An examination of the role of an affective opponent-process in the maintenance of negative intrusive thoughts.

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ABSTRACT

The present investigation sought to determine whether the opponent process theory of acquired motivation (Soloman and Corbit, 1974; Soloman, 1980) could provide a theoretical account for the maintenance of intrusive thoughts and obsessions. Ten subjects experiencing negative intrusive thoughts of a high frequency, participated in an habituation training procedure which involved exposure to their thoughts over several trials. It was predicted that the intensity of negative affect would decrease with ongoing exposure. In accordance with opponent process theory, it was further predicted that a mood change in the opposite direction would occur upon termination of these thoughts.

Using subjective mood scales it was demonstrated that the engaging of negative intrusive thoughts successfully induced negative affect. However, there was no evidence to support the presence of affective habituation or contrast phenomena. These findings were consistent with earlier results observed by Ward (1988). It was suggested that further clarification of the opponent process theory is required before a definitive application to intrusive thoughts may be attempted.

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1 INTRODUCTION

1.1 OVERVIEW

The present study addresses an unusual proposition; can we become addicted to our own thoughts? Intrusive thoughts, clinical obsessions and compulsions are recurrent and compelling phenomena sharing drive features similar to other addictive and impulsive behaviours. Yet intrusive thoughts and obsessions are not regarded as 'addictive' because they provide no apparent source of pleasure which we would normally associate with the maintenance of such behaviours (Ward, 1988).

Intrusive thoughts are repetitive, involuntary cognitions that occur in the form of thoughts, images or impulses and may be either pleasant or unpleasant. They include intrusive mental activities such as perpetual day dreaming and persistent worries (Rachman, 1981). They are regarded as obsessions if they are experienced as egodystonic, occur at a high frequency, are significantly distressing and disrupt normal social functioning. They are frequently associated with compulsive behaviours, which are performed to reduce discomfort arising from the obsession and are negatively reinforced as a coping strategy (DSM-111-R, 1987).

Impulsive behaviours such as excessive drinking or gambling have come to be regarded as addictions because they share features characteristic of drug abuse models of addiction (e.g. Kagen and Squires, 1985). Defining characteristics include an inability to stop the behaviour, to engage in increasing levels of the activity, the development of psychological symptoms if use is prevented and impaired social or occupational performance (DSM-111-R, 1987). Obsessions and compulsions share these features and yet a clear theoretical distinction exists between this disorder and other

'addictive' behaviours. Thus, while gambling or drug taking provide pleasure and are egosyntonic, obsessions and compulsions are typically regarded as senseless and, apart from tension reduction, provide no identifiable source of pleasure. To establish such an affective basis within obsessional symptomology would question this distinction and have considerable theoretical implications.

Current methodologies examining the nature of obsessions have accepted the negative maintenance view of the disorder and considered only negative emotions associated with them. Numerous studies have observed anxiety and tension reduction in association with obsessions and compulsions (e.g. Rachman and Hodgeson, 1980; Emmelkamp, 1982 and Foa and Steketee, 1985) and a similar affective status associated with negative intrusive thoughts (Rachman and Hodgeson, 1980). Yet the pervasive failure to examine potential sources of positive emotion means that the affect-based distinction between addictive behaviours and obsessions is based on an assumption that has not been empirically validated.

Recent studies by Edwards and Dickerson (1987b) and Legg-England and Dickerson (1988) have questioned this assumption. They found that pleasant intrusive thoughts were similar to unpleasant intrusive thoughts in that they increased arousal, were emotionally intense and equally hard to control. Significantly, subjects reported that they 'enjoyed' the former category of thought. Unfortunately full scale measures of both positive and negative emotion were not used and so an accurate range of data on the affect induced by intrusive thoughts was not attained. In order to make a valid affect-based distinction between addictive behaviours and intrusive thought phenomena, future research into the latter will need to consider a full range of emotional responses.

The aim of this study was to consider both positive and negative emotions associated with intrusive thoughts. If it can be shown that positive as well as negative emotions are associated with negative intrusive thoughts then their maintenance and treatment could be studied from an 'addictions' perspective. While Edwards et. al. (1987b) were able to establish that intrusive thoughts can elicit positive emotions, a specific theoretical account of how positive affect could be derived from negative intrusive thoughts is still needed. Soloman's (1980) 'opponent-process theory' provides such an explanation. It postulates that negative affective states are capable of inducing positive affective secondary responses as a form of homeostasis. This may lead to the maintenance of an aversive initiating behaviour via a positively reinforcing postreaction, as might be seen in activities such as sky-diving (Epstein, 1967, cited in Soloman, 1980) or blood donation (Piliavin, Callero and Evans, 1982).

The present study follows an earlier attempt by Ward (1988) to establish a possible source of positive affect as a factor maintaining intrusive thoughts and incorporates a number of methodological refinements based on the results of that study. As with the earlier attempt, the present thesis proposes that opponent-process theory is consistent with current theoretical accounts of intrusive thought phenomena, as well as existing empirical evidence. Although the relevant literature indicates the possible existence of an opponent process associated with intrusive thoughts, conclusive evidence is still lacking. The current research design is presented as a further test of the proposition that negative intrusive thoughts are maintained by an affective opponent process.

1.2 THE OPPONENT PROCESS THEORY OF ACQUIRED MOTIVATION

In his opponent process theory, Soloman (1980) postulates that emotional or hedonic processes are involved in every case of acquired motivation. Three

affective phenomena are assumed to be operative within this system; (1) affective contrast, (2) affective habitation (tolerance) and (3) affective withdrawal (abstinence syndrome). Soloman points to heroin addiction as one of the most obvious examples of this dynamic. Initial doses of an opiate produce a highly pleasant sensation called a 'rush'. With the metabolic destruction of the drug the user then experiences a secondary aversive state characterised by mild physiological and psychological discomfort. Affective contrast such as this may also be observed where the initial stimulus has been unpleasant. Epstein (1967) reported the dramatic example of military parachutists who showed extreme fear responses during their first few jumps but became elated with their completion.

With the repeated presentation of affective stimuli subjects rapidly habituate demonstrating decreased responding to such stimulation. With opiate use this is initially realised as a lessening of the euphoric state following the initial rush experience. After a number of doses in succession addicts typically do not experience this euphoria. Affective habituation has then occurred with the decline of the initial hedonic state.

The withdrawal syndrome is the third affective phenomena considered by the opponent process theory and considers the accentuation of the secondary affective state which occurs in conjunction with the habituation process. For the heroin addict abstinence after routine dosing produces extreme physiological and psychological discomfort which includes nausea, muscular aches and cravings for the drug. From an initially pleasant state, withdrawal is experienced as highly aversive. Thus a shift in reinforcement contingencies usually emerges from the (reduced) positive reinforcement of the initial affective response towards avoidance of withdrawal symptoms, which negatively reinforces ongoing use.

Affective withdrawal also develops in behaviours where the initial experience is unpleasant. In such cases subjects may experience a small amount of relief after the unpleasant activity but are unlikely to continue in the absence of extraneous pressures to do so. This may typically occur when social pressures or personal beliefs lead to repetition of the activity (e.g. drug use, blood donation; Soloman, 1980; Piliavin, et. al. 1982). With ongoing repetition there will again be a shift in reinforcement contingencies with a decline in aversiveness and the emergence of a withdrawal syndrome with a positive valence. Experienced parachutists for example, no longer report intense fear but a level of tension and a 'thrill' during the free-fall followed by intense social interaction and euphoria after a safe landing. The standard pattern of affective dynamics is presented in Figure 1.1.

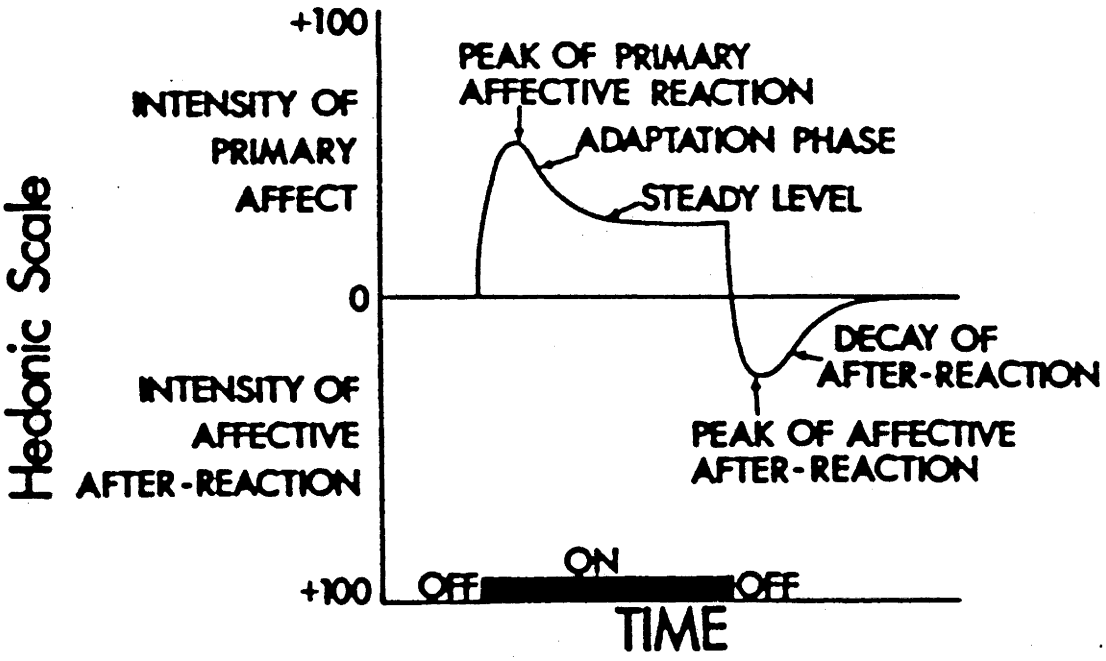

Figure 1.1: **The standard pattern of affective dynamics (from Soloman, 1980, p694)**

Soloman and Corbit (1973, 1974) devised a simple theoretical model to account for the affective dynamics observed in the examples above. This affect control system has a single negative feedback loop and assumes an operation similar to other homeostatic mechanisms such that the brains of mammals function to oppose extreme or prolonged emotional arousal. To this extent the ability to maintain affective stability is presumed to have an adaptive function. The theory suggests that a primary affective response, called an 'a' process, is elicited by any Pavlovian UCS, operant reinforcer or innate releaser. The **a** process is a stable, unconditional reaction which correlates with the intensity, quality and duration of the stimuli. The **a** process in turn arouses an opposing 'b' process which is hypothesised to be of sluggish latency, slow to reach its peak and slow to decay after the original sensory input has been terminated and the **a** process has stopped. Since the **b** process acts to oppose the **a** process, growth in strength by the former is associated with a weakening of the latter.

According to the model, the manifest emotional state of the subject may be computed as the absolute difference between the two underlying processes. If **a** > **b** then the subject is said to be experiencing an emotional state, known as State A; and if **b** > **a** then the subject is in State B. Each of these manifest states will be similar in quality to their underlying processes but will not necessarily be of the same magnitude. With the onset of the stimuli there will be a peak in emotional State A which rapidly subsides as the **b** process is initiated. With the offset of the stimuli, the **a** process is terminated and the true quality of the **b** process may be observed with the manifest B state being totally due to the opponent process from this point.

Soloman (1980) has further postulated that significant changes to the opponent process occur as a result of repeated exposure to the stimulus. Specifically,

while the a process is unaffected by repeated exposure, it is assumed that the b process is strengthened by use and weakened disuse. It is as a direct result of this strengthening of the b process that affective habituation and withdrawal occur; the former, specific to State A, occuring when the magnitude and intensity of the a process are reduced by the accentuating b process, which functions to drag it down. Thus if State A originally had a positive hedonic tone, it will become less pleasant with repeated exposure. The strengthening of the b process also produces the affective withdrawal syndrome as the manifest B State grows in both intensity and duration. With repeated presentations therefore, a B State experienced as pleasurable would become more so, whilst an aversive postreaction would similarly accentuate. Figure 1-2 shows a comparison of the effects on the b process of the presentation of both familiar and relatively novel stimuli.

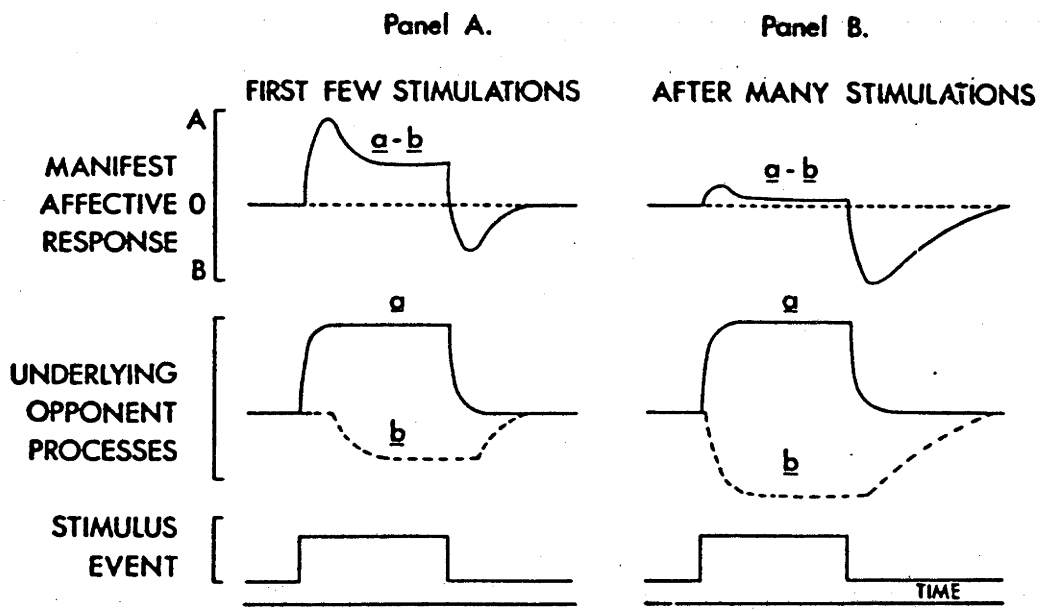

Figure 1.2: Effects on the b process of novel and familiar stimuli (from Soloman, 1980, p700.)

An important qualification to the effects of repeated exposure on the accentuation of the opponent process, is Soloman's suggestion that the intervals between successive exposures must be shorter than the time normally required to allow the **b** process to decay to its baseline value. Thus the **b** process will only accentuate if presentations occur within a certain inter-stimulus interval. An intermittent drug user for example will experience a full rush and minimal withdrawal. On the other hand, an habitual user, who doses within the withdrawal phase (**b** process) to avoid its aversive affects, will experience no 'high' and a subsequent accentuation of withdrawal, prolonging the cycle of maintenance.

