Evaluation and recall of valenced stimuli as a function of spatial positions

by

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Abstract

Meier and Robinson (2004) had subjects identify pleasant and unpleasant words presented individually either at the top or bottom of a computer screen. Subjects identified pleasant words faster when they appeared at the top of the screen and unpleasant words faster whey they appeared at the bottom of the screen. The authors discussed this finding in terms of metaphors noting that in language good things are often allocated upwards (e.g. “things are looking up for me”) and bad things downwards e.g. (“I’m down in the dumps”). The aim of the present study was to investigate whether this relationship between affective stimuli and visual space occurs automatically (implicitly) or whether explicit processing of affective stimuli is required. A second aim was to investigate if memory for affective words is influenced by spatial location. In Experiments 1 and 2 subjects were shown pleasant and unpleasant words presented either at the top or bottom of a computer screen. Half the words were coloured green and half coloured purple. Subjects had to identify the colour as quickly as possible. No significant interaction between stimulus valence and spatial position was found, nor did recall interact with spatial position. In Experiment 3 subjects had to explicitly identify the valence of the words shown either at the top or bottom of the screen. It was predicted that positive stimuli would be explicitly evaluated faster and recalled more accurately when shown at the top of the screen, with the opposite holding true for negative stimuli. Participants were quicker to identify positive words at the top of the screen. Recall did not interact with spatial position. Overall the results of this study were broadly supportive of the hypothesis for explicit evaluation but not so for implicit evaluation or recall.

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Evaluation and recall of valenced stimuli as a function of spatial

The initial portion of this paper introduces the theoretical background necessary to place the current study in context. Explanations of the key terminology used throughout the thesis will be provided, followed by a brief explanation of how Landau, Meier & Keefer (2010) propose conceptual metaphors fit as a mechanism within social cognition. Following this, the traditional theories of social cognition processes (schema and embodied cognition) will be examined. Lastly, the conceptual metaphor framework (CMF) will be introduced. The second portion of this introduction will explore the literature pertinent to the current study, providing the justification for the present experiments relevant to the CMF.

Terminology

The following is an explanation of key terminology as they relate specifically to this topic.

1. Concept – "a mental representation used for a variety of cognitive functions, including memory, reasoning, and using and understanding language" (Goldstein, 2008, p. 488).
2. Conceptual mapping – the process creating associations between concepts, including connecting source concepts to target concepts.
3. Conceptual metaphor – a cognitive instrument used by people to comprehend abstract concepts through the representation of a dissimilar concrete concept which is more familiar. This could be considered a type of conceptual mapping.
4. Source concepts – "represent commonplace, schematic knowledge about the attributes of familiar referents and the relations among those attributes derived from routine interactions with the physical and social world" (Landau, Meier &

Keefer, 2010, p. 1046). Source concepts are more concrete and familiar to the perceiver than an abstract target concept.

5. Target concepts – "abstract referents, which are more difficult to grasp" (Landau, Meier & Keefer, 2010, p. 1046).

The world of Social Cognition

Social Cognition

Put simply, social cognition seeks to explain how humans interact socially through the encoding, memory, retrieval, and processing, of information about one's self, others and the world (Overwalle, 2009). This system determines how we each view the world. Two widely discussed theories regarding the processes underlying social cognition, are the schema and embodied cognition theories (Landau, Meier & Keefer, 2010). Both of these theories are similar by virtue of the fact that they contend that people assess and evaluate stimuli through a filter of self constructed knowledge about a target stimulus. However, based on Lakoff & Johnson's (1980) cognitive linguistics perspective, which argues that people interpret the world via conceptual metaphors, Landau, Meier & Keefer (2010) have proposed a third and complementary account for the workings of social cognition, a conceptual metaphor framework (CMF). Indeed they argue "that social cognitive theory and research can and should be enriched by an explicit recognition that metaphor is a unique cognitive mechanism underlying social thought and attitudes" (Landau et al., 2010, p.1046). Before exploring the CMF, the currently accepted accounts of the processes underlying social cognition, schemas and embodied cognition, will be considered.

Schemas

It is broadly acknowledged that schemas are constructions that represent many sets of

categorised data relating to concepts and that they make possible inferences regarding these concepts and other related instances of them (Smith & Kihlstrom, 1987; Fiske & Taylor, 2008). Observed images of social stimuli are considered to be schema and are inclusive of their typical attributes. Schemas are viewed as the foundation of social cognition, upon which our thoughts and beliefs are based (Landau et al., 2010). Providing a cognitive rule of thumb, schemas allow us to complete mental pictures efficiently by leveraging historical information, for example, a schema for meeting a comedian would inform us they should be amusing, entertaining, probably confident on stage, articulate and fast of thought. This is important as we only have a finite amount of cognitive capacity and having to analyse every situation from the start each time would prove impossible. This categorisation provides us with a ready template for people, objects or situations that facilitate perception. In the case of the comedian, the schema is applied in seconds and likely without conscious awareness, for example we would automatically expect the comedian to be funny, rather than spending many minutes trying to analyse the person to find out if they are indeed humorous, the latter being a slow and inefficient use of our cognitive resources. As a result, we construct shortcuts that can be applied readily to concepts that may present to us for evaluation.

Schemas are believed to be stored in memory with closely associated concepts in a network fashion that can be activated by similar social stimuli (Gleitman, Fridlund & Reisburg, 2003). Landau et al's description gives voice to the basis of social schema theory, which attempts to articulate how we view our environment and how this is represented cognitively through categorisation. The schema is in effect a mental representation of our world that is activated as we visualise or think of a related concept. This activation maps back to the archetypal concept, thus creating an association. Continual activation of the schema (usually

unconsciously) via the concept will strengthen the association and facilitate future access to information connected with the archetypal concept. Due to the automatic nature of this process the activation of the original schema by other information has an impact on our perception of the world. This in turn shapes cognition and social behaviour regardless of the accuracy of one's perception.

Perception and processing of social information are filtered though cognitive schema, a preconception that can be activated in different ways (Gleitman, Fridlund & Reisburg, 2003). Research indicates that schemas can trigger emotional affect for new stimuli that are associated with past experiences (Fiske & Taylor, 2008). For example, meeting someone who looks very much like a deceased loved one may trigger a schema for love and nurturing. The impact of the schema in a given situation is also dependant upon the past experience of the individual (e.g., a student who gets straight A's and is used to getting awards may have a very different affective reaction to being called to the headmaster's office than a peer who has a schema related to being constantly in trouble). Schemas also appear to activate or facilitate attention and memory for concepts that are consistent with those schema criteria. For instance, through schema based encoding people are more likely to make future inferences and recall information that is connected to their schema (Anderson, Pichert & Shirey, 1983) e.g. if a person has a dog interaction schema informed by a past attack, it is likely that any contact with a dog, regardless of the reality of the situation, is likely to be framed in negative fashion. It is apparent that schematic processes play an important role in the process of how we perceive ourselves, others and the world, in short, social cognition.

Embodied Cognition

Embodied cognition proponents view as central the role of sensorimotor function to

enable humans to interact with their social environment (Wilson, 2002). An early example of this viewpoint comes from Jean Piaget, with his work on the developmental stages of children. Piaget considered that the sensorimotor skills of infants were employed to assist with adapting to their environment through their interactions, which in turn increased their cognitive ability. It was argued that infants internalise their sensorimotor experience and apply their gained knowledge later in life. For example, the primary action of sucking for the purpose of feeding is later extended by using their motor skills to acquire other objects to suck on. The feedback from these sensorimotor experiences leads to cognitive development, for example, the plum tastes good (I can eat this object), and that shoe does not taste good (not for eating). It is argued that the embodiment of these experiences drives our perception of the world around us. In essence, an individual is at the centre of all of their social context and subsequent cognitions, be them online (a physical interaction with the real world) or offline (cognitive images producing a bodily response) are facilitated by their historical sensorimotor experiences (Fiske & Taylor, 2008). In an online state (sometimes known as *situated cognition*; Wilson, 2002) the experience of dancing to a song during a very enjoyable evening may elicit feelings joy, freedom or even love (if a partner is present), and there may also be motor and spatial reactions of wanting to be close to the person. The in situ person is effectively gathering knowledge about their experience, which is encoded as an embodied account complete with modal (e.g., emotional, somatic, motor/spatial) information (Niedenthal, Barsalou, Winkielman, Krauth-Gruber & Ric, 2005). An offline example could manifest itself as a person thinking about a concept as opposed physically encountering it, yet the mere thought elicits a bodily reaction similar to a real world experience. Continuing the above example, simply hearing the title of a song that one danced to may trigger the bodily feelings of joy, love and the thought of closeness to another person. The production of

this mutli-modal affect is implicit within the embodied concept of the song (Niedenthal et al.). It could be argued that our reality is in fact reconciled through a filter of our personal embodiment. It follows that such a proposition would be central to any explanation of the mechanisms underpinning social cognition.

