strack, 1993; Strack, et al., 1988), that the use of emotional stimuli would produce a greater effect in terms of alteration of mood state. It was proposed that happy and sad faces would provide the perceptual manipulation with more emotional and social relevance for the participants and that this would influence mood to a greater degree than neutral letters (i.e. 'p' & 'q'). The results confirmed this hypothesis, with participants

recording fewer depressed symptoms subsequent to completing the upward manipulation and an escalation in depressed symptoms after completing the downward manipulation.

Interestingly, there was no significant effect of valence. Meaning that whether the faces shown were happy or sad this had no affect the participant's mood. This is contrary to research which has found that displaying happy or sad faces can be used to induce happy or sad moods (Schneider, Gur, Gur, & Muenz, 1994; Schneider, Gur, Gur, & Shtasel, 1995). However, the mood induction procedures in the above studies involved instructions for the participants to feel the emotion expressed in the photograph. This may have led participants to imitate the facial expressions depicted, causing a facial feedback response equivalent to Strack, Stepper and Martin's (1988) research. The valence of the emotional stimuli used in the current study did not have an effect on mood, but using emotional stimuli to direct participants' attention in an upward or downward direction did.

One of the possible issues addressed concerning Meier's (2005) experiments was the potential insensitivity of the mood measurements. It was hypothesised that clinical assessments of depression (such as the BDI-II and Zung SDS) may be too insensitive to detect small mood changes in non-clinical populations. Thus, a visual analogue sliding mood scale was introduced to measure participants' subjective mood before and after the manipulation. However, from the results it appears that the VAMS was less sensitive in detecting changes in mood than the clinical measure (Zung SDS). While single-item measures increase participants' motivation to provide valid responses, they may fail to encapsulate all of the components of the construct being measured (Youngblut & Casper, 1993). Thus the VAMS may have been less sensitive to changes in affect as it was not specific enough to obtain the necessary information to comprehensively assess participants' mood.

Consistent with the first experiment, the results indicate that the perceptual manipulation produced vertical biases in participants consistent with position. Attention was biased on average in an upward direction in both conditions, though the average scores were significantly different; with the upward condition biasing attention higher than the downward condition. The biasing of attention along a vertical plane with the use of emotionally arousing stimuli appears to produce changes in mood in a metaphorically consistent manner (i.e. bias towards a higher spatial plane reduces depressed symptomology and lower vertical bias increases reporting of depressed symptomology).

General Discussion

It was hypothesised that directing participants' attention upwards or downwards would affect their mood in a metaphorically consistent direction (i.e. directing attention upwards would positively effect their mood and downwards would negatively effect their mood). This was supported when the stimuli used to direct the participants' attention was emotive (i.e. schematic faces), but not when the stimuli were neutral (i.e. letters: 'p' and 'q').

In Experiment 1, the effect of having participants move neutral stimuli upwards or downwards on a computer screen was examined. The results showed that the task induced an attentional bias, but did not influence participants' mood to a significant degree. In Experiment 2, participants completed the same task, but the stimuli they moved were schematic faces. These faces expresses either happiness or sadness and participants moved them upwards or downwards on the screen. The valence of the faces (whether they were happy or sad) did not significantly influence participants' mood, however the spatial direction did. When participants moved schematic faces upwards, their score on a measure of depression improved and when they moved them downwards their scores deteriorated.

Emotional Stimuli

The results are consistent with previous research on mood manipulation. Strack, Stepper and Martin (1988) in their facial manipulation study, did not find a significant result until they had participants appraise cartoons as a part of the experiment. Likewise, Stepper and Strack (1993) found that the manipulation of posture only influenced feelings of pride in participants when they were receiving positive or negative feedback from the experimenter. Other studies involving mood inductions have used emotional stimuli, such as affective pictures (e.g. babies and cuddly animals) with mood-congruent music to successfully induce a mood state (Goodwin & Sher, 1993). One group of researchers tested three methods of inducing mood states; all of which involved emotional stimuli. The Velten mood-induction procedure (in which participants are taken through lists of either positive or negative mood statements), listening to elating or depressing music, and watching either a comedy video or one about a family visit to a disabled elderly relative. All three methods using emotional stimuli were found to be successful (Lewis, Dember, Schefft, & Radenhausen, 1995).