Starr (1978) has provided empirical evidence for this phenomena showing that distress calling in ducklings (aversive B state) was only accentuated by one minute separations from their mother while longer durations outside this critical decay duration produced no changes in responding. He further observed that an enhancement of the quality of the stimulation could produce an increase in the critical decay duration of the **b** process. Similarly, he noted that responding did not revert to baseline levels following a period of non-exposure but showed a more rapid return to previous levels of response intensity upon re-exposure. Starr referred to this latent maintenance of response function as the 'savings principle'. Soloman (1980) suggested a general principle for opponent processes based on these findings, suggesting that they are strengthened by use and approach asymptotes having values that are a direct function of the quality, intensity, and duration of each exposure and an inverse function of the interstimulus interval. They are also subject to more rapid accentuation following re-exposure where there has been a previous history of responding.

Since its first presentation (Soloman and Corbit, 1973) and subsequent

elaboration (Soloman, 1980) opponent-process theory has been applied to a variety of human behaviours to explain the motivation for such diverse activities as cigarette smoking (Soloman and Corbit, 1973), job satisfaction (Landy, 1978), alcohol use (Shipley, 1982) and exercise dependence (Thompson and Blanton, 1987). Recent studies supporting the predictions of the opponent-process theory have typically used subjective ratings to assess mood status, the dependent variable; as in the assessment of examination stress (Craig and Siegal, 1979), blood donation (Piliavin, et. al. 1982), breast feeding (Myers and Siegal, 1985) and food tastes (Rozin and Vollmecke, 1986). However, performance measures such as speech rate (Williams, 1980) and naming latencies (Tyson and Flemming, 1987), and physiological measures of skin conductance (Yelan, 1985) and salivation response (Rozin, Reff, Mark and Schull, 1984) have also been used successfully as indices of the dependent variable.

1.3 THEORETICAL MODELS OF OBSESSIONS, COMPULSIONS AND INTRUSIVE THOUGHTS

The central hypothesis of the current thesis considers the possibility that obsessive-compulsive thoughts and behaviour are maintained via an affective opponent process. Given its focus on the affective dynamics associated with negative intrusive thoughts it is necessary to examine current theoretical models of obsessions and intrusive thoughts and consider the relationship between them.

Psychodynamic formulations of obsessive-compulsive disorder (OCD) were first to emerge (e.g. Freud, 1896) but have generally failed to find empirical support and have typically yielded poor treatment outcomes (Cawley, 1974). Behaviourally oriented approaches have enjoyed far greater success both empirically and as an applied treatment methodology (Foa, Steketee, Grayson and Doppelt, 1983). These have their genesis in the work of Mowrer (1960) who

proposed a two-stage theory of acquisition and maintenance of OCD. In the first stage obsessions are classically conditioned when a neutral event becomes associated with fear by being paired with stimuli which evoke discomfort or anxiety. Through an associative process, concrete objects, thoughts and images all acquire the ability to produce discomfort. In the second stage, avoidance responses develop, including compulsive rituals and escape behaviours, which reduce discomfort and are thereby negatively reinforced, leading to their maintenance as a coping strategy. These strategies are only effective in the short term however, preventing longer term exposure which would lead to habituation and their eventual extinction.

Despite some criticism of the fear acquisition phase of this process (e.g. Gray, 1975; Rachman and Wilson, 1980) recent theories have maintained the essential elements of the two-stage model, pertaining to onset and maintenance, while expanding upon the conditions pertinent to these phenomena (e.g. Rachman and Hodgeson, 1980; Salkovskis, 1985). Rachman has extended the model beyond the clinical population, pointing to major similarities between normal intrusive thoughts and clinical ruminations. Evidence from several studies has shown that unwanted intrusive thoughts are a common experience and occur in 80-97% of the normal population. (e.g. Rachman and De Silva, 1978; Parkinson and Rachman, 1981; Salkovskis and Harrison, 1984; Legg England and Dickerson, 1988).

Rachman and De Silva (1978) established that 'intrusive unacceptable thoughts' experienced by normal subjects were similar to clinical obsessions in their form, content, meaningfulness and relationship to triggering stimuli. They note that experienced clinicians were unable to distiguish them on these indices alone. Clinical obsessions do, however differ in their frequency, duration and intensity. They also cause more distress, are harder to dismiss, are less acceptable, more unpleasant and provoke more urges to neutralise.

These results indicate, essentially, that normal and abnormal thought phenomena such as these do not differ qualitatively in terms of the form or content of the experience, but do so quantitatively in terms of the factors relating to the emotional response they elicit (i.e. intensity and subsequent duration and frequency). Thus, Rachman and De Silva (1978) deduced that intrusive thought phenomena occur on a continuum, with clinical obsessions being a more severe manifestation of thoughts experienced by the normal population. Salkovskis (1985, 1989a) has suggested that it is differences in cognitive appraisal of the content of the thought which lead to quantitative differences in the emotional response to these stimuli.

Rachman and De Silva (1978) in establishing a theoretical relationship between clinical obsessions and unwanted intrusive thoughts, have significantly expanded the population available for study. In outlining his model of OCD (Rachman and Hodgeson, 1980), Rachman has further elucidated this relationship, outlining the conditions under which normal intrusive thought phenomena may take on clinical significance. Based on the three systems analysis of Lang, obsessions are conceived of having cognitive, behavioural and psychophysiological components (Lang, Malamed and Hart, 1970). The cognitive component has two facets, 1) the subjects perceived loss of control and 2) subjective reports of distress. The behavioural component includes overt compulsive rituals and avoidance behaviours which reduce discomfort and are negatively reinforced. The psychophysiological component considers typical fight or flight responses and is derived from emotion and fear theories (e.g. Lang, 1979).

Rachman argues that while most people periodically experience unwanted intrusive thoughts, in the absence of lowered affect and certain predisposing factors, such thoughts produce little emotional disturbance and are readily

assimilated. However during or after periods of dysphoria and/or exposure to stress, these thoughts or urges may become frequent, intrusive and discomforting. During times of heightened arousal they take on the properties of noxious stimuli causing distress. In this sense they come to resemble phobic stimuli, provoking avoidance behaviour and a failure to habituate leading to their maintenance.

A number of predisposing factors have been described by Rachman, the presence of which may exacerbate clinical obsessions or result in intrusive thoughts taking on a clinical status where this was not previously the case. These include 1) dysphoric mood state, 2) exposure to stress, 3) personally idiosyncratic perceptions of 'unacceptability' (i.e. high standards of conduct or morality), 4) sensitivity to danger signals and 5) personality factors. Thus a tendency to neuroticism and a predisposition toward the attainment of a high standard of conduct is likely to produce unwanted intrusive thoughts at times of high stress and/or dysphoric mood. Obsessions are thereafter maintained by a cycle of events whereby intrusive thoughts produce psychological and somatic disturbance as well as a perceived loss of control. This generates further dysphoria, producing greater susceptibility to the intrusive thought and the subsequent repetition of the cycle (Rachman and Hodgeson, 1980.)

A central tenet of Rachman's model is that it is the unpleasantness of the thought which primarily determines the persons ability to control it. Studies by Salkovskis and Harrison (1984) and Clarke (1986a) have supported such a relationship, although Parkinson and Rachman (1981) observed a factorial separation between unpleasantness and controllability, questioning its validity. Other findings have indicated that it is not the inherent 'unpleasantness' of the thought, per se, which determines controllability but

its emotional intensity. Thus Clarke and De Silva (1985) argue that unwanted intrusive thoughts are events that are of a primarily anxious nature and observed that emotional intensity and controllability were the most salient defining features of intrusive thoughts. Recent findings by Edwards and Dickerson (1987b) and Legg-England and Dickerson (1988), that pleasant intrusive thoughts associated with high levels of arousal are as difficult to control as unpleasant intrusions, adds further weight to this theory suggesting that emotional intensity of a positive valence, similarly leads to impaired control.

Salkovskis (1985, 1989a) has outlined a cognitive behavioural model of obsessions which expands upon the basic structure of the behavioural paradigm. Like Rachman, he assumes that most people experience intrusive thoughts, but emphasises the role of cognitions in determining which thoughts will persist. He argues that negative affect temporally associated with an intrusive thought is not the result of the thought itself but of negative automatic thoughts (Salkovskis, 1985), or the system of appraisal (Salkovskis, 1989b) by which the intrusive thought is evaluated. More specifically he suggests that this appraisal centres on cognitive beliefs in responsibility for the prevention of harm, which produce distress and lead to compulsive rituals. Such responses relieve distress associated with feelings of responsibility but reinforce the belief that responsiblity was actually involved. This leads to the maintenance of both the thought and compulsion which come to be regarded as valid. Fig 1.3 shows the cognitive behavioural model of the development of Obsessive-Compulsive Disorder.

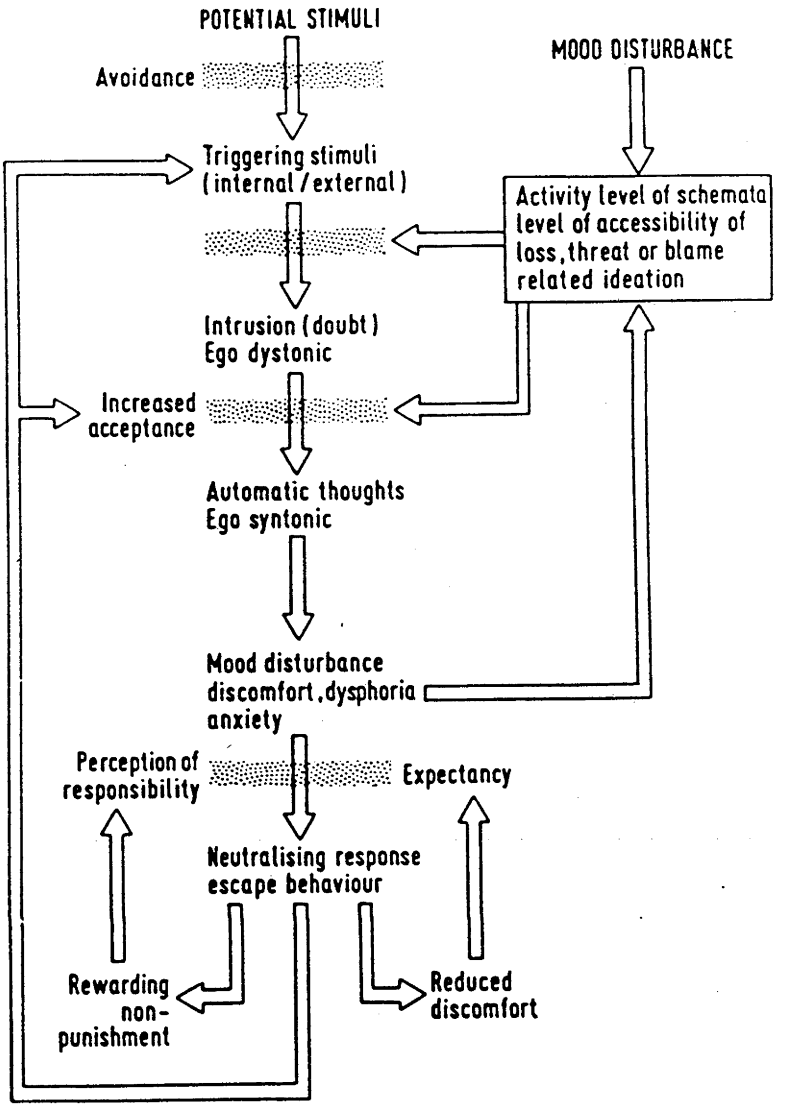

Figure 1.3: Cognitive and behavioural factors mediating obsessive-compulsive symptomology (from Salvkoskis, 1985, p578)

Within the model Salkovskis emphasises the crucial role played by neutralising behaviours and especially neutralising thoughts. The presence of such

thoughts, regarded as functionally equivalent to overt compulsive rituals, has been recognised for some time. They have been variously described as 'anxiety-reducing obsessions', 'covert compulsions' (Wolpe, 1958) 'cognitive rituals' (Robertson, Wiggenson and Kaplan, 1983) and as a form of cognitive 'neutralising' (Salkovskis, 1985). Yet despite their long-term recognition as a clinical entity and the success of behavioural interventions with obsessive-compulsive disorder, such treatment has yielded conspicuously poor outcomes in the treatment of pure obsessional ruminations. Salkovskis argues that in such cases behavioural methodologies such as exposure and response prevention have been inappropriately applied and that exposure to the thought and cognitive response prevention applied to cognitive rituals is necessary to achieve habituation and a lowering of frequency. Supporting evidence for the function of cognitive rituals has come from a treatment study by Kirk (1983) who demonstrated that the application of thought stopping to neutralising cognitions (rather than the obsessions) resulted in rapid habituation and successful treatment outcomes.

1.4 INTRUSIVE THOUGHTS AND OPPONENT PROCESS THEORY

Intrusive thoughts are, by definition, associated with mood states of a non-neutral valence. Rachman (1981) defines intrusive thoughts as:

> "repetitive thoughts, impulses or images that are unacceptable and unwanted...[and which] interrupt ongoing activity, are attibuted to an internal origin and are difficult to control." p.91.

Thus, intrusive thoughts are differentiated from spontaneous cognitions related to routine activities by virtue of their recurrence, non-volitional quality and associated hedonic tone. Their content is typically evaluated as pleasant or unpleasant, whilst features of their presentation, namely a lack

of predictability and control, often provide a further source of distress. Edwards and Dickerson (1987b) have provided further evidence suggesting that intrusive thoughts are capable of inducing both positive and negative affective states. Evidence of primary affective responses concomitant with intrusive thoughts provides a necessary pre-condition for the testing of Solomon's theory. The acquisition of a new motivational source, of the type postulated for intrusive thought phenomena, is derived from an affective dynamic (i.e. habituation, contrast and withdrawal processes) which is ultimately dependent on an initial mood induction, the **a** process.

1.4.1. HABITUATION TO INTRUSIVE THOUGHTS

Habituation training procedures have had an obvious clinical application in the treatment of obsessions. These methods, variously labelled 'satiation' (Rachman, 1971) 'paradoxical intention' (Solyom, 1972) and 'exposure' (Emmelkamp and Giesselbach, 1981) have in common the attempt to decrease discomfort associated with obsessions by allowing progressive adaptation, via exposure, to the potent emotional elements of these stimuli. With various modifications they have proven successful in reducing anxiety over repeated presentations and also decreasing the frequency of obsessional ruminations (e.g. Foa and Steketee, 1979; Moregan, Maier, Brown and Pollard, 1987 and Salkovskis and Westbrook, 1989).

Consistent with the results of clinical trials, Parkinson and Rachman (1980) observed significant decrements in responding following the application of habituation training to intrusive thoughts experienced by non-clinical subjects. In addition to decreases in subjective ratings of discomfort across trials, they also observed that the latency (i.e. retrieval times) of intrusive thoughts increased. Other indices such as intensity, stressfulness, unacceptability, uncontrollability and anxiety also decreased. This effect

was augmented by the prior use of relaxation training which appeared to facilitate exposure. These results are similar to those of Sutherland, Newman and Rachman (1982) who observed that repeated exposure to intrusive thoughts led to an increase in dismissal times during a sad mood condition.