Conceptual Metaphor Framework

The use of the metaphor in linguistics to equate dissimilar concepts can be traced back to Aristotle, with later theorists opining the metaphors role in communication, culture, art and as an element of human cognition (Landau et al., 2010). It was the work of Lakoff and Johnson (1980a) that has seen research on role of the metaphor as a mapping mechanism between dissimilar concepts really burgeon. Lakoff and Johnson's stance is that metaphors are used so widely in language that their use is barely noticed, yet they are indispensable as they provide a concrete source reference with which to explain an abstract target. To illustrate this point, Lakoff and Johnson (1980a) used the metaphor of an argument as war;

> ARGUMENT IS WAR
>
> Your claims are *indefensible*.
>
> He *attacked every weak point* in my argument.
>
> His criticisms were *right on target*.
>
> I *demolished* his argument.
>
> I've never *won* an argument with him.
>
> You disagree? Okay, *shoot!*
>
> If you use that *strategy*, he'll *wipe you out*.
>
> He *shot down* all my arguments. (p.454)

In this example, the concrete source concept of *war* (being easily understood by society), is used to convey the more opaque target concept, *argument*. We may also use concrete concepts not only to assist us in language but also in our perceptions and actions. Lakoff and Johnson (1980a) posited that there are only a small number of concrete concepts that can be embodied through in vivo experience (as per embodied cognition) and therefore be comprehended in their own right. For instance, orientational metaphors operate in a way that is related with our bodies, which itself physically interfaces with the world in a motor driven fashion which requires a sense of spatial orientation. In childhood we may experience an adult coming from a high position to give us a hug or perhaps tripping and falling down caused pain. As a result, we relate easily to metaphorical concepts such as “up is good”, “down is bad”, “up is happy”, “down is sad”, “virtue is up”, “depravity is down”. It appears that there is a key role for a few concrete concepts to be used as source concepts to express numerous complex abstract target concepts in a readily understood manner. Indeed Lakoff and Johnson (1980a) asserted that “Metaphorical concepts provide ways of understanding one kind of experience in terms of another kind of experience. Typically this involves understanding less concrete experiences in terms of more concrete and more highly structured experiences” (p.486). Further, conceptual metaphors provide the connection that enables humans to render abstract concepts which would otherwise be unattainable (Meier & Robinson, 2004). Over time, repeated use of such connections strengthens the association, making the conceptual metaphor more accessible, to the extent that it becomes available to our implicit cognitive processes. In this sense, the role of the conceptual metaphor would become crucial in facilitating social cognition and as such may impact the way we view our environment (e.g., one may recognise the picture of an angel faster in an up position than

when in a down position, due to its metaphorical correlation with up being good).

We may be capable of experiencing a positive emotion, however in Lakoff and Johnson's view (1980a, 1999) in order to think about this state we would use a conceptual metaphor to make sense of abstract emotional concept, for example, using the spatial orientation metaphors "I feel on *top* of the world", "I am *down* in the dumps". Lakoff and Johnson's metaphorical theory of concepts implies that they have a role within our cognitive processes. If this is the case, and one accepts that concepts are the foundations of human cognition, then conceptual metaphor theory has implications not just for language, but also perception, memory and attention (Crawford, 2009). It is the significance of this question that appears to be the basis of the work undertaken by Landau, Meier & Keefer (2010) and their proposal of the CMF.

Landau et al. (2010) have sought to extend Lakoff's theory by proposing that conceptual metaphors are not only linguistic tools but are a complementary part of social cognitive processes in that they provide a framework for the way in which we conceive the world. Particularly, they argue that conceptual metaphors are part of a specific process that maps source concepts to dissimilar target concepts, and as such contribute uniquely to social cognition. The linguistic metaphor allows us to conceive difficult abstract concepts in simpler concrete terms for the sake of clear communication. For instance, the use of a war metaphor to convey the intensity of a legal engagement, (e.g., "it was a tough legal battle with sides fighting to the end") adds clarity to an otherwise abstract concept. Conceptual metaphors, as argued by Lakoff and Johnson (1980a), use peoples' early bodily experiences of domains, like spatial location (near, far, up, down) to clarify abstract concepts such as romantic love, for example, "I feel so *close* to you" or "I am *high* on love". These conceptual metaphors are argued to be derived from our unconscious association of *close* being a spatial expression of good relations and *high* being

linked with positive stimuli. These early experiences take the shape of being held *close* by parent when you were frightened or food coming down from *high* position when you were a baby. The process of perceiving the world is influenced by conceptual metaphors and this is proven in part by the "automatic metaphoric association between affective valence and vertical spatial location" (Landau, Meier & Keefer, 2010, p. 1050) These associations mean that metaphors (e.g., that we believe *good* is up and *bad* is down) affect the way we process information without having experienced the association (source to target) directly (embodied cognition theory) or without having previously created a cognitive rule (schema).

Meier and Robinson (2004) assert that conceptual metaphors are not only an expression of experiential domains, but also represent the implicit understanding from these experiences and form part of our unconscious cognitive process which influence the way we evaluate the world. In the case of vertical spatial location, the CMF proposes that a person's inherent metaphoric understanding of valence will automatically influence their evaluation of valenced stimuli in relation to vertical position. For example, owing to the metaphorical connection between valence (positive versus negative) and vertical spatial location (e.g. 'living the high life', 'being down and out'), the displayed height of a valenced stimulus can unconsciously bias the evaluation of valence, with positive stimuli in high positions being recognised faster than in a low position (Meier & Robinson, 2004.) In other words, the valenced stimuli are in a metaphorically congruent location, which unconsciously maps to our related but dissimilar experience of spatial domains, thus automatically facilitating evaluation. It is via such experimental studies that Meier and colleagues are building upon Lakoff and Johnson's (1980a; 1999) work by seeking empirical evidence for the theory underpinning the CMF. When organising their empirical content, Landau et al. (2010) outline two approaches for delineating the role of the CMF from schema and

embodied cognition explanations of social cognition. To corroborate their assertions, they outline methodologies for obtaining empirical support for the CMF.

CMF and schema

In promoting the role of the conceptual metaphor in social cognition, Landau et al. (2010) are explicit in their view that schemas play a role in influencing social perspectives and thought.

> People undoubtedly rely on schemas to impose simple structure on their social environment… a metaphor-enriched perspective suggests that a complete account of the meanings people give to abstract, socially relevant concepts requires an understanding not only of their schematic knowledge about those concepts in isolation but also how they structure those concepts in terms of superficially dissimilar, relatively more concrete concepts (p.1047).

That is, if the schemas' function relates to providing a heuristic for a situation or related concept, how does one explain facilitation of understanding for unrelated concepts? The current understanding of schemas does not provide for the transfer of information from a concrete concept to a dissimilar abstract target concept (Landau, Meier & Keefer, 2010). For example, prior research has found that introducing the physical feeling of warmth through the presentation of a warm drink induced the conceptually dissimilar feeling of closeness to ones' family (Ijzerman & Semin, 2009). A schematic view of information transfer would find it difficult to explain to how the introduction of temperature can moderate feelings of closeness to family and friends without direct learning. It is possible however that the conceptual metaphors related to temperature and proximity (e.g., "we have a warm relationship" to indicate a closeness), could

hold a clue as to how the bridge is established between dissimilar concepts.

It appears that the CMF may well fill the theoretical gap between schema and the perception of unrelated concepts. In order to support the metaphors role in linking concrete source concepts with dissimilar target concepts, Landau et al. propose the use of *metaphoric transfer strategy* to unravel where a schemas' role ends and where the conceptual metaphors function begins. This means manipulating people's perception in a way that should elicit metaphorically congruent effects if the CMF is valid. In other words, there should be a conceptual implementation of the metaphor's meaning that demonstrates itself through transference to a dissimilar situation. The failure of this outcome would suggest that metaphors are purely linguistic in nature and that another mechanism facilitates the translation of the schema to dissimilar concepts. For example, supposing the concept of verticality is used to elucidate the dissimilar concept of valence; then the manipulation of the vertical position of the stimuli should modify the person's recognition of the stimuli in a way that is metaphorically congruent. Such an outcome would be supportive of the theory that the conceptual metaphor's influence extends beyond pure linguistics. The empirical evidence developed through the metaphoric transfer strategy will be addressed later in this paper, however it is enough to say at this stage that a number of studies have provided data that is tentatively supportive of the CMF. It is proposed to use the metaphoric transfer strategy in the current study to investigate the potential affect conceptual metaphors have on evaluation and memory. Through this strategy the author seeks to confirm or disconfirm the assertions of the CMF.

CMF and embodied cognition

It is not in the scope of this research to test the role of embodied cognition experimentally, however comment will be made on the potential distinction between the

workings of embodied cognition and the CMF.

As articulated by Landau et al. (2010), the similarity between the CMF and embodied cognition lies in the process of attaining social meaning through multi modal bodily experiences. These experiences are accessed during our interaction with the world and frame the way we perceive our world. For example, the experience of being bitten on the arm by a dog may colour the way one reacts and interacts with dogs in the future. Just discussing the subject of dogs may elicit anxious bodily reactions (e.g., stomach pains, flushed face, hyper vigilance) and fearful thoughts. The key difference between the CMF and embodied cognitions is that the latter involves what Landau et al. describe as *intraconceptual* mechanisms. The accessing and manifestation of the previous experience to the present is limited to the original modalities (e.g., sight, smell, taste, sound, pressure) related to that experiential concept. In the example of the dog bite, this could mean that just seeing a picture of dog may bring back memories of the incident, triggering the associated bodily reactions and fearful thought patterns. In this case the target concept (picture) and the source concept (original dog bite) are similar, in that the form of a dog is visually present and thus the concepts are related.