Meier (2005) did not obtain a significant result when directing participants' attention to up, down and middle locations. However this may have been the result of the use of neutral stimuli. In his first experiment, Meier directed participants' attention using the letters 'p' and 'q'. While, in his second experiment attention was directed using a video documentary on psychology research. Both of the two experimental procedures utilised neutral stimuli. From the results of previous research and the current study it would seem that the stimuli used in tasks designed to produce an affective shift should be emotive to be effective. It could be that the affective system requires a certain level of stimulation for the activation of the perceptual system to have an effect on mood. This is also consistent with theory around the arousal domain of affect. Studies examining the structure of affect have disseminated two distinct dimensions. The two dimensions are valence; positive vs. negative

mood and arousal; high vs. low (Barrett & Russell, 1999; Feldman, 1995; Shapiro, MacInnis, & Park, 2002). Clore and Storbeck (2006) posited that the level of arousal amplifies the affect being experienced. Research on the effect of valence and arousal on judgments of advertisements found that positive and negative evaluations were more intense when arousal was high (Gorn, Pham, & Sin, 2001). Accordingly, it would make sense that mood changes are greater when arousal is stimulated by way of emotional stimuli.

Psychological Realism

Meier (2005) reasoned that mood experiments require a certain amount of realism to utilise the psychological processes which are the cause of everyday variations in mood. In a meta-analysis of mood state-dependent memory, Ucross (1989) found that an experiment's realism was one of the most important elements in determining the outcome of the study. During depressed mood states, features such as downward-directed or avoidant eye-gaze (Hinchliffe, Lancashire, & Roberts, 1970; Larsen & Shackelford, 1996; Natale, 1977) and stooped posture (Michalak et al., 2009) happen during socially meaningful interaction. As social withdrawal is often a part of a major depressive episode (American Psychiatric Association, 2000; Trew, 2011), it could be that a function of downward directed attention is to avoid social contact. A case in point is research by Natale (1977) who found that inducing a negative mood state in participants led to avoidance of eye contact. Thus, using human faces as stimuli would lend to the ecological validity of the experiment (Bradley et al., 1997). This was supported by the results of the second experiment in the current study, finding that using schematic human faces in the vertical attention manipulation resulted in a shift in mood. Though, the artificial environment of the lab and the use of a computer screen for the presentation of the faces may have reduced the realism of the experimental conditions.

Shifting Attention

In Meier's (2005) research, participants attended to locations in the top, middle and bottom of a computer screen or projected image. While in the current study participants were required to move the stimuli from a central location on a screen to either the top or the bottom of a computer screen. This was hypothesised to bias attention more effectively by shifting participants' attention in the desired direction during each trial in the attention manipulation task. It was speculated that prolonged attendance to a particular location in Meier's (2005) study may have led participants to realign their perception with that point as vertically neutral; making the upward or downward location the new midpoint. Further, Meier suggested that having participants shift their attention from a central point to a higher or lower location may induce an experience which was more sensory in nature, through moving their head or eyes, as opposed to a more perceptually-based experience. As much of the research to date, especially in the embodied cognitions area, has involved a sensory or sensori-motor experience (e.g. body position/expressions; Stepper and Strack, 1993; Strack, Stepper & Martin, 1988; or sound; Gabrielsson, & Lindström, 2001; Weger, Meier, Robinson & Inhoff, 2007), it may be that these experiences have a greater effect on a person's mood. Researchers such as Teasdale (1993) contended that sensori-motor activities which are incongruent with low mood, such as exercise, would be an effective preventative measure against depression. These ideas fit with conceptual metaphor theory (Lakoff & Johnson, 1999) which proposes that metaphors are created by pairing affect with a sensory or sensori-motor experience. However, the current study found that having participants engage with a sensory manipulation without the use of emotional stimuli, did not produce significant changes in affect. From the current data it is unclear whether a sensory-based task is more effective than a perceptually-based one in the modification of mood states. Further research is required to examine this matter.

In both Experiment 1 and Experiment 2, though the biases produced from the upward and downward manipulations were significantly distinct, vertical attention was biased for both conditions on average in an upward direction in relation to the mid-point. This may reflect what many psychological researchers have deemed the ‘optimism bias’ or ‘rose-tinted glasses’. Whereby, the average person has a bias towards the positive. Researchers found that most people hold a bias towards seeing the future as more pleasant than it is likely to be (Hoch, 1985; Taylor & Brown, 1988; Weinstein, 1980). While only those who rated highly on measures of depression showed a bias towards the negative (Strunk, Lopez, & DeRubeis, 2006). A recent study found that the majority of the sample rated their satisfaction with life as seven out of ten or higher (Office for National Statistics, 2011). As people are on average biased towards the positive end of the valence dimension, a corresponding bias towards upward vertical space could be present. This is supported by the work of Drain and Reuter-Lorenz (1996) who found that average individuals completing line bisection tasks exhibited upward biases.