The time taken to retrieve and dismiss an intrusive thought are important in that they appear to provide an index of habituation beyond subjective or physiological measures. This relates to the relationship between emotional intensity and controllability previously discussed. Edwards and Dickerson (1987a) observed similar results to those of the habituation studies when they observed that the time required to dismiss negative intrusive thoughts was longer than for neutral thoughts. They also found that positive and negative intrusive thoughts were equally uncontrollable (Edwards and Dickerson, 1987b). In explaining their results they drew upon information processing theories relating to attentional resources (e.g.Navon and Gopher, 1979 and Salame and Badderly, 1982). They suggested that intrusive thoughts, by virtue of their complexity and high emotional intensity, are automatically given processing priority. This results in an impoverished (parallel) capacity to conduct other processes which might be directed at disattending the primary intrusive stimuli.

The account provided by Edwards and Dickerson provides a theoretical explanation for the 'uncontrollability' observed in association with emotionally intense intrusive cognitions. In this sense also the effect of habituation may be seen as a lowering of affective tone which allows a normal information processing capacity (i.e. 'control') to be reinstated. A spiral effect may then ensue whereby an increase in perceived control further lowers affect, increasing subsequent processing resources. It also accounts for improved habituation with prior relaxation (Parkinson and Rachman, 1980) and greater vulnerability to intrusive thoughts during dysphoria (Sutherland,

Newman and Rachman, 1982). These results are not consistent with those of Clarke (1986b), who found that repeated exposure to negative cognitions did not significantly influence retrieval or dismissal times. In this case however, the failure of subjects to use their own thoughts, the small trial numbers and short exposure durations, were not likely to have produced habituation in accordance with the paradigm (Rachman, 1976).

1.4.2 AFFECTIVE CONTRAST & WITHDRAWAL

In contrast to the available evidence on habituation to clinical and non-clinical intrusive cognitions, there has been virtually no examination of contrast and withdrawal processes in relation to these phenomena. With the exception of one study to be discussed further (Ward, 1988), there has been a presumption that positive affect is unlikely to be associated with negative cognitions, such that measures including a positive affect scale have not been used. In addition, affective status has typically been measured only during the thought, with the failure to consider affective postreactions ensuring that an opponent process would not be detected. Despite this, physiological measures taken before, during and after obsessional thinking have shown trends consistent with an opponent process. Rabavilas and Boulougouris (1974) and Grey, Rachman and Sartory (1981) have observed increases in heart rate during obsessional ruminations which have fallen below baseline upon termination of these thoughts. While significance tests were not reported, and a direct coincidence should not be assumed (e.g. Lang, 1969) these trends in physiological responding are indicative of an affective opponent process. A report by Rachman and Roper (1976), showing a similar trend with self-reported measures of discomfort in relation to obsessional thinking, further supports this.

1.4.3. EVIDENCE FROM MOOD INDUCTION PROCEDURES

The previous section pointed to a lack of direct evidence for contrast and

withdrawal processes in relation to intrusive thoughts. Furthermore, studies reporting such processes have typically considered primary affective sources derived from external stimuli such as drugs and food. Intrusive thoughts by contrast may be regarded as internal stimuli, producing an emotional response more directly mediated by cognitions. Emotional responses derived in this way, as in studies of job satisfaction or test anxiety, have been shown to follow an opponent process. Evidence from mood induction experiments is of particular relevance however in that they offer a close analogue to processes observed in intrusive thoughts. Specifically, they produce a primary affective state similar to that of instrusive thoughts (Teasdale et. al., 1980; Clark and De Silva, 1985) are primarily derived from cognitive stimuli (e.g. Sutherland, Newman and Rachman, 1982) and have shown some specific evidence of an opponent process.

Williams (1980) used a mood induction procedure devised by Thompson et. al. (1979) to determine the effect of depressed mood on speech rate. He observed that the time taken to count to ten was significantly faster following the completion of a performance task, than immediately after mood induction or at baseline prior to the procedure. Willlams regarded this 'rebound effect' on speech rate following mood induction as evidence consistent with other opponent process phenomena observed in animals and humans.

Ranieri and Zeiss (1981, cited in Ranieri and Zeiss, 1984) conducted an exploratory study considering why people willingly engage in activities that make them feel sad. They found that subjects rated events occuring immediately after a 'sadness-inducing activity' as subjectively more pleasant than events prior to this activity. They argued that the opponent-process theory offered the best explanation for this finding. In a further experiment (Ranieri and Zeiss, 1984) using the Velten (1968) mood induction procedure, no

evidence was found for an opponent process, although it may be argued that a design flaw in the spacing of assessment intervals produced the null result. As in the Williams study, the greatest rate of mood change was observed at 2.5 minutes following mood induction, at which point Williams observed a peak decline below baseline. However since the mood induction duration in the Ranieri study was 20 minutes, twice that of the Williams induction, it is probable that the peak of the **b** process would have been around the 5 minute mark. In failing to measure mood until 12.5 minutes post-stimulus, it is conceivable that the B State peaked and decayed within this time, appearing at baseline when next measured.

The methodological issues considered in the Ranieri study point to the necessity of sensitive assessment intervals given the difficulty of predicting a time course for the B State. Whilst habituation studies would predict an accentuated B State due to multiple presentations, mood induction procedures are only likely to achieve a small opponent process. In this respect an initial presentation is likely to produce a B State that will peak and decay within the duration equivalent to that of the initial stimuli. Whilst recurring intrusive thoughts may be hypothesised to have an accentuated B State, as internal stimuli the course and termination of the **a** process itself may be difficult to determine. This further necessitates sensitive measures to determine a subsequent opponent process.

1.5 THE POTENTIAL ROLE OF COGNITIVE NEUTRALISING

The previous consideration of cognitive neutralising, as an activity requiring clinical intervention, also has implications for the opponent-process account of the maintenance of intrusive thoughts. Salkovskis and Westbrook (1989) have reiterated the functional equivalence of cognitive neutralising with behavioural compulsions in that they terminate exposure to intrusive

cognitions, reduce associated negative affect and are negatively reinforced. The successful application of response prevention procedures to these cognitions (Kirk, 1983; Salkovskis and Westbrook, 1989) has supported the theoretical account of their existence and function. Whilst it was also believed that, as a factor leading to the maintenance of obsessional thinking, cognitive neutralisers should be absent from non-clinical populations, recent evidence suggests this is not the case. Salkovskis and Dent (1989) report that in a survey of 243 non-clinical subjects, 77% reported some level of covert neutralising behaviour associated with intrusive thoughts, a prevalence consistent with that reported in clinical populations (Rachman and De Silva, 1978). In addition, subjects who frequently neutralised reported a higher degree of discomfort associated with their thoughts. Presumably neutralising processes have a strong negative reinforcement value in such cases, are quickly adopted and paradoxically produce low levels of distress thereafter. Indeed Salkovskis and Warwick (1988) have reported cases in which cognitive neutralising responses became so efficient that negative affect was no longer experienced in association with intrusive thoughts.

The high prevalence of neutralising behaviour in both clinical and non-clinical subjects suggests potentially widespread mediation of primary affective responses to intrusive thoughts. This may in turn affect any opponent process. Several postulates are of relevance to this; (1) the **a** process (initially) correlates closely in magnitude to the intensity, quality and duration of the provoking stimulus, (2) these primary processes are phasic and subject to small stimulus changes, and (3) opponent processes are strengthened by use and have asymptotes that are a direct function of the quality, intensity and duration of each exposure (i.e. the **a** process). Thus the initial magnitude of an affective response to an intrusive thought is regarded as directly proportional to its duration and intensity, with the

former subject to even small changes in the latter. The opponent process similarly correlates with the magnitude of the primary affective response and is likewise subject to changes in these indices.

The previous discussion indicates that where cognitive neutralisers affect the intrusive thought and reduce the emotional response to them, this will subsequently impact upon the opponent process, reducing or eliminating it. This could occur via a shortening of the duration of the thought or a direct reduction of associated affect via some semantic manifestation such that the actual duration of the thought was no longer related to its affective potential (Rachman, 1976). The first process would reduce the duration of the **a** process, the second its asymptote. The aforementioned principles indicate that either outcome would be reflected in the opponent process, essentially resulting in its reduction. Over time, neutralising behaviour would lead to maintenance, normally satisfying the necessary condition for the accentuation of the B State. Yet the recurrent low magnitude of the primary process presumably would ensure that its opponent process remained small. This latter point remains speculative as the governing theory is not yet sufficiently detailed to determine whether an **a** process of small magnitude which nonetheless remains constant (in failing to habituate) will produce a greatly accentuated B State. As a homeostatic mechanism compensating for a small initial process, this would appear unlikely. For present purposes, there is sufficient evidence to suspect that cognitive neutralising exists as a potential confound, reducing the hypothesised maintenance role of the opponent process. Parkinson and Rachman (1980) indicate the necessity of screening subjects for their presence, while Ward's (1988) failure to do so may have been a contributing factor in her null finding for an affective opponent process.

1.6 THE PRESENT STUDY

The primary objective of the present study was to determine the presence of an affective opponent process subsequent to primary mood induction via negative intrusive thoughts. It is argued that intrusive thoughts are internal stimuli capable of inducing mood via cognitive processes. The primary emotional response is thought to represent State A. It is expected that this will elicit an opponent process with an hedonic tone opposite that of the original response. With the termination of the intrusive thought, State B will rise to its asymptote and should be observed. The opponent affective state will then return to baseline as long as the thought is not reaccessed. In such an event the A State will lower and the B State will accentuate further, being accessible to measurement at a later point.

The investigation considered negative intrusive thoughts only. The opponent-process theory postulates a trend which is essentially the same whether the primary affective response has a positive or negative valency. Whilst a specific examination of positive and negative intrusive thoughts via the opponent process theory may point to important differences, this is not directly germane to the central hypothesis. The study has implications for an affect-derived theory of obsessions, that is, negative cognitions maintained via a post-reaction hypothesised to be positive. Negative intrusive thoughts are therefore the logical choice for a specific examination.

The study by Ward (1988), whilst observing mood induction, failed to establish habituation or affective contrast. Whilst the study appeared well designed to elicit and record the presence of an opponent process, its failure to do so may have been due to several factors. Firstly, the subject population had intrusive thoughts of relatively low intensity occurring at intervals of up to two weeks. In such a group the magnitude of the B State is likely to have

been minimal by virtue of their low rate of occurrence or the 'savings' principle noted previously (Soloman, 1980). Secondly, it may be argued that the practice of asking subjects to 'think about their thought' on cue is unlikely to produce a valid re-creation of the phenomena in either its usual form or intensity. If the stimuli were impoverished in this manner, inter-stimulus intervals of one minute may also have been longer than the decay duration, leading to a failure of the B State to accentuate. Thirdly, the failure to screen subjects for cognitive neutralising responses means that if they did effectively elicit the thought they may equally have neutralised its affective impact in the time alotted, hindering the habituation process and moderating any resultant B State.

The present study incorporated a number of methodological refinements into the basic paradigm to address the above criticisms and maximise the potential magnitude of the opponent process:

- Subjects were chosen for the experiment on the basis of earlier questionnaire responses and were those who reported a much higher frequency of intrusive thoughts occuring at an average rate of up to one per day. It was argued that the higher frequency and level of distress of these thoughts was more conducive to the presence of an accentuated B State by virtue of recurrent processing and/or a latent savings principle that could be effectively re-initiated via the habituation process.

- The method of presentation was modified in an attempt to make the thought experiences more intense and consistent. Subjects were exposed to edited audiotaped presentations of themselves discussing highly salient features of their intrusive thoughts. Salkovskis (1983) argues that subjects thinking tends to follow such taped material, evoking cognitive and affective processes that are experienced as a valid recreation of the

intrusive thought. These changes allowed the retention of the one minute inter-trial intervals following Soloman's (1980) suggestion that increases in stimulus duration and intensity increase the critical decay duration allowing the accentuation of the opponent process.

- Subjects were screened for the use of cognitive rituals in response to intrusive thoughts. Those making up the experimental group were instructed in means of avoiding such strategies but to subsequently report use where it did occur.

In summary, the study sought primarily to test for the presence of a positive affective opponent process in subjects who took part in an habituation training procedure for negative intrusive thoughts. In establishing this, the relevant theory predicts that the following will be observed; (A) initial mood induction, (B) habituation of the primary process, and (C) affective contrast.

Specifically, it is hypothesised that:

1) Subjects engaging a negative intrusive thought will exhibit a significant shift in mood in a negative direction away from baseline measures.

2) The initial mood shift will decrease with repeated presentations of the stimuli and be significantly less than the initial measure, in the direction of the baseline, when subsequently measured. This would constitute affective habituation.

3) At some point after the post-stimulus rest period there will be a shift in mood that significantly deviates from baseline measures in the opposite direction of the initial mood swing. That is, an affective contrast will be observed.

2 METHOD

2.1 SUBJECTS

A total of 118 undergraduate psychology students from the Australian National University completed an initial questionnaire on intrusive thoughts. This represented a 79% return rate on the 150 copies distributed. Subjects were regarded as suitable for the experimental procedure if they experienced their nominated thought at least five times during the previous two weeks. Thirty subjects experienced a thought at this frequency, of which twelve agreed to participate in the experiment. One subject decided not to take part when contacted while another subject reported a change of circumstance which resulted in a marked decline in the frequency of his thought and was therefore considered unsuitable.

Ten subjects completed the experimental task. The sample comprised 7 females and 3 males. Subjects ages ranged from 19 to 53 years. Most subjects received course credit for completing the questionnaire but not for the experimental procedure itself.

2.2 APPARATUS

2.2.1 INTRUSIVE THOUGHTS QUESTIONNAIRE

The Intrusive Thoughts Questionnaire (Appendix 1) was a brief form examining descriptive features of negative intrusive thoughts. Its format was largely derived from a questionnaire by Edwards (1984) and where possible, response options from that instrument were retained to allow direct comparisons of the data. The present questionnaire included eleven items examining quantitative features, such as the frequency and duration of such thoughts, as well as qualitative features such as form, content and triggering stimuli.

The principal purpose of the questionnaire was to act as a screening device allowing subject selection for the experimental procedure that followed. Participation in that task was based on frequency initially reported, with the minimum requirement being that subjects experienced their nominated thought on no less than 5 (i.e. 5 - 14) occasions over the previous two weeks. Information from the questionnaire also assisted in the setting of experimental parameters for intrusive thoughts and provided initial information on neutralising responses.