Landau et al. (2010) argue that embodied cognition lacks an explanation for the transference of conceptual information when the concepts are dissimilar. The CMF explanation on the other hand suggests that through an *interconceptual* process source concepts can be linked metaphorically to dissimilar target concepts. The example Landau et al. use as support is a study by Williams and Bargh (2008), in which the metaphorical link between temperature and interpersonal feelings is considered. For instance, linguistically we use sayings such as “they have a warm relationship” to describe a positive friendship, or someone may be described as being “given the cold shoulder” to illustrate social rejection. Williams and Bargh point to the

association between physical warmth, which is generated from being close to caregivers when young (e.g., being hugged) and the positive interpersonal feelings that develop from this experience, as being responsible for our psychological adoption of warmth to explain relationships in conversation. One would expect a hug from a person later in life to engender similar feelings, but probably not temperature. The aim of this study was to assess if a conceptually dissimilar source concept could moderate interpersonal feelings. In place of the physical proximity of a person creating warmth, Williams and Bargh used a hot cup of coffee as the source concept for warmth and for contrast, iced coffee for coldness. They found that when participants were asked to rate the nature of a target person, those who held the hot coffee rated the personality of the person as "warm", compared to the iced coffee group, who rated the person as being "cold". The intraconceptual underpinnings of embodied cognition account for the experiential link of associating warmth from a hug to interpersonal evaluations, but clearly struggle to explain the leap from the warmth of a cup to congruent interpersonal ratings based on a non-experiential dissimilar source concept. This leaves a theoretical hole that Landau et al. believe can be filled by the interconceptual role they deem is played by the conceptual metaphor within a CMF.

To continue with the dog bite analogy, a fear response to dogs would be expected to be limited to occasions where the stimuli are modally similar (intraconceptual). In contrast, Landau et al. argue that a fear response to dogs could be elicited through dissimilar concepts (interconceptual). For example, the act of a person applying pressure to the previously bitten arm may produce a detectable fear response even though the modalities are dissimilar to the experienced concept. The concept of fear would not usually be associated with pressure, but if you follow Landau et al. thinking, if the act of a person applying pressure produces fear, then a

non-experiential process would be in affect, suggesting that the bodily concept of arm pressure is now mapped metaphorically to the abstract concept of fear.

Concluding this section, it is Landau et al's. (2010) assertion that conceptual metaphors and embodied cognition have commonalties but are differentiated at the point of the future use of the source concept, with embodied cognition being limited to an intraconceptual application.

> …conceptual metaphor and embodied simulation are related in the sense that both mechanisms involve representations of bodily states in processing abstract concepts. However, metaphors can draw on concepts representing commonplace knowledge about bodily states (e.g., heavy things are difficult to move), whereas embodied simulations exclusively involve particular bodily states that occur during experience with the abstract concepts (e.g., the representation of the motor activity required to lift a heavy object) (p.1054).

Empirical Findings

Evaluations

How often do we stop to consider the role of common expressions like "I am high on life" or "my life is on a downward spiral"? We use these vertical metaphors as part of our vernacular to relate our feelings to others. Furthermore, there is evidence to suggest that metaphors, in particular those with vertical descriptors, interact with emotional affect to influence our perception of target stimuli (Meier & Robinson, 2004). Indeed, the use of verticality in communication is of assistance to human functioning in general, as all movement develops from and depends on spatial awareness (Klippel, Hirtle & Davies, 2010). The use of

metaphors may assist people in evaluating attended stimuli based on personal experiential reality. In this following example the descriptor can be classified as an orientational metaphor, which is embodied into our cognitive processes through learned associations. Through our experience we tend to take on the view that downward assertions (e.g., “my business is going down the tubes”) are negative and upward statements (e.g., “I am top of the class”) are positive. So, as part of our human development it appears we somewhat intuitively assign valenced categories (positive, negative) to vertical spatial locations and use this information as part of everyday functioning.

It has been argued that emotional experiences entwined with sensorimotor activity embody a meaning (e.g. valence) for metaphors via a process that starts from a child’s first breath (Lakoff & Johnson, 1999). For example, infants associate the feelings of warmth, comfort, security and hunger satiation with close physical proximity to a parent during feeding. Constant repetition of these associations leads to the idea that the immediacy of one’s position to people is anchored to feelings of affection and security. As a result of these formative experiences, developing a ‘close’ relationship with someone is usually viewed as a positive situation. Metaphorically we use terms like “close knit family” to represent a positive family unit or depicting a special person in our life as being a ‘close friend’. On the other hand, proximity can also be associated with negatively valenced concepts. In politics one may read that ‘the party is trying to distance themselves from the renegade MP’, the implication being that distal proximity reflects the party’s desire to show they do not agree with the MP. It is Lakoff and Johnson’s (1999) assertion that the frequent utilisation of metaphors in our language and the physiological and cognitive reactions that result are developed through our life experiences. Building on this position, Crawford (2009) suggests that if affect and metaphors are integrated to any extent they

may influence the processing of evaluating interactions with our environment. Specifically and related to this current study, the premise that viewing positive valenced words in high vertical location will assist with evaluation of the words (Meier & Robinson, 2004). From the perspective of Lakoff and Johnson, the learned association of positive objects being in high positions (e.g., feeding bottle coming from a upward location) assists evaluation by providing a metaphorical congruence between position 'up' and valance ' good' which impacts cognitive processes for assessment.

Research into the effect that metaphors have in our response to stimuli, in particular the interaction between affect and spatial location began in the early 20th century. In a study analysing the association of line direction and valenced words, participants were inclined to draw lines in a downward direction when representing negative words and an upward direction for positive words (Lundholm, 1921).

> The downward tendency of a line expresses relaxation, the upward expresses power. The downward tendency expresses faintness, not sufficient strength to keep up. Going downwards expresses losing of energy. The doleful line droops without energy. If it had force it would have ascended higher. Strength is expressed by going upwards. A joyous line also ascends. Joy is an uplifting feeling. A forceful line tends upwards. Thereby it obtains the idea of ambition. A line indicating strength is a line tending upwards, never downwards. (Lundholm, 1921, p55).

It seems that valence of the words interacts with the process of evaluation and as a consequence influences the interpretation of the spatial output (line direction). In Lundholm's study the participants automatically applied a rule of good concepts being up (e.g., merry) and

bad concepts being down (e.g., cruel). This rule adoption may be the result of unconscious thought being affected by the conceptual implications of the words, which in turn mediated the participant's response. It is this process that Landau et al. (2010) suggest shows the ability of conceptual metaphors to influence unconscious cognitive processes that filter social thought and attitudes.

Since Lundholm's formative study the research area of metaphors and spatial location has flourished. In a study central to the current research, participants were asked to evaluate the valence of words presented at random in vertical positions at the top or bottom of a computer display (Meier & Robinson, 2004). Evaluation of negative words was faster in the down position compared to the up position, whilst positive words were assessed more rapidly in the higher location. This was consistent with Meier and Robinson's theory of congruent expectations, that is, people associate and therefore expect positive concepts to be in elevated positions, whereas negative concepts are more congruent in lower spatial locations, consequently, evaluation is fastest when the word is in the anticipated location. Meier and Robinson's second experiment investigated whether a vertical effect could be found when participants appraised non-valenced letters subsequent to being primed by valenced words. The participants were asked to differentiate between positive and negative valenced words that were presented in the centre of a computer screen. Immediately following the word categorisation task, a non-valenced stimuli, either a 'p' or a 'q', was displayed at the top or bottom of the computer screen. Each participant was instructed to push the letter on the keyboard that matched the display character (e.g., if the letter 'p' appeared, selecting 'p' on the keyboard would be a correct answer). Results supported the findings of the first experiment, with the non-valenced stimuli being evaluated faster in the up location when they had been primed by a positive word and faster in the down position when

primed by a negative word. This indicated that valenced stimuli can prime and facilitate the evaluation of non-valenced stimuli when verticality is congruent. In support of Lakoff and Johnson's (1999) assertion that conceptual cognitions are underpinned by sensorimotor experiences but not the reverse, Meier and Robinson's third experiment revealed that priming with valenced stimuli resulted in an interaction with vertical spatial location to influence perception, however, priming with spatial location did not facilitate evaluation of valenced stimuli. In Meier and Robinson's words:

> In Study 2, we extended these results by showing that evaluations bias spatial attention in a metaphor-consistent direction (e.g., ''good'' activates ''up''). By contrast, Study 3 showed that the activation of areas of visual space does not prime evaluations (e.g., ''up'' does not activate ''good''). (p.246)

This finding appears to support Lakoff & Johnson, (1980b) who speculated that metaphors are asymmetrical in nature, moving bi-directionally only, from a concrete concept to a comparatively more abstract concept. For example, ones understanding of the familiar concept *hell* may be used to clarify a loveless relationship but not vice versa i.e. the relationship was *hell* but trying to make sense of the term hell by using the concept of a relationship does not follow. Therefore it is theorised that concrete or familiar concepts can explain abstract concept, but not the other way around.

