Dreams and their Central Imagery: A factor analysis of the CI construct and how this relates to Emotion and Trauma.

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Submitted in partial fulfilment of the requirements for the degree of Doctor of Psychology at the University of Tasmania, July 2012.
I declare that this thesis contains no material which has been accepted for a degree or diploma by the University or any other institution, except by way of background information and duly acknowledged in the thesis, and to the best of my knowledge and belief no material previously published or written by another person except where due acknowledgement is made in the text of the thesis.

____________________________
Glenn P. Bilsborrow
3 July 2012

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Statement of Co-Authorship

The following people contributed to the publication of the work undertaken as part of this thesis:

**Paper 1 (Published)**

"Exploratory Factor Analysis of Hartmann’s Scale for Central Imagery and its Relationship to Dreamer Emotion"

**Contributions:** Glenn Bilsborrow (70%), Dr John Davidson (20%), Dr Jennifer Scott (10%)

**Paper 2 (Submitted)**

"Factors in Hartmann’s Central Imagery Scale and their Relationship to Emotion and Traumatic Experiences"

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Statement of Ethical Conduct

The research associated with this thesis abides by the international and Australian codes on human and animal experimentation, the guidelines by the Australian Government’s Office of the Gene Technology Regulator and the rulings of the Safety, Ethics and Institutional Biosafety Committees of the University.
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Abstract

The contemporary theory of dreaming proposed by Hartmann (2011) states that the function of dreaming is to make broad connections in the mind in order to integrate new material into memory systems. This process is not random but guided by the emotional concerns of the dreamer, which helps the dreamer by integrating sometimes distressing experiences by building meaningful emotional memory systems. This theory has as one of its core constructs a scale that measures the central imagery (CI) of a dream and this rating is said to be an indicator of the emotional concerns of the dreamer. Research has demonstrated that higher CIs are found after traumatic events, are higher in people with a history of abuse, and in people who have thinner boundaries. However, findings from a recent study suggested that CI may not be unitary, a fact which would have an impact on future research in this area. The present studies examined the underlying factor structure of CI. In study one, we collected the dreams of 99 people for a total of 230 dreams which were rated using Hartmann's CI scale as well as a scale which rates the descriptor words associated with CI. Dreamers also stated the level of emotion in their dreams and completed measures of dissociation and of boundaries in the mind. We found that CI was best thought of as having three dimensions, which were considered to be related to the visual, impact and attention aspects of the imagery. It was found that CI was not significantly related to boundaries or dissociation, but it was related to emotion. The impact and attention factors were related to emotion but the visual factor was not.
In study two, we attempted to replicate the three factor structure of CI and also to explore how CI was related to trauma in a person’s past. We collected two dreams each from 143 participants and asked them to rate each dream again for emotion. We also asked whether they had a history of trauma, and if so, we explored variables associated with this trauma such as length of time since the trauma, level of distress at the time, peritraumatic events, trauma and trait coping, impact of the event on their lives and current distress. We expected to 1) replicate the three factor structure and also to find that 2) CI was related to current and trauma related distress, peritraumatic events, current functioning and dream emotion. There was partial support for hypothesis one in that statistically we replicated the three factor solution, but two factors had better economy. There was partial support for hypothesis two as overall CI and CI factors were positively correlated with dream emotion and peritraumatic events. However, CI was not related to other indications of trauma such as past and current distress, trauma related coping, the development of post-traumatic stress disorder symptoms, and the impact of the trauma on the person’s life. CI was significantly related to emotion at a similar level to what was found in study one.

Hartmann’s theory would predict current distress to be related to CI or the CI factors. As dream emotion and CI were correlated, the current findings raise the question as to the mechanisms that increase the intensity of CI. Future research should use longitudinal designs to explore the relationships between dream imagery and emotion, trauma and coping.
Chapter 1

The Contemporary Theory of Dreaming

1.1 Structure of this thesis

This thesis addresses Hartmann’s Contemporary Theory of dreaming (Hartmann, 1996a, 1998c, 2007a, 2011), which provides a method of assessing dreams for the intensity of the Central Image (CI), a construct he has developed to demonstrate the impact on dreams of significant life events. The unidimensionality of this construct has not been previously examined in any studies in the literature, and it is explored in chapters 2 and 4 of this thesis by considering its relationship to various measures of trauma.

The thesis contains two empirical studies. The first study has been published and the second has been submitted for publication at the time of writing. The thesis introduces Hartmann's theory (the Contemporary Theory of dreaming) in chapter one and discusses its tenets, which Hartmann himself has elaborated in a number of his expositions (e.g. Hartmann, 2007a, 2011). In doing so, it discusses some of the evidence related to each area, and then moves into the issue of the CI scale itself which is much of the focus of study one, contained in chapter two. In chapter 3, the topic of trauma and how this relates to dreams is explored. This again introduces the major questions that are explored in the second study, which is contained in chapter four. A final chapter reviews the issues discussed in each of the two studies, their implications, and future directions.
1.2 Introduction to the work of Hartmann

1.2.1 The nature and function of dreaming

There are a number of theories that attempt to explain why we dream. From those that claim dreaming is no more than a by-product of sleep that has no function, to Freud's psychoanalytic interpretation of dreams (Freud, 1900). Some researchers have stated that certain circuits of the brain become activated during sleep and the resultant activity is then interpreted by the conceptual brain as best it can (Hobson & McCarley, 1977). Still others take an evolutionary perspective speculating that dreams are a way of further processing information related to threat by rehearsing fight and flight responses in a safe place (Revonsuo, 2000). Dreams have also been seen as a 'clearing house' for memories retained from the day, by weakening connections that are inefficient. This process is said to be similar to 'defragmenting' a computer's hard drive (Crick and Mitchison, 1983). Thus the process of dreaming is still somewhat of an enigma to researchers and no consensus has been reached. The current research is focussed on Hartmann's theory of dreaming (Hartmann, 2011), which has shown some promise as a theory but has been under-researched. Thus, Hartmann posits a number contentions that have yet to be empirically validated. Much of the research that has been undertaken to date, is by himself and his collaborators. One of the strengths of the theory is that it attempts to integrate some of the metaphorical aspects of dream images and trauma. It also has a scale which is a central construct and is open to scrutiny in a measurable way. Thus, the objective of the current research was to focus on Hartmann's theory with a view to evaluating some of the central tenets therein, rather than compare it with other theories or to attempt to evaluate all aspects of the theory, some of which remain speculative or
contentious at this stage of our knowledge. The current research aims to outline Hartmann's view in some detail, and then focus on the central construct and how this relates to emotion and trauma in line with predictions by the theory.

1.2.2 Ernest Hartmann

Among the most prolific scholars in the dream research literature is Ernest Hartmann. He is a professor of psychiatry at Tufts University and the author of almost 340 research papers and books. Hartmann and his collaborators noticed that when people had a recent trauma, their dreams were more vivid and emotionally charged. In this case what is on the mind of the individual is known, they reasoned, which was the recent trauma. This led to the concept of dreams as creating a picture context for the dominant emotional concerns of the dreamer. The main imagery in dreams was said to contextualise emotions felt by the dreamer. This was referred to as Contextualising Imagery (CI) and later changed to Central Imagery (CI), as the first title was found to be unwieldy. This concept was defined and used to measure the relative strength of the imagery in dreams (Hartmann, 1996; Hartmann, 2007). Further, Hartmann contended that dreaming is analogous to a kind of psychotherapy that the mind uses in the safe haven of dreams. He stated that dreaming is not unlike psychotherapy whereby the dreamer is able to go over traumatic experiences, in a safe place, in order to integrate them into the memory system (Hartmann, 1995a). This process is not random, but is said to be guided by the emotional concerns of the dreamer (Hartmann, 1998c, 2007, 2011). Over the years, a great number of the tenets of the theory have been investigated empirically. However, some issues have yet to be resolved adequately.
1.3 Boundaries in the mind

In the late 80s Hartmann formulated the concept of boundaries in the mind which he proposed as a dimension of personality and an aspect of the overall organisation of the mind; the degree to which an individual has separation or overlap between processes in the mind. There are many ways to speak of the content of our minds, such as thoughts, feelings, memories and perceptions. No matter what terms are used, we are speaking of regions, functions, or processes that are separate from one another and yet connected. Boundaries between them are not absolute separations. Thus, Hartmann states that the boundary concept explains the degree of separation between these entities within each individual. For an individual with thick boundaries, we would expect a 'thick skinned' person, one who is well defended, solid and well organised. In contrast, people with thin boundaries are especially sensitive, open or vulnerable. They see things in a much more fluid way, may allow thoughts and feelings to merge, are less well defended and often have a less solid sense of self (Hartmann, 1998). The boundary concept has been found to be highly correlated (0.66) to the 'openness to experience' scale on the NEO-PI, a fact that McCrae (1994) describes as "remarkable given the independent origins of the instruments and the lapse of seven years between their administrations" (p. 263).

Boundaries can be measured using a questionnaire devised by Hartmann and his collaborators and called the Boundary Questionnaire (BQ; Hartmann, 1989; Hartmann, et al., 1987; Hartmann, 1991). His subsequent research showed that people with thinner boundaries had more vivid, 'dreamlike' and more emotional dreams than those with
thicker boundaries (Hartmann, Elkin, & Garg, 1991) and that they recall dreams more often and have dreams that are more emotionally intense than people with thicker boundaries (Schredl, Schafer, Hofmann & Jocob, 1999). They also found that people with thin boundaries were more likely to have trauma in their history (Hartmann, Zborowski, Rosen & Grace, 2001). There have been few other scales that have shown such a robust relationship between dreams and measures of personality or personal circumstances.

1.4 Outline of the Contemporary Theory of Dreaming

1.4.1 The Nature and functions of Dreaming

According to the ‘Contemporary Theory of Dreaming’ dreams make connections in the mind, guided by emotion. The imagery in dreams is a measure of the power of the underlying emotion (Hartmann, 2007a, 2011). The theory is summarised by the following:

1. *Dreaming is a form of mental functioning. It is one end of a continuum of mental functioning that runs from focussed waking thought at one end, through reverie and daydreaming, to dreaming at the other end.*

2. *Dreaming is hyperconnective. At the dreaming end of the continuum, connections are made more easily than in waking, and connections are made more broadly and loosely. Dreaming avoids tightly structured, over-learned material.*
3. Connections are not made randomly. They are guided by the emotions and emotional concerns of the dreamer.

4. The dream, and especially the Central Image (CI) of the dream, pictures or expresses the dreamer’s emotion. The CI is a measure of the power of the emotion. The more powerful the emotion, the more powerful (intense) is the CI.

5. This making of broad connections guided by emotion probably has an adaptive function, which we conceptualise as “weaving in” new material – in other words, taking new experiences, especially if they are traumatic, stressful, or emotional, and gradually connecting them, cross-connecting them, weaving them, into existing memory systems.

6. In addition to this basic function of dreaming, the entire focused waking-to-dreaming continuum has an adaptive function. It is useful for us to be able to think in clear, focused, serial fashion at certain times, and at other times to associate more broadly, and loosely – in other words, to dream.

(Hartmann, 2011, p.5).

There are a number of issues embedded within these precepts. Of those that have been empirically investigated, some are better supported than others. Each of these six propositions will now be considered in detail.
1.5 Evaluation of the Contemporary Theory of Dreaming

1.5.1 Dreaming is one end of a continuum of thought

According to Hartmann, dreaming is at one end of a continuum of thought, with focussed waking thought at the other end. He states that dreaming is a form of mental functioning and as such, is a neurocognitive state (Hartmann, 2003; Hartmann, 2007). The notion that dreaming is a developmental cognitive achievement that depends on maturation of forebrain structures has substantial evidence (see Domhoff, 2001). Indeed Domhoff also suggests that "dreaming is a cognitive achievement related to visual and spatial skills in its frequency of occurrence and to verbal and narrative skills in its length and complexity" (Domhoff, 2000, p176). Looking at the form of consciousness while awake versus while dreaming, Hartmann states that while awake and focussed in thought we are more self-reflective, more solid in our 'boundaries' of thought, and we are more reliant on perceptual input. He conceptualised thought as being on a continuum from this waking, focussed end, through to the dreaming end. Thus at the dreaming end of the continuum, thoughts are more connective (in fact 'hyperconnective'), and connections are made more loosely, more easily and more broadly. He proposes that waking thought is more linear in its process moving from A to B to C, whereas dreaming moves forward and backward and between entities (Hartmann, 2007b).

In his earlier research, Hartmann noticed that a) some people had daydreams that could be just as vivid, bizarre and metaphoric as nocturnal dreams and b) that dreams could sometimes be controlled, or the dreamer might become 'lucid' during a dream (Hartmann, 1987), that is, the dreamer becomes aware (lucid) they are having a dream.
whilst in the dream state. Considering the first point, in some cases nightmare sufferers have had nightmares while fully awake just through the process of daydreaming (Vanderkolk, Blitz, Burr, Sherry, & Hartmann, 1984). Antrobus and others have shown that the longer a period of uninterrupted isolation (or internal processing) lasts in the waking state, the more dreamlike cognitive activity becomes (see Antrobus 1990 for a review). In terms of lucid dreaming, there is a large literature that shows there is a great deal of variation in the population. Indeed, lucidity may also be seen to be on a continuum between 'lucidity and non-lucidity' (LaBerge & DeGracia, 2000).

Starting with Freud (1917/1915), there are many who believe that dreams are highly bizarre and qualitatively different from waking thought. Further, that dreaming is an hallucinatory wish fulfilment state, full of delusions and with reality testing suspended (Yu, 2009). Indeed many researchers go further and say that dreaming is in fact a kind of psychosis (Hobson, 2002). That dreaming is a rather separate state to waking consciousness is firmly refuted by many, including Hartmann. Hartmann agrees that the neurochemical changes in the brain while sleeping produce a state that is conducive for dreaming to occur. However he does not agree that this change in chemical state per se causes dreaming (Hartmann, 2007). Nor does he agree that the processes of REM sleep are distinctive and cause bizarreness in dreams as proposed by Hobson (1988). In other words he argues against REM and dreaming being a completely separate state to waking. Rather, he states that bizarreness is related to personality variables, and there is much variation in the dreaming 'state'. Indeed, although there has been a widely held assumption that dreams are bizarre, this view has been increasing disputed by many. Indeed so much so that it has led Domhoff (2007) to
state that dreams are "far more coherent, patterned, and thoughtful than is suggested by the usual image. Instead, they are by and large a realistic simulation of waking life" (p. 2).

During his research on frequent nightmare sufferers, Hartmann noticed some particular themes in relation to the personality type of the sufferer. These were attributes such as being relatively psychologically undefended, seeing things in grey rather than black and white, and being especially open and vulnerable (Hartmann, 1998). As noted earlier, he developed and tested a new measure of personality called the Boundary Questionnaire (Hartmann, 1991) which could measure the degree to which someone had 'thin' or 'thick' boundaries. People who have very 'thin' boundaries are more likely to have nightmares, recall their dreams more often, and have more bizarre dreams (Schredl, Schafer, Hofmann, & Jacob, 1999). Thus, this research found a strong link between boundary thickness and the imagery and intensity of dreams. In one study, people with very thick and very thin boundaries reported their most recent dream, most recent daydream, a dream that really stands out, and a daydream that really stands out. Dreams and daydreams were rated on three 8-point scales for 'bizarreness', 'dreamlikeness', and 'emotionality' by two independent raters who were blind to the boundary scores. Overall, dream reports were rated more bizarre, more dreamlike and more emotional than the daydream reports. Importantly, however, thin boundary individuals' reports were significantly more bizarre than thick boundary individuals' reports. Indeed, the recent daydreams of people with thin boundaries were as bizarre as the recent dreams of those with thick boundaries (Kunzendorf, Hartmann, Cohen, & Cutler, 1997).
1.5.2 *Dreaming is hyperconnective*

The next premise in Hartmann’s theory is that dreams are at one end of a continuum where connections in the brain are more loosely made and are associated with information more broadly. This means that thinking patterns while asleep supposedly avoid the more regular and ‘overlearned’ pathways thereby making connections in a more expansive way (Hartmann, 2007). He suggests that some evidence for this is in the strangeness of dreams. We can sometimes fly while dreaming and we may find ourselves in houses that are a mixture of houses we have known. We can also meet and talk with people who have died and we can meet mythical creatures. This he states is evidence for dreaming making connections in a broader way to normal by bringing together material from our memory that may not normally come together (Hartmann, 1998).

This connectivity notion is modelled on the brain as a neural network derived from the McClelland and Rumelhart model of parallel distributed processing (McClelland and Rumelhart 1986). Hartmann refers to the neural net of the brain as a complex entity that processes information by activation along the network to make connections, strengthen connections or weaken connections. The difference between the ways connections are made, or how the net is activated, depends on the type of thought being engaged in. During daily activity when thought processes are more focussed, linear processing along pathways from sensory input to motor output is much more likely. Therefore, rapid and straightforward serial activities involving input-output processing would be consistent with the waking end of this continuum. Activities such
as reading, writing, and typing would be considered to be good examples of this (Hartmann, 1998). In some theories of dreaming, people who are at work all day typing and reading, should have more of this activity in their dreams. For example, Crick and Mitchison’s (1983) view that dreams form part of a process that prunes excess daytime information collected would suggest that those that spend all day in front of a computer should dream about such activities. Hartmann’s model on the other hand, would predict that these are not seen as much in dreaming because dreaming is at the other end of the spectrum.

In a study to test this, Hartmann examined 456 dreams from several different studies. Independent scorers were asked to check whether each dream contained any instance of reading (a book, document, letter, etc.), writing (including typing) or calculating. Both scorers agreed exactly that there were zero examples of reading, zero examples of writing and one example of calculating in all the dreams. In a second study by the same authors, two hundred and forty regular dreamers answered questions about the relative prominence of six types of activities in dreams versus while awake. Participants were asked to respond on a 7 point scale running from ‘far more prominent in waking life’ to ‘far more prominent in dreaming’ as to how frequently they engaged in walking, talking with friends, reading, sexual activity, and typing. Results showed two distinct groups where activities such as walking, talking with friends and sexual activity were slightly more prominent in waking, while the activities of writing, reading, and typing were much more prominent in waking life. There was a significant difference between these groups. The authors suggest that this indicates that we dream very little of activities such as reading, writing and arithmetic, even though these are
over-learned activities that we engage in often during the day, compared to other activities that we might engage in (Hartmann, 2000b).

This notion that we dream very little of the 3Rs, has been directly challenged. According to one researcher, saying that dreaming is at one end of a continuum does not reflect the phenomena of dreaming adequately. Barrett (2007) points to specific examples of students claiming to go through steps of math problems which they had not already solved, within a dream. In other evidence, she states that a well-known mathematician has said that all his mathematical proofs came to him in dreams. Presumably these types of thought processes in these dreams are similar to the focussed thoughts at Hartmann’s non-dreaming end of the continuum. There is also evidence that self-reflection and other thought processes associated with the prefrontal and parietal areas of the brain are diminished in dreaming (LaBerge, 2007). Hartmann’s theory is in line with this. However, statements that these areas are totally shut down or that there is no reflective content in dreams are not accurate. One does not have to look far to find examples of dreamers reporting being self-aware, or retrieving accurate memories, or having control of activities within the dream, or even deciding to wake themselves up. In fact, this type of deliberate direction of one’s thoughts and actions in dreams has been found to be under-represented in dream reports compared with people’s self-ratings (Kahan, 1994). Research by LaBerge (2003) into lucid dreaming has uncovered numerous examples of these types of activities. However, even this author concedes that many researchers have doubted that the dreaming brain was capable of such consciousness. Indeed, although there are many examples within his research, the vast majority of sleepers never reach this state of self-awareness within their dreams or only
on rare occasions. Thus, this type of mentation during sleep presents as a possible activity of the mind (as opposed to the past belief that it was impossible) and can be learned with some effort. However, spontaneous lucid dreaming occurs only in about 20% of the population and is therefore not a regular state of dreaming mentation (Snyder & Gackenback, 1988). To some extent this has been Hartmann's argument in any case. Dreams do not represent a distinct brain process separate from waking thought, meaning that we are capable of conscious thought while dreaming and we are capable of dreaming thoughts while awake. However, while sleeping our mind tends toward the more bizarre, almost pure vivid imagery, more metaphor, and less self-awareness (Hartmann, 2007). Further, when thoughts are more focussed in dreams they may represent another process all together. Post-trauma nightmares for example are often a type of memory sequence that can intrude into consciousness during the night or the day. During the day it is called a flashback, and during the night it may be considered to be encapsulated memory that intrudes into sleep. Dreams of those with PTSD are often long lasting and repeating nightmares. What characterises these nightmares is that they are most often a replay of the traumatic scene. In this situation Hartmann argues that these are not the dreams which he is saying represent the dreaming end of the continuum, but rather memory intrusions that are a more focussed and over learned cognition (Hartmann, 1996b).