2.2.2 INTRUSIVE THOUGHTS DIARY

Subjects who completed the pre-experiment interview were asked to complete an Intrusive Thoughts Diary for 5 consecutive days prior to taking part in the experiment (see Appendix 2). The primary purpose of the diary was to provide an additional in vivo assessment of subjects use of cognitive neutralising responses which are known to have a high frequency in the non-clinical population (Salkovskis and Dent, 1989). During the interviews it was determined that none of the subjects engaged in behavioural rituals in response to intrusive thoughts. Cognitive neutralising was defined as thoughts used to stop or reduce unpleasant feeling associated with the intrusive cognition. Ratings of unpleasant affect were taken before and after the neutralising thought to determine their capacity to perform this function. Subjects were regarded as engaging in neutralising responses, of a sufficient frequency to interfere with primary and opponent affective reactions, if they performed such rituals on more than 50% of the occasions noted. It was additionally determined that subjects should experience a reduction in discomfort following the response on at least 50% of these occasions for this consideration to be made. Subjects were thereafter deemed 'neutralisers' or 'non-neutralisers' according to these two criteria and could be briefed for non-use prior to the procedure (see Appendix 2).

The diary also sought to determine frequency, duration and triggering stimuli in relation to intrusive thoughts. The frequency count was used to assess the reliability of questionnaire estimates. Duration estimates were used to assess reasonable trial periods for the experimental task. Information on triggering stimuli helped direct the individual editing of taped interview material to effectively evoke the intrusive thought.

2.2.3 MOOD ASSESSMENT INSTRUMENTS

2.2.3.1 THE PROFILE OF MOOD STATES (POMS)

Subjects completed the POMS questionnaire, a measure of general mood, for the two week period preceding the experiment (Appendix 3C). Excessive chronic mood states such as depression and anxiety have been found to increase the frequency and persistence of intrusive thoughts (Sutherland, Newman and Rachman, 1982; Edwards and Dickerson, 1987b). The POMS was used as a means of controlling for excessive mood states such as these. The depression and tension (anxiety) scales were the only ones to be scored.

The POMS has been demonstrated to be a reliable and valid measure of mood (McNaire, Lorr and Droppleman, 1971) and to show a high degree of structural similarity between American and Australian student samples (Robbins, 1981). The 'one week' verison of the POMS was modified to 'two weeks' to include the period of diary keeping since the frequencies reported during this period were similar to those of the period preceding the Intrusive Thoughts Questionnaire.

2.2.3.2 VISUAL ANALOGUE MOOD SCALES

Ten visual analogue scales were used to assess subjects current subjective mood states (Appendix 3D). A number of studies have reported the successful use of these scales to measure transient mood shifts in non-clinical

populations (Williams, 1980: Teasdale and Taylor, 1981; Teadsale and Russell, 1983). The scales presently used consisted of 100mm lines labelled at either end by opposing statements such as 'I am NOT feeling at all anxious' to 'I am feeling extremely anxious'. Subjects indicated how they felt 'RIGHT NOW' by placing a cross at an appropriate point along the line.

Each of the ten scales was based on a mood adjective in common usage, with five representing positive mood and five representing negative mood. The scores of the five positive adjective scales (pleased, relaxed, lighthearted, excited and happy) were summed to produce a postive mood scale ('Posmood'). The five negative adjective scales (anxious, irritated, frustrated, discouraged and disappointed) were summed to produce a negative mood scale ('Negmood'). In each case the scale represented a score between 0 and 500. The choice of the adjectives was based on Ward (1988) while the formation of the positive and negative mood scales was based on studies by Walsh (1986) who found them to be significant measures of mood induction in Australian students.

2.2.3.3. THE STROOP TASK

Subjects completed emotion-based variations of the Stroop Colour-Naming Task (1938) as a secondary measure of mood. In its usual form subjects are required to name the ink colour in which words are written and ignore the word content. Colour-naming is known to be significantly slowed if the words themselves are colour names that conflict with the colour of the ink in which they are written. Subsequent studies have shown that interference phenomena occur whenever cognitive representations corresponding to the meaning of the word are simultaneously activated (Warren, 1972).

Emotional states have also been shown to contribute to Stroop interference as a function of affect concomitant with, or induced by, the task. Pallak,

Pittman, Heller and Munson (1975) observed an increase in errors when items were presented at a fixed rate to subjects threatened with electric shock. Experiments by Clore (cited in Bower, 1981) showed that the induction of mood states slowed colour-naming for all emotional words, whether positive or negative. Watts, McKenna, Sharrock and Trezise (1986) observed that spider phobics are selectively showed in the colour-naming of spider-related words, while Mathews and McLeod (1985) observed evidence of interference in fear-specific domains such that subjects reporting fear of physical threats were selectively slowed in the naming of the physical threat words.

In interpreting their results Mathews and McLeod (1985) suggested that words representing a specific threat are selectively attended to in competition for processing resources against the original task, producing the interference. Harvey (1984) has pointed to an alternative, affect-induced processing bias suggesting that sub-processing of salient word content produces an emotional response which reduces subsequent attentional resources. Mathews and McLeod (1985) have suggested that both processes may be operating to produce interference or may selectively produce interference effects in different populations. For example, the most pronounced affects have been observed in clinical subjects with an apparent bias in threat evaluation (Williams and McNulty, 1986) although significant differences in processing rates have been observed in normal subjects in response to transient mood induction procedures (e.g. Pollack et al. 1975; Clore, 1981). It appears that the latter interference is predominantly affect-mediated while the former represents a stimulus-specific processing bias. Whilst employing threat-specific materials, it was expected that any interference effect in the present study would be predominantly affect-based and responsive to transient mood shifts.

The Stroop Task appears capable of providing an objective performance measure of transient shifts in affect. Since emotion is a diffucult construct to measure (Coleman, 1975) a secondary device to the Visual Analogue Scales could potentially improve the reliability of these measures. Alternative psychomotor measures such as speech rate, writing speed and facial movement were rejected due to a lack of evidence supporting their use as a measure of transient mood states (Ward, 1988; Walsh, 1984; Davidson, 1984). Physiological measures such as heart rate and skin conductance were similarly rejected because of interpretive difficulties in relation to an opponent process and as measures of emotion generally (Lang, 1979), as well as reported low levels of reliability of such measures (Arena, Blanchard, Andrasik, Cotch and Myers, 1983).

Examples of two verions of the Stroop Task used in the current experiment are presented in Appendices 3E and 3F. Words selected for the task represented either physical or social threat, based on evidence that category specificity selectively increases response latencies (Mathews and McLeod, 1985). Three subjects completed the 'physical-threat' Stroop and seven completed the 'social-threat' version based on the theme of their nominated thought. Twelve threat words from each category were used (Mathews et. al., 1985) and supplemented by a further four words from Watts et. al. (1984) and placed in the appropriate category (e.g. 'crash', 'shame'). This yielded a pool of 16 words all matched for frequency, length and syllable number. To minimise practice affects the first and second presentation consisted of eight different words in each category and a combination of first and second list words in the final presentation. The eight words were repeated ten times yielding a list of eighty threat words and an equivalent number of control words in each of the three presentations. The words were written in colour pens on A4 paper, in block capitals 0.5cm high and in one of four colours (red, orange, green and blue) with each word balanced across colours.

Due to the odd number of trials and the prospect of an incomplete rotation of threat and control words across presentations, the control words were always presented first and the threat words second. Practice affects have been noted with the Stroop (Jensen and Rohwer, 1966) and it may therefore be argued that the later presentation of the threat words would work against the hypothesised interference (slowing) effect. Significant differences despite this would indicate a robust interference in threat specific processing.

On the basis of the cognitive processing models outlined above, it was predicted that at baseline, in the absence of mood induction, there would be no interference and therefore no significant differences in response latencies between neutral and threat-relevant word lists. With the negative mood swing hypothesised at the time of the second presentation it is expected that threat words would evince significantly longer latencies than neutral words. A similar result is expected at the third presentation but based on the hypothesised swing into positive effect. This follows Clore's (1981) observation that strong positive emotion increased naming times for both positive and negatively valenced materials. Since the interference effect is non-specific, corroborative subjective evidence from the Analogue Scales will be needed to determine the valence of the mood state producing the effect during the second and third presentations.

2.2.4 PRE-TEST QUESTIONS

Prior to commencing the experimental task subjects were asked to answer questions about their nominated intrusive thought (see Appendix 3B). This was an additional screening device to ensure that the content, frequency and valence of the presenting thought was consistent with that previously nominated in the questionnaire and discussed in the pre-experiment interview. The questions were presented to the subject by the experimenter and included a

description of the thought, its frequency in the previous week and a check of its valence via mood adjectives from the Visual Analogue Scale. The experiment proceeded when it was ascertained that content and frequency were consistent with previous descriptions, and mood induction categories indicated current negative valence.

Prior to the screening subjects had also been categorised according to their tendencies to engage in cognitive rituals. These followed the criteria derived from the results of the intrusive thoughts diaries. Following the screening, subjects were given information about the form and function of these behaviours and asked to avoid their use. Continued use of these strategies despite instruction was subsequently determined in the Post-Test Questions.

2.2.5 RELAXATION

Subjects participated in a five minute relaxation exercise prior to the commencement of the experimental task. This was a modified version of Wolpe and Lazarus' (1966) progressive muscular relaxation procedure and involved tension and relaxation of major muscle groups. Subjects followed audiotaped instructions to complete the procedure.

Parkinson and Rachman (1980) found that habituation to intrusive thoughts is facilitated by prior relaxation. They also observed that relaxation reduced discomfort associated with intrusive thoughts and that this occured independently of the reductions associated with the habituation process itself, effectively facilitating exposure to the thoughts. To the extent that relaxation could enhance habituation and contribute to an opponent process, it was regarded as important to reduce initial levels of tension prior to the task.

2.2.6 POST-TEST QUESTIONS

Upon completion of the experimental task subjects were asked to rate features of the procedure to determine the validity of the thought experience it had produced (Appendix 3H). The questions considered the perceived naturalness of the thought and 'mind-wandering' from the task. The latter category considered time spent thinking of other things during the 'thought periods' and also the extent to which the intrusive thought was engaged during the inter-trial period.

The perceived 'naturalness' of the thought was regarded as a crucial variable since it provided a measure of the validity of the thought experience. Where subjects failed to have an intrusive thought they regarded as reasonably natural, a primary affective response (a process) is unlikely to have emerged, leading to a failure of the opponent process. On this basis there appeared grounds to exclude the data of subjects reporting that their thoughts appeared 'not very much' like the naturally occuring event.

Mind-wandering was considered a less serious failure of the paradigm since fluctuations in both cognitive and affective engagement of intrusive thoughts are a recognised feature of these phenomena (Edwards and Dickerson, 1987a). Fluctuations in mood induction may effect the timing of the proposed B State but not its occurrence, assuming primary mood induction is achieved. Should the latency of the B State be delayed it is argued that the sensitivity and overall duration of mood assessment intervals would ensure they are detected nonetheless.

2.3 PROCEDURE

Following completion of the Intrusive Thoughts Questionnaire subjects meeting frequency criteria and willing to participate were asked to attend a

pre-experiment interview. The purpose of this was to gather audiotaped material relating to the subjects intrusive thought and edit this for use in the experimental procedure. A series of standard questions were used to elicit information about the form, content, triggering material or situations, emotional quality and personal meaning of the thought. Sessions were generally less than 30 minutes, typically yeilding 10-20 minutes of taped material. While the sessions may have contributed to the habitutation process they were nonetheless kept brief, so as to interfere with the natural progression of the thought as little as possible. Subjects were given the Intrusive Thoughts Diary at the end of the session and asked to begin the following day and return mail them on completion. The subjects were contacted again upon diary completion and given an appointment time for the experiment. All subjects completed the experimental task within four weeks of receiving the initial questionnaire.

The experiment was conducted in a small room without windows, devoid of extraneous materials and with light sufficient for reading. Subjects sat in an armchair with tape equipment, the experimental booklet and reading materials placed on a table to their right. A tape deck with connecting headphones was used to present the experimental procedure. A separate portable tape unit with in-built microphone was used to record recitations of the Stroop colour-naming task. Following a reiteration of the intructions by the experimenter to correct any misunderstandings, the subject was left alone to complete the taped procedure. The experimenter occupied an adjoining room and kept independent timing of the procedure, returning with further materials after the completion of the tape.

The experimental procedure is presented in Appendix 3. All materials presented to subjects during this task are reproduced in Appendices 3A - 3H. Subjects were given three different test 'booklets' during the course of the

experiment. The first booklet contained a set of general instructions (Appendix 3A) giving a rationale for the experiment and further definitions of negative intrusive thoughts. This was followed by the Pre-Test screening questionnaire, the POMS and the initial Visual Analogue Scale and Stroop Task which provided the baseline for these two measures. The first booklet concluded with specific instructions for the experimental procedure (Appendix 3G). Subjects were also given instructions at this point to refrain from using cognitive neutralising strategies during the procedure.

The experiment proper consisted of a taped habituation training procedure presented over headphones. Following relaxation instructions subjects experienced six presentations of edited taped material consisting of their descriptions of salient features of their thought. The first three of these 'thought periods' were four minutes long with the last three being three minutes in length. The thought periods were interspersed with one minute periods of silence during which subjects were to avoid thinking about their nominated thought, examining emotionally neutral reading material if necessary. The beginning and the end of each thought period was marked by a tone. All other instructions, such as the timing of the analogue mood scales, were presented over the tape.

Subjects completed a second booklet of materials during the experimental phase which contained four analogue scales and two Stroop tasks. A break between the third and fourth thought periods allowed completion of the second analogue and Stroop tasks respectively. The three remaining analogue scales in this phase were completed at 2.5 minute intervals one minute after the completion of the sixth and final thought period (i.e. at 30, 32.5 and 35 min.). The tape finished at the 38 minute mark following instructions for the final Stroop task.

A seven minute rest period followed the final Stroop task. The experimenter entered the room at this point and presented the final booklet. These contained the last two analogue scales, completed at 48 and 50.5 min. respectively, and the Post-Test validity ratings. The experimenter allowed 8 minutes for the completion of this material before entering the room. Debriefing included an expansion of the previous experimental rationale to include consideration of an opponent-process and a check of any ongoing negative emotion. This was worked through where appropriate. All subjects reported a level of emotion at least equivalent to pre-experimental levels upon departure, with most reporting an improved state.

3 RESULTS

3.1 INTRUSIVE THOUGHTS QUESTIONNAIRE

The Intrusive Thoughts Questionnaire was used primarily as a screening device and as such the results (presented in Appendix 4) will only be given cursory attention.

Of the 118 subjects who completed the questionnaire, 106 (95%) suggested that they had experienced a negative intrusive thought, while 81 (67%) stated that they had had at least one such thought in the previous two weeks. Such an incidence is consistent with previously reported rates of occurrence (e.g. Edwards, 1984; Salkovskis and Harrison, 1984).

The content of the thoughts typically involved thoughts of violence or harm to self or others, with 65% of subjects and 50% of the experimental group reporting this as the theme of their primary thought. This compares with Edwards (1984) finding of 44% for a similar 'harm' cagegory, although this tended to be less inclusive than the current category which included thoughts of illness or disease. It is worth noting that many of the thoughts in this major category involve subjects concern regarding their capacity for direct/indirect harm to others. These results tend to support Salkovskis' (1985) view that the etiology and maintenance of intrusive cognitions revolves around subjects perceptions of responsibility for harm and its prevention.