As discussed, the relationship between vertical position and affect is argued by some to develop from birth. It is from this very early stage that we experience life as an ongoing dialogue among stimuli and spatial locations. Children invariably look up to gain parental comfort, and in

addition, food to fulfil their hunger needs usually comes from an upward position. As we develop, we continue to build associations of verticality and valance, for example, confident people walk with their head held high, conversely, the guilty walk with their head bowed down in shame. As we judge others, we are inclined to “look up” to powerful people, yet “look down” upon the weak (Crawford, 2009). Orientational metaphors are so commonplace that their impact on the process of perceiving our surrounding environment was overlooked until the research of Werner and Wapner, (1949). They started to consider that the human act of perceiving stimuli may be shaped by their unconscious emotions and cognitions. Accordingly, they proffered the sensory tonic theory, suggesting all experiential stimulation, including sensory, cognitive or muscular, will influence uniquely the perception of each human being (Wapner, 2005). As such, the perception of an individual attending to a specific object may differ depending on the attributes of the object, its surroundings and the person’s experiences. Wapner, Werner and Krus (1957) conducted an experiment to measure the affect of mood on vertical spatial perception. Using university students, Wapner et al. tested whether receiving good or bad examination results (therefore inducing a positive or negative mood) would affect the assessment of spatial position. Before the students received their examination results, they were instructed to place a horizontal line through what they judged as being the centre of a box. Subsequent to reading their results, the same group of participants conducted the experiment for a second time. If Wapner et al’s predictions were correct then the induced mood following the receipt of the examination result would have a significant impact on the placement of the horizontal in the second experiment.

The findings supported their hypothesis, as the students who were happy with their grades drew the line in an elevated position as compared to their first estimation of the mid point.

The reverse was true for those who were unhappy with their results, with their second estimation of the centre point being lower than the line drawn before they received their grades. This lent support to the sensory tonic theory and the premise that changes in affect can have consequences for the way in which we perceive spatial information. In a related study, Meier and Robinson (2006) conducted an investigation of the influence of depressive symptoms on vertical attention. The results of this study revealed that people with depression-like phenomena were biased to spatial locations in comparatively low positions. This provided some empirical support for a metaphorical description of people diagnosed with depression being literally "downcast".

Since the early studies of Wapner, Werner and Krus, research on the effect of conceptual metaphors, perception and their association with verticality has diversified further. Schubert (2005) investigated the effect the perception of power had on verticality. He carried out six experiments on metaphors related to the concept of 'power', its association with verticality, and the effect on evaluation of stimuli. The initial experiment demonstrated that people affiliate prominent height as being powerful and low height stimuli as being less powerful. In a study of similar design to Meier and Robinson (2004), Schubert considered the rate of evaluation of stimuli displayed at differing vertical locations. The aim was to investigate whether verticality had an effect on the perceived power of stimuli in the form of labelled groups. Two groups (powerful e.g. professor, parent and powerless e.g. student, child) were shown to participants and they were asked to identify as quickly as possible which group they considered more powerful. For each presentation the vertical position of the images was varied randomly, so that the actual 'powerful' group may have been higher or lower than the other group. A second condition was then introduced, in which the participants were tasked with identifying the powerless group. Schubert found that recognition of the powerful group was fastest when it was higher on the

screen than the powerless group. For the powerless group, evaluation was quickest when it was in a position that was lower than the powerful group. In essence, the rate of recognition was facilitated when the perceived power of each group was matched by a spatially congruent position. This outcome supports the results for the first experiment where power and height were found to have a significant interaction (power equals high, powerless equals low).

Continuing with the 'power' concept in study 6, Schubert used images of animals in an attempt to extend this body of work. Images of either a powerful animal (e.g. tiger) or a powerless animal (e.g. rabbit) was presented to participants in an up or down spatial location. At the conclusion of each image presentation the participants indicated their level of respect for the depicted animal by selecting a number from 1 (not at all) to 9 (very much). Commensurate with the previous studies, the evaluation for powerful animals was facilitated in the upper position, however, in contrast with the previous studies, no effect was found for powerless animal in the lower spatial position. It was Schubert's view that that this outcome occurred because the powerless animals were so manifestly powerless that vertical position had no opportunity to assist the evaluation process.

Schubert (2005) went on to argue that his findings from the powerless versus powerful animal images corroborated research performed by Higgins (1996; Higgins & Brendl, 1995). In his work Higgins considered the role of ambiguity in the operation of perceiving objects, coming to the conclusion that the effect for priming is most significant when the stimuli being attended to is somehow vague. As a consequence, if the target concept is somewhat vague then verticality has an opportunity to assist in making sense of the target stimuli. Further support for this position can be found from work undertaken by Loersch and Payne (2011), whose research on the way priming affects perception, behaviour and motivation led them to make the following statement.

> …relatively unambiguous targets are more likely to elicit very specific and distinctive thoughts when considered for judgments, they are less susceptible to the misattribution process proposed by the situated inference model. Highly ambiguous targets, on the other hand, do not call for any specific type of thought. This allows a variety of prime-related mental content (even that only loosely related to the target) to serve as a potential source of information. (p. 243)

Using Schubert's experiment as an example, if a powerless animal image is presented and the extent of its power is unclear, the downward location and subsequent metaphoric congruence will reduce evaluation time by clarifying the animal's power status for the participant. However, if the power status of the stimuli is clear, then as in Schubert's (2005) study, the presence of vertical congruence provides no advantage during the process of evaluation. Extending Schubert's work, Robinson, Zabelina, Ode and Moeller (2008) studied the effect of verticality on power in terms of submissive and dominant personalities. Their prediction was that dominant people would preferentially attend to 'self related' (e.g., me, mine, I) stimuli in upper positions, whereas submissive personalities would discriminate for 'other' (e.g., them, theirs, they) stimuli in lower positions. The participants were categorised submissive or dominant following the completion of a bipolar rating scale. During the experiment the participants were directed to evaluate words displayed on a computer screen (randomly presented in up or down position) as being 'self related' or 'other. Robinson et al. found no significant effect for personality and self/other concepts; however as per Schubert's study, they found an effect for verticality. Specifically, submissive personalities processed stimuli at a faster rate when in the lower screen

position, with the opposite holding true for dominant participants. This indicates that evaluation of stimuli along a vertical axis may be filtered by individual personality types. Accepting that dominant personality may be viewed as powerful and submissive as powerless, Robinson et al. add further credence to the role that conceptual metaphors play in our evaluation of stimuli. Conceptual metaphors appear to provide us not only with a means of communication, but seemingly provide an unconscious cognitive bridge connecting experiential information to automatic associations with seemly unrelated concepts (e.g., the leap from 'up is good' as per our childhood experiences to 'up' also being related to increased power).

Research indicates that mood interacts with verticality to play a role in the evaluation of conceptual metaphors related to power. Echoes of the verticality studies can be seen in these studies regarding the more transient factor of mood. This research suggests that mood assumes a role within our perceptual processes, with happy and unhappy people unconsciously processing and attending to valenced stimuli differently, for example, people with negative affect will bias towards a lower spatial region (Fisher, 1963). Fisher used emotional descriptions of face masks to determine if the participants were of high sadness or low sadness**.** To test for the impact of mood on vertical assessment the participants completed two tasks. First, participants were asked to draw a representation of a beam of light moving on paper. The direction (up or down) of the line was measured for each of the trials. The second study involved the participants estimating the horizontal position of a luminous rod displayed in a dark environment. The results revealed that those participants categorised as being high in sadness illustrated a significant preference for drawing downwards and estimated the horizontal position to be below 180 degrees. Consistent with these findings, one study showed that people with depressive symptoms were attentively biased towards lower spatial locations (Meier & Robinson, 2006). Further, it seems that in

general unhappy individuals are more likely to attend to negatively valenced information than positive, and accordingly retrieval for unpleasant information is facilitated and pleasant information recall inhibited (Rusting & Larsen, 1998).

To test their hypothesis, Rusting and Larsen (1998) studied participants with extraverted and neurotic personality traits across similar studies. In each study the first task the participants performed was a word fragment completion task, where the partially presented word could be completed as positive or negative in valence. Then participants were asked to evaluate a word or face and indicate using a specific key on a computer keyboard whether it was positive, negative or neutral. Finally the participants were asked to recall as many of the words as possible from the evaluation. The results from the two studies showed that neuroticism was correlated with an increased likelihood of the completed word task being negative, and specifically, in study two, extraversion produced significantly increased positive completions, although over both studies only extroverts' demonstrated faster reaction times. People with higher levels of extroversion appeared to process positively valenced words faster than those high in neurotic traits, were more accurate in their evaluation and also recalled more positive words, where neuroticism was linked to the recall of negative words. These results indicate that efficiency for recall of emotional memories is contingent on trait congruence. Research from the study of human mood indicates that in general life most people are happy (Diener & Diener, 1996). This suggests most people are likely to find it easier to access positive concepts compared to negative concepts which may account for Rusting and Larsen's results. Given that affect has been shown to be congruent with spatial location and that affect facilitates congruent memories, it is possible that conceptual metaphors play a role in developing this congruence. If so, valenced stimuli could be used to prime and facilitate memory for targets in metaphorically congruent spatial locations.