1.5.3 Connections are guided by the emotional concerns of the dreamer.

The empirical support for the notion that connections in the brain during dreaming are guided by the emotional concerns of the dreamer is less plentiful. Even Hartmann states
that "there is a great deal of data on emotion in dreams, but it is only marginally relevant to our discussion of the Contemporary Theory" (Hartmann, 2007; p189).

Indeed the degree to which emotions appear in dreams has been studied extensively and there does seem to be as a minimum a 'smoking gun' in terms of Hartmann's assertion. In a vein similar to many aspects of the dream literature history, it was thought that emotions rarely populate dreams. However, today it is well recognised that emotion plays an important part in REM sleep, and in dreams (Walker & van der Helm, 2009).

Compared to previous studies, some have found a ten-fold increase in the amount of emotion reported and no difference between men and women (Merritt, Stickgold, Paceschott, Williams, & Hobson, 1994). Indeed, dreamers often neglect to mention the emotion contained in their dreams in dream reports. Thus, when they are asked if the dream contained emotion, the prevalence is much higher than when spontaneously identified, and occupies dreams much more frequently than was previously thought (Nielsen, Deslauriers, & Baylor, 1991). In contrast, others have stated that emotions are not part of every dream when this is studied in the lab, which is thought to be a more objective measure due to the fact that people are awoken and report immediately.

Indeed, several studies have found that emotions are only in about 75% of dream reports (Domhoff, 2007). The majority of dream reports come from REM sleep, with only about 7% coming from Non-REM sleep and this has led some to caution against the assumption that REM sleep is equivalent to dreaming. It could be that dreams have both a cognitive element (occurring mostly in Non-REM sleep) and an emotional processing function (occurring mostly in REM sleep) (Wamsley & Antrobus, 2007). It has been known for some time that the emotion circuits within the brain are activated during
REM sleep. Dreams from this period may be particularly emotional compared with Non-REM dreams. Arguments downplaying the role of emotion in dreams may overlook the divide between REM dreams and Non-REM dreams, with the former being more involved in emotion processing (Panksepp, 2007).

Hartmann suggests that the evidence for connections in the brain during dreaming being guided by the emotional concerns of the dreamer, is in the combination of the areas already discussed in this paper, along with some not discussed yet. The main support comes from his own observations of people's dreams before and after trauma, as well as empirical studies designed to consider aspects of this. Certainly a great deal of research has pointed to the brain making connections while we dream, even though earlier thought was divided. Most of this research has focussed on the brain integrating new material while we sleep (Christos, 2003). In a clever study designed to look at this question, Hoelscher, Klinger and Barta (1981) asked participants what to identify their concerns as well as things were not of concern to them. They then summarised both their concern and non-concern material into a single word. This word was then taped and played back to each participant three times while they were in REM sleep. They were then awakened. It was found that concern related material was much more likely to be incorporated into the dreams of participants than non-concern material. They concluded that cues related to current concerns exert a controlling effect sleeping attentional and cognitive processes.
1.5.4 The Central Image (CI) is a picture context of the dreamer's emotion.

Hartmann states that the purpose of dreams can be seen most clearly in the dreams of people who have suffered a traumatic event. For those people leading fairly ordinary lives, there are many emotional concerns active at any given time and so it is not easy to determine any one dominant emotion. Indeed, their emotional concerns may be a mixture of many much smaller ones. This may make the content of dreams seem random or confused, or not actually remembered. When there is recent trauma, the emotional concerns are known and dreams such as being washed away in a tidal wave, a dream that is highly arousing, are said to be a picture context for the strong emotional concerns of the dreamer. The tidal wave dream, or dreams of a similarly powerful and vivid kind such as being swept up in a whirlwind or burned in a fire, are paradigmatic of this process and are often seen in people who have recently experienced a traumatic event. What Hartmann and his associates say is that this type of dream is not a replication of the actual trauma but it pictures the powerful emotion felt by the dreamer (Hartmann, 1998; Hartmann, 2007). These images in dreams can be measured and are described as contextualising images, or more recently 'central images' (CI; Hartmann & Kunzendorf, 2006).

A Central Image or CI in a dream is a powerful image that provides a picture context for the dominant emotional concerns of the dreamer and is defined as a "striking, arresting, or compelling image - not simply a story - but an image which stands out by virtue of being especially powerful, vivid, bizarre, or detailed" (Hartmann, Zborowski, Rosen, Grace, 2001, p. 99). This definition lends itself well to empirical scrutiny and has been tested in a number of studies. A scoring system using this
definition has been developed. In an earlier version of the system, raters scored dreams as either having, or not having a CI. If one was present, it was rated from 1 (lowest intensity) through to 3, with increments of .5. An estimation of the emotion pictured in the imagery was then decided upon. A newer system has added in zero to indicate no image (Hartmann, 2007). In one of the first studies to test the notion that images are a picture context for the emotional concerns of the dreamer, Hartmann and his collaborators conducted a number of experiments based on the premise that dreams after trauma represent clearer examples of the emotional concerns of the dreamer. A number of dreams after trauma (68) and a number after no known trauma (67) were rated blindly for the presence of CI. Two raters correctly agreed that a CI was present in the dreams after trauma in 85% of cases. In one case a dream series was collected after a rape had occurred and agreement was 100% on 7 out of 8 dreams being identified as having a CI present. Based on these and other results, they concluded that dreams after trauma appear to have more CIs, more easily scored CIs, more intense CIs and that blind raters can agree on whether a CI is present or not (Hartmann, Rosen, Gazells, Moulton; 1997).

In another study, (Hartmann, Kunzendorf, Rosen & Grace, 2001) the dreams and daydreams of 40 students were rated for CI and an intensity assigned. Recent dreams were shown to have more and more intense CIs than daydreams. They also found that participants who had 'thin boundaries' had more and more intense CIs than participants with 'thick boundaries'. The researchers concluded that powerful images occurred more in dreams than in daydreams, which is consistent with their model. They stated that this suggests that dreaming is at one end of a continuum of thought, with daydreaming
further towards focussed thought. To further test the notion that CIs are related to the emotional concerns of the dreamer, and Hartmann’s contention that dreams after trauma represent a paradigmatic example of this, dreams after abuse and trauma were tested for CI. Two sets of dream data were studied. A single most recent dream was obtained from 306 students. CI was then scored on a blind basis for all dreams and found to be higher among students who reported any abuse (physical or sexual) compared to those who did not. In a second set of data, a total of 451 dreams were collected in periods after trauma from ten persons who had experienced a variety of different acute traumas. In four of these cases, dreams before the trauma and dreams after the trauma were collected. In all four cases, CI scores after the trauma were significantly higher than scores before the trauma. The scores of the group of trauma sufferers were significantly higher than the scores of the non-trauma group. Further, in each of the ten trauma cases, their CI score was significantly higher than the mean score of the non-trauma group. Their conclusion from these results was that CI scores tend to be higher when abuse, or recent trauma or some other factor, has produced emotional activation, and when the emotional activation ‘gets through’ to the dreaming process (Hartmann, Zborowski, Rosen, Grace; 2001).

Several studies have looked at the imagery of dreams of ordinary people before and after a large-scale traumatic event such as the 11 September 2001 terrorist attack. In one study, dreams were collected for two groups; one after watching the 9/11 attack on video and the other after watching a psychology lecture. The impact of events scale was also administered. The dreams after the terrorist attack video had significantly higher CI scores. Further, there was a significant correlation between their CI scores and the
impact of events scale. The authors suggest that this is an indication of the emotional activation of the dreamers to the disturbing video and is consistent with Hartmann’s contention that emotional activation is what impacts on the imagery of dreams (Davidson, Hart, & Haines, 2005). A similar study was conducted by Hartmann and Basile (2003) which looked at a natural sample of dreams before and after the attack. They collected the last ten dreams before the attack and the first ten after the attack from 16 individuals who normally recorded their dreams. They found that the dreams after were characterised by significantly more intense imagery, but were no longer or more dreamlike than those before the event. Indeed, the dreams after the event contained no more images of planes, attacks or buildings than those before it. The authors state that these were normal individuals whose dream images became more intense after the event. This study was subsequently replicated with more participants with similar results (Hartmann & Brezler, 2008). This is consistent with Hartmann’s contemporary theory of dreaming which states that dreams after trauma have more intense imagery but are not longer and do not replay the event, but create a picture context for the emotion activated by it.

Studying CI in terms of how it has been influenced by a traumatic event, which presumably elevates as well as identifies the emotional concerns of the dreamer, has been considered earlier. However, looking at what emotions may have been created by an image in a dream, would also be of interest as a means of considering the issue of emotional activation from another vantage point.
1.5.5 The Central Image scale

Studies that have utilised the Central Imagery scale have shown it to be robust (Hartmann, 2007), and that it can be rated reliably (Hartmann, Rosen, Gazells, & Moulton, 1997; Hartmann, Kunzendorf, Rosen, Grace, 2001). The CI concept also lends itself well to empirical investigation and it is relatively simple in construction. Previous attempts to harvest dreams for their meaning, utilise symbols or count content, have been elaborate and complicated, and met with limited success (Domhoff, 1999).

Essentially Hartmann's scale employs one measure, the CI, which is used to rate the intensity of a threshold-meeting image, once per dream. A CI is defined as a "striking, arresting or compelling image - not simply a story - but an image that stands out by virtue of being especially powerful, vivid, bizarre or detailed" (Hartmann, Zboroski, McNamara, Rosen & Grace, 1999; Hartmann, 2011). Using this definition, raters are required to ascertain whether a) there is an image within the dream that meets this criteria, and b) if there is, what level of intensity it has using a scale of 1 through to a maximum of 3 and allowing for .5 increments (Hartmann, 1996). Later, this scale was combined by scoring no image as zero, and any image from .5 through to 3, again allowing for .5 increments (Hartmann, Zborowski, Rosen, & Grace, 2001).

Some consideration has been given to the particular descriptor words that make up this definition. For example in some earlier work, Hartmann and his collaborators looked separately at the 'vividness', 'amount of detail', and 'bizarreness' of the dreams being rated, each being one of the seven descriptor words that make up the definition of CI. They scored a total of 757 dreams from people who were described as having either thick or thin boundaries, with a view to comparing these groups on the above measures.
To rate the dreams on these descriptor words, they used a scale developed by Foulkes's (1966). They found a significant difference between the two groups for 'bizarreness' and 'vividness', but not for 'detail' (Hartmann, Elkin & Garg, 1991). The issue of dream length was also addressed. They found that the length of dream reports was not significantly related to outcomes. This has also been corroborated in later studies (Hartmann, 1996; 2007; Hartmann & Brezler 2008). Another aspect of dream reports that might be considered a confounder is the ability of the dreamer to produce words. This was considered in one study which found no differences between groups on a measure of word production known at the Controlled Oral Word Association Test (COWAT; Davidson, Lee-Archer, Sanders, 2005).

When the CI scale itself is considered, common sense dictates that it may be difficult to keep all of the seven descriptor words in mind while rating. Moreover, some of the descriptor words may be easier to score compared with others. This then creates the possibility that scores may be reflective of some words more than others. Indeed, as CI is considered an activation of emotion, the question also arises as to what extent some of these words are more synonymous with emotion than others. For example, if one is rating an image in a dream that is highly 'powerful' and 'striking', this could potentially mean that the rater is judging his or her reaction to the level of perceived emotion in the imagery. The fact that a rater is looking for an image that is a "striking, arresting or compelling image - not simply a story - but an image that stands out by virtue of being especially powerful, vivid, bizarre or detailed", might create the expectation in the rater that the emotional impact of the imagery is what is being rated. On the other hand, the level of 'detail' in the dream may be less related to emotion. So
for example, a dreamer may describe in intricate detail every aspect of an image in a dream but that image has very little impact. Thus, some researchers have raised doubts about whether CI is a single entity. What undermines this hypothesis somewhat is the fact that all studies have had a high level of agreement between raters (Hartmann, 2007). Nonetheless, in a study by Davidson, Lee-Archer and Sanders (2005), the authors pointed out that the definition of CI may inherently introduce a bias along these lines. In their study, they decided to look at the detail of the imagery separately. Their results were equivocal; they found that a separate measure of 'detail' they devised which counted the number of objects, people and interactions within each image, was not related to the emotion measured, whereas CI was. Although this adds further weight to the argument that 'detail' is a separate factor in the CI scale, these authors concede that their detail counting scale may not be a valid measure of detail the way it is in the CI definition or at least not measuring 'detail' in the same way. Whatever the case, evidence is mounting that CI may not be a unitary construct. Indeed, (Davidson, Lee-Archer and Sanders, 2005) suggest that the issue may be resolved by developing separate scales for each of the seven descriptor words, rating dreams with them and factor analysing the results.

1.6 Summary of chapter 1

A theory for the purpose and function of dreaming has been developed by Hartmann (1996a, 2000a) and colleagues, who state that dreaming is a neurocognitive process in which the brain assimilates new information. In this theory, the intensity of the Central Image of a dream is considered to be an indication of the level of emotional activation
within the dreamer. A scale for measuring the CI of a dream has been developed, which has allowed more empirical investigation of the construct. During the process of dreaming, imagery is presented within the brain as a means of exposing the individual to emotionally arousing events while in the safe haven of sleep. The purpose of this is that it functions as a means by which the brain can 'weave in' new material using emotion to guide it. The process is said to be 'hyperconnective' in nature, allowing new connections to be made within the brain, rather than following over-learned pathways. The theory was developed through clinical observation and further elaborated through experimental results. Experiments looking at how prominent activities are within dreaming compared to waking, support the notion that there is much less dreaming involving activities that are of a more process focussed kind, such as reading or typing. Research has supported the notion that dreams are largely related to the regulation of emotion and the processing of emotional memories. A number of studies have focussed on the use of the CI scale and its validity in measuring emotional activation, and found that images are more intense after a traumatic experience, which is in line with theory. However, although the CI measure produces a single score, research has found that the scale may not be a unitary construct. There is reason to believe that the detail aspect of the imagery may not be as related to the emotion of the dreamer as the rest of the construct. This will be a point of departure for the present research.
Chapter 2: A Factor Analytic Study of Hartmann’s Scale for Contextualising Imagery and its relationship to emotion (published study).

Is published as:
Chapter 3

3.1 Trauma and Dreams

3.1.1 Introduction

People have known for centuries the close and special relationship dreams have with trauma (Van de Castle, 1993). Dream studies consistently find that dreams focus on stress and trauma and some even say that the central purpose of dreams is to facilitate emotional processing of traumatic events and ultimately adaptation and recovery (Barrett, 1996). The nightmares associated with post-traumatic stress disorder (PTSD: DSM-IV, American Psychiatric Association, 2000) are considered by some as a special case of this process, as these dreams are often found to be a literal re-enactment of the trauma. Over time the dreamer's PTSD begins to improve, then the dream content tends to be more symbolic (van der Kolk, Blitz, Burr, Sherry, Hartmann, 1984). Since the conflict in Vietnam, veterans have represented a large group of traumatised individuals available for the study of PTSD symptoms. Earlier wars were known to cause traumatic responses, but the exact nature of conditions such as 'shell shock' and 'war neurosis' was less understood (Loughran, 2010). The study of trauma per se has also benefited from better definitions of trauma and the inclusion of PTSD in the later version of the DSM. The advent of the Vietnam conflict brought home many issues related to trauma due to the sheer number of highly traumatised individuals and the result this had on society when they returned, such as domestic violence and having to care for them better than had been done for
previous wars (Barrett, 1996). Thus since that time, the psychological damage that can be caused by trauma has been studied much more extensively than was the case prior to this war. In addition there has been recognition that dreams, but more particularly nightmares, are related to trauma (Davis, Byrd, Rhudy, & Wright, 2007; Levin, Fireman, & Spendlove, 2005). Further, how post trauma symptomatology and dreams or nightmares are related, continues to be studied in much more detail than in earlier decades (Duke, 2008). As the nature of trauma and its corollaries is better understood, the nocturnal world of dreams as a result is made clearer as well.

3.2 The nature and prevalence of trauma

The extent of trauma in the general population is hard to estimate. Prevalence rates are dependent on the definition of trauma used, the types of trauma examined, and the methods used for assessing them. The study of the psychiatric response to traumatic events began in 1980 when Post Traumatic Stress Disorder (PTSD) was introduced into the official classification of mental disorders (Breslau, 2002). The diagnostic criteria for posttraumatic stress disorder (PTSD) in DSM-III specified that events were traumatic if they were outside the realm of usual human experience and would evoke significant distress in the vast majority of people. The finding that a traumatic event will occur at some time in the lives of more than half of the adults in the United States necessitated revision of this specification
The Diagnostic and Statistical Manual of Mental Disorders IV (DSM-IV; American Psychiatric Association [APA], 2000) classifies an experience as traumatic when: (1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others; (2) the person’s response involved intense fear, helplessness, or horror (p.467). In a national study of 5877 people aged between 15 and 54 in the USA, it was concluded that the lifetime prevalence of PTSD is 7.8% based on DSM III criteria (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). More recently in Australia, the lifetime prevalence of trauma exposure found in a sample of 10,641 was around 57%. However, 12 month prevalence rates of PTSD found in those exposed to trauma was 2.6% overall (Creamer, Burgess & McFarlane, 2001). In a US study of 9,282 participants, lifetime prevalence rates for PTSD were estimated at 6.8% overall. Rates among the age group 45-59 were the highest at 9.2%, and the lowest were found in the over 60 age group, at only 2.5%. The estimated risk of any anxiety disorder at the age of 75 was 29% (Kessler et al., 2005). Prevalence rates tend to differ according to gender, and the types of traumas experienced also vary. The most frequent types of events reported by women included natural disasters (15.2%), witnessed violence (14.5%), accidents (13.8%), great shock (12.4%), and sexual assault (12.3%). The most frequent types reported by men included witnessed violence (35.6%),
accidents (25%), threats with a weapon (19%), natural disaster (18.9%), and great shock (11.4%; Kessler et al., 1995).

3.3 Post Traumatic Stress Disorder (PTSD)

3.3.1 Criteria for PTSD

PTSD is an anxiety disorder resulting from exposure to a traumatic event (criterion A). It consists of three symptom clusters which are intrusive recollections (criterion B), avoidant/numbing symptoms (criterion C), and hyper-arousal symptoms (criterion D). To be diagnosed with PTSD, a person needs to have both criteria A1 and A2. Criterion A1 states that a person must have experienced, witnessed, or been confronted with an event that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others. Criterion A2 states that the person's response involved intense fear, helplessness, or horror. For criterion B, intrusive recollections must be experienced persistently in at least one of the following ways: distressing recollections of the event, dreams of the event, acting or feeling as if the event were recurring, distress at exposure to internal or external cues of the event, and physiologic reactivity to exposure to internal or external cues of the event. There must also be present, at least three of the following from criterion C; efforts to avoid thoughts, feelings, or conversations associated with the trauma, efforts to avoid things that arouse recollections of the trauma, inability to recall an important aspect of
the trauma, reduced interest in significant activities, feeling of detachment from others, restricted range of affect, and a sense of foreshortened future. Finally, there need to be present at least two of the following from criterion D; difficulty falling or staying asleep, irritability or anger outbursts, difficulty concentrating, hyper-vigilance, and exaggerated startle response (American Psychiatric Association, 2000).