Negative intrusive thoughts tended to take the form of an image (30%) or a thought (33%). This differs from Edwards (1984) findings for images (12%) and tends to support de Silva's (1986) contention that more extreme ruminatory phenomena, the present basis for selection, may involve images at a greater frequency.

Most subjects experienced their primary thought for less than 10 minutes when it occurred (89%), with 43% experiencing them for less than one minute. Nine of the ten subjects noted a typical duration of less than 10 minutes, suggesting that the task duration of 3-4 minutes was a valid duration. Those in the experimental group also reported a lowered capacity to control the duration of their thoughts with 90% reporting that they had control only 'to some extent' or less, compared with 60% of the main group.

The 81 subjects experiencing intrusive thoughts gave a combined total of 188 responses regarding cognitive or behavioural actions subsequent to their thoughts. Only 21% of these responses were not consistent with attempts to neutralise the thought or anxiety associated with it (i.e. 'don't do anything', 'think it through'). A further 12% of responses related to forms of behavioural ritualising ('absorbing activity', 'action or ritual') while 62% (116 responses) involved cognitive strategies to remove the thought or associated affect ('reassure myself', 'think of something else', 'say stop'). These latter responses were given by 68 subjects, indicating that 84% of those experiencing negative intrusive thoughts reported the use of one or more strategies involving cognitive neutralising responses. This included 75% of the experimental group. Such findings are consistent with those of Salkovskis and Dent (1989) who observed that 77% of a non-clinical group utilised such strategies in response to negative intrusive thoughts. Such a high incidence has obvious implications for the maintenance of these thoughts in clinical and non-clinical settings.

3.2 PRE-TEST QUESTIONS

None of the 10 experimental subjects were excluded from the procedure on the basis of the pre-test questions. All subjects described content consistent with the thought previously nominated and nine used negative adjectives

exclusively to represent its valence. One subject additionally used positive adjectives but it had been previously recognised that this perception contributed significantly to the anxiety associated with the thought.

Seven of the subjects reported a frequency in the preceding week which was consistent with questionnaire and diary ratings. One subject reported a slight increase while two others reported a decrease of approximately 50% from the initial measures but still regarded them as having their previous emotional impact.

3.3 PROFILE OF MOOD STATES (POMS)

Group means and standard deviations were calculated for the Tension-Anxiety ($\bar{x}$=16.4, s=7.6) and the Depression-Dejection ($\bar{x}$=18.5, s=31.2) scales for the POMS. Two t-test comparisons were then made against normative data for American college students (T-A, $\bar{x}$=13.4, s=7.1: D-D, $\bar{x}$=13.95, s=10.00). These indicated that the present subject group did not differ significantly from the normative sample for either anxiety ($t=1.11$, $p<0.05$) or depression ($t=1.08$, $p<0.05$).

While individual subjects did produce mood scores outside the range for student norms, these were in all cases below normative measures for clinical outpatients (McNair et. al. 1971). It is likely that the more stringent criteria of considering mood over the previous fortnight generally inflated scores relative to the student norms. On this basis it appeared that none of the subjects were currently experiencing anxiety or depression which was of clinical significance and which may have provided an experimental confound.

3.4 POST-TEST QUESTIONS

It was suggested that in the absence of a reasonably natural intrusive thought

during the procedure subjects were unlikely to experience strong primary affect or a subsequent opponent process. Two subjects failed to meet the minimum criteria set for this i.e. that their thoughts were like the naturally occurring event at least 'to some extent'. On this basis they were excluded from subsequent data analysis.

Mind-wandering was considered less serious since its likely effect would be on the timing of an opponent process, not its occurrence. Two subjects reported that they 'sometimes' thought of other things during the thought periods while the six remaining subjects reported that this happpened 'never' or 'not very often'. One subject reported thinking of her nominated thought 'most of the time' during the inter-trial intervals, four subjects noted that this occurred only 'sometimes', whilst the remainder reported no such occurrence.

Only one of the eight subjects reported the use of cognitive neutralising activities. This involved an active attempt to think of another specific thought during consideration of particular aspects of her intrusive thought. This subject had described previous neutralising thoughts in both her questionnaire and diary responses and had been placed in the neutralising group.

3.5 VISUAL ANALOGUE SCALES

The analogue mood ratings of eight subjects were included in the final analysis. Table 1 outlines the means, standard deviations, and confidence intervals for the combined positive ('Posmood') and negative ('Negmood') mood scales completed by the subjects over the seven presentations. Given the available data set, it is argued that the most appropriate analysis of the hypotheses under consideration would be made using a series of paired t-test comparisons (1). The data are reproduced graphically in Figure 4.1.

POSMOOD

Presentation	1(0)	2(14)	3(30)	4(32.5)	5(35)	6(48)	7(50.5)
$\bar{X}$	246	118	96	143	147	229	250
S.D.	90	60	64	95	81	134	135
C.I.	±75	±50	±54	±80	±68	±113	±113

Comparison	1:2	2:3	3:4	3:5
t*	4.06**	1.06	2.47**	1.47

NEGMOOD

Presentation	1(0)	2(14)	3(30)	4(32.5)	5(35)	6(48)	7(50.5)
$\bar{X}$	145	276	309	287	257	148	163
S.D.	83	112	95	81	134	138	112
C.I.	±70	±94	±80	±68	±113	±116	±94

Comparison	1:2	2:3	3:4	3:5
t*	2.67**	0.94	1.27	1.27

*where $t(df, \frac{\alpha}{2}) = 2.36$

**significant result

Table 1: Means, standard deviations, confidence intervals and paired t-test comparisons for the positive and negative analogue mood scales

A necessary pre-condition for the occurrence of a positive opponent process was the establishment of primary negative mood induction. This would be observed as a significant swing towards negative affect, away from baseline measures, following the three initial presentations of the intrusive thought material. A comparison of Posmood ratings at Time 1 (baseline) and Time 2 (14 mins.) indicated a significant reduction in positive affect over this period ($t = 4.06$, $p<0.05$). This was supported by a significant increase in mean Negmood ratings over the same interval ($t=2.67$, $p<0.05$). These results supported the first hypothesis; that the presentation of the interview material would elicit salient aspects of the intrusive thought resulting in significant negative mood induction.

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(1) The decision to use selected t-test comparisons followed consultation with the Faculties Statistical Consultant. Their use allowed direct comparisons of the mean pairs relevant to the three main hypotheses under consideration. They have been used selectively because of the known hazards of multiple testing such as changes in the notional probability level, and limitations such as a lack of orthogonal independence. An analysis of variance was unlikely to be appropriate since its use in the present case would violate the assumption of compound symmetry. Beyond this, the scope of the present data do not justify the use of formal multivariate analysis. Whilst a MANOVA incorporating the Hotelings-t procedure was theoretically appropriate, the size of the present data set would also have violated assumptions inherent in its use.

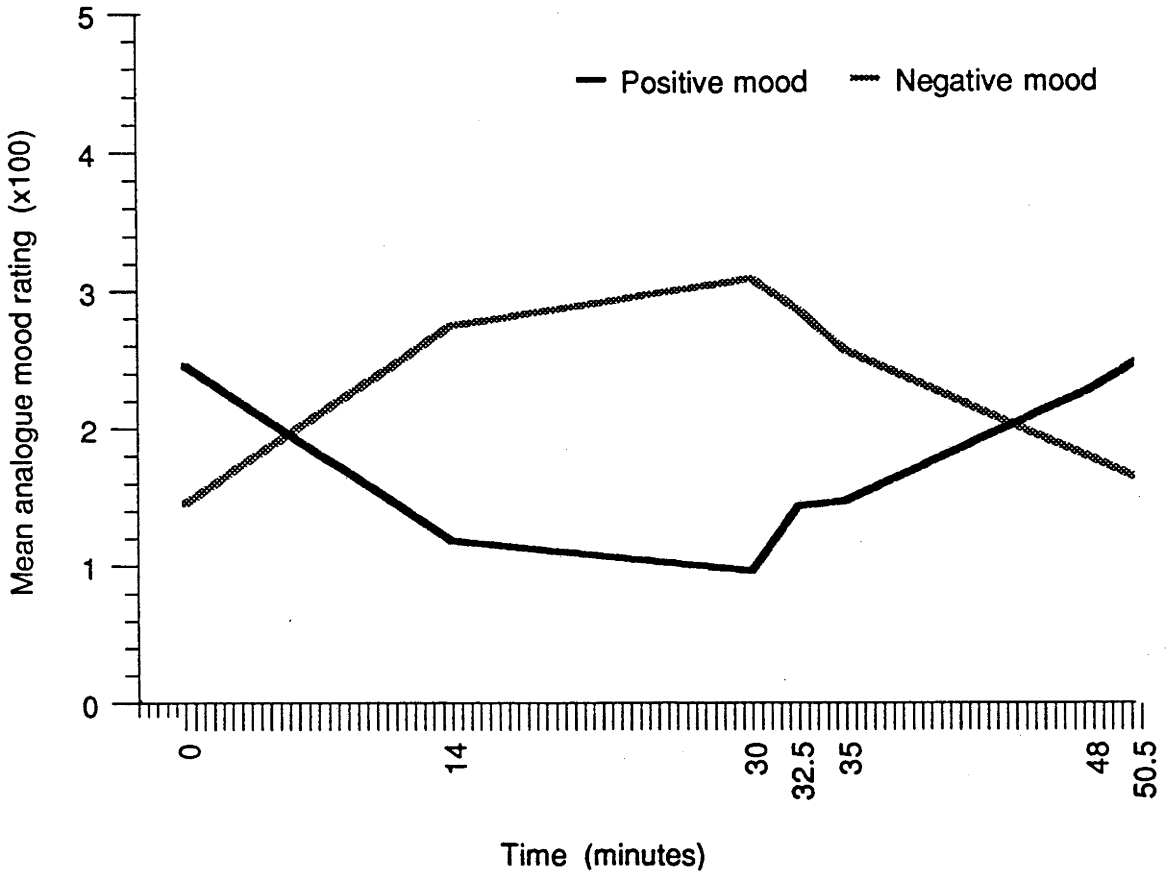

Figure 4.1 Mean positive and negative mood ratings for the Visual Analogue Scales.

Following mood induction with the initial stimuli it was predicted that subjects would show affective habituation to the intrusive thoughts. This process would be observed as a significant decline in negative affect with the offset of the stimulus at Time 3 (30 min.) relative to Time 2 (14 min.). A comparison of mood ratings between these intervals indicated that such a trend had not occurred. For both Posmood and Negmood, comparative measures between Time 2 and Time 3 indicated a continuation of the earlier trend towards negative affect, although this was not statistically significant (Posmood: $t = 1.06$, $p<0.05$) (Negmood; $t = 0.94$, $p<0.05$). These results indicated that, contrary to the hypothesis, affective habituation to the intrusive thoughts had not occurred following initial mood induction.

It was further hypothesised that with the offset of the stimuli, an affective opponent process would be observed. This would be manifest as a significant shift in affect, in a positive direction, at Time 4 (32.5 min.) and/or Time 5 (35 min.) relative to Time 3 and baseline measures. As can be seen in Fig 4.1 none of the mean mood ratings at Times 4 or 5, for either the positive or negative mood scales, approached their respective baselines. For the Negmood scale the comparison of Time 3 and Time 4 was not significant ($t = 1.27$, $P<0.05$). The comparison between Time 3 and Time 5 was also not significant ($t = 1.27$, $p<0.05$). For the Posmood scale there was a significant increase in positive affect between Time 3 and Time 4 ($t = 2.47$, $p<0.05$) whilst the comparison between Time 3 and Time 5 was not significant ($t = 1.42$, $p<0.05$). Thus, the results indicated that, contrary to the hypothesis, no significant affective contrast emerged following the offset of the intrusive thought stimuli.

The results for the visual analogue scales indicated a generally increasing level of negative affect over the course of presentations, as measured by increases in Negmood and decreases in the Posmood scale. This followed a gradual return to baseline measures for both scales with the offset of the stimuli. This result, which represented a highly uniform trend for both positive and negative mood measures, is consistent with the occurrence of negative mood induction and a subsequent return to pre-experimental levels. Whilst a significant increase in positive affect was observed on the positive mood scale following the offset of the stimuli, this occurred relative to the Time 3 (30 min) measurement and not the baseline measure for positive mood, set as the criteria for an opponent process. As such, this particular finding appears to represent an accelerated return to baseline relative to other post-stimulus measures but indicates a similar trend nonetheless.

3.5.1 INDIVIDUAL RESULTS

Individual results for the Visual Analogue Scales were largely consistent with the trend observed for the group results. Whilst negative mood induction was consistently observed, there was no evidence of comprehensive habituation or affective opponent processes. Table 3 outlines the results for the first five presentations for each of the eight subjects.

SUBJECT	TIME (min.)	BASELINE (0)	14	30	32.5	25
1	POSMOOD (+) NEGMOOD (-)	56 238	10 291	10 333	11 337	11 341
2	+ -	326 62	129 372	222 318	317 267	126 381
3	+ -	210 155	224 84	127 338	232 257	202 271
4	+ -	316 145	109 360	46 369	139 264	243 51
5	+ -	317 117	80 414	89 485	100 464	74 464
6	+ -	202 151	118 189	83 169	164 202	199 168
7	+ -	291 276	126 311	67 250	91 283	220 237
8	+ -	255 22	149 192	128 222	94 225	104 156

TABLE 2: Individual results for the Visual Analogue Scale over the first five presentations

As with the group results, mood induction would be observed as a decrease in positive affect and an increase in negative affect at Time 2 (14 min.) relative to Time 1 (baseline). With the exception of subject 3, all subjects reported a shift towards negative affect consistent with this trend. Subject 3 initially reported a slight increase in positive affect and a decrease in

negative affect at Time 2 (14 min.) but subsequently reported a large decrease in positive affect and an increase in negative affect relative to Time 3 (30 min.). Thus it appeared that negative mood induction did occur in this case but was the result of later rather than earlier presentations.

The failure of an habituation process to emerge in the group results was similarly evident at the individual level. Subjects 5, 6 and 7 observed mild trends consistent with an habituation process on either the positive or negative scale. Subject 2 reported both a decrease on the negative scale and an increase on the positive scale at Time 3 (30 min.) relative to Time 2 (14 min.). Whilst the former results are more equivocal, subject 2 provided the only results fully consistent with an habituation process, within a body of results otherwise indicating the absence of such a process. Despite the apparent occurrence of affective habituation in this subject no subsequent evidence of an opponent process was observed in relation to this individual.

An affective opponent process would be observed as an increase in positive affect and a decrease in negative affect at Time 4 (32.5 min.) relative to individual baseline measures. Subjects 3, 4 and 7 showed minor trends consistent with an opponent process but in all cases these occurred on either the positive or negative scales only, were of small proportions and were not maintained across intervals. As such they were to likely represent minor fluctuations away from individual trends which were otherwise in accordance with the group results.