Memory

The role that conceptual metaphors play in the memory process is a relatively new and exciting area of research. In the same way that research has shown that vertical spatial location and emotion associate to influence evaluation of stimuli, so is an understanding sought for the possible impact on memory. Spatial memory research undertaken by Huttenlocher, Hedges, Corrigan, and Crawford (2004) revealed that people use various sources of information to encode information about stimuli location; in turn this affects recall for stimulus location. Specifically, participants utilised vertical and horizontal framing to categorise space which facilitates memory for location. For example, people make clear associations about the attributes of objects within the spatial category and as a result evaluate situations with this information in mind.

> …such categories tend to be embedded in general cognitive structures or theories. Oranges grow on trees, they start as blossoms, they must be supported on limbs that are strong enough to hold them, etc. Such considerations provide information or ideas about objects that may establish the boundaries or central values of the categories. (Huttenlocher et al, 2004, p.94)

The key point in terms of the current research is that it appears people use (consciously or unconsciously) the category of spatial location to facilitate memory. Like any category, spatial location has attributes and it is possible that metaphors may form a cognitive attribute that links to a spatial category which in turn has an effect on memory processes. For example, if good is up, is it possible that spatial location can become an attribute of affect that is used by people to assist in their memory of the world? Put another way, the use of conceptual metaphors is part of

the categorisation process that assists human memory. Given the research to date on conceptual metaphors and the impact affect has on perspective, it is reasonable to predict that memory may be influenced in a similar fashion to vertical evaluation. In subsequent research the relationship between valence and spatial location was explored as being a possible source of information regarding valenced stimuli that produces a bias for spatial recall (Crawford, Margolies, Drake & Murphy, 2006). This research investigated if there was an association for valance and recall of vertical spatial location using non-language stimuli. In this exercise instead of using affective words (as per Meier, 2004), Crawford et al. (2006) used "affectively evocative images" (p.1155). They hypothesised that if the valance and verticality effect held true for memory, then negative images would be remembered as being lower than when presented, conversely, recall for positive images is likely to be reported as presenting in a higher than originally displayed location. In this experiment, participants were randomly exposed to 30 positive images and 30 negative images displayed in various spatial locations on a computer screen. In the testing phase, positive and negative images were displayed centred horizontally and vertically, then the subject had one second to relocate the image to the position they believed it had been initially exhibited. Consistent with earlier vertical special location studies, Crawford et al's study found in an upward bias for positive images in the higher spatial locations and a downward shift for negative images in the lower areas. That is, in the test phase the participants estimated that positive images originally presented in the upper half of the screen were higher than was the case. For negative words the reverse was exhibited, although a bias effect occurred asymmetrically in favour of elevated positive images. Overall, this study extends Meier and Robinson's (2004) work on evaluation of spatial stimuli into memory for spatial stimuli. The results from Crawford et al. are uniform with Meier and Robinson in the sense that across the three studies, positive

stimuli was biased upward relative to negative stimuli. This provides further evidence for the generalisation of the verticality effect derived from automatic conceptual metaphor processes.

Meier, Hauser, Robinson, Friesen and Schjeldahl (2007) investigated the interaction of vertical spatial location with memory for metaphorical constructs connected with the words "God" and "Devil". For this study participants were instructed to evaluate if a word was God-like (Almighty) or Devil-like (Demon) and up or down. In line with previous studies, evaluation of God-like words was fastest in the 'up' position and for Devil-like words, fastest in the down position. For the memory component, participants were presented with a God or Devil-like image in a random spatial location along a vertical line. The participants were then shown each stimulus one at a time and tasked with estimating the position on the vertical line it had been originally displayed. As expected, recall for Devil-like images was biased to a position downward of its original location, with the reverse being the case for God-like images. These observations are consistent with the default understanding of metaphorical interactions between affect and verticality, in that "good is up" and "bad is down".

More recent research (Palma, Garrido & Semin, 2011) considered the role spatial conceptual metaphors in the recall of behavioural information related to a target person; one positive (a childcare professional) and one (a skinhead). In the first of two experiments participants were instructed read behavioural information about the target person, which was either presented in a vertically up or down position on a computer screen. In the second experiment participants were required to read a card with behavioural information on the target person and then place it at the instructed vertical level on a bookshelf. The participants then completed a surprise recall task for the previously presented behavioural information. The findings were consistent with the CMF relating to vertical location. That is memory for the

childcare worker was better when in the up position and recall for the skinheads information was better when in the down position. Interestingly the second experiment, which involved greater degree of arm movement, resulted in recall that was better when compared to experiment 1. Palma et al suggests these results provide support for the ability of metaphorically congruent movement to facilitate memory beyond the influence of spatial location alone.

These studies appear to indicate that the CMF, which has empirical support for interactions between affect and our environment (e.g. spatial location) via metaphorical language, may also help explain the shaping of our attention and memory (Crawford, 2009).

Present Study

The objective of the present study was to investigate the research on conceptual metaphors undertaken by Meier and Robinson (2004) and implement the knowledge from Hewson's (2010) unsuccessful replication of Meier et al's work. Research suggests that people normally frame the concept of positive valence as being in an elevated vertical location (e.g., "I am on a *high* today"), and in contrast negative valence is expressed as a low vertical location ("My life is going *downhill*"). The CMF posits that these terms mirror a metaphoric comprehension of valence expressed in the form of verticality. If this holds true, it would be expected that fluctuations in verticality perceptions would consistently relate to the participant's perception and memory for valenced stimuli.

If it is assumed the CMF view of social cognition holds true, the next question to be posed is whether the influence of the conceptual metaphor requires implicit and/or explicit attention on the task to produce an effect. Do people need to explicitly evaluate stimuli to gain a metaphorically congruent effect for verticality (e.g., evaluation of the valence of a word) or is there an implicit process that influences perception regardless of the evaluation point? To answer

this question Experiment 1 is a combination of research performed by Meier and Robinson (2004) and Brookshire, Casasanto and Ivry (2010). In their research, Brookshire et al. asked participants to evaluate the colour of words that were presented randomly in an up or down position, and were either positively or negatively valenced. They found a significant interaction between position and valance suggesting that the CMF may influence evaluation even when it is implicit in nature. This is illustrated by the fact that positive words were responded to faster in the up position and negative words in the down position respectively, in spite of the evaluation task being to assess colour of the words (as opposed to valence).

The present study used the words and procedures from Meier & Robinson (2004), combined with a word colour evaluation task as per Brookshire et al. (2010). The reason for combining the studies was to investigate if Brookshire et al's findings could be supported using a set of stimuli that had already been used to support the CMF's role within explicit evaluation tasks. If the CMF hypothesis was to generalise to implicit evaluation then it is expected that similar results to Brookshire et al would be found. The present study also included a surprise recall task to test if a spatially congruent effect can be found for memory. Consistent with the underlying theory of conceptual metaphors, it is predicted that words of positive valence will be remembered more when they appeared in the up position, with the opposite occurring for negative valenced words. As well it is anticipated that positive words will be appraised faster and recalled more effectively irrespective of spatial location in comparison to negative words.

Experiment 3 will specifically test explicit evaluation and recall, predicting that words with a positive valence will be assessed faster when in the up location and for negative words, in the down position. A surprise recall task matching the previous experiments will be then be conducted to test if a spatially congruent effect can be found for memory during explicit

evaluation.

Experiment 1: Implicit evaluation and recall of valenced stimuli

The aim of Experiment 1 was to build on the results from Meier and Robinson (2004) and Hewson (2010) by exploring whether metaphorical congruence for valence, in terms of spatial location, could be achieved even when the assessment of such stimuli was implicit.

Method

Design

This experiment used a within-subject experimental design with two independent variables, each with two levels; Valence (negative vs. positive) and Position (up vs. down). The dependent variables were response time (RT) for the colour evaluation task and recall, for the memory task. Response time was measured by recording the time taken from presentation of the word, to the selection of the relevant key press.

Participants

Thirty five participants took part in the experiment. Participants were students enrolled in a first-year psychology course at Victoria University of Wellington, New Zealand. Recruitment was via the Introduction to Psychology Research Programme (IPRP). Individual participants completed the experiment as part of a 30-minute IPRP session, and in return they received course credit.

Materials/Apparatus

Words from Meier and Robinson's (2004) experiment were used, however four words were removed to enable the balancing of the presentation over two blocks. The 96 words (Appendix A) were presented in purple (48 words) or green (48 words) font, Courier new style, and size 18 on a black background. The words were in Courier new style, bold white font, size

18, presented on a black background. The main experiment was undertaken using a standard Windows based Dell desktop computer. Response entry was carried out on a basic QWERTY keyboard placed directly below the computer monitor.

Procedure

The Victoria University of Wellington, School of Psychology Ethics Committee approved the implementation of this experiment. Each participant was shown into the research laboratory where they were presented with an information sheet and then instructed to sit at a designated computer. Prior to the experiment, participants were verbally informed that their task was to identify if the presented word was green or purple in colour. The specific instruction presented to them as part of the experiment computer program was as follows.