3.3.2 Risk factors for PTSD

While many individuals will experience a potentially traumatic event, only a minority will suffer long-term problems (Blanchard et al., 1996). Like many psychological processes, the connection between the trauma and the development of PTSD is not straightforward, as the level of the trauma and individual differences each play a part. Indeed, having PTSD can lead to other problems, such as poorer cognitive processing, deficits in communication and the elaboration of affect. Childhood trauma can also lead to these problems (Zlotnick, Mattia, & Zimmerman, 2001). For example, trauma may have cumulative effects on the individual, and the results of the trauma may be subclinical but impacting on a person's life nevertheless. According to Breslau (2002), there are three risk factors that have been found as having relatively uniform effects across studies: pre-existing psychiatric disorders, a family history of disorders, and childhood trauma. It is also proposed that individual responses to trauma vary, which include coping responses and seeking support. Therefore, some of the factors that contribute to better outcomes must lie in the individual, or at
least they may mediate other causes (Davis, 2009). There are a multitude of factors that potentially contribute to the development of PTSD in trauma sufferers. Such factors include, proximity to, duration of, and severity of the trauma, and interpersonal traumas cause more problems than impersonal ones (Janoff-Bulman, 1992). The degree of loss (Breslau, 1998) and being female is a risk factor (Tolin & Foa, 2006), as is being younger (Norris, 1992), and having a history of personal or familial psychopathology (including major depression and anxiety disorders: de Jong et al., 2001). Negative reactions of others to the victim and avoidance coping were found to be risk factors as well. In a sample of 636 women in the community, potential risk factors such as assault severity, global support, negative social reactions, traumatic life experiences, self-blame, and avoidance coping were examined. It was found that avoidance coping and negative social reactions were the strongest correlates of PTSD symptoms. These authors found that self blame normally associated with PTSD, may in fact be at least partially due to negative social reactions from others. Indeed they found that negative social evaluations from others contribute to both self blame and PTSD (Ullman, Townsend, Filipas, & Starzynski, 2007). The type of traumatic event experienced is another risk factor for PTSD, with assaultative violence being the highest risk (Breslau, 1998). Increased life-threat perception and decreased sense of personal control were found to predict poor outcomes as well (Mills, Donaldson, & Park, 2007).
As a general category of risk, “peritraumatic” reactions have come to be known as those responses occurring at the time and immediately following a traumatic event (Marmar, Weiss, & Metzler, 1997). These responses have been shown to be an important contributor to PTSD onset. Looking at a multitude of socio-demographic, historical, event related, acute cognitive, emotional, and physiological reactions in a cross sectional sample (n=2001) of those exposed to the September 11 terrorist attack in New York, Lawyer and colleagues found that dissociation, panic arousal and emotional reactions (fear of dying, helplessness and horror) were the three main response patterns that predicted PTSD. Such a study is important, as many of those participating suffered the same trauma, whereas within other studies participants often do not. They state that their results support a growing literature concerning the predictive value of peritraumatic reactions in relation to the development of PTSD (Lawyer et al., 2006).

3.3.3 Peritraumatic Reactions and PTSD

Broadly speaking, PTSD research has focussed on pre-trauma variables, the nature of the trauma itself, and peritraumatic factors as potential causes of PTSD. Given that some people go on to develop PTSD and others do not (even where victims are involved in the same trauma; Lawyer et al., 2006; Breslau, 2002), researchers have increasingly turned to reactions at the time of the trauma as a means of predicting subsequent trauma-related sequelae. Indeed it could be argued that factors relating to a person’s past (such as
trauma history or personal history of psychopathology) may simply augment peritraumatic responses. Finding the common factors that underlie PTSD may help to reduce or prevent onset, alleviate symptoms, and help to understand the disorder better. Two of the main factors that may contribute to the onset of PTSD symptoms that are being investigated in recent times are dissociation, and tonic immobility, however recent views support the idea that these may be separate conceptualisations of the same thing (Levine, 2010).

3.4 Coping strategies and PTSD

3.4.1 Introduction to coping

Coping represents behavioural and cognitive efforts to deal with stress. Coping with stress has been conceptualised as being either problem focussed or emotion focussed, relating to the way an individual either deals with the problem or with the emotional outcomes. Whether a person sees the problem as one that they have to endure, or one that they can do something about, leads to the strategy used (Lazarus & Folkman, 1984). Most approaches in coping research follow Folkman and Lazarus (1980) who define coping as "the cognitive and behavioural efforts made to master, tolerate, or reduce external and internal demands and conflicts among them" (p. 223). Their model of stress is further elaborated by three processes vis; a
primary appraisal of perceiving a threat to the self, a secondary appraisal involving bringing to mind a potential response to the threat, and coping which is an execution of that response (Carver, Sheier, Weintraub, 1989). Thus, there are two concepts that are central to any psychological stress theory, namely, appraisal and coping. Firstly, individuals have to make evaluations of what is happening to them in terms of its significance for their well-being. Secondly, they need to cope with the threat by responding in a manner that they believe will help. Coping was conceptualised as people employing either emotion focussed or a problem focussed strategies. However, more recent elaborations have included three, which are emotion-focussed, problem-focussed and appraisal-focussed. In appraisal-focussed strategies, the individual modifies the way they think using denial or by altering their goals, for example. In a problem-focussed mode, they try to find solutions to the their problem by gathering information on the problem or learning new skills. In an emotion-focussed strategy, a person will try to relieve pent up emotions or talk to others about the problem. Typically people use a mixture of all of these, and what they use will change over time. Even though each one is useful in differing circumstances, it is generally believed that problem-focussed strategies are better (Weiten & Lloyd, 2006).
3.4.2 State versus Trait Coping

Broadly speaking, the literature on coping divides theories into the two camps of trait-oriented (dispositional or style approach) and state oriented (process approach), although there are other classifications such as the microanalytic versus macroanalytic approaches (Krohne, 2002). In the early days, the way people generally coped was considered to be a style and derived from the developmental psychoanalytic formulation. Then in the late 1970s, the trait approach to coping was abandoned in favour of a more process-oriented approach. From a process perspective, coping changes over time and in accordance with the situational contexts in which it occurs. Now both forms of coping style are researched and essentially constitute two sides of the same coin (Lazarus, 1993).

As stated, researchers believe there to be three main methods that humans use to deal with stressful situations, such as emotion, problem or appraisal focussed strategies (Weiten & Lloyd, 2006). Research has focussed on whether each of the particular strategies are adaptive or not, and consensus appears to be that it depends on the situation (Folkman and Moskowitz, 2004). However, coping as a dichotomy of problem-focussed or emotion-focussed, still remains as the dominant view of coping in the literature. This view is based on the influential work of Lazarus and Folkman (1984) and further elaborated with the development of the COPE inventory (Carver, Sheier, & Weintraub, 1989) which is still used to assess coping strategies in the present day. Embedded within this instrument are
two major scales that relate to either problem-focussed or emotion-focussed modes of coping. It consists of sixty questions clustered around 15 scales. There is also a brief version of the instrument, which has 28 questions using 14 scales (Carver, 1997). Much research has looked at how coping, based on one or more of the scales, impacts on adaption in its various forms. Although many have considered there to be two scales of emotion vs problem focussed coping styles, these are implied in the questionnaires and are not readily identified by the authors. Instead it is suggested that a factor-analytic approach be used to identify higher-order factors from the scales and use these as predictors (Carver, 2010). There is also a distinction made in the literature between approach and avoidance styles of coping, which is based on several items from the original scale. These were defined by Carver, Scheier and Weintraub (1989) as characterised by emotional venting and behavioural and mental disengagement.

The research literature on coping has burgeoned over the last three and a half decades. Researchers have sought to explain individual differences in the ability to cope with stress by unlocking the intricacies of how people cope generally and how they cope in situ. Coping as a variable has offered much allure due to the promise of intervention strategies based on its cognitive and behavioural constituents (Folkman and Moskowitz, 2004). Research on coping has focussed predominantly on psychological distress as the result of poor coping. However, some literature has also considered the use of coping strategies as a means of promoting positive
affect and subjective well-being. In a recent study, it was found that problem-focussed coping was positively related to positive affect, whereas avoidance coping showed the opposite effect (Ben-Zur, 2009).

3.4.3 Coping and trauma symptomatology

How a person's coping style impacts on their well-being after trauma has been of considerable interest to researchers. Understanding whether coping style impacts on the development of problems such as mental illness in the aftermath of stressful events, is important for the treatment of such individuals, and perhaps in the ultimate prevention or amelioration of symptoms. Much research has focussed on the coping strategies that are used as to whether there are state or trait modes which might predict such outcomes (Folkman and Moskowitz, 2004). Cognitive appraisal and coping style are now perceived as potential pre- and posttraumatic predictors for the development of PTSD (Kanninen, Punamäki, & Qouta, 2002). There is generally considered to be a negative relationship between emotion-focussed coping and stress, and a positive relationship between problem-focussed coping and stress (Snyder, 1999). However, in a recent study the authors found that acuteness of the trauma, the appraisal of the traumatic experience as harmful and involving loss, and the use of both emotion and problem focussed coping efforts were associated with high levels of PTSD (Kanninen, Punamäki, & Qouta, 2002). Interestingly this is not a simple relationship, as this study found that emotion-focussed coping was
beneficial in the long run, and problem-focussed coping useful in the shorter term. The distinction between state and trait coping styles was made in a study that looked at the development of PTSD in a group of students who were exposed to a terrorist explosion. In this study, the researcher had taken measures of trait coping style in students 2 weeks prior to the explosion that killed 17 students. Those who were exposed to the explosion consisted of 81 students who were then assessed for state coping style one month after the attack and for PTSD six months after the attack. It was found that students that received a diagnosis of PTSD at 6 month follow up, scored higher on the trait and state avoidance coping styles, higher on the trait emotion-focussed coping style, and lower on the state problem-focussed coping style, compared to those without PTSD (Gil, 2005). Avoidance may be a strong predictor of PTSD and indeed sub-clinical symptomatology as well. For example in a recent study looking at parents whose children were unexpectedly admitted to an intensive care unit, researchers were able to assess for trauma symptomatology in a 3 month follow up. They found that 12% met the criteria for PTSD, and 24% had sub-clinical post trauma symptomatology. They also found that an avoidance coping strategy was strongly associated with symptoms of PTSD (Bronner et al., 2009).
3.5 Measuring Post Traumatic Stress Disorder

3.5.1 Overview of Testing Instruments

Trauma is a relatively recent phenomenon in terms of its assessment. Until a definition of trauma was included in the DSM III in 1980, stressful situations were not linked to any particular disorder. Since that time, traumatic experiences have been connected aetiologically to a specific syndrome known as Post Traumatic Stress Disorder. The criteria for this disorder dictate that a direct link is established with a particular traumatic experience before a diagnosis can be given (Breslau, 2002). Due to the imperatives associated with consistent assessment of symptoms related to formal diagnostic criteria, several instruments have been developed. There are a number of stand-alone interview schedules such as the PTSD Interview (PTSD-I; Watson, Juba, Manifold, Kucala, & Anderson, 1991), the PTSD Symptom Scale - Interview (PSS-I; Foa, Riggs, Dancu, & Rothbaum, 1993), and the Clinician-Administered PTSD Scale-Version 1 (CAPS-1; Blake et al., 1990; Blake et al., 1995). On top of this array, there are also several PTSD modules of comprehensive diagnostic interviews such as the Diagnostic Interview Schedule (DIS; Helzer, Robins, & McEvoy, 1987), and the Structured Clinical Interview for DSM-III-R (SCID; Spitzer & Williams, 1985; Spitzer, Williams, Gibbon, & First, 1990). In terms of the self administered questionnaires, there are a large number. According to a survey done by Alhai, Gray, Kashdan and Franklin (2005), there are more than 30 self-report instruments available for use.
However, the top four account for 70% of users. These are, in order of use, the Trauma Symptom Inventory (TSI; Briere, 1995), the PTSD Checklist (PCL; Weathers, Litz, Huska, & Keane, 1994), the Posttraumatic Stress Diagnostic Scale (PDS; Foa, Riggs, Dancu, Rothbaum, 1993; Foa, 1995), and the Minnesota Multiphasic Personality Inventory-2-Keane PTSD Scale (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989). Of the four self-report measures listed, all are proprietary measures except for the PCL, which is in the public domain.

3.5.2 The Posttraumatic Stress Disorder Checklist (PCL)

Clinically administered assessments are not always convenient for research purposes because they usually require specialised one-on-one supervision and scoring. For expediency, self-report measures are preferred, where multiple administrations can take place at the same time, particularly in relation to research. However, self-report measures are not considered to be as accurate as the clinically based diagnostic interview schedules (Gregory, 1996).

The PCL was developed at the national centre for PTSD (USA) and is a 17 item self-report questionnaire based on the diagnostic criteria given in the Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition (DSM-IV; American Psychiatric Association, 1994). Respondents rate each item from 1 (not at all) to 5 (extremely), to indicate the degree to which they have been bothered by that particular symptom over the past month.
Several studies have looked at the PCL in terms of its ability to diagnose, whether it adequately covers PTSD symptomatology, as well as the factor structure of the instrument. It is based on the three factors that are present in the diagnostic criteria of the DSM, namely re-experiencing, avoidance, and hyperarousal symptoms. However, studies have found that although the PCL does support a 3 factor model in general, a fourth factor emerges to account for the data better. For example, Palmieri, Weathers, Defede and King, (2007) found that a fourth factor which they termed dysphoria, was a more adequate description of what they found. This was confirmed in another study, although the authors suggest that dysphoria may be a non-specific component of PTSD (Elklit, Armour, & Shevlin, 2010). Another study also found four which were reexperiencing, avoidance, numbing, and arousal in a sample of cancer sufferers (Shelby, Golden-Kreutz, Andersen, 2005). Overall, the PCL has been shown to be a very adequate measure of PTSD (Norris & Hamblen, 2004).

Specificity and sensitivity are terms used to describe the ability of an instrument to capture a construct such as PTSD. Sensitivity refers to the proportion of actual positives which are correctly identified, and specificity refers to proportion of negatives which are correctly identified (Hennekens & Buring, 1987). Studies looking at these factors in relation to an instrument are concerned with finding cut-off scores that gain the greatest specificity (diagnosis) while retaining sensitivity (not cutting out those that do potentially have a disorder). Several studies have assessed both
specificity and sensitivity for the PCL in a variety of populations. In one study (Yeager, et al., 2006) the authors suggested that the widely accepted cut-off score on the PCL of 50 as diagnostic for PTSD has a sensitivity of only 53%, which may be inadequate. This score has a specificity of 95% which is high. They recommend a cut-off score of 31, which gives a specificity of 81% and a sensitivity of 81%, and these figures provide more balance between the goals of not excluding possible PTSD sufferers and including false positives (Yeager, et al., 2006).

3.6 Dreams, Nightmares and PTSD

3.6.1 Introduction to dreams and trauma

Dreams as a generic class have been defined as a succession of images, thoughts, sounds, or emotions which pass through the mind during sleep, however there is no consensus on this and a single definition of a dream that satisfies all researchers is probably impossible (Pagel et al., 2001). The difference between bad dreams and nightmares is also contentious, leading some to state that disturbing dreams and nightmares may have been clumped together in one category whereas they are distinct entities. However, Zadra and Donderi (2000) state that even with a definition that separates out bad dreams from nightmares, there is reason to believe that the prevalence of nightmares is under-reported and could be much higher in the general population than was previously thought. They define a nightmare as
a disturbing dream that causes the dreamer to awaken, whereas a bad dream does not awaken the dreamer (Zadra & Donderi, 2000).

Disturbing dreams or nightmares are common. In fact, a lifetime incidence rate may approach 100% (Moore & Krakow, 2010). However only a smaller percentage of the population has regular nightmares and only between 4 and 8% report at least one nightmare per week (Nielsen & Zadra, 2000). There are gender differences as well, with women having a greater frequency of nightmare occurrence than men (Schredl & Reinhard, 2011). Increased prevalence of nightmares has been found in those exposed to a wide range of traumatic experiences (Barrett, 1996; Low et al., 2003), and particularly those suffering from posttraumatic stress disorder (PTSD; Kilpatrick et al., 1998; Krakow et al., 2002). Indeed "recurrent distressing dreams of the event" are part of the diagnostic criteria for PTSD (DSM–IV, American Psychiatric Association, 2000). Thus, disturbing dreams are considered to be part of the epiphenomena associated with the underlying trauma cognitions. Our understanding of nightmare development following traumatic events if far from clear. In fact, there is still no consensus amongst researchers regarding whether the mechanisms underlying posttrauma nightmares are the same as they are for dreams, idiopathic nightmares, or disturbing dreams (Krystal & Davidson, 2007).
3.6.2 The Nature of Nightmares

Nightmares are considered both a symptom of pathology and a pathology in and of itself (e.g., nightmare disorder). Idiopathic nightmares occur primarily during REM sleep, and tend to take place later in the sleep cycle (around 5 to 7am). Individuals awaken nearly fully oriented from idiopathic nightmares, they tend to have vivid recall, and there is rarely any body movement associated with these dreams due to the atonia that is part of REM sleep (Davis, 2009). Although there is generally no identifiable trigger for these kinds of nightmares, they are associated with certain personality characteristics and are commonly reported in individuals suffering other psychiatric difficulties (Levin, Fireman & Rackley, 2003). Post trauma nightmares differ from idiopathic nightmares in a number of ways. Firstly they have an obvious precipitating event. They are described as the most defining feature of PTSD, and they tend to occur much earlier in the sleep cycle as well, around 1 to 3 am (Pagel, 2000). Post trauma nightmares are often accompanied by gross body movements, which have included reports of some individuals physically attacking their partners (Davis, 2009). Following a nightmare, recall of content is usually vivid, individuals may experience panic upon awakening, and they very often find it undesirable to go back to sleep. Persons with PTSD generally report dreams that involve reliving the trauma and experience strong emotions such as rage, fear or
Research has found that there are numerous psychological difficulties related to both idiopathic and posttrauma nightmares, although the causal relationship is unclear. As sleep architecture is disturbed, the result is sleep deprivation causing a reduction in coping skills, confusion, irritability, memory loss and emotional lability (Dorrian & Dinges, 2006). Recent research has pointed toward nightmares as being potentially an independent sleep disorder. In this view, nightmares cause their own morbidity through impairment of sleep or through influencing specific parameters of sleep. It has been found that many who suffer from PTSD and the attendant nightmares, had nightmares before the trauma. Therefore, pre-trauma nightmares and other sleep disturbances may confer increased risk for chronic PTSD, and nightmares may evolve into a much more independent disorder. Furthermore, nightmare sufferers are often reported to continue with nightmares, even after successful therapeutic intervention, indicating that nightmares can be maintained independently of a possible traumatic aetiology (Moore & Krakow, 2010). Nevertheless, it has been well established that a greater prevalence of nightmares ensue after trauma, and especially for those with PTSD, whatever the maintaining factors (Hefez, Metz & Lavie, 1987; Germain, 2009).
3.6.3 Nightmares and PTSD

Those that suffer PTSD have no refuge; by day danger around every corner, and by night nightmares that often replicate the original trauma, thus potentially re-traumatising them over and over. It seems logical that since dreams become more disturbing after trauma, that there is some relationship between them and trauma. Even further, that somehow the mind may be working on the trauma, even in the process of sleep. However, these disturbing dreams could easily be the result of the difficulty the mind is having in dealing with disturbing real-life events. That dreams become more intense after trauma, irrespective of the whether PTSD ensues, might attest to some adaptive function they have. On the other hand, dreams may also be a failure of the mind to integrate traumatic events and simply be re-traumatising sufferers by reminding them of the original trauma. Thus, these post trauma dreams are really failures at integration or they serve no purpose and form part of the disorder (Hartmann, 2007a). These particular types of dreams are found in PTSD and are intense replications of the original trauma and are speculated to be part of the reexperiencing phenomenon (Mellman, David, Bustamante, Torres, & Fins, 2001). 'Normal' nightmares on the other hand may actually be part of the adaptive process that helps to integrate new material. There is reason to believe that all of these things are true, and that dreams are in fact a means by which the mind tries to deal with the traumatic material. There is some support in the dream research literature for the view that dreams serve some adaptive function,
even nightmares, and it is the failure of that process that leads to reliving the trauma in a PTSD dream (Hartmann, 1998). However, not all researchers agree that dreams serve an adaptive function. Domhoff, who is one of the most strident critics of the general acceptance of dreams as having a purpose or adaptive function, sees dreams as purely a cognitive process. He sees dreams as a cognitive achievement which draws on memory schemas and experience to produce simulations of the real world. He also believes that dreams have psychological meaning in that they are coherent and correspond to waking thought, but that this does not necessarily mean that they have ‘purpose’ (Domhoff, 2000b).