3.6 THE STROOP TASK

Table 3 presents the means, standard deviations and confidence intervals for the reaction time data of the eight subjects completing the Stroop Task. These data represent a collapsing of the physical and social threat categories following observation that the results for the two subjects in the physical category observed a similar trend to those in the social threat group. Paired t-tests were calculated comparing mean reaction times for the neutral and threat-related lists at each of the three presentations. These are also presented in Table 2. Figure 4.2 shows the mean reaction times and confidence intervals for the neutral and threat related lists over the three presentations.

NEUTRAL WORDS

Presentation	N1	N2	N3
$\bar{X}$	71.71	61.23	64.62
S.D.	20.88	11.52	15.45
C.I.	±17.11	±9.69	±13.00

THREAT WORDS

Presentation	T1	T2	T3
$\bar{X}$	78.81	71.91	72.59
S.D.	23.84	13.48	18.03
C.I.	±20.09	±11.36	±15.19

Comparison	N1:T1	N2:T2	N3:T3
t	3.0**	7.41**	2.23

*where $t(df, \frac{\alpha}{2}) = 2.36$
**significant result

Table 3: Means, standard deviations, confidence intervals and paired t-test comparisons for the neutral and threat versions of the Stroop Colour-Naming Task

On the basis of the cognitive processing model previously discussed it was predicted that at baseline, in the absence of mood induction, there would be no interference and therefore no significant difference in mean response latencies between normal and threat-related mood lists. A comparison of these two conditions at the first presentation indicted that, contrary to the hypothesis, response latencies for the threat list were significantly slower that for the neutral list ($t=3.00$, $p<0.05$). This indicated that an affect-based interference in the cognitive processing of this material had occurred.

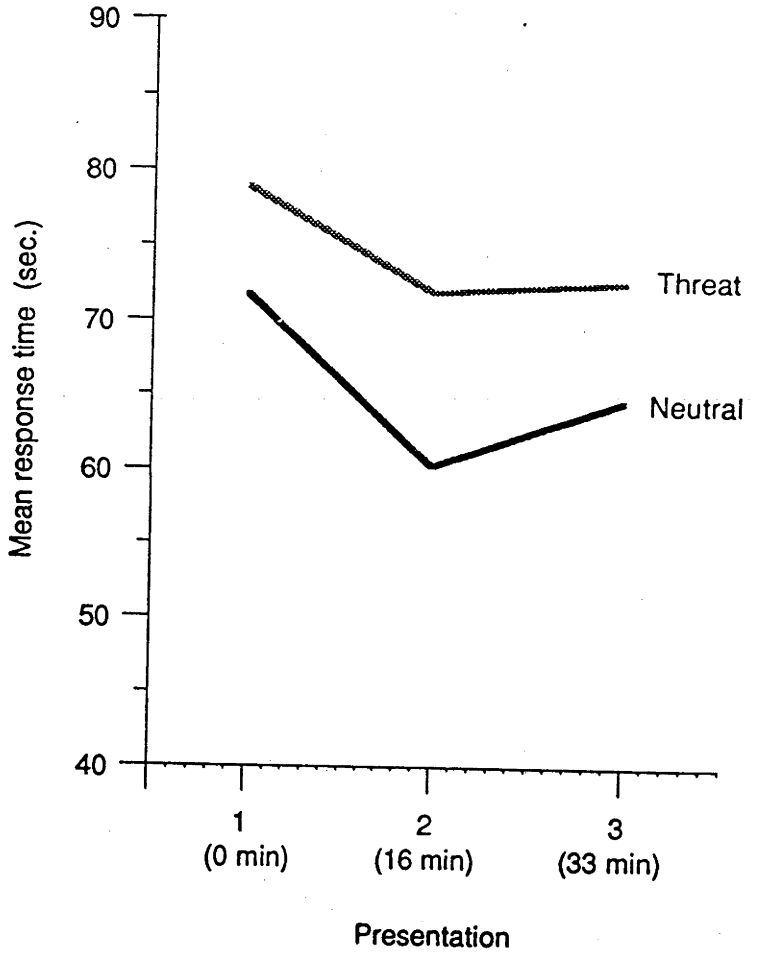

Figure 4.2 Mean naming latencies for threat-related and neutral Stroop word lists

With the negative mood swing hypothesised at the time of the second presentation, it was predicted that threat words would evince significantly longer naming latencies than neutral words. A comparison of the two conditions at the second presentation supported this prediction. The mean naming time for the threat condition was significantly slower than that for the neutral condition ($t=7.41$, $p<0.5$). This was a highly robust finding and represented the greatest discrepancy in response latencies between these conditions over the three presentations. As such it supported the prediction that the induction of strong negative affect associated with intrusive thoughts would selectively retard the naming latencies of threat-related words.

At the third presentation, with the hypothesised swing into positive affect, it was again predicted that threat words would evince longer naming latencies than neutral words. The effect in this instance was assumed to be the result of processing interference resulting from strong positive affect rather than negative affect. However, since the mean analogue mood ratings taken at the 32.5 minute interval indicated that a negative affective state persisted at this point, a significant effect would reflect this, rather than the positive affect predicted. In fact the difference between response latencies at the third presentation failed to reach significance ($t=2.23$, $p<0.05$).

The results of the Stroop colour-naming task appear to be broadly consistent with those of the Visual Analogue Scales, supporting their use as a secondary, objective measure of mood status. Despite known practice affects for the Stroop task, (Jensen and Rohwer, 1966), which would tend to reduce the naming latencies of the latter presentations, the threat-related list produced longer latencies on each occasion in spite of their secondary ordering. A simple ordering effects explanation for the retarded processing of threat material also seems untenable given the necessity of working against any practice effects and the considerable variation in response-time comparisons observed across presentations.

As expected a significant slowing of threat-related words was observed at the second presentation concomitant with the subjective reporting strong negative affect. This supported the hypothesis of a selective affect-based interference in the cognitive processing of threat-related material. This result must be interpreted with caution however, in the absence of the non-significant baseline effect which had been predicted. This hypothesis was based on the assumption that at baseline (presentation 1), prior to the experimental task, subjects would experience a neutral affective state producing no interference. The result may have been accounted for by negative affect based on subjects anticipation of an unpleasant task. However, analogue measures at this point suggested neutral to positive affect. This result may reflect a more enduring bias in the cognitive processing of threat material which may operate in the absence of, or concomitant with, a specific affect-based interference. Both of these accounts have been considered previously (e.g. Clore, 1981; Mathews and McLeod, 1985) although it had been postulated that the present subjects were likely to respond on the basis of transient mood shifts rather than an enduring processing bias. It remains possible that both were a feature of the present results.

In summary, the results of the second and third Stroop presentations appear consistent with the affect-based interference originally postulated. As such they support the subjective findings that an affective opponent process did not occur. However the failure to establish affective neutrality at baseline measures for this task, and a possible alternative account for these findings, makes the former results more equivocal. It is perhaps worth noting that had more stringent probability levels been adopted, the baseline result would have failed to reach significance while those for the second presentation would have remained robust. This would have been more consistent with the interference account originally postulated.

4. DISCUSSION

The results of the present study did not support the central hypothesis; that a positive affective state would emerge following negative mood induction relating to intrusive thoughts. The first hypothesis, that intrusive thoughts would induce a significant shift toward negative mood, was supported. There was no evidence indicating affective habituation to the thoughts following primary mood induction. Thus the results are consistent with affective changes that would be expected during a mood induction procedure and are in accord with the earlier findings of Ward (1988). A significant shift towards negative mood was experienced consistent with the engagement of negative intrusive thoughts. This was followed by a return to baseline with the termination of the stimulus.

The failure of an opponent process to emerge gives rise to the question of whether the methodology employed in the study provided an adequate test of the theory. A functional definition of 'adequacy' in this sense requires an examination of the theoretical pre-condition necessary for the emergence of an affective opponent process. According to Soloman (1980) primary mood induction is both a necessary and sufficient condition for the creation of an opponent process. Habituation is not a necessary pre-condition. To the extent that the present methodology produced significant negative mood induction, it successfully established the affective state necessary for the creation of an opponent process. In fact, comparisons with the results of Ward (1988) indicate mood induction of a greater magnitude than that observed in the earlier procedure. Methodological refinements including the use of a taped procedure, controlling the use of cognitive neutralising strategies and the selection of a higher frequency subject group appear to have been successful in creating a more intense primary affective state. Despite this a subsequent opponent process was not evident. Explanations for this may be considered at both a methodological and theoretical level.

It may be argued that the requirement of listening to audiotaped material as a prompt to the engaging of the thought was an artificial procedure which was unlikely to produce a valid recreation of the thought. However the experience of participating subjects and wider empirical evidence indicates that this is not the case. Eight of the ten subjects reported that their thought experiences were similar to their naturally occurring cognitions. Similarly Kirk (1983) and Salkovskis (1985) have reported significant reductions in the frequency of clinical and non-clinical ruminations using this procedure. To the extent that exposure to the thought is posited to be the effective therapeutic component (Kirk, 1983) it would appear that this procedure is capable of inducing valid intrusive thought experiences.

Whilst habituation is not considered necessary for the establishment of an opponent process, its presence is indicative of an accentuation of the **b** process. The failure of habituation to emerge questions the application of the training procedure presently employed. It is possible that both the number of trials and their timing were insufficient to produce this effect. While Parkinson and Rachman (1980) also had six trials, their inclusion of pre and post measurements increased this number to eight. The number in the present procedure was reduced to six to match the time intervals of the Ranieri and Zeiss (1984) mood induction procedure. Parkinson and Rachman (1980) have also indicated that the total duration of stimulus exposure is an important determinant of the habituation process. While the present procedure employed fewer trials the total duration of exposure was greater than that of Parkinson and Rachman. To this extent it would appear that trial durations were theoretically sufficient to produce habituation effects.

In addition to the actual trial number the necessity of including mood measures prior to the third inter-trial interval may also have reduced the 'effective' number of habituation trials. According to opponent process

theory the increase in the inter trial phase may have been sufficient to extinguish any emerging **b** process, thereby halting habituation. Parkinson and Rachman's (1980) suggestion that the habituation process often occurs subsequent to an increase in disturbance points to the necessity of a sufficient number of trials which are consistently maintained. It was postulated that increases in stimulus quality and duration would allow an effective increase in the critical decay duration (e.g. Starr, 1978). However, the findings of a non-significant increase in negative mood ratings from the third to the sixth trial may indicate the decay of the **b** process at this point, reducing any subsequent habituation.

A further possibility is that the mood measures employed in the study were not sensitive enough to detect the emergence of a B state. In the absence of habituation, the **b** process would have failed to accentuate and therefore would have remained relatively small. However the self report measures did reflect the initial mood changes from baseline as well as subtle shifts observed on the positive scale following the sixth thought period. As noted previously, small changes in the magnitude of self-reported mood, as occured in the latter, may otherwise have been interpreted as an opponent process had they occured relative to baseline. This latter result represented an accelerated return to pre-experimental affective levels which was anomalous to the overall trend.

The evidence above suggests that the Analogue scales were sufficiently sensitive to register even a small opponent process had it occurred. This necessarily assumes that the process is occurring during the measurement interval and overlooks the possibility of a complete opponent phase during the 2.5 minute inter-assessment intervals. Such an event is unlikely given the uniform return to baseline with the termination of the stimulus but does highlight the limitations of discrete measurement intervals within this

paradigm. Future research adopting a continuous assessment would overcome this restriction and be potentially less intrusive within this process.

Given the primary measurement function of subjective rating scales it is necessary to address the possibility that the current results reflect experimental demand characteristics. This is especially important given that the results appear consistent with such an outcome, while an affective opponent process would be counter-intuitive and less subject to such a process.

Several factors mitigate against an explanation of the current results based on subject demand. Firstly, it has been argued that the procedure is capable of eliciting intrusive thoughts that are a valid recreation of the natural event and that the reported emotional shifts reflect real change. Secondly, the results of the Stroop task are generally consistent with those observed for the Analogue scales. As objective measures these are presumably not subject to experimental demand. Thirdly, if the results reflect this process, then the question remains as to why the return to baseline should have been so protracted when the intuitive response may have been a rapid return to pre-experimental levels with the offset of the stimuli. Finally, a number of mood induction studies have observed that demand characteristics are not the sole cause of subjects self-reported mood changes (e.g. Velten 1968; Polivy and Doyle, 1980; Renieri and Zeiss, 1984).

In summary, the experimental design appears to have been adequate to test for the opponent process hypothesised in response to primary affective changes associated with the negative intrusive thoughts. Several methodological refinements appear to have produced an enhanced primary response compared to that observed by Ward (1988). Despite the limited sample size significant mood changes were observed during the course of the experiment. These were, however, consistent with the induction of negative mood only. Neither self

report nor objective measures provided evidence to support the occurrence of affective habituation or an opponent process.

The results of the Stroop task were generally consistent with self reported mood changes, especially at the second interval where the greatest negative mood induction was predicted. However, their failure to establish affective neutrality at baseline and the possibility of an alternative processing strategy at this point, questions the value of this task as a secondary measure of mood. Finally, methodological features of the design which may have accounted for the null finding were considered.

The major results of the present study are in accord with those of Ward (1988) who observed primary mood induction but the absence of habitiation or opponent process. This occurred despite the apparent success of the current methodology in enhancing the primary affective state. Although methodological features have been considered in relation to this outcome, theoretical issues regarding the conceptualisation and subsequent measurement of emotion are also of relevance.

At a general level the ambiguous relationship between the subjective and performance measures used in this experiment reflect the broader difficulties encountered by researches attempting to measure emotion. Despite a general consensus that "emotion is more than subjective reports of feeling" (Lang, 1984), comprehensive analyses employing behavioural, subjective and physiological measures typically show poor correlations (Arena et al., 1983).

This difficulty is further compounded when a specific analysis via opponent process theory is attempted. Soloman (1980) makes no specific attempt to define emotion but refers simply to 'hedonic processes'. Given the early emphasis on measures of physiological arousal in the creation of the theory,

the questions arises as to whether it may effectively be applied to all emotional states or to specific quantitative measures of arousal. In examining negative mood as the dependent variable, the current procedure followed other studies of the opponent process in not addressing a formal distinction between affective and arousal states. Schacter and Singer (1962) have argued that physiological arousal is a necessary condition in the experience of an emotional state. More recently however, Arena et al. (1983) have pointed to the complexity of this relationship and argued against a pre-eminant role for arousal in emotional processes.

Despite conceptual issues relating to the subject of measurement, numerous studies of opponent process theory employing self report measures have observed significant emotional shifts which appear inconsistent with quantitative changes in arousal alone. Whilst capable of producing physiological arousal (Rabavilas et al., 1974) intrusive thoughts have been primarily conceptualised as cognitive stimuli which produce affective changes (Rachman, 1981). Given this observation, it was postulated that affective changes induced by these thoughts are comparable to those observed in other applications of opponent process theory and should therefore be subject to the affective dynamics postulated. The failure to observe such a process may indicate that this assumption is simplistic and that intrusive thought phenomena constitute a special case.