Theoretical Implications

The results from the current study are consistent with conceptual metaphor theory in the idea that sensory/perceptual experiences become paired with affective states; allowing emotional experiences (such as dejection) to be explained with spatial metaphors (such as down or low). As well as Lakoff and Johnson’s (1980a, 1980b, 1999) reasoning that abstract ideas are made sense of by way of concrete domains (i.e. anger can be better understood by thinking of it as fire). If one interpreted the results of the current study in conceptual metaphor theory terminology, then the manipulation of the source domain (concrete; senses/perception) via a vertical attention manipulation task, had an effect upon the target domain (abstract; mood state) when the stimuli was emotionally arousing.

The results are also consistent with embodied cognition, as this line of thought also proposes that sensori-motor experiences become paired with affective states during early development (Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005). How the theories differ is in whether these early experiences are conceptualized into metaphors, which are later drawn upon to aid understanding of abstract domains, or linked neurally in the brain and when one is stimulated, the interconnected systems are activated. The parameters of the current research are insufficient to resolve this.

Measurement of Mood

In the current study it was hypothesised that clinical measures of depressed mood may be insensitive to the slight shifts in mood which would be expected in a perceptual attention experiment such as this. Consequently, a single-item subjective measure was introduced. The visual analogue mood scale measured mood across a bipolar continuum from negative to positive. Participants were required to subjectively estimate of their mood between the saddest they have ever been, normal mood and the happiest they have been. However, the VAMS appeared too insensitive to detect changes in mood. While, the clinical measure of mood was able to register these changes. It may be that the VAMS single-item scale was too imprecise to comprehensively assess participants' mood and failed to encapsulate other important aspects of mood. Although several previous studies have measured the success of mood induction methods using a single-item analogue scale (Michalak, et al., 2009; Teasdale & Taylor, 1981; Watkins, Teasdale & Williams, 2003).

As the VAMS asked participants to rate their mood between the saddest and happiest affect they have previously experienced, it could be that the undifferentiated valence and arousal dimensions of affect created a confound. Researchers such as Wilhelm and Schoebi (2007) have advocated for a three dimensional view of affect and found evidence to support this view. They created a six-item short mood scale based around the dimensions of valence

(unpleasant-pleasant), calmness (tense-relaxed) and energetic arousal (lacking energy-full of energy). Although the three factor structure was not supported for between-person calculations, this scale was found to be a suitable method of measuring mood changes in a participant across time. It may therefore be a better measure for use in future studies examining changes in mood.

The Zung SDS enquired about specific symptoms of low mood (e.g. appetite) and is designed to assess the severity of depression (Biggs, et al., 1978). The comprehensive coverage of the symptoms of depression in the Zung SDS may have increased its sensitivity to alterations in mood. One limitation with the Zung SDS was that when completing the Zung, participants were asked to pick the option which best described how they had felt or behaved during the last several days. Thus, when there was a change in mood from time one to time two, it was a change in how the participant perceived their feelings or behaviour in the recent past, as opposed to how they felt at that moment in time. It could be reasoned that this is an effect of mood congruent or state-dependent memory; with the participant recalling more positive or negative information depending upon their mood when completing the questionnaire (Bower, 1981). A similar finding was made by Goodwin and Sher (1993) who found that participants who were induced into a sad mood recalled a greater number of depressed and dysthymic mood symptoms across their lifetime than those induced into a happy mood. Also, Schwarz and Clore (1983), who found that participants rated their life as more satisfying when questioned during sunny days, as opposed to rainy ones.

Future Research

Future research should investigate the use of other measures of mood. Measures which have been found to be sensitive to mood changes over a short period of time and are not overly arduous for the participants. For instance, the previously mentioned six-item measure by Wilhelm and Schoebi (2007), or the short version of the pleasantness-

unpleasantness adjective checklist (Steyer et al., 1994). Which is comprised of four adjectives (happy, unhappy, well and dissatisfied) rated on a five-point scale and has been shown to be reliable in French and German (Courvoisier, Eid, Lischetzke, & Schreiber, 2010).