Research has found that PTSD sufferers have more nightmares and are more distressed by them. They are also more likely to suffer as a result of the nightmares than those who do not have PTSD (Ross, Ball, Sullivan, & Caroff, 1989). Further, those that have nightmares that are replicative of the trauma are the most distressed and have more disruptions to sleeping (Duval & Zadra, 2010). There may even be a causal relationship between these nightmares and the development of PTSD. That is to say that those who have had a history of sleep problems and nightmares may be more likely to develop PTSD after a trauma (Davis, Byrd, Rhudy, & Wright 2007; Mellman, David, Bustamante, Torres, & Fins, 2001).

Confirming this relationship, a very recent study (Wittmann, Zehnder, Schredl, Jenni, & Landolt, 2010) found that children who were involved in car accidents had much more chance of developing PTSD if they had
replicative nightmares at baseline. These children were assessed again at 2 and 6 months after the accident for psychopathology. The authors found that nightmares predicted PTSD but not depression, and this relationship was especially strong when children experienced replicative nightmares. They concluded that replicative nightmares may be related to the psychopathological mechanisms of posttraumatic stress in children (Wittmann et al., 2010).

3.6.4 PTSD and Replicative or PTSD Nightmares

But not all post trauma nightmares are the same, with some being nightmares that are disturbing, and others being a replication of the original trauma. Generally in the trauma literature, nightmares after PTSD that replicate the trauma, are viewed as a re-experiencing symptom of PTSD (Moore & Krakow, 2010). These 'replicative' nightmares appear to be a special case as they are disturbing but reflecting real events which cannot be avoided once awake. This can cause sleep disturbances which then contribute to pathology. Replication of the trauma in dreams may be an attempt by the mind to expose the individual to the trauma in a 'safe' environment, but even here the dreamer avoids facing the threat, resulting in a failure to integrate the experience and maintaining their distress (Hartmann, 1996b). There are several lines of research that support this proposition. A number of studies have probed the idea that exposure therapy, which has a long history of being efficacious for trauma, can be
used with these dreams (Joseph & Gray, 2008). It has been suggested that PTSD emerges due to the development of a fear network in memory which produces escape and avoidance behaviour. Therapy designed to reduce the impact of the trauma on daily functioning requires that the fear structure be activated, followed by introduction of new elements that are corrective of the pathological structure and incompatible with the existing elements (Foa, Steketee, & Rothbaum, 1989).

3.7 Dreams and adaption

3.7.1 Adaption related to nightmares

The commonsense question arises therefore that since replicative dreams are a form of exposure, why does this not reduce PTSD symptomatology? There are several reasons why this might be the case. In the first instance, exposure to the trauma needs to be in the context of being safe while being exposed. In dreams, the trauma is replayed as if real and therefore without the feeling of being safe or being able to escape. Secondly, sufferers often awaken during exposure resulting in insufficient time for habituation to the stimulus to occur. Finally, in an imaginal procedure, the level of exposure is controlled so that initial exposure is limited and of lower intensity than the original, which allows for the sufferer's fear to reduce before removing the stimulus. If removal of the stimulus occurs before this, negative
reinforcement occurs instead, and avoidance then continues to be the preferred means of reducing fear (Rothbaum & Mellman, 2001).

Views of the nightmare as a secondary symptom of trauma, rather than targetable for treatment in its own right, are being eroded by new research paradigms. Nightmares are viewed more and more as being an independent sleep disorder, causing morbidity through direct impairment of sleep. Treatment of PTSD has traditionally called for work on trauma symptomatology, with the expectation that nightmares would reduce as a result. However new research findings indicate that disruptions in sleep caused by nightmares are directly treatable. Thus, it has been found that if the nightmares are treated, then symptoms of PTSD also diminish, especially anxiety and depression (Mellman et al., 2001). There is a growing research literature showing that Imagery Rehearsal Therapy, a form of therapy that teaches sufferers to re-script their nightmares and rehearse the new imagery in the re-scripted dream, is efficacious in treating nightmares in a range of trauma exposed individuals (Krakow et al., 2001; Moore & Krakow, 2010; Nappi, Drummond, Thorp, & McQuaid, 2010). There have been numerous controlled studies that have shown that treating nightmares with imagery rehearsal therapy reduces frequency, intensity and the associated distress of nightmares. This integration of traumatic material through the use of therapy, which results in a reduction of the disturbing dreams, supports the idea that dreams have the function of integrating material (Moore & Krakow, 2010).
3.7.2 Dreams and the integration of memory

Another line of research that supports the idea that dreams form a process of integration of new material into memory systems, states that all dreams serve an adaptive function, even nightmares. Hartmann (1998) does not believe that nightmares are unsuccessful dreams as has been proposed by others such as Kramer (1993). He asserts that nightmares are the place to start when considering the purpose of dreams. When a trauma has taken place and then nightmares begin, the cause of the dreams is known, which gives an indication of their purpose. Not all nightmares are the result of trauma, but when they do result after a trauma such as rape or a disaster, the cause is known. At other times, idiopathic nightmares or disturbing dreams may be the result of diffuse stress rather than a specific event, making the cause harder to pin down (Hartmann, 1998a). Individuals that have been exposed to information that is intolerable to them, may develop trauma symptomatology, as once something is experienced, it cannot be unknown. Therefore new information they have acquired changes the way they view the world and themselves. Sometimes this new information is integrated successfully, sometimes it is not (Kennedy et al., 2004). Thus, disturbing dreams after a trauma are likely to be related to this new information. Sleep and dreaming seem to be especially vulnerable in trauma, but the role of dreaming in trauma is still largely undecided (Punamäki, 2007). Evidence does show that traumatic experiences increase distressing dreams,
nightmares and sleep disturbance (Koren, Arnon, Lavie, & Klein, 2002). Researchers also agree that traumatic and stressful experiences are incorporated in dreams, but the mechanism through which this process occurs is inconclusive (Barret, 1996; Newel & Cartwright, 2000). Studies by Hartmann and his collaborators looking at the central imagery in dreams of trauma victims have shown that dreams do not replicate trauma but modify it in some way. This Hartmann states is contrary to those who say that dreams, particularly recurrent ones, are static and therefore do not represent material being processed. Rather, he has gathered evidence that dreams do change over time and are not exact replications of traumatic events. This he claims substantiates the role of dreams as ‘weaving in’ new material, but he also claims that this process is guided by the dominant emotional concern of the dreamer (Hartmann, 2010). After the September 11 attack in New York, Hartman and Brezler (2008) collected 440 dreams before the attack and 440 afterwards (the first 10 after and the last 10 before from each participant). They found that the imagery in dreams after the attack was significantly more intense, but dreams did not incorporate increased levels of direct negative emotions of fear and terror. Although there was a slight increase in attack themes after the event, dreams were not longer, nor more dreamlike or more vivid. Importantly there were no images of buildings and airplanes in the dreams after the event. The researchers concluded that dreams, even ones based on a known traumatic event, do not literally replay events, and that it is the emotion embedded within the imagery of the dream that relates
to the trauma. Further that this indicates that the new material is being weaved in but not in a literal replay of it (Hartmann & Basile, 2003; Hartmann & Brezler, 2008). Imagery was also found to be more intense after watching the same event on video, compared to controls (Davidson, Hart, & Haines, 2005). Even the PTSD generated, so called replicative nightmares are changed in some way, such as the dreamer seeing themselves in a body bag instead of their friend (Hartmann, 1999).

3.7.3 Dreams and emotional processing

The role of emotional concerns are central to Hartmann's claims. It is the processing of general emotional concerns that guides how new material is stored in the brain, and this processing takes place in dreaming (Hartmann, 2000a). Idiopathic nightmares for example have been shown to become more prominent during times of exam stress, especially recurrent ones (Duke & Davidson, 2002). However, the replicative PTSD dreams are not considered to be nightmares at all. Rather, Hartmann conceptualises them as "a different phenomenon, a kind of memory intrusion" (Hartmann, 1996, p.113). The role of memory consolidation during sleep and dreaming has been assessed in large numbers of studies looking at the types of memory involved in various stages of sleep. There are now understood to be several different memory systems that are relatively independent of each other. Declarative and non-declarative memory are served by separate neural structures and memory processing in each may occur at different times in
the night, and in differing stages of sleep. Emotionally charged memories are better consolidated after periods of REM sleep (Smith, 2010). The vast majority of dreams are not available to conscious awareness, yet many dreams are experienced by most people on most nights. Hartmann states that dreams are a kind of 'safe place' for the mind to deal with the emotional processing of events, and that this may normally go on without the awareness of the individual (Hartmann, 2007).

The majority of nightmare theories converge on the view that the principal function of dreaming is the regulation of emotion and some alteration of this emotion regulation leads to nightmares (Nielson & Lara-Carrasco, 2007). Further, the role of dreaming as having an emotional processing function is highlighted by the fact that dreaming activates the emotional centre of the brain, while keeping the autonomic nervous system relatively inactive. For example, in a study by Nielson and Zadra (2005), the authors found that a low level of autonomic activation occurred in a sleep laboratory where spontaneous nightmares were experienced by otherwise healthy individuals. They suggest that REM dreaming utilizes a mechanism for modulating affect by uncoupling anxious dream imagery from its physiological concomitants. On the basis of this, severe nightmares occur when anxiety exceeds REM sleep's capacity to contain it (Nielson & Zadra, 2005). This process being similar to that as promulgated by Hartmann, functions as an extinction process that exposes the individual to fear-inducing stimuli to reduce the fear response over time. However, the
theorists diverge on the role of nightmares, as Hartmann believes them to be working in the same way as normal dreams, rather than 'failed' dreams (Hartmann, 2010). There is also evidence that mood improves over the course of the night, and that waking state mood is related to dreams, presumably due to the regulation of emotions during sleep. However, this was found to be related to dreaming rather than sleep (Kramer, 2006). Another researcher has considered this question in a different way and found similar outcomes when dealing with untreated divorcees. Cartwright (2005) found that those who successfully adapted to their situation with regard to the divorce at one-year follow up had more emotionally intense incorporations of their ex-spouse in the REM dreams on the first night in the lab at intake, than the less successful adaptors. Dreams may also be an adaption to stress, by this process of emotional activation. If nightmares are a means by which the mind copes with stress, then the high level of nightmares reported by individuals with a Type A personality type may be a manifestation of the need to deal with elevated stress. This was exactly the question asked by Picchioni and colleagues when they gathered 412 students who were grouped according to whether they had high, medium and low nightmare frequency and intensity. They looked at daily stressors, life stressors, social support, and coping. They found that nightmares were positively related to daily stressors, to life stressors, and coping, as well as negatively related to social support. They concluded that the overall pattern was that there is a significant relationship between nightmares and stress.
(Picchioni et al., 2002). Finally, in a review by Phelps, Forbes and Creamer (2008), the authors offer some reconciliation of the notions that nightmares are the result of trauma, as well as being a disorder in its own right. These authors suggest that there may be a normal or functioning form of nightmare which is typically more symbolic rather than replicating, and leads to emotional recovery. Whereas the replicative PTSD nightmares, which often replay the original trauma, appear to have no obvious function other than to create a situation that replays the trauma, and retraumatises the individual (Phelps, Forbes & Creamer, 2008).

3.8 Summary of Chapter 3

The notion of trauma is a relatively recent inclusion in the nomenclature for mental disorders. Since its inclusion, a multitude of studies have been generated seeking to understand the mechanisms that cause such disorders as PTSD and dissociation. Risk factors for acquiring PTSD may be found within the individual, with the type and severity of the event, and with the stress reaction at the time of the trauma. The interaction effect between these variables makes it harder to pin down the exact cause of PTSD in an individual. However, a history of psychopathology may make an individual more prone to PTSD, perhaps due to their reactions at the time of the trauma. Peritraumatic dissociation has been found to be a key component of the aetiology of PTSD. Dissociation in turn may be related to a phenomenon known in the animal world as tonic immobility. This is a fear reaction in
which the animal believes that there is no escape and an involuntary
response of motor inhibition, paralysis and analgesia are conceptualised as
the last defence against predation. Recent studies are strongly predicting that
TI has an important role in the development of PTSD. It has been especially
tied to the reexperiencing symptoms. Dreams, nightmares, and PTSD
replicative nightmares have been shown to be related to PTSD and trauma
in general. Nightmares after traumas are common, and it is believed that the
mind is trying to adapt to the new information that a traumatic experience
imposes. Recurrent disturbing dreams of a traumatic event are part of the
diagnostic criteria for PTSD. Idiopathic nightmares have been
conceptualised as failed attempts to process disturbing information.
However, others have disputed this and believe nightmares to be related to
dealing with stress. The replicative nightmares are less contentious in terms
of the notion that they are the result of a failure to integrate disturbing
information into the psyche. Posttrauma nightmares are also different on a
number of other fronts. They tend to occur much earlier in the sleep cycle,
are accompanied by gross body movements, and they have an obvious
precipitating event. Further, dreamers often report dreams of reliving the
event and experience all the emotion that goes along with it. As the event is
usually of such high emotional load, and exposure to the event still causes
distress, these dreams can be particularly disturbing and disrupt sleep
causing exacerbation of PTSD symptomatology. Dreams may be a form of
emotional processing for the purposes of adaption to arousing stimuli. The
fact that the physiological arousal does not take place during high anxiety
dreams, suggests a deliberate act within the brain, designed to expose the
psyche to highly arousing information possibly for the purpose of
habituation and therefore adaption. One line of research states that the
purpose of dreams is to integrate new information into memory systems,
guided by emotion. This theory posits that dreams help the mind form
connections by providing a safe place to explore the implications
emotionally, of new information. In support of this, the researchers say that
nightmares after trauma change over time, reflecting the changing emotional
status of the dreamer’s concerns. Separate lines of research looking at
memory consolidation have found that emotional processing occurs mostly
within REM sleep, where dreams predominantly occur.
Chapter 5

General Discussion

5.1 Hartmann's Theory of the Function of Dreaming

5.1.1 Overview of the theory

Hartmann's theory (Hartmann, 1996, 2000, 2007a, 2011) posits that dreaming has a function, which is adaptive, in that it helps us to process new memories. Rather than memories being simply laid down in a haphazard way, or as basic data, this theory states that dreaming helps to give new memories meaning by using emotion to guide the process. The CI of a dream is considered to be a contextualization of the dominant emotional concerns of the dreamer. The form of dreams is picture metaphor, but this mode of thinking is in everyday thought as well. Metaphor is at the dreaming end of the continuum, which is less task oriented and less serial processing oriented. The making of broad connections guided by emotion has an adaptive function, which is that it 'weaves in' new material by taking new experiences and integrating them gradually into existing memory systems. Finally, the entire focused waking-to-dreaming continuum has the function of allowing humans to think in a direct, focused, serial fashion at some times, while at others to associate more broadly and loosely thus allowing for creative mixtures of knowledge and experience (Hartmann, 2011).
5.2 The Central Imagery Scale

One of the issues addressed in the current research was whether the CI scale was a unitary construct. In the present research, we conducted two studies which both assessed the underlying structure of the CI scale. We undertook a factor analysis of the CI scale itself as there has been some speculation that the scale is not a unitary construct. This was seen as important in ascertaining whether the CI scale is measuring what it is purported to measure. Both studies found evidence that there are at least two dimensions to the CI scale, with one being related to the detail aspect of the imagery and the other to the impact or attention-getting aspects of it.

5.2.1 The CI scale was found to have at least two dimensions

The implications of having two dimensions in the CI scale are that a) any relationship that is found between the CI of dreams and some other variable is likely to be reduced because the scale may be measuring two different things, b) the visual aspect of dream images is less related to the emotional concerns of the dreamer, and c) in terms of emotion and trauma, the CI scale itself does not appear to gain anything by adding in the detail and vivid descriptor words. In other words, the detail aspect of the scale may be measuring something else. In the study by Davidson, Lee Archer & Sanders (2005), the authors put forward the idea that the definition of a CI may introduce a bias in the scoring of CI towards emotion, because many of the descriptor words used to define a CI connote emotion. The definition is made up almost entirely of seven descriptor words. Some of these words relate to the impact of dream imagery, and some relate to the
detail of the imagery. For example, the seven descriptor words are 'detail, vivid, bizarre, striking, arresting, compelling, and powerful'. Common sense states that the last four words are more related to emotion than the first three or even just the first two. This is consistent with the results of both studies; we found that the first two words, "detailed" and "vivid", were much less related to any of the explanatory variables.

The detail aspect of the imagery was included in the definition originally as it was Hartmann's impression that many dreams contained a vivid, detailed and powerful image that provided a context for the emotion that was being processed by the dreamer. In other words, the vivid and detail aspect of the imagery made the imagery stand out more, and it was therefore more powerful. This 'central image' was seen as a metaphor for the actual emotion that was being processed by the dreamer and as such it provided a context in which the particular emotion could be re-experienced. The detail was seen as important as the imagery that was said to contextualise the emotion of the dreamer was 'powerful' but also 'vivid' and 'detailed'.

5.2.2 Measuring CI - augmenting the scale

In an attempt to understand this relationship, the current research developed a scale that measured each of the descriptor words that make up the definition of a CI. Each word was defined, and given a description for the rater to use to guide the rating procedure. In addition, each word was given 5 levels from none or almost none, through to extreme. Each level of intensity was explained and an
example provided to guide the rater. Thus, a central image was rated on each of the seven descriptor words based on which level of intensity it was judged to be on each. This was seen as the fairest way to rate a central image as it did not require the rater to judge whether a ‘central image’ was present or not, but only to rate the main imagery on each of the descriptor words. Thus, raters could in fact be blind even to the notion of a CI. In addition, the scale was found to have good inter-rater reliability and has provided a useful tool in rating aspects of dream imagery in a systematic and particularised way. An average of all these descriptor words was found to be highly related to the rating of the same dreams using the traditional measure of the CI rated separately. The present research also provided a single factor analysis of the data and the single factor extracted was found to be highly correlated with the separate measure of CI as well. All in all, it was found that the present research’s method of using ratings from each of the descriptor words was robust, meaningful, and captured a significant portion of the traditional CI measure.