Unlike the present study, successful applications of opponent process theory have usually occured in circumscribed situations and typically involved discrete forms of stimuli (e.g Pilivin et at., 1982; Craig and Siegal, 1979). The implications of this are twofold. Firstly, beyond operational definitions of the thought 'engagement' cognitions as stimuli are difficult to control. Whilst it was suggested that the present methodology could accomodate

temporally variable affect, the factors previously noted which might reduce the **b** process would make this task more difficult. Secondly, whilst not necessarily appealing to a demand feature, successful applications of opponent process theory have typically involved situations providing a recognisable context for the experience of positive emotion. Conversely, intrusive thoughts and the experimental situation may provide an environment where any positive post-reaction appeared contextually inappropriate and was therefore suppressed, both personally and via self-report. Attribution theorists have noted a tendency for individuals to interpret unexplained arousal negatively (eg. Maslach, 1979) and for environmental cues to mediate the perceived valence of affective states generally (Brodt and Zimbardo, 1981). Given this possibility, it is interesting to consider whether environmental cues in a naturalistic setting may more readily facilitate the attribution of positive affect following negative intrusive thoughts.

The outcome of this study has several implications for the opponent process theory itself. Like the earlier work by Ward (1988), the present paradigm failed to demonstrate an opponent process despite a strong primary affective response. Self report measures were used because of previous successful applications (e.g. Myers and Siegal, 1985) and theoretical extrapolations regarding the subject of measurement i.e. affective states. In its original form however, opponent process theory refers to a maintenance system based on arousal states (Soloman and Corbit, 1973; Soloman, 1980). It remains possible that the effective component in opponent process states is primarily physiological in nature and that changes in affect are not strictly concomitant with physiological changes. A distinction such as this may account for the 'success' of some tests of the theory and the absence of an effect in others, including the present result.

Clearly, the delineation between affective and arousal states is complex and the former cannot be assumed on the basis of the latter (Arena et al., 1983). Further clarification of the theory is needed if it is to attain broad relevance within human populations. In particular, this should involve a determination of whether the theory appeals more strictly to a physiological homeostatic response or motivation via affective reinforcement contingencies. While Soloman (1980) has implied that both are operative, further clarification of the theory has implications for both the measurement instruments applied to its assessment and, potentially, the range of human experience it may encompass.

Finally, what implications do the present results have for a theory regarding the maintenance of obsessional thoughts. The theoretical association between intrusive thoughts and obsessions, their mutual capacity to evoke negative affect and the successful demonstration of affective opponent processes in related activities has been considered. Given this, it appeared feasible to apply the theory to instrusive thoughts and generalise supporting results to a maintenance theory of obsessions. In the absence of an opponent process subsequent to negative intrusive thoughts, the role of a reinforcing post-reaction has not been established.

Clearly it cannot be stated that opponent process theory is untenable on the basis of the current null finding. Successful applications of the theory indicate that opponent processes are operative within these contexts. However, the current results may indicate that its specific application to intrusive thoughts is untenable. Reasons for this include problems inherent in the nature of the stimulus and the experimental setting. These are, arguably, methodological considerations which may be potentially overcome. More important however, is the need for further clarifying theory regarding the object of measurement before such a definitive test could be performed.

At present, these results and similar previous findings (Ward, 1988) do not support a maintenance theory of intrusive thoughts based on an affective opponent process. As such, they can be said to offer little to compliment or challenge existing theories (e.g. Rachman and Hodgeson, 1980; Salkovskis, 1985). Despite this, the theory remains a useful heuristic which may potentially link theoretical accounts of addiction and obsessional phenomena and have important implications for both of these areas.

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Appendix 1

Return to:
Garry Stevens
C/0 Psychology
Office

CODE NUMBER:_____

INTRUSIVE THOUGHTS QUESTIONNAIRE

This questionnaire is part of a Clinical Master's research project on the nature of intrusive thoughts. Intrusive thoughts are defined as thoughts which seem to be involuntary and which you have repeatedly. Intrusive thoughts vary in content from thoughts of pleasant topics, like romance and holidays, to thoughts of unpleasant topics, like violence and illness. The present project will only be examining unpleasant intrusive thoughts.

The questions that follow ask for information about various aspects of your intrusive thoughts. As a clinician I am aware of the importance of privacy and your responses will be treated with utmost confidentiality. Please answer questions as accurately and completely as you can. Try not to leave out any questions that apply to you. There are no right or wrong answers.

Thank you.

Age _____

Sex M\F

PLEASE READ THE FOLLOWING:

The following questions are all concerned with unpleasant intrusive thoughts.

Intrusive thoughts enter your mind repeatedly, that is, they do not occur just once or twice, but come back a number of times on separate occasions. They are often unpleasant, unwanted and upsetting. Intrusive thoughts may take the form of an urge to do something, a picture or image in your mind, or may involve just thinking about something. Recent research has shown that most people at some time experience intrusive thoughts.

Examples of unpleasant intrusive thoughts may include:

- a repeated urge to jump out a window
- a repeated image of being attacked
- repeated thoughts of a 'disgusting' sexual act
- a repeated thought that something is wrong with your health
- thoughts of loved ones being harmed

Please complete the following questions on intrusive thoughts. If you do not want to do so however, please hand back the form, or you may keep it if you wish.

Q.1 Have you ever experienced an unpleasant intrusive thought?

YES NO (circle one)

Q.2 How many different intrusive thoughts have you experienced in the past two weeks?

NONE 1 2 3 or more (circle one)

If you have experienced at least one unpleasant intrusive thought in the past two weeks please continue. If you have NOT, you have completed as much as you can and have now finished. Please return this sheet. Thank you for taking part.

Think about the most unpleasant and memorable intrusive thought you have experienced during the past two weeks and answer the following questions about that one.

Q.3 Describe briefly the content of this unpleasant thought in the space below (If you do not wish to disclose its content, just list some key words that would help you to recognise it)

Q.4 Describe briefly the situation that you are usually in when you have this intrusive thought. For example, studying, falling asleep or talking to someone.

For each of the following questions, circle the number that best applies to the unpleasant intrusive thought that you just described.

Q.5 This intrusive thought takes the form of:

1. an image or picture in my mind
2. an urge to do something
3. a thought that is neither an image nor an urge.
4. a combination of the above.

Q.6 About how long does this intrusive thought usually last when it occurs?

1. Less than a minute
2. one to ten minutes
3. ten to thirty minutes
4. more than thirty minutes

Q.7 When was the first time that you experienced this intrusive thought?

1. less than a week ago
2. about 1 to 2 weeks ago
3. about 2 weeks to a month ago
4. about 1 to 6 months ago
5. more than 6 months ago

Q.8 During the past two weeks about how many times has this intrusive thought occurred

1. once
2. 2 to 4 times
3. 5 to 14 times (up to once a day)
4. 15 to 56 (up to 4 times per day)
5. over 56 times (over 4 times per day)

Q.9 Please circle any of the following which seem to trigger off your intrusive thought. Circle as many as you wish.

1. the mood I'm in
2. another thought of my own
3. an act of my own
4. something done or said by someone else
5. some other event: (please specify)

_____

_____

6. I am not aware of any particular triggers.

Q.10 To what extent can you control the duration of this thought?

not at all	not very much	to some extent	to a large extent	completely

Q.11 Once the intrusive thought gets into your mind, what do you usually do about it? Circle all the choices that apply, but don't include methods you hardly ever use.

1. I don't do anything, it goes of its own accord
2. I reassure myself that it doesn't mean anything
3. I think it through
4. I try to think of something else
5. I throw myself into some absorbing activity
6. I say 'stop' to myself
7. I perform an action or ritual (either in my mind or in actuality) which makes the thought powerless
8. Other.

CODE NUMBER:_____

The second part of this study will involve an experiment examining the relationship between intrusive thoughts and mood. Only a small number of people will be asked to participate in this study. If you would be willing to be contacted over possible participation in the experimental phase please fill in the details below or see me immediately after you have finished filling out the questionnaire. All of this information will be removed from this page and destroyed once the subjects have been contacted.

NAME:_____

CONTACT PHONE NO:_____

CONTACT ADDRESS:_____

_____

Appendix 2

Day	Time	Triggered By	Duration	unpleasant Feeling (0-100)	Used a Thought or Action to Stop it (Y/N)	Unpleasant Feeling (0-100)
1	11.20	heard word on T.V.	60 sec	70	Y	20
—	—	— —	—	— —	— — —	— —

APPENDIX 3

PROCEDURE

TIME (MIN)			
	A)	General Instructions	)
	B)	Pre-Test Questions	)
(*BASELINE)	C)	POMS/Analogue Mood Scale #1/ Stroop #1	) Booklet 1
	D)	Experimental Instructions	)
TAPE START →	E)	Relaxation	)
0 - 4	F)	Thought Period (T1)	)
4 - 5		Rest	)
5 - 9		T2	)
9 - 10		Rest	)
10 - 14		T3	)
			)
(14) - 18 MID BREAK	G)	Analogue #2/Stroop #2	)
			)
18 - 21	H)	T4	)
21 - 22		Rest	)
22 - 25		T5	)
25 - 26		Rest	) Booklet 2
26 - 29		T6	)
29 - 30		Rest	)
			)
(30)	I)	Analogue #3	)
(32.5)		Analogue #4	)
(35)		Analogue #5	)
38 - 48	J)	Instructions Stroop #3→ STOP TAPE (38) - Stroop #3/Rest	)
(48)	K)	Analogue #6	)
(50.5)		Analogue #7	)
			) Booklet 3
	L)	Post-Test Questions	)
	M)	Debrief	)

Appendix 3A

INTRUSIVE THOUGHTS PROJECT

This experiment is part of a Master's research project on the nature of intrusive thoughts. Intrusive thoughts are defined as thoughts which seem to be involuntary and which you have repeatedly. Intrusive thoughts vary in content and include thoughts of pleasant topics, like romance and holidays, as well as thoughts of unpleasant topics like violence and illness. They may be triggered by such things as your mood, music, certain smells or particular situations. Some thoughts intrude as images. Some intrusive thoughts occur as impulses to do something. Most normal people experience intrusive thoughts. The present study will be examining unpleasant intrusive thoughts only.

The project is primarily concerned with how people feel while thinking of a negative intrusive thought. The specific content of intrusive thoughts is not the focus of the study. However, the procedure does require subjects to provide a general description of their nominated thought so that these may then be recorded and played back during the experiment to provide a focus for thinking about a particular thought. This material will be gathered prior to the experiment. All of these responses will be treated as strictly confidential and erased immediately after the experiment is completed.

During the experiment you will first be asked to answer some general questions about intrusive thoughts and your general mood over the last two weeks. There will then be a five minute period of relaxation exercises. The experiment will involve you concentrating for short periods of time on your nominated thought with the aid of taped material played over a personal stereo. There will be seven of these 'thought periods' with short rest periods in between and at various time intervals your current mood will be tested.

Further instructions will be given as we go through the experiment, which will take about 90 minutes to complete. Your participation in this exercise is completely voluntary so that if now or at any other stage you would rather not take part please feel free to indicate. If you have any questions please ask.

I have read and understood the above information
and have agreed to participate in this study. _____

Appendix 3B

SCREENING QUESTIONS

1) What is your intrusive thought about?
(description as check of nominated thought)

2) How many times have you had it in the past week?

A. None

B. 1-2

C. 3-7 [Circle one]

D. more than 7 times

3) How do you usually feel whilst you are having this thought?

A. Pleased	F. frustrated
B. relaxed	G. depressed
C. anxious	H. excited
D. angry	I. happy
E. lighthearted	J. disappointed

4) Group. A. Non-neutraliser [ ]

B. Neutraliser* (instructed non-use) [ ]

*Neutralising activity reported in questionnaire and 50% + use in diary

5710-ODF-54321

NAME _____ DATE _____

SEX: Male (M) Female (F)

IDENTIFICATION

Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in ONE circle under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST ~~WEEK~~ 2 WEEKS INCLUDING TODAY.

The numbers refer to these phrases.

0 = Not at all
1 = A little
2 = Moderately
3 = Quite a bit
4 = Extremely

Col (C) O.P. (O)

	NOT AT ALL	A LITTLE	MODERATELY	QUITE A BIT	EXTREMELY
Friendly	0	1	2	3	4
Tense	0	1	2	3	4
Angry	0	1	2	3	4
Worn out	0	1	2	3	4
Unhappy	0	1	2	3	4
Clear-headed	0	1	2	3	4
Lively	0	1	2	3	4
Confused	0	1	2	3	4
Sorry for things done	0	1	2	3	4
Shaky	0	1	2	3	4
Listless	0	1	2	3	4
Peeved	0	1	2	3	4
Considerate	0	1	2	3	4
Sad	0	1	2	3	4
Active	0	1	2	3	4
On edge	0	1	2	3	4
Grouchy	0	1	2	3	4
Blue	0	1	2	3	4
Energetic	0	1	2	3	4
Panicky	0	1	2	3	4
21. Hopeless	0	1	2	3	4
22. Relaxed	0	1	2	3	4
23. Unworthy	0	1	2	3	4
24. Spiteful	0	1	2	3	4
25. Sympathetic	0	1	2	3	4
26. Uneasy	0	1	2	3	4
27. Restless	0	1	2	3	4
28. Unable to concentrate	0	1	2	3	4
29. Fatigued	0	1	2	3	4
30. Helpful	0	1	2	3	4
31. Annoyed	0	1	2	3	4
32. Discouraged	0	1	2	3	4
33. Resentful	0	1	2	3	4
34. Nervous	0	1	2	3	4
35. Lonely	0	1	2	3	4
36. Miserable	0	1	2	3	4
37. Muddled	0	1	2	3	4
38. Cheerful	0	1	2	3	4
39. Bitter	0	1	2	3	4
40. Exhausted	0	1	2	3	4
41. Anxious	0	1	2	3	4
42. Ready to fight	0	1	2	3	4
43. Good natured	0	1	2	3	4
44. Gloomy	0	1	2	3	4
45. Desperate	0	1	2	3	4
46. Sluggish	0	1	2	3	4
47. Rebellious	0	1	2	3	4
48. Helpless	0	1	2	3	4
49. Weary	0	1	2	3	4
50. Bewildered	0	1	2	3	4
51. Alert	0	1	2	3	4
52. Deceived	0	1	2	3	4
53. Furious	0	1	2	3	4
54. Efficient	0	1	2	3	4
55. Trusting	0	1	2	3	4
56. Full of pep	0	1	2	3	4
57. Bad-tempered	0	1	2	3	4
58. Worthless	0	1	2	3	4
59. Forgetful	0	1	2	3	4
60. Carefree	0	1	2	3	4
61. Terrified	0	1	2	3	4
62. Guilty	0	1	2	3	4
63. Vigorous	0	1	2	3	4
64. Uncertain about things	0	1	2	3	4
65. Bushed	0	1	2	3	4

MAKE SURE YOU HAVE ANSWERED EVERY ITEM.