> This experiment is concerned with your ability to categorize words as either being the colour green or purple. A trial will start with 3 plus signs (+++) on the center of the screen for about half of a second. Next, you will see three plus signs flashing on and off as they approach the top or bottom of the screen. After the second set of plus signs disappears, you will see a word on the top or bottom of the screen. The flashing plus signs will direct you to the top or bottom of the screen, which is where the word will appear for that trial.
>
> When you see the word, your task is to determine if the word is green or purple. If the word is green, press the "1" key on the keyboard. If the word is purple, press the "5" key on the keyboard. You should try to be both quick and accurate in your responses. To help you with this, you should keep the index fingers of your hands on the "1" and "5" keys of the keyboard.

Press any key to begin the experiment.

The initial fixation cue (+++) was presented for 300ms, followed by two more identical cues presented for the same duration. The vertical location of each cue differed, starting with the first cue being presented one third of the way toward the top or bottom of the screen from the midpoint. Two subsequent cues were displayed at graduating distances from the midpoint following the course of the initial cue. This was designed to act as a prompt to facilitate directional attention and minimise any distractions. The participant was presented with a random word in the up or down position with word being positively or negatively valenced, however, the position and valence of the word was of no consequence to the task. The sole task for the participants was to evaluate the colour of the word stimuli. Two blocks of 96 words were presented, with a 60 second break between the blocks of words. A warning was presented in this experiment that if the participant made a false colour selection the word ‘incorrect’ would appear in red font for 1500ms. This prompt reminded the participants of the need for accuracy.

Subsequent to the computer-based activity, participants completed a distraction task to inhibit memory rehearsal, despite being unaware of the recall task that was to follow. This entailed spending thirty seconds crossing out every letter “e” in a paragraph of words on a sheet of paper. Following this, participants were directed to note down the words they could recall from the computer task within the space of two minutes. Once finished, the participants received a verbal debriefing, any questions were answered and then a written debriefing sheet was supplied. All of the participants were thanked by the researcher and supplied with an email address in case of further questions.

Experiment 1 Results

Incorrect trial responses were excluded from the data for all the current studies, including any responses greater than 1500ms. In all of the current studies participants were encouraged to be accurate but to respond quickly. Table 1 presents the means and standard deviations for each of the Experiment 1 conditions.

Table 1. Experiment 1 means and standard deviations for response time (RT) for implicit evaluation (ms) and recall (number of words) words.

	Up		Down	
	Mean	*SD*	Mean	*SD*
Positive RT	457.64	66.87	445.93	58.81
Negative RT	469.45	78.53	462.45	66.15
Positive word recall	2.11	1.76	2.06	2.13
Negative word recall	3.74	2.54	3.57	2.67

Response Time

Analysis consisted of a 2 (word valence: positive vs. negative) x 2 (vertical position: up vs. down) repeated measures analysis of variance (ANOVA). The results showed a significant main effect for Position, $F(1, 34) = 4.38$, $p < .05$, indicative of words in the ‘up’ location (M = 463.54 ms) were evaluated more slowly than words located in the ‘down’ position (M = 454.25 ms) irrespective of valence. There was also a main effect for Valence $F(1, 34) = 5.89$, $p < .05$,

which suggested participants were quicker in identifying positive words than negative words in both the 'up' and 'down' positions. Overall response time to positive words was quicker (*M* = 452 ms) compared to negative words at (*M* = 466 ms). There was no significant interaction for Position x Valance.

Recall

The analysis of word recall comprised a 2 (word valence: positive vs. negative) x 2 (vertical position: up vs. down) ANOVA. There was a significant main effect for Valence, $F(1, 34) = 14.80$, $p < .05$, indicating that negative words (*M* = 3.66 words recalled) were recalled better than positive words (*M* = 2.09 words recalled) regardless of position. There was no effect for Position, $F(1, 34) = 0.16$, $p = 0.69$ or a Valence x Position interaction, $F(1, 34) = 0.04$, $p < 1$.

Experiment 1 Discussion

Experiment 1 did not find a significant interaction between valence and vertical position for either response time or recall as hypothesised. It is possible that the conceptual metaphor lacked the perceptual salience of Brookshire et al's (2010) experiment, which used a spatial motor task during colour evaluation. Specifically, this task required participants to move their index fingers up and down a vertical keyboard to make the appropriate response. It is feasible that using a conceptually congruent action (vertical movement) increased the salience of the metaphor which, in turn, made it more concrete. This allows for the possible existence of boundary criteria, suggesting that if a conceptual metaphor is to play a role in evaluation, it must, as the source concept, be more concrete than the abstract target concept. The role of the increased concreteness is to afford sufficient salience to the conceptual metaphor so that it enables the participant to perceive (during implicit or explicit evaluation) its existence, thus allowing the conceptual metaphor to aid in the evaluation process and make it sufficiently salient

to allow the memory encoding process to take place. With this in mind, Experiment 2 was altered to attempt to increase the perceptual salience of the conceptual metaphor.

Experiment 2: Enhanced conceptual metaphor to facilitate implicit evaluation and recall

In experiment 2 the keyboard was rotated 90 degrees clockwise so the letter 'A' was at the end of the keyboard pointing toward the screen. It was hypothesised that the change of keyboard position and use of colour coded keys would add strength to the conceptual metaphor by ensuring participants were required to make an up and down type movement, as opposed to a side to side movement. Such a strengthening of the conceptual metaphor should make its role as the source concept more concrete and thus arguably facilitate an implicit effect for the perception of the target concept. As a result, it was expected that colour evaluation of positive words would be facilitated when the positive target word was in the 'up' position and the negative in the lower position. It was also expected that the increase source concept concreteness would allow for the effect to generalise to the surprise recall task.

Method

Design

Experiment 2 used a within-subject experimental design with two independent variables, each with two levels; Valence (negative vs. positive) and Position (up vs. down). The dependent variables were response time (RT) for the colour evaluation task and recall for the memory task.

Participants

There were 36 participants recruited for this experiment using the procedure as in Experiment 1.

Materials/Apparatus

Three stickers placed on specific keys were used for the purpose of identification. These

included purple on the ‘L’ key, white on the ‘G’ key and green on the ‘A’ key. The white sticker was used to identify where the index finger of the participant should be placed after the completion of each trial.

Procedure

The procedure from Experiment 1 was similar with the exception of rotating the keyboard 90 degrees. Participants were asked to start each trial with their index finger depressing the white button and then once the word stimuli was presented, to move that finger to the key with the matching colour. At the conclusion of the selection, the index finger was to be moved back to the white key, depressed and then wait for the next word to be presented. If the participant did not return their index finger to the white button the computer programme automatically paused and then presented an instruction to move the index finger to the white key. This approach was adopted to ensure selection of the colour always began from a point equidistant to the green and purple keys. The major change in the procedure is reflected in the following exert from the instructions.

> You must start by using the index finger of your strongest hand to depress and hold down the “white” key. When you see the word, your task is to determine if the word is green or purple. If the word is green, press the "Green" key on the keyboard. If the word is purple, press the "Purple" key on the keyboard. You should try to be both quick and accurate in your responses. Each time you have finished making your colour selection, return your index finger to the “White” key, depress and hold, then wait for the next word to appear. Press any key to begin the experiment.

Experiment 2 Results

Table 2. Experiment 2 means and standard deviations for response time (RT) for implicit evaluation (ms) and recall (number of words) words.

	Up		Down	
	Mean	*SD*	Mean	*SD*
Positive word RT	709.39	141.34	686.16	134.18
Negative word RT	705.90	141.94	680.00	133.37
Positive word recall	3.17	2.43	3.25	2.27
Negative word recall	3.56	2.08	3.44	2.21

Response Time

The analysis was the same as Experiment 1, with results revealing a significant main effect for Position, $F(1, 35) = 29.16$, $p < .05$. This indicated the participants were faster in evaluating the colour of the words when they were in the 'down' position irrespective of valence. No further significant effects or interactions were found in the results for Experiment 2.

Recall

To analyse word recall, a 2 (word valence: positive vs. negative) x 2 (vertical position: up vs. down) ANOVA was completed. The results showed no main effect found for Valence, $F(1, 34) = 0.50$, $p = 0.49$ or Position, $F(1, 34) = .0.01$, $p = 0.97$. There was no significant interaction for Valence x Position interaction, $F(1, 35) = 0.16$, $p = .70$.

Experiment 2 Discussion

In Experiment 2 the results once again did not produce any metaphorically consistent results when evaluation was implicit. In fact, the attempt to add to the concreteness of the conceptual metaphor by making it more concrete appeared to have had the opposite effect. The response time interaction between valence and position trended further away from a significant result when compared to Experiment 1. The main distinction between this experiment and that of Brookshire et al, (2010) was the use of the keyboard rotated end-on-end with the monitor on a horizontal on the table as opposed to being positioned vertically. It may be that having to perform the evaluation input task with the keyboard on a horizontal plane, plus using a motor action that was more consistent with a proximity metaphor (good is near, bad is far) actually made the conceptual metaphor for valence and vertical position less accessible. As a result, the concreteness of the conceptual metaphor was reduced (less concrete) and for that reason was not strong enough as a source concept to lend any assistance to the implicit evaluation of the target concept (valenced stimuli in vertical positions).