It is a possibility that perceptual manipulations influence mood relatively quickly and that the effect reduces rapidly. If so, the experimental task may have been too lengthy and some of the effect on mood could have been lost before the mood measures were completed a second time. In future studies, researchers may plan to have participants complete perceptual attention manipulation tasks of differing lengths to examine the effect of this on changes in mood.

A finding of the current study was that the use of emotional stimuli in the perceptual manipulation task resulted in a significant shift in mood. One explanation for this is the arousal dimension of affect. Using emotional stimuli may have increased the participants' level of arousal, intensifying the mood shift. Contemporary researchers have hypothesised that high arousal conveys importance and urgency and thus amplifies positive or negative affect; i.e. feelings of peace become ecstasy and lethargy becomes misery (Clore & Storbeck, 2006; Gorn, et al., 2001). Future research should employ a more arousing perceptual task to determine if it will bring about more dramatic changes in mood. Another approach would be to observe the effects of emotional and non-emotional arousing stimuli, in order to determine if an emotional component is required to produce changes in mood.

Implications and Applications

The current study has built on previous research concerning vertical metaphors, such as the finding that people more rapidly process positive and negative words when the valence is metaphorically consistent with their vertical position (Meier & Robinson, 2004) and that mood traits appear to be metaphorically consistent with vertical attentional biases (Meier & Robinson, 2006). The results of the current study supported the concept that a person's mood

state can be altered in a metaphorically consistent way by biasing their attention towards a vertical orientation (upwards or downwards).

Affective states determine how people categorise and interpret social situations and information (Clore & Storbeck, 2006). Research by Forgas, Bower and Krantz (1984) demonstrated that mood has a large effect on how people interpret others' behaviour and expressions in social situations, as well as what they remember about them. In their research, participants were hypnotised, inducing happy or sad mood. Happy participants remembered a greater number of relaxed, positive social interactions while sad participants recalled more tense, negative ones. Mood also influences decision-making, for example, the selection of a political party to vote for (Razran, 1940). Applying vertical perceptual manipulations (i.e. utilising a higher vertical placement of advertisements or positioning of people relative to others) could have effects on the political realm; in the court room, concerning judge and juror rulings (Blumenthal, 2010; Semmler & Brewer, 2002); on dating and attractiveness, with reference to the other person's vertical position in relation to one's own (Shepperd & Strathman, 1989); on the job market and presenting oneself (Case & Paxson, 2008); and on the media, such as advertising (Gardner, 1985). Furthermore, low mood affects many individuals throughout their life. Williams, Mathews and MacLeod (1996) argued that attentional biases present in psychopathologies are not just a symptom, but a factor in the maintenance, and possibly the production, of disorders. Increasing our understanding of mood and the perceptual biases entailed, could help with the treatment of mood disorders as well as making everyday life more cheerful.

Conclusions

The goal of the current study was to investigate the effects of vertical perceptual biases on mood; whether shifting perception could have an effect upon the emotional experience of an individual. It was hypothesised that completing a task designed to induce an

upward or downward vertical bias would lead to a mood shift in a metaphorically consistent direction (i.e. an upward biasing task would lead to participants feeling “upbeat”, while a downward biasing task would lead them to feel “down”). The attention manipulation task biased attention (Experiment 1); however a change in mood state resulted from this only when schematic faces were used as stimuli in the task (Experiment 2). Therefore, the current study found that shifting an individual’s perception of the vertical dimension can influence their mood when the task is emotionally arousing. It is recommended that future research utilises arousing attention manipulation tasks and measures of mood which consider the multidimensional structure of affect.

There are possibly more effective and efficient ways of inducing mood changes (such as recalling a time when the desired emotion was last experienced, looking at emotional pictures, using emotional music, or hypnotic induction). However, the results of the current study are appealing as they are consistent with vertical metaphors embedded in our everyday language. As it turns out, it does seem like things are looking up when you are looking upwards.

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Appendix A

Face stimuli used in the experiment 2 perceptual manipulation task.

Appendix B

Information Sheet and Consent given to IPRP Students.

Information Sheet

Michael Burrows
MSc student

Email: Michael.Burrows@vuw.ac.nz

John McDowall
Supervisor/Senior Lecturer

Email: John.Mcdowall@vuw.ac.nz

Ph: 04 463 6423

What is the purpose of this research?

- We are interested in how certain tasks affect the way we think about the world around us.

Who is conducting the research?