EdITS POM 021

The scale that follows is a measure of different aspects of your mood as you are presently experiencing it. You will be asked to complete these scales at several points during the course of the experiment. To do so you should take a moment to monitor how you are feeling and then try to accurately rate it.

Appendix 3D

CURRENT MOOD SCALE

There are ten scales below to allow you to indicate how pleased, relaxed, anxious, irritated, lighthearted, frustrated, discouraged, excited, happy and disappointed you are feeling at this moment.

Each feeling is represented by a line (scale). The left hand end of each line represents " I am not feeling at all ...." and the right hand end represents " I am feeling extremely ....".

Please place a cross on each line in the position that best describes how you are feeling RIGHT NOW.

I am NOT feeling at all PLEASED ——— I am feeling extremely PLEASED

I am NOT feeling at all RELAXED ——— I am feeling extremely RELAXED

I am NOT feeling at all ANXIOUS ——— I am feeling extremely ANXIOUS

I am NOT feeling at all IRRITATED ——— I am feeling extremely IRRITATED

I am NOT feeling at all LIGHTHEARTED ——— I am feeling extremely LIGHTHEARTED

I am NOT feeling at all FRUSTRATED ——— I am feeling extremely FRUSTRATED

I am NOT feeling at all DISCOURAGED ——— I am feeling extremely DISCOURAGED

I am NOT feeling at all EXCITED ——— I am feeling extremely EXCITED

I am NOT feeling at all HAPPY ——— I am feeling extremely HAPPY

I am NOT feeling at all DISAPPOINTED ——— I am feeling extremely DISAPPOINTED

THE STROOP TASK

INSTRUCTIONS

In the task that follows you will be presented with two lists of words that are written in different colours (red, green, blue or orange). Your task is simply to go through this list and name the colours in which the words are written. You don't need to pay attention to the content of the words but just say the colours in which they are written. You should do this as quickly as you can without making errors. If you do make an error then try to correct it before going onto the next word.

You will do this task three times during the course of the experiment and it will be recorded each time. There will be two lists of words each time it is presented. There will be a number on top of both lists (e.g. "201") which you should read out aloud before you start that list. You should <u>not</u> look at these lists prior to commencing the task but begin as soon as you turn the page.

"211"

EISURE	GATE	SATISFACTION	NOTE	MERRIMENT	CAREFREE
AREFREE	NOTE	MERRIMENT	LEISURE	GATE	LEISURE
OTE	SATISFACTION	GATE	CAREFREE	OVERJOYED	NOTE
ERRIMENT	MERRIMENT	LEISURE	SATISFACTION	CAREFREE	GATE
ATISFACTION	GATE	SATISFACTION	COCKY	NOTE	COCKY
ATE	LEISURE	COCKY	MERRIMENT	LEISURE	NOTE
OCKY	OVERJOYED	MERRIMENT	GATE	GATE	LEISURE
VERJOYED	NOTE	NOTE	LEISURE	COCKY	CAREFREE
OCKY	CAREFREE	LEISURE	OVERJOYED	SATISFACTION	GATE
ATISFACTION	COCKY	GATE	CAREFREE	MERRIMENT	SATISFACTION
ERRIMENT	NOTE	CAREFREE	NOTE	OVERJOYED	MERRIMENT
VERJOYED	COCKY	OVERJOYED	COCKY	MERRIMENT	COCKY
EISURE	CAREFREE	OVERJOYED	SATISFACTION	SATISFACTION	OVERJOYED
AREFREE	OVERJOYED				

"212"

IAZARD	GRIEF	COFFIN	COFFIN	PARALYSED	AMBULANCE
EATHBED	EMERGENCY	AMBULANCE	FEAR	EMERGENCY	FEAR
ARALYSED	PARALYSED	HAZARD	AMBULANCE	FEAR	DEATHBED
EMERGENCY	COFFIN	DEATHBED	GRIEF	EMERGENCY	EMERGENCY
FEAR	EMERGENCY	AMBULANCE	PARALSED	HAZARD	GRIEF
GRIEF	HAZARD	DEATHBED	DEATHBED	AMBULANCE	HAZARD
COFFIN	AMBULANCE	FEAR	HAZARD	COFFIN	PARALYSED
AMBULANCE	FEAR	HAZARD	FEAR	GRIEF	COFFIN
FEAR	DEATHBED	COFFIN	HAZARD	DEATHBED	GRIEF
DEATHBED	GRIEF	EMERGENCY	DEATHBED	PARALYSED	FEAR
PARALYSED	PARALYSED	GRIEF	AMBULANCE	PARALYSED	AMBULANCE
HAZARD	GRIEF	PARALYSED	GRIEF	HAZARD	DEATHBED
AMBULANCE	EMERGENCY	EMERGENCY	COFFIN	COFFIN	EMERGENCY
COFFIN	FEAR				

"201"

ELAXED	HOLIDAY	ASSURED	WINDFALL	ASSURED	NOTE
INDFALL	GATE	NOTE	ENTERTAIN	ENTERTAIN	ASSURED
ATE	RELAXED	RELAXED	ASSURED	MELODY	RELAXED
NTERTAIN	NOTE	WINDFALL	NOTE	GATE	GATE
OTE	GATE	HOLIDAY	RELAXED	RELAXED	WINDFALL
SSURED	HOLIDAY	ENTERTAIN	HOLIDAY	NOTE	ENTERTAIN
OLIDAY	ENTERTAIN	GATE	MELODY	WINDFALL	ASSURED
ELODY	ASSURED	RELAXED	NOTE	ASSURED	HOLIDAY
ELODY	WINDFALL	ASSURED	RELAXED	HOLIDAY	RELAXED
SSURED	MELODY	MELODY	WINDFALL	ENTERTAIN	NOTE
INDFALL	HOLIDAY	WINDFALL	MELODY	MELODY	WINDFALL
NTERTAIN	GATE	NOTE	GATE	ENTERTAIN	MELODY
OTE	ENTERTAIN	GATE	HOLIDAY	HOLIDAY	GATE
ELAXED	MELODY				

"202"

HAME	STUPID	HATED	HATED	STUPID	INADEQUATE
NEPT	SHAME	INADEQUATE	STUPID	FAILURE	FEAR
EMBARRASS	STUPID	FAILURE	FAILURE	INADEQUATE	HATED
AILURE	HATED	FEAR	EMBARRASS	FEAR	INEPT
EAR	INADEQUATE	STUPID	INEPT	HATED	SHAME
ATED	EMBARRASS	INADEQUATE	SHAME	INEPT	STUPID
NADEQUATE	SHAME	FEAR	INADEQUATE	FAILURE	INEPT
STUPID	FEAR	SHAME	SHAME	EMBARRASS	FAILURE
FEAR	FAILURE	INEPT	EMBARRASS	STUPID	FEAR
NADEQUATE	INEPT	EMBARRASS	INEPT	SHAME	EMBARRASS
FAILURE	EMBARRASS	FAILURE	FEAR	STUPID	INADEQUATE
EMBARRASS	SHAME	HATED	HATED	FAILURE	SHAME
INEPT	INEPT	FEAR	INADEQUATE	EMBARRASS	HATED
HATED	STUPID				

Appendix 3G

INSTRUCTIONS

The main purpose of this exercise is to see what sort of emotions people experience when they have an intrusive thought and what sort of emotions they have after it is gone. Your task is to concentrate all of your attention on your nominated thought. In doing this you will be aided by a taped description of your thought, which you provided during the earlier session. You will also hear some general questions. The purpose of both the description and questions is to help you fully concentrate on your specific thought during several periods of the experiment. You may follow the description as a way of experiencing your thought or use it as a starting point for thinking about other aspects of your thought. In the same way the questions may be used as cues to help you think about features of your thought. In any case you should be trying to absorb yourself as much as possible in the thought and experience it as naturally and realistically as possible. This also means opening yourself up to the emotions which are associated with the thought or the situation it represents. Try not to resist the thought in any way. If you find yourself getting distracted, try to bring yourself back to the thought. You can do this by thinking about it in different ways (e.g. visualise a scence, concentrate on an emotion) or focussing on different aspects of the thought.

You will be asked to think about your nominated thought, in the manner described above, a total of six times. Each of these 'thought periods' will be 3 to 4 minutes in length and there will be a one minute rest phase between each period. During the rest interval, just sit quietly and try not to think of the thought nominated for the experiment. If you find yourself returning to this thought and cannot distract yourself, some reading material will be available for this purpose. You will be asked to complete mood ratings after the third thought period, the sixth thought period and at various time intervals after that. Instructions about when to do these tasks will be presented over the headphones.

IF FOR ANY REASON YOU FEEL YOU CANNOT CONTINUE PLEASE FEEL FREE TO STOP THE EXPERIMENT.

Appendix 3H

FINAL QUESTIONS

A) Naturalness

Did the thought resemble the way it would feel if it had occurred naturally?

not at all	not very much	to some extent	to a large extent	completely

B) Mind-wandering

How often were you thinking about other things when you were meant to be thinking of the nominated thought?

Never	not very often	sometimes	most of the time	all of the time

How often were you thinking of the nominated thought when you were meant to be sitting quietly, thinking of other things (or reading)?

never	not very often	sometimes	most of the time	all of the time

C) Neutralisers

During the 'thought periods' were you aware of any attempts to stop either the nominated thought or any emotions associated with it.

[Tick one] Yes [ ] No [ ]

If yes, circle any of the following you recall using

1. tried to think of something else
2. reassured myself it didn't mean anything/attempted to rationalise
3. said 'stop' to myself (or another word or phrase)
4. performed a mental ritual or action to stop the thought or moderate it in some way
5. provide some details for the above responses (1-4) or for any other actions you recall

_____

_____

APPENDIX 4

INTRUSIVE THOUGHTS QUESTIONNAIRE - RESULTS

N = 118 (10)

1.a	SEX	M - 41	(3)	[35]
		F - 77	(7)	[65]

1.b	AGE	18-19	28	(3) [24]
		20-24	63	(4) [53]
		25-29	13	(1) [11]
		30-34	2	(1) [2]
		35-39	6	(1) [5]
		40-44	5	[4]
		45-49	1	[1]

1. "Ever experience unpleasant intrusive thoughts?"

YES - 106	(10)	[95]
NO - 12		[5]

2. "Number of different intrusive thoughts in past two weeks?

None	25	(2)	[24]
One	33	(3)	[31]
Two	18	(1)	[17]
Three	30	(6)	[28]
	81		

↓ N = 81

( ) indicate no. from experimental group - included within larger group.

[ ] percentage

3. Content

A. Violence or harm to self or others.

1.	Accidental/intentional harm to loved one or friend	17	[21]
2.	Harming friend or loved one	4 (2)	[5]
3.	Accidental/intentional harm to self by others	11 (1)	[14]
4.	Harming oneself	2	[2]
5.	Suicide of self and/or others	3	[4]
6.	Physical/mental illness	5 (2)	[6]
7.	Terminal illness	3	[4]
8.	Death/non-existence of self or others	8	[10]
B.	Failing course or exams	8 (2)	[10]
C.	Infidelity/betrayed confidence	5 (2)	[6]
D.	Other	10 (1)	[12]
E.	Content unknown	5	[6]

4. Situation in which it usually occurs *

A.	Falling asleep	19	[16]
B.	Studying	19	[16]
C.	When alone	15	[12]
D.	Talking to someone	11	[9]
E.	Mentally unoccupied/bored	9	[7]
F.	Relaxing/Music/Television	9	[7]
G.	Driving	6	[5]
H.	Topic specific cue (e.g. person, place)	6	[5]
I.	Waking up	3	[2]
J.	Working	3	[3]
K.	Other	9	[7]
L.	Unknown	3	[2]

* Percentage of total number of responses (n =121) not subjects

5. Form

1. Image	24	(1)	[30]
2. Impulse	8	(1)	[10]
3. Thought	27	(3)	[33]
4. Combination	22	(5)	[27]

6. Duration

1. Less than 1 minute	35	(5)	[43]
2. 1 - 10 minutes	37	(4)	[46]
3. 10 - 30 minutes	7	(1)	[9]
4. More than 30 minutes	2		[2]

7. First Occurred?

1. Less than 1 week ago	6		[7]
2. 1 - 2 weeks ago	8		[10]
3. 2 - 4 weeks ago	9	(2)	[11]
4. 1-6 months ago	18	(2)	[22]
5. more than 6 months ago	40	(6)	[49]

8. Frequency (last 2 weeks)

1. Once	27		[33]
2. 2 - 4	24		[29]
5 - 14	21	(7)	[26]
15 - 56	6	(3)	[7]
57 +	3		[4]

9. Triggers

1. Mood	42		[42]
2. Another thought	30		[19]
3. An action	22		[14]
4. Something said/done by another	28		[18]
5. Other	18		[12]
6. Not aware of triggers	14		[9]

10. Control duration?

1.	Not at all	6	(1)	[7]
2.	Not very much	14	(1)	[17]
3.	To some extent	29	(7)	[36]
4.	A large extent	26	(1)	[32]
	Completely	6		[7]

11. Responses to thought

1.	Don't do anything	13	[7]
2.	Reassure myself	30	[16]
3.	Think it through	27	[14]
4.	Think of something else	43	[23]
5.	Absorbing activity	14	[7]
6.	'Stop'	43	[23]
7.	Action or ritual	9	[5]
8.	Other	9	[5]

Addendum

P.1 'Kagen' should read 'Kagan'

P.2,10, 11,13 'Rachman and Hodgeson' should read 'Rachman and Hodgson'

P.2,13 'Legg-England' should read 'Legg England'

P.3 'Edwards et. al. (1987b)' should read 'Edwards and Dickerson (1987b)'

P.4 'Epstein (1967)' should read 'Epstein (1967, cited Soloman,1980)

P.10,12 'Parkinson and Rachman (1981)' should read 'Parkinson and Rachman (1981a)'

P.16 'Moregan' should read 'Moergan'

P.17 'Badderly' should read 'Badderley'

P.18 'Robins (1981)' should read 'Robins (1980)'

P.50 Paragraph 2; "...at the third presentation failed to reach significance" should read "...at the third presentation showed a significant difference".

P.55 **Addit.** 'Polivy, J., and Doyle, C. (1980). Laboratory induction of mood states through the reading of self-referent mood statements: Affective changes or demand characteristics? Journal of Abnormal Psychology,89,286-290

P.56,64 'Lang (1984)' should read 'Lang (1979)'

P.65 'Pallack' should read 'Pollack'

P.67 Salkovskis,P.M. (1985) **incorrect cite,** should read Salkovskis,P.M. (1988) Intrusive thoughts and obsessional disorders. In Glasgow, D. and Eisenberg N. (Eds.), Current Issues in Clinical Psychology,4. London, Gower.

P.69 'Solyom, L. (1976)' should read 'Solyom, L. (1972)'

P.70 'Walsh, F.J. (1986)' should read 'Walsh, F.J.(1984)'