Experiment 3: Explicit evaluation and recall of valenced stimuli

Experiment 3 was an attempt required to confirm that a metaphorically congruent effect for valence and position could at least be found during explicit evaluation. Failure to do so would call into question the basis of the CMF. It was predicted that following explicit evaluation of emotionally toned words positive would be identified faster in the up position and negative words identified faster in the down position. Furthermore, it was expected that positive words presented in the up position would be recalled better than those presented in the down position, with the reverse holding true for negative words.

Method

Design

The current experiment used a within-subjects experimental design. There were two independent variables, each with two levels – Valence (negative vs. positive) and Vertical Spatial Position (up vs. down). The dependent variables were response time (RT) for the computer-based task and recall, for the memory task.

Participants

Fifty two participants were recruited using the same process as for Experiment 1.

Materials/Apparatus

The computer based equipment was the same as Experiment 1. A list of one hundred words (Appendix B), including 50 positive words and 50 negative were used; 96 of which were used in experiments 2 and 3, with earnest, festival, aimless and unfair added.

Procedure

A verbal overview of the experiment was presented, during which the participants were asked to evaluate if a word shown on the screen was positively or negatively valenced and to be as fast and as accurate as possible in their responses. The following on-screen instructions proceeded the verbal presentation.

> This experiment is concerned with your ability to categorize words as having either a negative or positive meaning. A trial will start with 3 plus signs (+++) on the center of the screen for about half of a second. Next, you will see three plus signs flashing on and off as they approach the top or bottom of the screen. After the second set of plus signs disappears, you will see a word on the top or bottom of the screen. The flashing plus

signs will direct you to the top or bottom of the screen, which is where the word will appear for that trial.

When you see the word, your task is to determine if the word has a negative or positive meaning. If the word has a negative meaning, press the "5" key on the response box. If the word has a positive meaning, press the "1" key on the response box. You should try to be both quick and accurate in your responses. To help you with this, you should keep the index fingers of your hands on the "1" and "5" keys of the response box.

Press any key to begin the experiment.

Following the presentation of the fixation cues as per Experiment 1, the participants were presented with a word presented randomly in the up or down position and participants indicated whether the word was of positive or negative valence by pressing the relevant key. Post selection, a blank screen was presented for 500ms between each trial. Participants were presented with a random combination of fifty positive words and fifty negative words in total.

Experiment 3 Results

Inaccurate trial responses were treated in the same way as Experiment 1, as were the instructions to the participants with regard to accuracy and speed. Means and standard deviations for each of the conditions are displayed in Table 3.

Table 3. Experiment 3 means and standard deviations for response time (RT) for explicit evaluation (ms) and recall (number of words) of words.

	Up		Down	
	Mean	*SD*	Mean	*SD*
Positive word RT	773.23	122.37	799.12	121.02
Negative word RT	815.97	131.86	818.33	116.42
Positive word recall	2.85	1.89	3.10	1.90
Negative word recall	2.77	1.75	2.83	1.83

Response Time

To test for the effects of vertical position on the evaluation of valence the analysis consisted of a 2 (word valence: positive vs. negative) x 2 (vertical position: up vs. down) repeated measures analysis of variance (ANOVA). This revealed a significant main effect for Position, $F(1, 51) = 5.43$, $p < .05$, indicating that words in the ‘up’ location (M = 795 ms) were evaluated quicker than words located in the ‘down’ position (M = 809 ms) regardless of valence. There was a main effect for Valence $F(1, 51) = 25.76$, $p < .05$ suggesting that overall identification of positive words (M = 786 ms) was faster than negative words (M = 817 ms) in both the ‘up’ and ‘down’ positions. Of most interest was the significant interaction for Position x Valance, $F(1, 51) = 4.69$, $p < .05$, with participants being faster to appraise positive words in the

'up' position (versus 'down'), however the opposite was not true for negative words. A t-test between RT for positive words and their position, found a significant difference, $t(51) = -3.01$, $p = .003$, suggesting a clear difference between the evaluation of positive words in the 'up' and 'down' condition. However, a t-test analysing the RT for negative words and their position, showed no significant difference, with $t(51) = -0.30$, $p = .77$. The significant and non-significant effects for response time are illustrated in Figure 1.

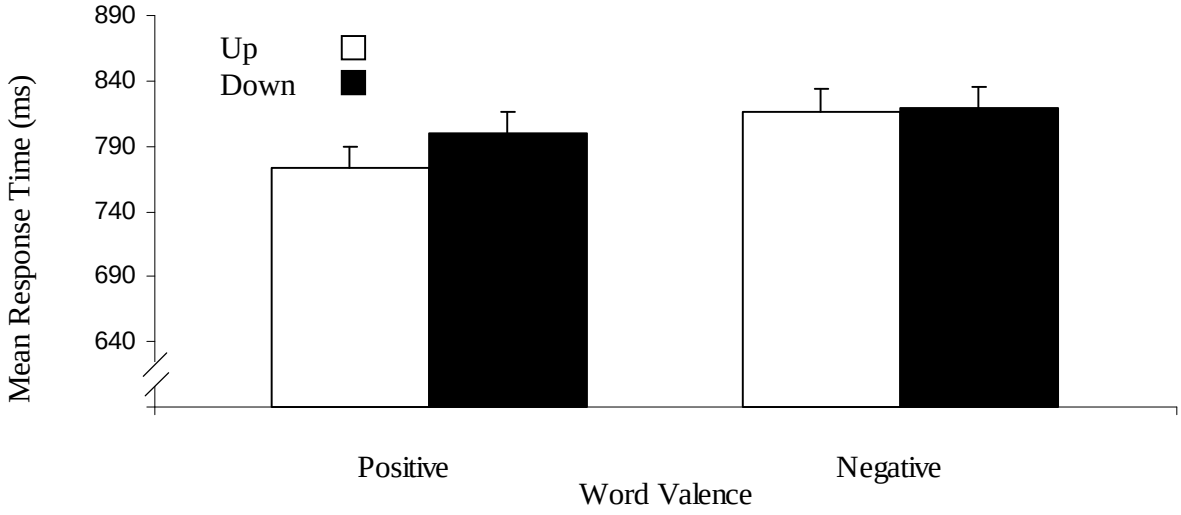

Figure 1. Experiment 3 mean response time for evaluation as a function of word valence and word position.

Recall

For the analysis of word recall, a 2 (word valence: positive vs. negative) x 2 (vertical position: up vs. down) ANOVA was completed. There was no significant main effect for Valence, $F(1, 51) = 0.98$, $p = 0.33$ or Position, $F(1, 51) = .0.41$, $p = 0.52$. In addition, the Valence x Position interaction was non-significant, $F(1, 51) = 013$, $p = .72$.

Experiment 3 Discussion

This experiment investigated whether the explicit evaluation of valenced words could be

influenced by vertical position. The results supported the CMF's assertion that conceptual metaphors may act as a complementary component of social cognition. In line with Meier and Robinson (2004), there was a significant interaction between valence and position, supporting their view of an association between affect and position during explicit evaluation tasks. Specifically, use of the general conceptual metaphor that "good things come from high places" appears to act as a concrete source concept that assists in making sense of the more abstract (and conceptually dissimilar) target concept of word valence. Despite obtaining an effect for evaluation in terms of response time, no significant result for recall of the words was found. Potential explanations for the inability to find an interaction for memory of valenced words and vertical position will be discussed in the main discussion. In short, Experiment 3 provides evidence to support a CMF view of social cognition when the stimuli evaluation is explicit.

General Discussion

In Experiment 1, participants were directed to attend to the colour of the word and pay no attention to valence and vertical position. It was hypothesised that implicit evaluation of word valence would be facilitated when positive valenced words were shown in the up location and negative words in the down location. Following a distraction task in the second component of this experiment the participants were asked to recall as many words from the evaluation phase as possible. It was hypothesised that recall data would show an interaction between valence and vertical position. However there was no significant interaction found for valence and spatial location during either evaluation or recall.

In Experiment 2 an attempt was made to increase the concreteness of conceptual metaphor by changing the orientation of the keyboard, in order to better represent an up-down movement. It was predicted this would strengthen the concreteness of the source concept and

enable the acquisition of the conceptual metaphor thus facilitating perception. As in Experiment 1 there was no interaction between valence and spatial location.

In Experiment 3 participants were instructed to explicitly appraise the valence of negative and positive words that were presented randomly at the top or bottom of a computer monitor. In line with the other experiments, it was hypothesised that evaluation would be facilitated and recall would be superior, when positive words were in the up position and negative words in the down position. The hypothesised interaction was broadly supported, with a significant effect for valence and position. However, for recall, positive words were remembered more often than negative words regardless of vertical conditions.