5.2.3 CI as one or more dimensions

Importantly, in the current research we found that a one factor solution accounted for a major portion of the variance. This provides justification for a single construct as is implied in Hartmann’s scale. Adding weight to this proposition was the fact that there was considerable correlation between each of the factors. When we used a two factor solution in the second study, the correlation between the factors was stronger. Thus, the visual factor and the impact factor are substantially
related which could justify, for practical purposes, the use of the scale to measure a single variable called CI. The current research did find however, that there is reasonably consistent evidence that this scale has at least two sub-factors and one of them is not as related to emotion as the other. In addition, the impact factor was significantly related to trauma at the time of the event but again the visual factor was not.

5.3 Emotion and CI

5.3.1 Emotion in Hartmann's research

One of Hartmann's most important claims is that the dream images which are measured by CI, are a 'contextualisation' of emotion. In particular, the powerful images contained in many dreams are said to be representations of the emotional concerns of the dreamer. Thus, rather than actual replays of important events, dream images are dramatisations that represent an emotion that needs to be processed. In this way, CIs are considered to be a measure of emotional activation. It stands to reason then, that the level of a CI should be related to the level of emotion in that dream. Surprisingly, dreamer-rated emotion has rarely been considered empirically in Hartmann's research. Instead, he and his collaborators have sought to ask raters to identify the level and type of emotion in dream reports submitted by dreamers. Emotional 'activation' is inferred when those who have recently befallen a trauma are shown to have higher CIs in their dreams than controls, or when those measured have a history of abuse, either physical or sexual (Hartmann, Zborowski, Rosen & Grace, 2001). Probably the
first study to incorporate measures of emotion as identified by the dreamers themselves was conducted by Davidson, Lee-Archer and Sanders (2005). These authors asked participants to rate the emotion in their dreams but also had independent raters do the same. They separated dreams into scenes and then rated each scene for CI and for emotion. They found that the scene considered to be the CI scene had a significantly higher CI score than the scene before, but also it had more emotion. They concluded that CI and emotion were related.

The current research also considered emotion in dreams. In both studies, we asked dreamers to rate the level of emotion in each of their dreams. We then rated each of the dreams on both CI as defined by Hartmann, as well as separately using the scale we devised. In study two, with only two factors, emotion was correlated with the impact factor and again not with the visual factor. We believe that this is consistent evidence that the visual aspect of the CI in a dream (vivid and detail descriptor words) is not as related to the emotion of the dream as the other part of the CI definition is. This suggests that themes and associations that are aroused, especially by experience involving emotion, appear to give rise to CIs as Hartmann has said, but are more related to the impact of the CI rather than the vividness or detail of it.

5.4 Trauma, CI and Emotion

5.4.1 The impact of trauma on CI

In a similar vein to the Hartmann, Zborowski, Rosen & Grace (2001) study, in our second study we sought to further investigate how a history of trauma would
impact on CI. According to Hartmann’s assertions in his previously published monographs (i.e. Hartmann, 1996, 2000, 2007a, 2011), trauma can be regarded as having the effect on the imagery of dreams due to the activation of emotion in a dreamer. Thus, emotion related to the trauma should impact on the CI of their dreams, such that those with a trauma history would have higher CIs, which was found in a previous study (Hartmann, Zborowski, Rosen & Grace, 2001). In study two we undertook to further evaluate this notion by asking about trauma history, current trauma symptomatology, and current functioning. We also considered the impact of events around the time of the trauma separately by asking about the number of peritraumatic events that took place, and by asking about the level of distress at the time of the trauma. As previously discussed, we found that the level of dreamer-rated emotion was correlated with the intensity of the imagery in that dream overall as well as with the impact factor. However, the impact of trauma history on CI scores was more complex. Study two sought to a) identify people who have a trauma history by asking them whether they have suffered any trauma as defined by a list, b) have them complete a well validated instrument that measures the level of trauma-related distress they have currently, c) identify the length of time since the trauma, d) ascertain the number of peritraumatic events they experienced from a list known to impact on trauma sequelae, and e) rate the level of distress at the time of the event. Unexpectedly we did not find a relationship between current trauma symptomatology and the level of CI in their dreams. Indeed between CI and current trauma symptomatology we found a non-significant correlation, and between CI and current distress it was even lower. This is not predicted by the theory. One reason for these low correlations could
simply be related to chance variations in the data. A replication study needs to be
done to ascertain whether this is the case or whether there is indeed very little
correlation between these variables. Another reason may be to do with the nature
of trauma itself. Those who have had a trauma, and who self-report little trauma
symptomatology, may not be able to access those memories even though they are
there. If asked to recall the event or events, this may trigger those memories and
create an emotional response, which is not part of their everyday life, but is part of
their dreams. In the Hartmann, Zborowski, Rosen & Grace (2001) study, the
authors simply asked whether a respondent had a trauma history without regard to
the length of time since and therefore without regard to the current distress
(emotional activation) associated with the trauma. Our study provided a much
more detailed history of distress thereby (presumably) giving a clearer
identification of which aspect of trauma is related to the imagery. However, the
only trauma variable which was found to be related to CI scores was the number
of peritraumatic events.

5.4.2 The interaction between emotional activation, trauma, and CI

It is somewhat perplexing that we only found the one relationship between the
trauma variables and CI, given that previous research has found a strong
relationship between CI and a trauma history. We sought to cover trauma in
several ways, and many of these variables were related. For example, our measure
of peritraumatic events had medium level correlations with life interference, with
PCL score and with distress now. This would indicate that there is a relationship
between what happened at the time of the event with how someone feels now. We
sought to address the problem that Hartmann's study faced which was that there was no way of knowing whether someone who has a history of abuse or trauma is still afflicted with it. However, none of these other variables were significantly related to CI. This finding is intriguing in that somehow CI discriminated between the measure of peritraumatic events and the other variables even though the peritraumatic events measure was related to them. Studies by Hartmann and colleagues found a relationship between CI and trauma history purportedly because of the 'emotional activation' that a trauma history brings, or indeed the 'underlying emotion', so surely this relationship would be stronger where current distress related to trauma is found to be raised. In fact we found an opposite effect in that rather than current emotional distress (and presumably emotional processing), it was events occurring at the time of the trauma that had the most significant effect on CI, and the time since the event was not a factor in this. Thus, we did not establish that CIs continue to be elevated years after the traumatic event, except where the number of peritraumatic events is high, and we did not find that current trauma symptomatology would necessarily be related to CI.

Hartmann states that all dreams process emotion but it is only after trauma when we see the effect. Thus, dreams after trauma are thought to have more intense CIs. The question remains; what is the difference between peritraumatic events and current trauma symptomatology? They are highly related, they both relate to an original trauma, but somehow only peritraumatic events such as the ones we asked about, have an impact on dreams sometimes years later. Potentially some people have resolved the trauma. Can we say that because they still have post trauma symptomatology that they have not? This would suggest that it is not
emotional processing that diminishes CIs. On the other hand, perhaps some people still have post trauma symptomatology but have successfully resolved some aspect of the trauma while those who were subjected to more intense events at the time of the trauma have had more difficulty. These are questions that have not been adequately answered.

However, the level of emotion in dreams was related to the level of current distress in the dreamer. We found that the higher the level of emotion in a dream, as reported by the dreamer, the higher the level of current distress they are likely to have. This would seem to imply, by a different route, that activated emotion, as measured by current symptomatology, can be seen in the level of emotion in people's dreams. Furthermore, we found that CI was modestly related to dream emotion in both studies and at very similar levels. Thus, both studies found that emotion and CI were related as predicted by Hartmann's theory. However, an issue that has not been addressed is whether the emotion as rated by the dreamer, is the same as the emotional activation in a dreamer as Hartmann has talked about. It may be that the 'emotional concerns' of a dreamer are not the same thing as the self-rating of emotion of their own dreams.

5.4.3 Trauma and dissociation

The question remains as to how these factors are related to dream imagery. We have found in both the current studies that the level of emotion in these dreams was related to distress within the dreamer. This distress, or emotional activation, is the aspect of dreaming that is consistent with Hartmann's theory. But it was not
related to the CI level and only the peritraumatic events were. It could be that these peritraumatic events are related to dissociation, and that dissociation or some other mechanism related to these events is impacting CI rather than being simply related to trauma *per se*. We did consider this question in study one using the Dissociative Experiences Scale version C (Wright and Loftus, 2000). We did not find any relationship between this measure and CI. However, this version of the scale may have resulted in methodological problems as it asks raters to compare themselves with others and we found considerable variation in scores. This may be worth following up by looking at another version of the DES, as we did find that it was related (r = .61) to boundaries in the mind measure, which has been found to be related to CI (Hartmann, 1989; Hartmann, Elkin & Garg, 1991).

To further elucidate the relationship between CI and dissociation, a future study could look at CI and a measure of peritraumatic dissociation which covers the events at the time of the trauma in greater detail, such as the 'peritraumatic distress inventory' (Brunet, et al., 2001). When all is considered, it seems that there is more to be discovered about the nature of peritraumatic events and its relationship to dream imagery, as well as the nature of trauma itself. Whether dissociation, ongoing dissociation, tonic immobility, peritraumatic distress, or some other factor is important to the processing done within dreams, could be a revealing venture for future research.
5.5 The Central Imagery over time

5.5.1 Changes in CI over time

Hartmann asserts in his many books that his impression is that CI changes over time (Hartmann, 1996, 2000, 2007a, 2011). He states that someone who has recently suffered from a traumatic event often has a 'tidal wave dream' which is central to the Contemporary Theory of Dreaming. This dream is conceptualised as a picture context for the intense emotion felt by the dreamer due to the recent trauma. Thus, it is a 'dominant emotional concern' of the dreamer, such as terror which reflects the terror of the actual event. This is considered to be an extreme example, one that demonstrates this aspect of the theory in a more salient manner, as without such a trauma there is no one dominant concern. Much of the research associated with this theory has focused on the emotion of the dream and how this relates to CI. The present research has investigated the CI of dreams and attempted to relate this construct back to emotion. Part of the theory, however, states that dreams create connections, in a safe place, so that these emotional concerns can be resolved over time. Hartmann states:

What happens following a trauma as it resolves is that gradually more and more 'usual' dream material is introduced along with the direct or metaphorical representations of the trauma. Eventually, usually within weeks or months, dreams return to their normal patterns, whatever those may be (Hartmann, 2001, p. 27).

That dreams change over time is also restated in a later book where he says
"É but I believe we can see it happening if we follow long series of dreams over time." But he prefaces the same sentence with the following statement, relating to dreams changing over time due to the integration of new and old memories; "There is no direct experimental proof for this view of functioné " (Hartmann, 2011, p. 109).

The lack of systematic empirical support for this important central tenet of the theory means that drawing conclusions from the current research is problematic. Certainly a crucial underlying aspect of the theory is much the poorer for not having been investigated empirically. Further, a theory that states that dreams serve the function of processing information by integrating it into the meaning systems of the mind over time guided by emotion, would stand much stronger were this shown to be the case by applying an experimental paradigm. Simply looking at dreams over a period of some months in those that have just undergone a traumatic experience could be undertaken as a means of looking at this issue empirically. Thus, there are still issues relating to causality between the dream imagery and the resolution of the trauma that need to be addressed. These issues will be discussed in the following sections. Stemming from the themes of the current research, it would be helpful to establish whether the intensity of the visual (factor) aspect of the CI and the impact (factor) of the CI, both decline over time, compared to controls.
5.6 The Adaptive Function of CI

5.6.1 Does CI have an adaptive function?

Hartmann believes that the function of Central Imagery is to create a picture context for the emotional concerns of the dreamer. Thus, the Central Image of a dream pictures or expresses the underlying concerns of the dreamer as a way of processing these emotions. He contends that in the dreaming state, the mind is 'hyperconnective', which allows it to make broader associations than would normally be the case when awake. This process takes place in the 'safe' haven of sleep. Of course these associations are guided by the emotional concerns of the dreamer (Hartmann, 2011). Therefore, to summarize, the function of dreaming according to Hartmann is to integrate new material through the emotional system.

There is a paucity of experimental data on what amount to core components of the theory. Specific predictions about how the expected evolving imagery following trauma should arise according to the theory need to be tested. For example, the assumption that dream imagery reflects the current emotional concerns of the dreamer would have more support if a difference in the intensity of imagery was found between post trauma nightmares and normal dreams. Phelps, Forbes, and Creamer (2007) for example state that models of a psychological function for dreaming can account for dreams and post trauma nightmares where nightmares are not stuck in repetition. On this issue Hartmann is firm that even the repetitious nightmares still have aspects that are changed and so fit with his theory (Hartmann, 2010a).
The current research found a relationship between only the peritrauma variables and CI. This is a very interesting finding in that the length of time since the trauma was not a factor in this relationship. In their study, Hartmann, Zborowski, Rosen & Grace (2001) found a relationship between CI and two questions which were:

1. Have you experienced any physical abuse in childhood?, in adolescence?, more recently?

The authors collected dreams from 306 college students. They asked the above questions and formed a group of 52 who said yes to any one of the six questions. Therefore, they were not able to make any distinction between recent or previous abuse. As these are broad questions relating to this issue of abuse, and there is no distinction between recent or past abuse, it is conceivable that what they actually measured was the peritraumatic factors that the current research found were related to CI. In our study, peritraumatic events were related to CI as well as dream emotion. However, all the measures of trauma symptomatology relating to current distress in the current study were only related to dream emotion and not significantly related to CI. This would therefore indicate that elevation of emotion in the present moment due to trauma is not the required key component that increases CI. Such a finding is somewhat paradoxical and given that there have been some significant correlations between intensity of current dream emotion and intensity of CI in previous research, more investigation is needed to establish
consistency and replicability of relationships. The question as to whether CI is adaptive is much harder to answer if the findings of the current research are replicable. According to Cartwright (1996) the adaptive function of dreaming is broadly considered to be to make things that are harmful, harmless. This is consistent with Hartmann’s notion of dreaming as allowing the processing of emotionally arousing material. In her own study, Cartwright looked at people going through a divorce and the incorporation of their ex-spouses into their dreams. She found that at one year follow up, those that incorporated their ex-spouses had much better adjustment than those that did not. However, whether this ‘imagery’ of the ex-spouse could be considered to be a CI cannot be established. Thus, it is well recognized that dreams and trauma are related, however the exact nature of that relationship is far from being fully understood. Indeed, the causal relationship between dreams and other personality variables, including the resolution of emotional concerns, is a topic that is hotly debated, and this will be discussed in the next section.

5.6.2 Post hoc ergo propter hoc – is there a causal relationship?

Dream research has often been criticised for not adequately addressing the issue of causal relationships between dreams and other variables, as most often these relationships are assessed using correlational designs (Blagrove, 1992). Indeed if we consider Hartmann’s research, he is making the claim that dreams help resolve the emotional issues of the dreamer, and as such it is the dreams that cause the resolution of emotional concerns by processing them in a safe place. He states, as has been outlined previously, that as the trauma resolves, dreams become more
and more usual. The problem with this assertion is that there is no way to tell which way the relationship is going. Do dreams process traumatic events and therefore cause resolution of the trauma, or do dreams reflect the change as the trauma is resolved? Further, it is possible that there is no causal relationship at all and that some other mechanism is providing the resolution and dreams have no bearing on it. Hartmann claims that integration of traumatic memories can be seen to take place when the intensity of the images within their dreams is shown to have reduced. However, as Punamäki (2007) notes, there is the confounding variable relating to Hartmann’s impressions that the imagery was reducing over time, as many of the people demonstrating such changes were clients of his in therapy, which is where the information came from. Obviously, the therapy could be the cause of the change in imagery of the dreams and not the other way around.

5.6.3 The causal relationship revisited

There have been a number of theories regarding the possible function of dreaming, and Hartmann has offered a plausible prospect as well. But not all researchers believe that dreaming has a function. There are those that state dreaming and imagery may have been selected for in evolutionary terms, but dreaming is really an epiphenomenon (Blagrove, 2003). Domhoff believes that dreams have systematic relationships with other variables and they are coherent, but they serve no function (Domhoff, 2009). Blagrove has for some time been critical of potentially spurious relationships between dreams and other variables, based on his observation that much of the research in this area is correlational in nature and causal relationships are harder to prove (Blagrove, 1992).
Demonstrating that dreams can ameliorate trauma symptoms, or are the causal reason for reducing trauma symptomatology has proven to be difficult. Hartmann's theory faces just such a challenge. What would be useful in this area would be to manipulate the variable that is the very subject at issue: the dream. Obviously this is something that has not been done in the past as it presents a seemingly insurmountable challenge. There is in fact a significant body of research not normally invoked by Hartmann that uses such a methodology in the research area of post-traumatic nightmares.

Nightmares are one of the greatest contributors to sleep disturbance after trauma, and even when trauma is successfully dealt with in therapy, nightmares may continue (Davis, 2009). Therefore, nightmares may sustain themselves and not be as related to emotional processing as some have argued. Thus, nightmares are increasingly being considered as processes that can be modified and have been targeted for change. As such, interventions that target nightmares directly have become more attractive (Phelps, Forbes, & Creamer, 2007). Much recent research has focused on this area, with studies showing a good deal of success by directly targeting the nightmare for change. One of the most researched techniques is known as Imagery Rehearsal Therapy (IRT: Krakow, et al., 2000; Neidhardt, Krakow, Kellner, & Pathak, 1992). This approach builds on techniques that date back to the 1930s. In the modern version, Krakow and others have developed a procedure that asks those afflicted to choose a nightmare, then to change the nightmare in any way they wish (not necessarily to make it better) and then to rehearse the imagery of the new dream. Importantly, Imagery Rehearsal Therapy seeks to minimize exposure elements in the protocol as exposure may reinforce
the original traumatic memories (Phelps, Forbes, & Creamer, 2007). The results show there are clinically meaningful decreases in all aspects of PTSD symptoms and insomnia and this has been remarkably consistent over a number of studies (Krakow & Zadra, 2006). Dream imagery is changed directly and the result is a change in sleep quality, nightmares, and trauma symptomatology (Moore & Krakow, 2010; Krakow et al., 2001, Krakow et al., 2002;). In one study of sexual assault survivors with PTSD, the authors found a significant drop in nightmares experienced per week, number of nights experiencing nightmares, improved sleep and improved PTSD symptoms. Comparisons between a treatment group and a control group showed no change or worsening of symptoms in 69% in the control group, with improvement in 65% of the treatment group (Krakow et al., 2001). This is of import for Hartmann's theory, as it is consistent with his claims that dreams changing over time show effects on a person's trauma symptomatology. If dreams can be manipulated in this way, then future research into Hartmann's theory could experimentally modify dreams through Imagery Rehearsal Therapy with the expectation that the imagery (CI) of the person's dreams would also become less intense over time along with the trauma symptomatology. In such a research procedure, it would be important to follow up after some time to confirm an enduring decrease in CI intensity, should the expected decrease be found. The process implicated in Imagery Rehearsal may involve a similar mechanism to what is hypothesized to happen during dreaming according to Hartmann. That is, the dreamer makes connections to material already in memory that is only loosely associated with the content of the original dream. One example was a dreamer turning a perpetrator into a clown which made him chuckle each time he thought
about it. Hartmann states that dreams function as a means of integrating experiences into memory by allowing association through hyper-connectivity while being guided by emotion to make the memory meaningful. In the Imagery Rehearsal Therapy paradigm, memories are being integrated by making the dream process meaningful, by giving control to the individual, and by changing the imagery so that it is less threatening.