- This study is being carried out by myself, Michael Burrows, under the supervision of Dr. John McDowall.
- The research will contribute to my Masters thesis.
- This research has been approved by the School of Psychology Human Ethics Committee under delegated authority from Victoria University of Wellington Ethics Committee.

What is involved if you agree to participate?

- If you agree to participate in this study, you will fill out a brief self-report questionnaire on mood, complete a computer-based task (dragging and dropping letters into their assigned boxes with the mouse), then complete the mood questionnaire once more, and another short computer task (judging the distance between objects).
- Some questions might be of a sensitive nature (eg. "I still enjoy sex").
- We anticipate that your total involvement will take no more than half an hour and will be worth 0.5hrs IPRP credit.
- During the research you are free to withdraw, without any penalty, at any point before your data has been collected.

Privacy and Confidentiality

- We will keep your consent forms for five years after publication and data (unidentifiable) for at least five years after publication.

- You will never be identified in my research project or in any other presentation or publication. The information you provide will be coded by number only.
- In accordance with the requirements of some scientific journals and organisations, your coded data may be shared with other competent researchers.
- Your coded data may be used in other, related studies.
- A copy of the coded data will remain in the custody of Dr. John McDowall and Michael Burrows.

What happens to the information that you provide?

- The data you provide may be used for one or more of the following purposes:
 - The overall findings may be submitted for publication in a scientific journal, or presented at scientific conferences.
 - The overall findings may form part of a PhD thesis, Masters thesis, or Honours research project that will be submitted for assessment.

If you would like to know the results of this study, please put your email address on the consent form.

If you have any further questions regarding this study, please contact above.

Statement of consent

I have read the information about this research and any questions I wanted to ask have been answered to my satisfaction.

I agree to participate in this research. I understand that I can withdraw my consent at any time, without penalty, prior to the end of my participation.

Name: _____

Signature: _____

Date: _____

Student ID: _____

If you would like to know the results of this study, write your email address below:

Appendix C

Debriefing form for IPRP students.

Debriefing statement: immediate debriefing.

Thank you for participating in this experiment.

This study examined how directing attention upwards or downwards can affect mood.

Research by Meier and Robinson (2006) found that participants rating high in depression or neuroticism (persistent negative emotional states, eg. anger, anxiety, guilt) showed an attentional bias toward stimuli displayed lower down on a computer screen, and the opposite effect for participants rating low in depressive and neurotic symptoms. This gives a whole new significance to the phrase “things are looking up”. Pertaining to this, there are numerous metaphors relating vertical position to pleasant or unpleasant things. Some examples of this are as follows: Heaven and Hell; one considered to be up, one down. Euphoric feelings are considered to be “highs”, or you could be said to be “on top of the world”. We ask if someone is feeling “down in the dumps”, and if someone gets a promotion we say they are “coming up in the world”. There are many more examples of these metaphors, and these may be producing, or are produced by, this concept of higher as positive and lower as negative.

Meier (in press), wanting to test the practical applications of this, conducted research to see if the opposite was also true – whether shifting participants’ attention upwards or downwards would affect their mood. He did not find the result he was hoping for, but believed that may have been due to the insensitivity of the measures, as well as the possibility of the task being unsuccessful in actually biasing attention up or down. The current experiment employs a drag and drop task; shifting attention from the middle of the screen either in the upward or downward direction for each trial (independent variable). It is expected that this will be more successful at biasing attention one way or the other, and the line bisection task is used to test for this bias (dependent variable). The current experiment also used a visual analogue mood scale (dependent variable) as a more sensitive

measure of mood, in comparison to a more general measure (questionnaire) of mood (dependent variable).

Low mood affects many individuals throughout their life. The results of this research will give evidence as to whether the direction in which vertical attention is manipulated can have an influence on mood. Having a greater understanding of mood could help with the treatment of mood disorders as well as making everyday life more cheerful.

Thank you again for your involvement in this research.

If you feel distressed after completing the survey today, below are a list of places that you could contact if you would like to talk to someone:

Youthline VUW Student Health Service

Ph: 0800 37 66 33

[Kelburn Campus](#) Ph: (04) 463 5308

Email: talk@youthline.co.nz

[Pipitea Campus](#) - (04) 463 7474

Website: www.youthline.co.nz

Email: student-health@vuw.ac.nz

Psychology Clinic

5th Floor, Easterfield Building

Victoria University of Wellington

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