In the current research Experiment 1 and 2 failed to find any tangible support for a CMF view of social cognition, which posits an automatic association between affect and spatial location. The results from Experiment 3 support the hypothesis that explicit evaluation is required. However the results from Brookshire et al. (2010) and Santana and de Vega (2011) suggest an alternative explanation for the current results. Hewson (2010) proposed that the evaluation of affective stimuli in a CMF consistent manner requires the conceptual metaphor to attain sufficient salience for the participant to recognise its existence. Further, the individual features of the stimuli must be metaphorically congruent (e.g. white font, positive valence, up position) and have enough additive value to create a concrete and thus salient metaphor. It appears the findings from Experiment 3 lend some support to the view that a threshold of metaphorical concreteness must be met in order that the conceptual metaphor is salient enough to be recognised by the perceiver. What is lacking at this point is a clear explanation of why this study has had difficulty producing CMF consistent results

It is possible that for the conceptual metaphor to be salient enough to be perceived it

needs to be significantly more concrete than the target concept. When discussing salience and its role within the CMF, the author is highlighting the ability of the conceptual metaphor to attract the attention of the evaluator (consciously or unconsciously) as crucial. In attracting the evaluator's attention the conceptual metaphor has an opportunity to influence the evaluation of the target concept. It was Higgins (1996) who stated that, "It is not so much that salient objects receive much more attention than non-salient objects but rather that salient objects receive sufficient attention to permit judgements of them, whereas non-salient objects do not". Therefore reaching a threshold of concreteness may require the cumulative influence of a number of metaphorically congruent features to achieve sufficient perceptual salience

The current research suggests the cumulative impact of adding of white font (which is metaphorically congruent with participant mood (Diener & Diener, 1996), up location and word valence) as opposed to the black font used by Hewson (2010) allowed the source concept to generate enough metaphorical concreteness to allow the participant to detect the conceptual metaphor, thus facilitating evaluation. It is therefore possible that it is the strength of the concreteness that makes the metaphorical source concept salient when compared to other cognitive mechanisms (e.g. schemas) and the target concept, thus affording the person appraising the target concept accessibility its facilitating properties. Higgins (1996) spoke of this type of salience being achieved through *comparative distinctiveness*, "An object of perception or thought can be salient…because of something about its properties in comparison with the properties of other objects in the immediate situation" (p. 156). This hypothesis implies that implicit evaluation of affective stimuli is possible if the conceptual metaphor is salient enough to be recognised, albeit unconsciously. In theory, the salience may achieve this by providing a greater opportunity for feature overlap between the source concept and the perceiver's knowledge of

conceptual metaphors, thus stimulating activation of the conceptual metaphor (Higgins, 1996).

The results from the first two experiments suggested the level of concreteness of the conceptual metaphor was insufficient and this moderated the degree of influence it had over evaluation. Therefore it is possible that conceptual metaphors in the context of social cognition may operate along a spectrum, ranging from no influence when the metaphorical source concept is too abstract (e.g. Hewson 2010), to the ability to facilitate explicit evaluation when somewhat concrete (the current research) and then when very concrete and thus highly salient, the capacity to influence implicit evaluative situations (Brookshire et al, 2010). For instance Brookshire et al (2010) found a significant interaction during a stroop type task involving position and valance, suggestive of a CMF style influence when evaluation was implicit nature. However, for both the implicit evaluation experiments in the current study no effect was found for metaphorically congruent spatial evaluations. It may be that the lack of source target concreteness was due to the keyboard being placed in a horizontal position rather than a vertical position ("A" at the top and "L" key at the bottom). The horizontal position used in this study was inconsistent with the vertically based metaphor and arguably detracted from the concreteness of the source concept and thus reduced its salience. Given that implicit evaluation is a more subtle task than that in Experiment 3, it could be that participants failed to detect (unconsciously) the conceptual metaphor due to it not being highly salient. It seems possible that the lack of a highly influential congruent motor movement feature (up – down on a vertical plane) deteriorated the concreteness of the conceptual metaphor by such a degree that it was no longer able to be recruited. This position indicates that the inclusion a vertical motor task may make possible implicit evaluation.

Santana and de Vega (2011) in their research on the embodied contribution to conceptual metaphors concluded that congruent motor movement is a more important component of

conceptual metaphors than visual motion. This might suggest that when an abstract proposition is presented, the use of the motor action as in Brookshire et al (2010) may make such a significant contribution to the concreteness of the conceptual metaphor that it is able to prompt facilitation in an implicit evaluation task. Further research is required in the area, specifically, is the act of physical movement essential for spatial activation to be consistent with the source conceptual metaphors during implicit evaluation? Alternatively, could implicit evaluation be facilitated simply by the context of the exercise, which in Brookshire et al's case is the participants expectation that motor action will be required, which in turn cues congruence expectancy, making the participant more sensitive to existence of the conceptual metaphor. In Higgins (1996) phraseology, the conceptual metaphor maybe easier to acquire due to expectancy acting in a way that heightens the cognitive accessibility of congruent features, that when overlapped with the perceived features produce an activation threshold for the source concept. Both explanations could work to consolidate the concreteness of the source concept, although a detailed investigation is required to tease these two explanations apart.

With regards to the recall experiments, it should be noted that this current study is the first to test an interaction of affect and position for the free recall of valenced words. There was no data to support the role the CMF in the process of free recall, as opposed to evidence found for recall of simple spatial location (Crawford et al. 2006) and memory for behavioural information (Palma et al. 2011). It is not known why a significant interaction for affect and position was not found for the recall of valenced words.

A limitation of the current research was the horizontal orientation of the keyboard in experiments 1 and 2. The oriented profile appeared to have the opposite of the desired effect, which confused the source concept and thus provide no opportunity for facilitation. Subsequent

research should ensure that all the attributes are, where possible, congruent with the proposed conceptual metaphor. For example, the keyboard should be in a vertical position to encourage congruent up and down arm motor movements

Conclusion

Schema theory still represents the most widely accepted mechanism for social cognition, but perhaps the CMF has a role as a complementary perceptive facilitator when senses, schema (when considering dissimilar concepts) and embodied cognition prove to be inefficient at that given moment. Process wise, for conceptual metaphors to be a useful perceptual tool it may be that a threshold for conceptual concreteness needs to be met. Firstly it seems that by increasing the salience of the conceptual metaphor one finds support for the CMF during explicit evaluation. Secondly, there was no evidence in the current research to support a CMF view for memory for the recall of valenced words and to date no other similar have been completed. Thirdly, although not supported in the current research, metaphorically congruent implicit evaluation may be possible when the source concept is sufficiently concrete.

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Appendix A

Word list containing 96 words: 48 positive, 48 negative.

Positive Words		Negative Words	
ACTIVE	LOYAL	ARGUE	INSANE
AGILE	MATURE	BEGGAR	INSOLENT
AMBITIOUS	MERCY	BITTER	LIAR
BABY	NEAT	CANCER	MEDIOCRE
BRAVE	NURSE	CHEAT	MOSQUITO
CANDY	POLITE	CLUMSY	NASTY
CHAMPION	POWER	CRIME	NEUROTIC
CLEAN	PRETTY	CRITICAL	OBNOXIOUS
CORDIALLY	PROMPT	CROOKED	POISON
DEVOTION	RADIANT	CRUDE	POMPOUS
DREAM	RELIABLE	CRUEL	PROFANE
ETHICAL	RIGHTEOUS	DANGER	RUDE
FAITH	SATISFYING	DEAD	SARCASTIC
GARDEN	SENSIBLE	DEFEAT	SHALLOW
GENEROUS	SINCERE	DELAY	SLOPPY
GENIUS	SLEEP	DEVIL	SOUR
GENTLE	STUDIOUS	DISEASED	SPIDER
GRACIOUS	SWEET	DIVORCE	STEAL
HEAVEN	TALENTED	ENEMY	STINGY
HERO	TRUST	FICKLE	THEFT
JUSTICE	TRUTHFUL	FOOLISH	TOUCHY
KISS	VICTORY	FRAUD	UGLY
LEISURE	WISE	GREEDY	VAIN
LOVE	WITTY	HOSTILE	VULGAR

Appendix B

Word list containing 100 words: 50 positive, 50 negative.

Positive Words		Negative Words	
ACTIVE	LOVE	AIMLESS	INSANE
AGILE	LOYAL	ARGUE	INSOLENT
AMBITIOUS	MATURE	BEGGAR	LIAR
BABY	MERCY	BITTER	MEDIOCRE
BRAVE	NEAT	CANCER	MOSQUITO
CANDY	NURSE	CHEAT	NASTY
CHAMPION	POLITE	CLUMSY	NEUROTIC
CLEAN	POWER	CRIME	OBNOXIOUS
CORDIALLY	PRETTY	CRITICAL	POISON
DEVOTION	PROMPT	CROOKED	POMPOUS
DREAM	RADIANT	CRUDE	PROFANE
EARNEST	RELIABLE	CRUEL	RUDE
ETHICAL	RIGHTEOUS	DANGER	SARCASTIC
FAITH	SATISFYING	DEAD	SHALLOW
FESTIVAL	SENSIBLE	DEFEAT	SLOPPY
GARDEN	SINCERE	DELAY	SOUR
GENEROUS	SLEEP	DEVIL	SPIDER
GENIUS	STUDIOUS	DISEASED	STEAL
GENTLE	SWEET	DIVORCE	STINGY
GRACIOUS	TALENTED	ENEMY	THEFT
HEAVEN	TRUST	FICKLE	TOUCHY
HERO	TRUTHFUL	FOOLISH	UGLY
JUSTICE	VICTORY	FRAUD	UNFAIR
KISS	WISE	GREEDY	VAIN
LEISURE	WITTY	HOSTILE	VULGAR