Future research attempting to establish a causal influence for dream imagery might combine IRT with Hartmann’s CI construct, treating Imagery Rehearsal as the primary experimental manipulation, CI intensity as a mediating variable, and waking trauma symptoms as dependent variables. Using established analyses for exploring the strengths of relationships the role of CI intensity in mediating the healing from trauma could be clarified, albeit with reliance on correlational methods within the experimental paradigm aimed at modifying the dream imagery. This would provide evidence of causality. Noting that Hartmann (1996b) believes nightmares tend to resolve over time and are constantly changing, a similar analysis could then be performed within a naturalistic study to quantify the effects of a gradual natural reduction in CI intensity on the strength of waking trauma symptoms. The direction of causal influence would be based on the preceding IRT study. A contribution of the present research may be to elaborate and refine the CI construct by separating the impact and visual dimensions, with the expectation that the effect of the imagery in mediating a reduction in trauma symptoms may be related to the impact, but not the visual dimension of the CI.
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Appendices

Appendix A
A.1. Information sheet - Study 1
A.2. Consent form - Study 1
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A.4. Information sheet - Study 2
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Appendix B
B.1. Procedure for dividing dreams into scenes
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Appendix C
C.1. Dissociative Experiences Scale - Version C
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Appendix D
D.1. Descriptive Statistics - Study 1
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Appendix E
E.1. Published Article: Exploratory Factor Analysis of Hartmann’s Scale for Central Imagery and Its Relationship to Dreamer Emotion
Appendix A.1

Information sheet study 1
Information Sheet

The Relationship between Dream Imagery and Emotion

You are invited to participate in a study which is concerned with how vivid imagery, personality factors and emotions in dreams are related.

The chief investigator for the study is Dr John Davidson, who is a senior lecturer in psychology at the University of Tasmania School of Psychology. Mr Glenn Bilsborrow is undertaking the project as part of the requirements for a Master of Psychology degree.

The information gained from the study is of import to future studies in the area of dream research. Your participation will be a contribution to the knowledge of how dreams and emotions interact. It will also help us to learn more about how personal factors may influence the type of dreams we have. By having a better understanding of this, we take one step closer to understanding the real purpose, and perhaps even the real meaning of dreams.

Anyone who can recall between 1 and 3 dreams within a 2 week period, is eligible to take part.

Study Procedures
As a participant, you will be required to attend a session during which you will be asked to complete 2 personality questionnaires, a test of verbal fluency and instructions on how to fill in your Dream Diary. The total session time is expected to be around 30 minutes.

During the course of the next two weeks, you will need to write down 2 dreams in the pages provided. You may if you wish type these, as this would save us the time of doing it, but is not a requirement. You are asked to try to remember your dream and record it as soon as you awaken, as dreams can tend to fade very quickly from memory if they are not recorded.

At the bottom of each dream page there is a box that is marked Emotional Intensity of Dream. It is important that you place a number in each of these two boxes. The number needs to be from 0 to 10 inclusive. Zero means that there was no emotion in the dream at all and 10 means that it was about as emotionally intense as you have ever felt in a dream. These instructions will be provided in the dream diary.

No personal information will be collected from you. You will be filling in the questionnaires and writing down the dreams anonymously.

Once you have written down two dreams, you may simply bring the diary to room 132 (Sue Ross Office) in the psychology department, where you will find a box marked 'Glenns Dream Study', or just ask Sue Ross in the office where to put it.
Confidentiality
Apart from the initial contact with the researcher, all information is provided anonymously. There is no need, and no way, that a researcher can link the information contained in the dream diary with the person whose diary it is.

Payment
No payments will be provided to participants, as the study is of a voluntary nature. However, any first year psychology students who participate will be granted 1 hour course credit for completing the study.

Possible risks or discomforts
The study does not pose any risk or discomfort more than everyday living. However, some people may find the topic of some interest and therefore, at your request, you will be directed to relevant information sources for further investigation. If your dreams provoke a desire to explore more personal concerns, you are encouraged to consult with the University Counselling Unit, which offers a free and confidential service.

Freedom to refuse or withdraw
Participation is entirely voluntary. You may withdraw at any time without needing to provide a reason, and you will not attract any penalty for doing so.

Concerns or complaints
This project has received ethical approval from the Southern Tasmania Social Sciences Human Research Ethics Committee. If you have any concerns of an ethical nature or complaints about the manner in which the project is conducted, you may contact the Chair of the Southern Tasmania Social Sciences Human Research Ethics Committee, A/Prof Gino DAL Pont (6226 2078); or the Committees Executive Officer, Amanda McAully (6226 2763).

Students from the University of Tasmania who take part in this study may, if they have any personal concerns related to the study, choose to discuss these concerns confidentially with a University Student Counsellor.

Results of investigation
A summary of the results of the study will be provided to those participants who are interested on request. You can do this by emailing Glenn Bilsborrow at glenb@postoffice.utas.edu.au
Alternatively, results will be available on the University of Tasmania School of Psychology web page, which can be found at www.scieng.utas.edu.au/pschol. It is expected that these will be available in November 2003.

Contact persons
You will be given a copy of this information sheet to keep. Further clarification or information regarding any aspect of this study can be sought from Glenn Bilsborrow (Ph. 6234 4723) or email: glenb@postoffice.utas.edu.au or from Dr John Davidson: (Ph. 6226 2238) or E-mail: John.Davidson@utas.edu.au
Appendix A.2

Consent form - Study 1
Statement of Informed Consent

The Relationship between Dream Imagery and Emotion

Statement by participant:

1. I have read and understood the Information Sheet for this study.
2. The nature and possible effects of the study have been explained to me.
3. I understand that the study involves completing two personality tests and writing down two or three of my dreams.
4. I understand that all of the research data will be treated as confidential, and no identifying information will kept after the completion of the data collection.
5. Any questions that I have asked have been answered to my satisfaction.
6. I agree that research data gathered for the study may be published provided that I cannot be identified as a participant.
7. I agree to participate in this investigation and understand that I may withdraw at any time without any effect on my grades, or other disadvantage.

Name of Participant: __________________________________________

Signature of Participant: ______________________ Date: ______

Statement by Investigators:

I have explained this project and the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation.

Name of investigators:       Dr John Davidson
                              Glenn Bilsborrow

Signature of Investigator:_________________________ Date:______________

Signature of Investigator:_________________________ Date:______________
Appendix A.3

Dreamer’s Diary and Information Sheet
Dreamer’s Diary and Information Sheet

Thank you for participating in this study. We hope that through the efforts of people like yourself, we will be able to gain a better understanding of what dreams mean to humans.

Please write down a dream in each of the two areas provided below. It is best if you do not edit your dreams as you may edit out information relevant to this study. Your dream will be de-identified and then typed up. Only a number will be used to identify you so that you will be anonymous to raters. We will be using a formula to transform your student number into a code that will be used to match your dream with ratings.

You will also note that a box is provided for you to rate the emotional intensity of your dreams. Please use the following scale from 0 to 10:

- 0 = No Emotion
- 10 = About as emotionally intense as I have ever felt in a dream.

If you would like a summary of the findings of this research, please tick the box below and provide an email address. If you do not have an email contact, please provide some other form of contact (e.g., home address).

*** Thank you for your participation ***
Dream 1

1____________________________________________________________

2____________________________________________________________

3____________________________________________________________

4____________________________________________________________

5____________________________________________________________

6____________________________________________________________

7____________________________________________________________

8____________________________________________________________

9____________________________________________________________

10____________________________________________________________

11____________________________________________________________

12____________________________________________________________

13____________________________________________________________

14____________________________________________________________

15____________________________________________________________

Dream emotion level (0 to 10) ☐
Dream 2

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

Dream emotion level (0 to 10) [ ]
Appendix A.4

Information sheet - Study 2
Information Page

This page explains what is expected of you and things for you to consider before and after you have participated.

You are invited to participate in a study which is concerned with how vivid imagery, personality factors, traumatic events and emotions in dreams are related. When you have read this, go to the bottom of the page and click the proceed to Informed Consent link.

The chief investigators for the study are Dr Jenn Scott and Dr John Davidson who are senior lecturers in psychology at the University of Tasmania's School of Psychology. Mr Glenn Bilsborrow is undertaking the project as part of the requirements for a Doctor of Psychology degree. The information gained from the study is important because it provides further information on how dreams and personality are related. This then contributes to research in the area of dreaming and our understanding of purpose and meaning of dreams. Your participation will be a contribution to our understanding of whether dreams are related to personality or just random images generated by the brain while asleep. It also contributes to our knowledge of the relationship between dreams, trauma and emotion.

Anyone who can recall between 1 and 3 dreams from the last 2 week period, is eligible to take part. You will not be asked to provide any information that can identify who you are. We ask you to provide all answers anonymously.

Study Procedures

As a participant, you will be required to fill in 1 questionnaire about stressful events you may have had in your life, and to write down two or three dreams. These can be recent dreams or dreams that you write down over the course of the next 2 weeks. It is estimated that the total time investment by you will be between 20 and 40 minutes. At the bottom of each dream page there is a box that is marked Emotional Intensity of Dream. It is important that you place a number in each of these boxes. Using the drop down box, a number can be assigned from 0 to 10 inclusive. Zero means that there was no emotion in the dream at all and 10 means that it was about as emotionally intense as you have ever felt in a dream. These instructions will be provided on the dream page.

No personal information will be collected from you that can identify you. You will be filling in the questionnaires and writing down the dreams anonymously. Once you have filled in the questionnaires and written down two or three dreams, you will be asked to provide your age and gender. This process involves three pages with questions on them and a page that you write your dreams down on. This last page includes two questions that ask your age and gender.

Each page provides questions with a variety of answers. To respond, you simply click on the most appropriate response for that question, and move to the next one. At the end of each questionnaire, there is a 'go to next section' button which moves you to the next page until you are finished.

Confidentiality

All information is provided anonymously. There is no need, and no way, that your answers can be linked with you individually. No personally identifying information is collected. One important aspect of this fact is that you are able write down dreams no
matter how embarrassing you think they are. Also, it’s important to know that I will not be analysing the meaning of your dreams. The questionnaires are to see what personality traits are associated with what type of dreams.

**Payment**
No payments will be provided to participants, as the study is of a voluntary nature. However, any first year psychology students who participate will be granted 1 hour course credit for completing the study. On the last page a code will be provided that can be given to Sue Ross who will then allocate course credit.

**Possible risks or discomforts**
The study involves completing questionnaires only. This will require some memory of some recent dreams and answering questions relating to any stressful events you may have had in your life. Some people might find the recollection of a stressful event brings back painful memories. If the event or events are continuing to influence your everyday life in a negative way, you may wish to follow one of the links on the last page of this study. On the last page we have provided links to the University Counselling Unit, which offers a free and confidential service, and to other web sites that may be of interest to you. These include dream research web sites, information on trauma, and information on where you could get personal counselling.

**Freedom to refuse or withdraw**
Participation is entirely voluntary. You may withdraw at any time without needing to provide a reason, and you will not attract any penalty for doing so.

**Concerns or complaints**
This project has received ethical approval from the Southern Tasmania Social Sciences Human Research Ethics Committee. If you have any concerns of an ethical nature or complaints about the manner in which the project is conducted, you may contact the Chair of the Southern Tasmania Social Sciences Human Research Ethics Committee, A/Prof Gino DAL Pont (6226 2078); or the Committees Executive Officer, Marilyn Knott (Marilyn.Knott@utas.edu.au or 6226 2763).

Students from the University of Tasmania who take part in this study may, if they have any personal concerns related to the study, choose to discuss these concerns confidentially with a University Student Counsellor.

**Results of investigation**
A summary of the results of the study will be provided to those participants who are interested on request. You can do this by emailing Glenn Bilsborrow at glenb@postoffice.utas.edu.au. Alternatively, results will be available on the University of Tasmania School of Psychology web page, which can be found at www.scieng.utas.edu.au/pschol. Select Internal Resources from the top of the page and then go to Research participants info. It is expected that some information will be available by July 2007. The last page also provides a link to www.bilsborrow.com.au/research which will also provide information on the results of this study.

**Contact persons**
Further clarification or information regarding any aspect of this study can be sought from Glenn Bilsborrow (Ph. 0417 125 425) or email: glenb@postoffice.utas.edu.au or from Dr Jenn Scott: (Ph. 6226 2245) or E-mail: Jenn.Scott@utas.edu.au
Appendix A.5

Consent form - Study 2
Statement of Informed Consent
The Relationship between Dream Imagery and Emotion

Statement by participant:

1. I have read and understood the Information Sheet for this study.
2. The nature and possible effects of the study have been explained to me.
3. I understand that the study involves completing a questionnaire about stressful events that may have occurred in my life, a question each about my age and gender, and writing down two or three of my dreams.
4. I understand that all of the research data will be treated as confidential, and no identifying information will be kept after the completion of the data collection.
5. I am satisfied that the information sheet has answered any questions I have about the research.
6. I agree that research data gathered for the study may be published provided that I cannot be identified as a participant.
7. I agree to participate in this investigation and understand that I may withdraw at any time without any disadvantage to me.

I do not want to proceed. I have read the information sheet and agree to participate.

STOP PROCEED
Appendix A.6

Data Collection Web Pages - Study 2
History of Stressful Events

Your answers to this questionnaire are confidential and anonymous and will only be used for research purposes. We will not collect personally identifiable information from you.

Section 1

Please consider the events listed below. Have you ever experienced any such event/s that has/have significantly distressed you? Please consider everything on the list before going on.

If you have, please record how long ago this occurred, the number of times you have experienced the event (use >9 if the event was experienced continuously over a period of more than 3 months), and the level of distress experienced for each event.

For the 'Level of Distress Experienced' section, record how distressing the experience or experiences were at the time or immediately after the event, and how much distress you currently experience over the event, by ticking the box that most closely represents how much distress (None to Extreme) under each column.

If you did not have any experiences that significantly distressed you, stop here and go to the “Demographic Information” section and then on to the “Dream Section”. There you can write in two of your most recent dreams.
<table>
<thead>
<tr>
<th>Type of event</th>
<th>How long ago?</th>
<th>How many times?</th>
<th>Level of distress experienced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Months</td>
<td>Years</td>
<td>Use &gt;9 if Continuous</td>
</tr>
<tr>
<td></td>
<td>&lt;1</td>
<td>1-3</td>
<td>4-6</td>
</tr>
<tr>
<td>1. Serious accident, fire or explosion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Natural disaster (e.g. flood, bushfire, etc)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Non-sexual assault by someone you know (e.g. being mugged, shot, stabbed, attacked)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Non-sexual assault by a stranger (e.g., being mugged, shot, stabbed, attacked)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Sexual assault by someone you know (e.g., rape, attempted rape)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Sexual assault by a stranger (e.g., rape, attempted rape)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Military combat or war zone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Imprisonment (e.g., hostage, prison inmate, prisoner of war)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Torture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Witnessed any of the above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Life-threatening or very serious illness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Unexpected death of someone close</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Abortion or miscarriage (women only)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Relationship breakdown or Divorce</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Other: (Please specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Other: (Please specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. I do not wish to specify the event, but one has occurred</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 2

1. Please look at your answers above and pick from the list the event which you found most challenging or difficult. Record the item number for that event in the this box: [ ]

2. During this event (please circle yes or no on each):

   a. Were you physically injured?       Yes      No
   b. Was someone else physically injured? Yes      No
   c. Did you think that your life was in danger? Yes      No
   d. Did you think that someone else’s life was in danger? Yes      No
   e. Did you feel helpless?              Yes      No
   f. Did you feel terrified?             Yes      No
   g. Was there blood involved in the incident? Yes      No
3. With respect to this event, please indicate the extent to which you agree or disagree with the following statements about your coping with the event, by marking one of the boxes for each question:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree or Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have learned to think about this event in a way that helped me to cope.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Since the event I am able to act in ways that help me to cope.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. I have tried to put the event out of my mind since the day it happened.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I still think that the event sometimes bothers me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I have coped well with the event</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I am still trying to come to terms with or cope with the event</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Now think about your usual or preferred ways of coping generally. Indicate the extent to which you feel each of the statements below reflect your usual way of coping with life's challenges.

Normally my way of coping with challenges I face is to .......

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither Agree or Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ... think about it a great deal and try to understand my thoughts and feelings.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. ... talk about and share my thoughts and feelings with others.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. ... just let time heal.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. ... try and find solutions and answers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. ... hope the problem or challenge will go away.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. ... keep my emotions and thoughts to myself.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. ... try to distract myself and not think about the challenge or difficulty.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 3

1. Below is a list of problems and complaints that people sometimes have in response to stressful experiences. Please read each one carefully, then circle one of the numbers to the right to indicate how much you have been bothered by the above problem in the past month.

<table>
<thead>
<tr>
<th></th>
<th>Not At All</th>
<th>A Little Bit</th>
<th>Moderately</th>
<th>Quite A Bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Repeated, disturbing <em>memories, thoughts or images</em> of a stressful experience?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Repeated, disturbing <em>dreams</em> of a stressful experience?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Suddenly <em>acting or feeling</em> as if a stressful experience were happening again (as if you were reliving it)?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Feeling <em>very upset</em> when something reminded you of a stressful experience?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Having <em>physical reactions</em> (e.g., heart pounding, trouble breathing, sweating) when <em>something reminded you</em> of a stressful experience?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Avoiding <em>thinking about</em> or <em>talking about</em> of a stressful experience or avoiding <em>having feelings</em> related to it?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>7</td>
<td>Avoiding <em>activities or situations</em> because they reminded you of a stressful experience?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Trouble <em>remembering</em> important parts of a stressful experience?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td><em>Loss of interest</em> in activities you used to enjoy?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>Feeling <em>distant or cut off</em> from other people?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>Feeling <em>emotionally numb</em> or being unable to have loving feelings for those close to you</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>Feeling as if your <em>future</em> somehow will be <em>cut short</em>?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>Trouble falling or staying asleep?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>Feeling <em>irritable</em> or having <em>angry outbursts</em>?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>Having <em>difficulty concentrating</em>?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16</td>
<td>Being “<em>superalert</em>” or watchful or on guard?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17</td>
<td>Feeling <em>jumpy</em> or easily startled?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
## Section 4

Have these problems interfered with any of the following areas of your life *during the past month*? Please rate (mark a square) for each life area …

<table>
<thead>
<tr>
<th>Life Area</th>
<th>Not applicable</th>
<th>Not at all</th>
<th>A little bit / sometimes</th>
<th>Definitely / often</th>
<th>Markedly / very often</th>
<th>Very severely / ongoing</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Household chores and duties</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Relationships with friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Fun and leisure activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Schoolwork</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Relationships with family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Sex life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. General satisfaction with life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Overall level of functioning in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Demographic Information

1. What is your gender? 
   - Male ☐
   - Female ☐

2. How old are you? 
   - ☐

3. What was your highest level of schooling? 
   - Years 1 to 7 ☐
   - Years 8 to 10 ☐
   - Years 11 to 12 ☐
   - TAFE ☐
   - University ☐
Dream Section

Instructions:
Please write down in the space provided on the next two pages your two most recent dreams you can remember. If your dream is longer than the space provided, you can attach another sheet. There is no need to screen your dreams for embarrassing content, as they are anonymous. At the bottom of each page, a place is provided to rate the emotional level of the dream and to answer whether it is a recurring dream.

Emotion Rating

Each dream has a box at the bottom where you are required to rate the emotional intensity of the dream with a number from 0 to ten. Pick a number based on the emotional intensity of your dream. As a guide, 0 means no emotion and 10 means the most intense emotion you have felt in a dream.
Dream 1

______________________________________________________________________________________________________________
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________
______________________________________________________________________________________________________________

1. Please rate the emotion level for dream 1 (0-10)  
2. Is this a recurring dream? ☐ Yes ☐ No
Dream 2

1. Please rate the emotion level for dream 1 (0-10)  
2. Is this a recurring dream? ☐ Yes ☐ No
Appendix B.1.

Procedure for dividing dreams into scenes
Procedure for deciding the number of scenes within a dream
Hall and Van De Castle (1966) method

Introduction
In order to decide whether there has been a change of scene in a dream and thereby divide a dream into a number of scenes, a procedure for the identification of settings is provided. Each new setting within a dream will therefore constitute a scene change. Each dream will therefore be divided into scenes based on the number of settings.

Settings
Almost all dream reports include some form of recognizable setting, and people frequently begin their reports by saying something about the setting. Just as there are often several acts and scenes to a play, so, too, is it common for the setting to change during the course of a dream narrative, sometimes quite abruptly.

Establishing the categories for settings was the most difficult aspect of the entire coding system. The initial efforts to classify settings included a rather extensive number of possible settings. However, it proved impossible to obtain adequate intercoder reliability when such a large number were involved, so Hall and Van de Castle eventually collapsed all settings into two broad groupings—indoor and outdoor settings. Indoor settings are ones in which the dreamer is in a building or in an area attached to or part of the exterior of a building. Outdoor settings are those where the dreamer is described as being out-of-doors or outside a building, even if in a vehicle or a cave.

Divide the dream into scenes/settings according to the Hall/Van de Castle procedure.

Determining the Number of Settings
The rules for determining the number of settings are given below along with coding examples. Consistent with the format that appears throughout these pages, items to be coded will appear in capital letters while items which may seem relevant, but which should not be coded, are italicized.

1. In order for a setting to be coded, the dreamer must appear as an observer in the setting. Do not code settings in which other characters are located unless the dreamer appears as an observer in the same place.
   "I was walking through what I thought were THE STREETS OF NEW ORLEANS (OG)."
   "He said that he and my other fraternity brothers had gone for a drive through the streets of New Orleans."

2. All changes in location within a single building are coded as a single indoor setting. Changes in location from one building to a different building are coded as separate indoor settings.
   "I stopped IN THE TODDLE HOUSE (IF) for a cup of coffee and then went to A BEAUTY PARLOR (IQ) to get my hair done."
"We hunted for it IN THE ATTIC (IQ) then went downstairs and continued the search in the rooms on the second floor and finally wound up looking in the cellar but without any success."

3. If any type of codeable intervening setting occurs, the same indoor location may be coded more than once.

"We quickly packed a lunch AT DOROTHY'S HOUSE (IF), then drove for a while IN THE COUNTRY (OQ) and returned to DOROTHY'S HOUSE (IF) and listened to records."

"I left the LIVING ROOM OF THIS OLD GLOOMY HOUSE (IU), walked THROUGH THE STRANGE GARDEN OUTSIDE (OU), and then for some reason returned again to THE HOUSE (IU) and walked through the back door."

4. Outdoor settings are coded separately if they involve clearly differentiated and separate regions. If the dreamer is describing different areas of a larger region, a single overall outdoor setting is coded.

"We attended the burial at THE CATHOLIC CEMETERY (OF) then drove off to SOME NEARBY SMALL TOWN (OQ) to talk."

"As I was walking THROUGH SOME FOREST (OU) I came across a group of pine trees, then I walked through a grove of aspen and further on through a small stand of junipers."

5. If any type of codeable intervening setting occurs, the same outdoor location may be coded more than once.

"We were surfing at SOME BEACH THAT I COULDN'T RECOGNIZE (OU) when the scene shifted to some STRANGE ROOM THAT HAD PAINTINGS ALL OVER THE WALLS (IU), and then I was back surfing at the SAME BEACH (OU) again."

6. In order for an additional setting to be coded, some action should take place within the new setting or the dreamer must describe himself as actually being located in the new setting.

"AFTER WALKING IN THE RAIN (OQ) for what seemed a long time, I ARRIVED AT MY FRIEND'S HOME AND WENT INSIDE TO GET DRY (IF)."

"AFTER WALKING IN THE RAIN (OQ) for what seemed a long time, I arrived at my friend's home."

Reproduced from: http://dreamresearch.net/Coding/settings.html
Appendix B.2.

Scoring procedure for CIs
Definiton: A Central Image (CI) is a striking, arresting, or compelling image - not just a story - but an image which stands out by virtue of being especially powerful, vivid, bizarre, or detailed.

1. Read dream
2. Look at imagery of the dream - is there a strong image?
3. Decide whether there is a CI
4. Rate the image on following scale:
   a. 0 = no image
   b. .5 = very weak image
   c. 1
   d. 1.5
   e. 2.0
   f. 2.5
   g. 3.0 = being about as intense or powerful an image as you have seen in a dream

5. Write rating of dream in box provided.
Appendix B.3.

Rating procedure for 7 descriptor words - CI Descriptor Scale
Rating Procedure for 7 descriptor words
(CI Descriptor Scale)

Once all the dreams have been divided into scenes:

1. Become familiar with each of the meanings provided for each descriptor word.

2. Consider the imagery in the scene in terms of each descriptor word definition in turn.

3. Each scene needs to be rated using the rating criteria below, between 1 and 5 inclusive, on each of the 7 descriptor-words. This requires 7 ratings per scene. 1 is none/almost none, 2 is slight/mild, 3 is moderate, 4 is strong, 5 is extreme.

4. Select the descriptor word to use to rate the scene. Familiarise yourself with the criteria for each of the 5 levels for that descriptor word in the descriptor word scale chart. For example, *Vivid* is the first descriptor word on the rating list which means *Extremely lifelike and intense in colour and sharpness*. Level 1 means that the image contains no or almost no vividness, while level 5 means that it is all or almost all vivid.

5. Taking the example of *Vivid* once the scene has been read, and the imagery is viewed from the reader’s point of view and how vivid the described imagery appears to be. Use the examples to help you to assess this level.

6. Using the example of *Power* the imagery may be powerful in terms of how it affects the reader, as well as how power is exerted on the dream characters.
Appendix B.4.

Descriptor Word Rating Chart - CI Descriptor Scale
**Descriptor Word Rating Chart**

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>None/Almost none</strong></td>
<td>1</td>
<td>The image is totally or mostly vague, insipid or fuzzy. There is little or no intensity or sharpness present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“I was frightened by it. I knew it was there but I could not see it”</td>
</tr>
<tr>
<td><strong>Slight/Mild</strong></td>
<td>2</td>
<td>The imagery is generally vague but has some brightness or glimpses of being spirited or sharp.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“I was in an unknown place and the only thing there was a picture of a man on the wall.”</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>3</td>
<td>The imagery is in some way bright, fresh and sharp but is not generally intense. There is no mention of colour.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“We were in my old car on some sort of trip. As we drove along the highway, I could see a field of daisies bobbing in a gentle wind.”</td>
</tr>
<tr>
<td><strong>Strong</strong></td>
<td>4</td>
<td>There is no sense that the imagery is insipid or fuzzy. The imagery is quite intense and sharp but not totally so. There may be some mention of colour.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“I was dressed in a white wedding gown about to march down the isle. My dress seams split on both sides when I started to walk”</td>
</tr>
<tr>
<td><strong>Extreme</strong></td>
<td>5</td>
<td>Almost all of the imagery is intense, clear, bright, sharp and colourful.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“I was surrounded by little fireflies each emitting a different colour light. I could see their bodies clearly in the light. They all hovered around eye height for several minutes, as if observing me, and then were gone”.</td>
</tr>
</tbody>
</table>
## Powerful

The dream imagery has some aspect relating to power - to influence.

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>None/Almost none</td>
<td>1</td>
<td>The imagery is weak, lacks strength and has little or no force.</td>
<td>“I’m drinking beer at a bar and meet a friend of mine. We decide to go and have some dinner. We walk down to an eatery and sit down at a table.”</td>
</tr>
<tr>
<td>Slight/Mild</td>
<td>2</td>
<td>The imagery demonstrates some strength or power to influence (us or the dream characters) but is mostly insipid or weak.</td>
<td>“I was at home with my parents when a couple who were friends of theirs came over for a visit. But we didn’t want to see them, so we tried to think of excuses to ward them off.”</td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
<td>The imagery influences the reader to some degree or the dream characters are influenced moderately in some way to do something.</td>
<td>“I was walking into an amusement park with a group of friends. I said in a loud voice that if they would make a few improvements around there, the place would be more attractive. Everyone in the park suddenly stopped talking and turned towards me and stared.”</td>
</tr>
<tr>
<td>Strong</td>
<td>4</td>
<td>The imagery strongly influences the reader or it strongly influences the dream characters or objects are strong and potent in some way.</td>
<td>[Example text not provided]</td>
</tr>
<tr>
<td>Extreme</td>
<td>5</td>
<td>The imagery has very potent effects on the reader and the dream characters or objects show great force or potency or effect.</td>
<td>“One of the teachers is to leave school and we get to a place where suddenly the whole building twists and turns. There is an earthquake and everything collapses and I’ve got to get away on my motorbike. But there is no gas in it. The operator asks what I did and I say I pressed all kinds of buttons and he says, “yeah you really messed it up, I don’t want to deal with you any more.” Everything is collapsing and people are furious with me and are after me.”</td>
</tr>
</tbody>
</table>
## Compelling

The dream imagery has some aspect related to being compelled

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>None/Almost none</td>
<td>1</td>
<td>The imagery lacks any impact and is non-persuasive. There is no sense that any dream characters are obliged or compelled to act in any way.</td>
<td>&quot;I went outdoors, looked across the street and saw a field with a high fence around it. It was night and there were no people around.&quot;</td>
</tr>
<tr>
<td>Slight/Mild</td>
<td>2</td>
<td>The imagery is mostly non-persuasive. There is a minor sense that the dream characters are obliged to act or the reader feels that the imagery is persuasive.</td>
<td>&quot;I'm out in a boat with a friend. I don't know who he is. The propeller on the engine comes off and we are stuck.&quot;</td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
<td>The imagery is somewhat persuasive or there is some sense that the characters are forced or obliged to act.</td>
<td>&quot;My husband is trying to find our kids and me after an accident. Maybe a car accident, maybe a fire. Someone tells him it's too late we have both died. I'm saying 'no it isn't, you just have to look here.'&quot;</td>
</tr>
<tr>
<td>Strong</td>
<td>4</td>
<td>The imagery produces some unavoidable effects on the dream characters. The imagery obliges or urges characters to act or there is some sense of persuasion in the reader.</td>
<td>&quot;I thought I saw a shadow through the crack at the bottom of the door. I decided to open it just a little. There was a man there. It was too late to shut the door again. He pushed it open and aimed a gun at my face.&quot;</td>
</tr>
<tr>
<td>Extreme</td>
<td>5</td>
<td>The imagery strongly obliges the dream characters to act in some way. The imagery strongly influences or persuades the reader in some way.</td>
<td>&quot;After they both had their clothes off, he got under the blanket and came out with a small axe and started slitting her throat. I tried running out and slamming the doors shut behind me and locking them. He found me and took me back to the room. I ran in and put a bookshelf in front of the door but I wasn't strong enough to keep him out.&quot;</td>
</tr>
</tbody>
</table>
**Striking**

Of being struck, or being outstanding or dramatic.

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>None/Almost none</td>
<td>1</td>
<td>The imagery is <em>garden variety</em> or mundane or ordinary. There are little or no surprising or outstanding or dramatic features.</td>
<td>“I was driving somewhere but I don’t remember where. I was just driving around. I drove into a mall parking lot. I had to slow down for some pedestrians.”</td>
</tr>
<tr>
<td>Slight/Mild</td>
<td>2</td>
<td>The imagery is mostly mundane or ordinary but with some aspect that raises it slightly from everyday.</td>
<td>“I was with Mike. There was some other woman there as well. She was a much larger woman than I was. Mike and I were kissing and cuddling and the other woman appeared to be waiting to be included.”</td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
<td>The imagery has some stand-out or striking elements or there is a salient or dramatic twist.</td>
<td>“There was a group of children playing under a sprinkler. I thought my son was there but he wasn’t. They all ran away. There was a pipe protruding through the ground the diameter of a coin. I heard my son’s voice coming from the pipe.”</td>
</tr>
<tr>
<td>Strong</td>
<td>4</td>
<td>The imagery has a <em>wow factor</em> or has a salient, outstanding or dramatic event or is spectacular in some way.</td>
<td>“I drive faster and faster and we get up enough speed to leave the hole. We break free and escape.”</td>
</tr>
<tr>
<td>Extreme</td>
<td>5</td>
<td>The imagery is highly salient, outstanding, dramatic or spectacular.</td>
<td>“In my dream I woke up to a knock at the door. I open the door. There on my verandah is my friend, strapped to an electric chair frying alive. His eyes are popping out of his head and he is screaming.”</td>
</tr>
</tbody>
</table>
Detailed
Related to being particularised and elaborate in imagery.

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>None/Almost none</strong></td>
<td>1</td>
<td>The imagery is either mostly or totally vague, general or generic in nature. There is no detail.</td>
<td>“I walked outside and saw a garden. There were things in it but I could not tell what they were.”</td>
</tr>
<tr>
<td><strong>Slight/Mild</strong></td>
<td>2</td>
<td>The imagery contains some detail but is mostly vague or generic.</td>
<td>“I am in the home of a powerful woman who is like an evil stepmother to me. Suddenly this ‘stepmother’ is gone and there is a message on the answering machine.”</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>3</td>
<td>The image is reported with some detail and parts are reported distinctly.</td>
<td>“I’m at a party. A woman friend sits at a long table and my wife is there. She looks very grey and old, and my friend tells me she has filed for divorce.”</td>
</tr>
<tr>
<td><strong>Strong</strong></td>
<td>4</td>
<td>The imagery is quite detailed making parts quite distinct and specific.</td>
<td>“I see my uncle with a foulard draped around his neck and a checkered suit, possibly with nickerbockers, as if he was dressed for the mardi gras he loved so much. I storm out and see my father sitting on the couch.”</td>
</tr>
<tr>
<td><strong>Extreme</strong></td>
<td>5</td>
<td>The imagery is very detailed, elaborate and distinct. The imagery is particularised so that the theme or objects are seen clearly.</td>
<td>“First it looks like mucus. Then I see that there is a worm in it that looks like a fresh, sweet shrimp (amaebi sashimi). Then there is a insect with wings, long legs and antennae, with the slimy consistency of a snail covered with gelatine. White.”</td>
</tr>
</tbody>
</table>
**Bizarre**

Being out of the ordinary, surreal or odd and unusual or impossible.

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None/Almost none</td>
<td>1</td>
<td>All aspects of the imagery are rational and realistic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: “I was in the kitchen making breakfast when one of my family members came in, sat down at the table and asked for some toast”</td>
</tr>
<tr>
<td>Slight/Mild</td>
<td>2</td>
<td>The imagery involves slight variations from the everyday</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: “I returned home from work to find workmen in my bathroom removing all the pipes”</td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
<td>The imagery contains unlikely variations or unusual settings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: “I found myself in a deep cave. It was not somewhere I would normally go. There were a lot of people gathered for some reason”</td>
</tr>
<tr>
<td>Strong</td>
<td>4</td>
<td>The imagery contains an impossible twist or is very unlikely or odd.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: “I was walking along a road when one of the signposts bent down and said something to me.”</td>
</tr>
<tr>
<td>Extreme</td>
<td>5</td>
<td>The imagery is mainly irrational or impossible in reality. Extremely odd, unconventional or impossible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: “It seemed like a normal day but I noticed that trees around me were melting (maybe from the heat?) and when I looked over in the distance I saw some kind of alien device sucking up rocks from the mountain which was shrinking”</td>
</tr>
</tbody>
</table>
**Arresting**

Having a quality that seizes and holds. Grabs the attention - even unwillingly.

<table>
<thead>
<tr>
<th>Type</th>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None/Almost None</td>
<td>1</td>
<td>The imagery does not catch or arrest the attention of the reader in any way. The imagery is uninteresting, familiar, and nondescript.</td>
</tr>
<tr>
<td>Example</td>
<td></td>
<td>“I was attending a meeting of some sort. There were many plain faces looking on in a bored fashion. There were some notes on the table.”</td>
</tr>
<tr>
<td>Slight/Mild</td>
<td>2</td>
<td>The imagery has some detail that catches or holds the attention but is generally ordinary.</td>
</tr>
<tr>
<td>Example</td>
<td></td>
<td>“I was at a party, I think it was by a relative of mine. I wasn’t invited but it didn’t bother me at all. I went up stairs but had to step around food sitting on the steps. Some people were talking about a meringue but it was in a huge party bag.”</td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
<td>There is some aspect of the imagery that catches and holds the attention.</td>
</tr>
<tr>
<td>Example</td>
<td></td>
<td>“I was in a hotel at the beach. I was spinning the water in a goldfish bowl around in one direction. This would make the frog almost fly out of the bowl. But just as he was ready, I would stop and change direction of the water.”</td>
</tr>
<tr>
<td>Strong</td>
<td>4</td>
<td>The imagery is captivating. It catches and holds attention immediately.</td>
</tr>
<tr>
<td>Example</td>
<td></td>
<td>“We were eating dinner at a castle-type restaurant about 70 feet up. Then four guys came in and stick up the place. They took some money but as they were leaving I threw a chair and knocked one of them over. Ö</td>
</tr>
<tr>
<td>Extreme</td>
<td>5</td>
<td>The imagery is almost totally captivating, sensational and stunning. It holds the attention and is in no way uninteresting or nondescriptive.</td>
</tr>
<tr>
<td>Example</td>
<td></td>
<td>“I’m chasing somebody down my street. In my hand is a gun and I intend on shooting this guy. Just as I’m ready to shoot him, somebody pulls the gun out of my hand and shoots him. All that happens when the gun is fired is blue ink comes out of the barrel. I take the gun back, put a new clip in it and start chasing him again, this time to really shoot him.”</td>
</tr>
</tbody>
</table>
Appendix B.5.

Table of Imagery Intensity Ratings - CI Descriptor Scale
## Table of Image Intensity Ratings

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Level of Intensity</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>None</td>
<td>Slight</td>
<td>Mild</td>
<td>Moderate</td>
<td>Strong</td>
<td>Extreme</td>
</tr>
<tr>
<td>Vividness</td>
<td>Basically there is no purity, brightness or strength to be found in the imagery.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bizarreness</td>
<td>Image is in no way odd, out of the ordinary or unusual.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detailed</td>
<td>Image is not specific, or distinct. There was little or no elaborated theme.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Striking</td>
<td>The image is not surprising, forcible or in any way impressive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- The image is extremely true to life, fresh, animated, spirited bright and strong.
- The image is extremely extravagant, whimsical, grotesque and odd or unconventional.
- The image is extremely specific, carefully elaborated, distinct and particularised.
- The image is extremely surprising, forceful and impressive. It is very noticeable and affects with strong emotions.
| **Arresting** | The imagery does not seize, fix or hold the senses. There is nothing that catches the attention. | | | | The imagery has an extreme ability to command attention, seize, fix or hold the senses. |
| **Compelling** | The image is not irresistible. Nor does it drive or force us to respond in any way. | | | | The imagery is extremely irresistible and forces, urges or drives at our senses. |
| **Powerful** | The image has no potency or effect on the senses. The image has no ability to influence us. | | | | The imagery is extremely potent and influential. It effects the senses in an intense forcible and energetic manner. |
Appendix B.6.

Dream Imagery Rating Score Grid
# Dream Imagery Rating Score Grid

<table>
<thead>
<tr>
<th>Scene</th>
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Appendix B.7.

Criteria for scoring detail of images using Detail-count method
Criteria for coring detail of dynamic images in dreams

A dream is conceptualized as a sequence of dynamic images, each involving the dream characters and/or objects in concurrent activities or interactions. Accordingly, each scene of the dream is first divided into a sequence of concurrent activities. If one event clearly follows another, it is part of a separate, concurrent set, even if it is closely related. For example, ‘She sat down and then drank her tea’ comprises two sequential images. ‘She was sitting and drinking her tea’ is one image of two concurrent activities. The scoring system is based on a score of 1 for each person, object, observable descriptor, or interaction within the dynamic image. Emotions, cognitions, intentions, and the content of conversations are not scored as adding to the detail of the dream imagery.

Scoring system

1. Each separately described or identified character present in the dream receives a score of 1. The dreamer is also included, but only if he or she participated in the dream. ‘My best friend, Mabel and a man I did not recognize each receive a score of 1, as cognitions do not score extra.

2. A group of anything counts 2 (group _ 1 and type of members _ 1). Cognitive or historical qualifiers do not count extra. ‘Some friends from high school’ counts 2 for group of friends, but ‘from high school’ does not count extra.

3. If a group consists of separately identified characters from a previous scene, count them separately in the present scene.

4. Each object separately mentioned and present in the dream receives a score of 1.

5. Each part or accessory related to a character or object that is separately mentioned and present in the dream scores 1.

6. Each observed concurrent activity or interaction in which a dream entity is involved scores 1—a person does something, possibly to someone else. Do not score sequential activities as concurrent.

7. Each observable perceptual quality scores 1—color, shape, size, location, or physical attribute.

8. Do not score the cognitions of the dreamer for example, ‘I knew he had died in the fire.’ ‘My grandmother’s 80th birthday party’ scores only 1 for ‘party’ because the rest is not observed as part of the dream image.

9. Do not score affective reactions of the dreamer for example, ‘I was very afraid.’ ‘I was trembling’ does score 1 for ‘trembling’, as it is an observable part of the imagery.

10. For conversations, score 1 each for characters participating concurrently (‘John was talking to Mary’, ‘John and Mary were shouting at each other’). Score 1 for ‘conversing’, ‘shouting’, or ‘yelling’. Score 1 for observable qualifiers, such as ‘angrily’ or ‘jokingly’. Do not score the content of the conversation.

11. Intentions are not scored as such, only observable activities. ‘I was driving home’ scores 2 (‘I’ and ‘driving’ but not ‘home’).

Note. We acknowledge the advice and suggestions received during the review process, in particular the need to have a separate measure of detail or vividness apart from the CI measure and an approach to constructing it.
Appendix C.1.

Dissociative Experiences Scale - Version C
Daily Experiences Questionnaire

This questionnaire consists of twenty-eight questions about experiences that you may have in your daily life. We are interested in how often you have these experiences. It is important, however, that your answers show how often these experiences happen to you when you are not under the influence of alcohol or drugs. To answer these questions, please determine to what degree the experience described in the question applies to you and mark the box that is most appropriate.

1. Some people have the experience of driving or riding in a car or bus or subway and suddenly realising that they don’t remember what has happened during all or part of the trip. Please tick the box that most closely indicates how much this happens to you compared to others.
   - Much less than others
   - About the same as others
   - Much more than others

2. Some people find that sometimes they are listening to someone talk and they suddenly realise that they did not hear part or all of what was said. Please tick the box that most closely indicates how much this happens to you compared to others.
   - Much less than others
   - About the same as others
   - Much more than others

3. Some people have the experience of finding themselves in a place and having no idea how they got there. Please tick the box that most closely indicates how much this happens to you compared to others.
   - Much less than others
   - About the same as others
   - Much more than others

4. Some people have the experience of finding themselves dressed in clothes that they don’t remember putting on. Please tick the box that most closely indicates how much this happens to you compared to others.
   - Much less than others
   - About the same as others
   - Much more than others

5. Some people have the experience of finding new things among their belongings that they do not remember buying. Please tick the box that most closely indicates how much this happens to you compared to others.
   - Much less than others
   - About the same as others
   - Much more than others

6. Some people sometimes find that they are approached by people whom they do not know who call them by another name or insist that they have met them before. Please
tick the box that most closely indicates how much this happens to you compared to others.

<table>
<thead>
<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
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</table>

7. Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something and they actually see themselves as if they are looking at another person. Please tick the box that most closely indicates how much this happens to you compared to others.

<table>
<thead>
<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
</tr>
</thead>
</table>

8. Some people are told that they sometimes do not recognise friends or family members. Please tick the box that most closely indicates how much this happens to you compared to others.

<table>
<thead>
<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
</tr>
</thead>
</table>

9. Some people find that they have no memory for some important events in their lives (for example, a wedding or graduation). Please tick the box that most closely indicates how much this happens to you compared to others.

<table>
<thead>
<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
</tr>
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</table>

10. Some people have the experience of being accused of lying when they do not think that they have lied. Please tick the box that most closely indicates how much this happens to you compared to others.

<table>
<thead>
<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
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</table>

11. Some people have the experience of looking in a mirror and not recognising themselves. Please tick the box that most closely indicates how much this happens to you compared to others.

<table>
<thead>
<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
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</table>
12. Some people have the experience of feeling that other people, objects, and the world around them are not real. Please tick the box that most closely indicates how much this happens to you compared to others.

<table>
<thead>
<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
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13. Some people have the experience of feeling that their body does not seem to belong to them. Please tick the box that most closely indicates how much this happens to you compared to others.

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<thead>
<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
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14. Some people have the experience of sometimes remembering a past event so vividly that they feel as if they were reliving that event. Please tick the box that most closely indicates how much this happens to you compared to others.

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<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
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15. Some people have the experience of not being sure whether things that they remember happening really did happen or whether they just dreamed them. Please tick the box that most closely indicates how much this happens to you compared to others.

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<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
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16. Some people have the experience of being in a familiar place but finding it strange and unfamiliar. Please tick the box that most closely indicates how much this happens to you compared to others.

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<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
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17. Some people find that when they are watching television or a movie they become so absorbed in the story that they are unaware of other events happening around them. Please tick the box that most closely indicates how much this happens to you compared to others.

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<thead>
<tr>
<th>Much less than others</th>
<th>About the same as others</th>
<th>Much more than others</th>
</tr>
</thead>
</table>
18. Some people find that they become so involved in a fantasy or daydream that it feels as though it were really happening to them. Please tick the box that most closely indicates how much this happens to you compared to others.

- Much less than others
- About the same as others
- Much more than others

19. Some people find that they sometimes are able to ignore pain. Please tick the box that most closely indicates how much this happens to you compared to others.

- Much less than others
- About the same as others
- Much more than others

20. Some people find that they sometimes sit staring off into space, thinking nothing, and are not aware of the passage of time. Please tick the box that most closely indicates how much this happens to you compared to others.

- Much less than others
- About the same as others
- Much more than others

21. Some people sometimes find that when they are alone they talk out loud to themselves.

- Much less than others
- About the same as others
- Much more than others

22. Some people find that in one situation they may act so differently compared with another situation that they feel almost as if they were two different people. Please tick the box that most closely indicates how much this happens to you compared to others.

- Much less than others
- About the same as others
- Much more than others

23. Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them (for example, sports, work, social situations etc.). Please tick the box that most closely indicates how much this happens to you compared to others.

- Much less than others
- About the same as others
- Much more than others
24. Some people sometimes find that they cannot remember whether they have done something or have just thought about doing that thing (for example, not knowing whether they mailed a letter or have just thought about mailing it). Please tick the box that most closely indicates how much this happens to you compared to others.

[ ] Much less than others  [ ] About the same as others  [ ] Much more than others

25. Some people find evidence that they have done things that they do not remember doing. Please tick the box that most closely indicates how much this happens to you compared to others.

[ ] Much less than others  [ ] About the same as others  [ ] Much more than others

26. Some people sometimes find writings, drawing, or notes among their belongings that they must have done but cannot remember doing. Please tick the box that most closely indicates how much this happens to you compared to others.

[ ] Much less than others  [ ] About the same as others  [ ] Much more than others

27. Some people sometimes find that they hear voices inside their head that tell them to do things or comment on things that they are doing. Please tick the box that most closely indicates how much this happens to you compared to others.

[ ] Much less than others  [ ] About the same as others  [ ] Much more than others

28. Some people sometimes feel as if they are looking at the world through a fog so that people and objects appear far away or unclear. Please tick the box that most closely indicates how much this happens to you compared to others.

[ ] Much less than others  [ ] About the same as others  [ ] Much more than others

Thankyou for your time.
Appendix C.2.

Short form of the Boundary Questionnaire
Short Form of the B Q

The following is a list of statements that are more or less true for different people.

Please rate each of the statements below by circling one of the numbers - 0 to 4.

0 indicates - *not at all true of me*

4 indicates - *very true of me*

It is best if you respond without thinking too much on any one statement.

<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
<th>Very Untrue</th>
<th>Very True</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>My feelings blend into one another</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>2</td>
<td>I am very close to my childhood feelings.</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>3</td>
<td>I am easily hurt.</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
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<tr>
<td>4</td>
<td>I spend a lot of time daydreaming, fantasising or in reverie.</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
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<td>5</td>
<td>I like stories that have a definite beginning, middle and end.</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
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<tr>
<td>6</td>
<td>A good organisation is one in which all the lines of responsibility are</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td></td>
<td>precise and clearly established</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>There is a place for everything, and everything should be in its place</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
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<tr>
<td>8</td>
<td>Sometimes it is scary when one gets too involved with another person.</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
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<tr>
<td>9</td>
<td>A good parent has to be a bit of a child too.</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
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<tr>
<td>10</td>
<td>I can easily imagine myself as an animal or what it might be like to</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
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<tr>
<td></td>
<td>be an animal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>When something happens to a friend of mine or to a lover, it is</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
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<tr>
<td></td>
<td>almost as if it happens to me</td>
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<tr>
<td>12</td>
<td>When I work on a project, I don't like to tie myself down to a</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
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<tr>
<td></td>
<td>definite outline. I rather like to let my mind wander.</td>
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<tr>
<td>13</td>
<td>In dreams, people sometimes merge into each other or become other people.</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>14</td>
<td>I believe I am influenced by forces that no one can understand.</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>15</td>
<td>There are no sharp dividing lines between normal people, people</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td></td>
<td>with problems and people who are considered psychotic or crazy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>I am a down-to-earth no-nonsense kind of person.</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>17</td>
<td>I think I would enjoy being some kind of creative artist.</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>18</td>
<td>I have had the experience of someone calling me or speaking my name and</td>
<td>0 1 2 3 4</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td></td>
<td>not being sure whether it was really happening or whether I was</td>
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<tr>
<td></td>
<td>imagining it.</td>
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Appendix D.1.

Descriptive Statistics Study 1
Descriptive Statistics - Study 1

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<th>Max</th>
<th>Mean</th>
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<td>.70</td>
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<td>.76</td>
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<td>5.0</td>
<td>2.37</td>
<td>1.08</td>
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<td>5.0</td>
<td>2.66</td>
<td>1.01</td>
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<td>.77</td>
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<td>.77</td>
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<td>.98</td>
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<td>10.18</td>
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</table>
Appendix D.2.

Factor Analysis Study 1
## Factor Analysis - Study 1

### Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>Detail keyword</th>
<th>Vivid keyword</th>
<th>bizarre keyword</th>
<th>Striking keyword</th>
<th>Arresting keyword</th>
<th>Compelling keyword</th>
<th>Power keyword</th>
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<tbody>
<tr>
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<td>1.000</td>
<td>.737</td>
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<td>.462</td>
<td>.482</td>
<td>.346</td>
<td>.410</td>
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<td>.345</td>
<td>.403</td>
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<td>.310</td>
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<td>.468</td>
<td>.490</td>
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<td>.468</td>
<td>.573</td>
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<td>.310</td>
<td>.490</td>
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* a. Determinant = .006

### Total Variance Explained

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<tr>
<th>Factor</th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
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<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
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<td>4.241</td>
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<td>60.592</td>
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<td>2</td>
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<td>4</td>
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<tr>
<td>5</td>
<td>.234</td>
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<td>6</td>
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Extraction Method: Generalized Least Squares.

* a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.
### Reproduced Correlations

<table>
<thead>
<tr>
<th>Reproduced Correlation</th>
<th>Detail keyword</th>
<th>Vivid keyword</th>
<th>bizarre keyword</th>
<th>Striking keyword</th>
<th>Arresting keyword</th>
<th>Compelling keyword</th>
<th>Power keyword</th>
</tr>
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<tbody>
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<td>.489</td>
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<td>.307</td>
<td>.344</td>
<td>.402</td>
<td>.226</td>
<td>.310</td>
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<tr>
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<td>.800</td>
<td>.899</td>
<td>.789</td>
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<td>.663</td>
<td>.789</td>
<td>.752</td>
<td>.628</td>
<td>.760</td>
</tr>
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<td>.433</td>
<td>.591</td>
<td>.628</td>
<td>.644</td>
<td>.799</td>
</tr>
<tr>
<td>Power keyword</td>
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<td>.310</td>
<td>.490</td>
<td>.692</td>
<td>.760</td>
<td>.799</td>
<td>.999</td>
</tr>
<tr>
<td>Residual *</td>
<td>.000</td>
<td>-.002</td>
<td>.001</td>
<td>-.012</td>
<td>-.007</td>
<td>.024</td>
<td>-1.405E-5</td>
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<tr>
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<td>-.002</td>
<td>-.005</td>
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<td>-.010</td>
<td>.035</td>
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<td>-.005</td>
<td>.004</td>
<td>-.019</td>
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<td>-.010</td>
<td>.004</td>
<td>.004</td>
<td>-2.103E-5</td>
<td></td>
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<tr>
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<td>.035</td>
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<td>-2.103E-5</td>
<td>-5.587E-6</td>
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</table>

Extraction Method: Generalized Least Squares.

a. Reproduced communalities
b. Residuals are computed between observed and reproduced correlations. There are 0 (0.0%) nonredundant residuals with absolute values greater than 0.05.

### Factor Matrix *

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
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<th>3</th>
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</thead>
<tbody>
<tr>
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<td>.053</td>
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<tr>
<td>Vivid keyword</td>
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<tr>
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<td>.497</td>
<td>.263</td>
<td>.656</td>
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<tr>
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<td>.600</td>
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<td>.340</td>
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<td>Power keyword</td>
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</tbody>
</table>

Extraction Method: Generalized Least Squares.

a. Attempted to extract 3 factors. More than 25 iterations required. (Convergence=.064). Extraction was terminated.
### Pattern Matrix

<table>
<thead>
<tr>
<th>Factor</th>
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</thead>
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<tr>
<td>Detail keyword</td>
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<tr>
<td>Power keyword</td>
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</table>

Extraction Method: Generalized Least Squares.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 4 iterations.

### Structure Matrix

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<td>.969</td>
<td>.347</td>
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<td>.396</td>
<td>.862</td>
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<tr>
<td>Striking keyword</td>
<td>.714</td>
<td>.447</td>
<td>.938</td>
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<td>.772</td>
<td>.492</td>
<td>.791</td>
</tr>
<tr>
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<tr>
<td>Power keyword</td>
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Extraction Method: Generalized Least Squares.
Rotation Method: Oblimin with Kaiser Normalization.

### Factor Correlation Matrix

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<td>.651</td>
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<td>2</td>
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<td>.453</td>
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<tr>
<td>3</td>
<td>.651</td>
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Extraction Method: Generalized Least Squares.
Rotation Method: Oblimin with Kaiser Normalization.
Appendix D.3.

Descriptive Statistics - Study 2
Descriptive Statistics - Study 2

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
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</thead>
<tbody>
<tr>
<td>Gender</td>
<td>143</td>
<td>Male (1)</td>
<td>Female (2)</td>
<td>1.89</td>
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</tr>
<tr>
<td>Age of person</td>
<td>143</td>
<td>17</td>
<td>69</td>
<td>25.52</td>
<td>10.576</td>
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<tr>
<td>Education level</td>
<td>143</td>
<td>2</td>
<td>5</td>
<td>4.30</td>
<td>.950</td>
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<td>143</td>
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<td>5.00</td>
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<td>5.00</td>
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<td>Emotion - average of both dreams</td>
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<td>2.868</td>
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<td>No of traumas</td>
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<td>Cope Normal - high is better coping</td>
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<td>32</td>
<td>22.04</td>
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<tr>
<td>Cope Then - high is better coping</td>
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<td>6</td>
<td>28</td>
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</tr>
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</table>

*Note: Education level 1= 1-7, 2= 8-10, 3= 11-12, 4 = TAFE, 5 = University*
Appendix D.4.

Factor Analyses - Study 2
## Factor Analysis - Study 2

### Correlation Matrix

<table>
<thead>
<tr>
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<th>avedet</th>
<th>avecomp</th>
<th>avepow</th>
<th>avebiz</th>
<th>avestrik</th>
<th>averes</th>
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<td></td>
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<td>.573</td>
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<td>.632</td>
<td>.733</td>
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<td>.559</td>
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<td>.738</td>
<td>.735</td>
<td>.762</td>
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<td>.733</td>
<td>.806</td>
<td>.791</td>
<td>.712</td>
<td>.879</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Sig. (1-tailed) | aveviv | avedet | avecomp | avepow | avebiz | avestrik | averes |

- aveviv | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
- avedet  | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
- avecomp | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
- avepow  | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
- avebiz  | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
- avestrik| .000 | .000 | .000 | .000 | .000 | .000 | .000 |
- averes  | .000 | .000 | .000 | .000 | .000 | .000 | .000 |

a. Determinant = .001

### Total Variance Explained

<table>
<thead>
<tr>
<th>Factor</th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
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<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
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<td>75.453</td>
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Extraction Method: Generalized Least Squares.

- When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.
<table>
<thead>
<tr>
<th>Reproduced Correlations</th>
<th>aveviv</th>
<th>avedet</th>
<th>avecomp</th>
<th>avepow</th>
<th>avebiz</th>
<th>avestrik</th>
<th>avearres</th>
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<tr>
<td>Reproduced Correlation</td>
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<td></td>
<td></td>
<td></td>
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<td>-.011</td>
<td>-.028</td>
<td>.006</td>
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</tbody>
</table>

Extraction Method: Generalized Least Squares.

a. Reproduced communalities
b. Residuals are computed between observed and reproduced correlations. There are 5 (23.0%) nonredundant residuals with absolute values greater than 0.05.

<table>
<thead>
<tr>
<th>Factor Matrixa</th>
</tr>
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<tbody>
<tr>
<td></td>
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<tr>
<td>aveviv</td>
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<td>avedet</td>
</tr>
<tr>
<td>avecomp</td>
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<tr>
<td>avepow</td>
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<tr>
<td>avebiz</td>
</tr>
<tr>
<td>avestrik</td>
</tr>
<tr>
<td>avearres</td>
</tr>
</tbody>
</table>

Extraction Method: Generalized Least Squares.

a. 2 factors extracted. 12 iterations required.

<table>
<thead>
<tr>
<th>Pattern Matrixa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>aveviv</td>
</tr>
<tr>
<td>avedet</td>
</tr>
<tr>
<td>avecomp</td>
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<tr>
<td>avepow</td>
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<tr>
<td>avebiz</td>
</tr>
<tr>
<td>avestrik</td>
</tr>
<tr>
<td>avearres</td>
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</tbody>
</table>

Extraction Method: Generalized Least Squares.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 7 iterations.
### Structure Matrix

<table>
<thead>
<tr>
<th>Factor</th>
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<th>2</th>
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<tbody>
<tr>
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<td>avearres</td>
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</table>

Extraction Method: Generalized Least Squares.
Rotation Method: Oblimin with Kaiser Normalization.

### Factor Correlation Matrix

<table>
<thead>
<tr>
<th>Factor</th>
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<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.000</td>
<td>-.736</td>
</tr>
<tr>
<td>2</td>
<td>-.736</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Extraction Method: Generalized Least Squares.
Rotation Method: Oblimin with Kaiser Normalization.
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Appendix E.1. pp 187-205

Published Study
"Exploratory Factor Analysis of Hartmann’s Scale for Central Imagery and its Relationship to Dreamer Emotion"
Glenn Bilsborrow, John Davidson, and Jennifer Scott
Appendix E.1.

Published Study

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