Depressive responses to stressors: a study in individual differences.

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Abstract

From existing literature, attitudes of hostility, of introspunitiveness and of feeling unable to control events have been associated with susceptibility to stress and with depression.

These characteristics were examined in relation to:
(a) a laboratory stressor, and
(b) a real-life stressor.

In the laboratory, the stressor comprised unpleasantly loud tones, and the subjects' inability to control them.

Skin-conductance recovery times were used as a possible indication of perceived threat. These were only slightly longer for subjects with high hostility, introspunitiveness and external locus of control scores, but significantly so for the most hostile under conditions of failure. Introspunitiveness was significantly associated with post-stressor depressed mood and non-significantly associated with internally-directed attributions for task outcomes.

Attributions of control and direction of hostility were inconsistent.

The second part comprised field-work, where the potential stressor was that of childbirth, and the dependent variable, post-natally experienced depression. Perceptions of control and hostility were again "inconsistent" in this large sample of women. Extreme scores, measured in pregnancy on high external control, high overall hostility and high externally-directed hostility were associated with post-natal depression.
It was speculated that the conjunction between the 2 extremes of perceived control and direction of hostility might comprise 4 distinct attitudinal styles which might predispose to specific illness. Of these, it was hypothesized that intropunitiveness in combination with high external or high internal perceptions of control would be most predictive of later depression. While intropunitiveness alone did not predict post-natal depression, it proved to do so when found in conjunction with high external control as predicted, but not when in conjunction with high internal control.
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Introduction

This century has been one in which enormous progress has been made in elucidating the causes and developing treatments for a large number of hitherto untreatable illnesses. Prevention of illness has been less conspicuous, and Western medicine may still have much to learn from the East, concerning maintenance of health, rather than just adopting an institutionalized approach towards the symptoms of illness.

Recent years have seen more dialogue between medical practitioners, psychologists, sociologists and epidemiologists, and may have helped towards the acceptance of a holistic approach to the human organism. This is reflected in the World Health Organisation's definition of health, which is that of "a state of complete physical, mental and social well-being." Epidemiologists have emphasized aspects of modern Western life which may be antithetic to the experience of a disease-free life-style, (e.g. Marmot and Syme, 1976), and there has been debate as to whether the strength of external "stressors" play a crucial role, or whether variations within the individual determine whether or not stressors are succumbed to. There has been general consensus however that, confronted by similar situations, some individuals may weather these successfully, while others may show responses varying from altered mood and well-being to severely-altered mental state or physical illness.
It appears therefore a legitimate aim for research to investigate features which may determine why, in the face of an apparently similar stressor, one individual appears relatively undisturbed, while another fails to cope by manifesting symptoms of physical or mental distress.

The measurement of this "distress" itself may prove problematical. Some symptoms may be capable of relatively "objective" measurement, such as alterations in heart-rate, blood-pressure or subtle measures used by psychophysiologists such as changes in skin-conductance levels or responses (although these are also open to different interpretations.)

Observational methods, such as ratings of specified aspects of behaviour, may have a place. Where the measurement of altered mental state is concerned, this has never been free of problems. Psychiatry has evolved its own criteria for the observation and rating of physical and behavioural measures, commonly assessed in interview situations, and only occasionally by psychometric methods. There is still lack of agreement however as to whether such experimental phenomena should be "objectively" assessed in this way, or whether more emphasis should be placed on obtaining subjective data, (e.g. Brown and Zung, 1972).

Where mild transitory distress is concerned, there seems little alternative to employing brief subjective assessments of current mood, such as those of Nowlis (1965), and these may be eminently suitable for assessing an individual's state immediately following experience of minor stressors. They might be particularly useful in investigating whether such
small alterations in mental well-being may be related to more severely-disturbed mental states; consistencies in the former possibly being one precursor of maladaptive responses to more extreme stressors.

It is also possible that relatively subtle psychophysiological changes in response to minor "stressors" might be indicative of a "stress response" that might be accentuated under more severe conditions.

This thesis will therefore hope to investigate individual differences initially in response to a controlled minor stressor. It would not be expected (or hoped!) that such responses in a micro-stress situation would include indications of actual breakdown or severe distress. It might however yield useful insights into the individuals' perception and response to the situation, and it might then be relevant to pursue this in relation to more severe stressor situations.

In considering the measurement of individual differences, the first area of choice emerges. Psychology has produced such a vast range of "personality" measures that a decision must be taken as to whether to select from among these or to use specially-devised instruments. Yet another possibility is to treat, e.g. behavioural or psychophysiological differences in responding as the individual measure of interest.

Ultimate selection probably depends on the interests (or prejudices!) of the researcher, and here a personal interest lies in what could loosely be called "attitudinal style". It could be presumed that how the individual "sees"
Individuals suffering depressive symptoms have also been quoted, despite wishing themselves, or feeling out of control of their lives. Such an inconsistency, or belief of control, might be viewed as essentially "maladaptive" - or it might be that they would only prove to be so in specific situations, or under extreme conditions.

Foremost among perception of events could be the perception or belief as to what extent the individual feels in control of their own life, or feels controlled by others or external forces. Individuals at either end of this dimension have been described as "Internals" or "Externals" according to their belief or perception of control of their lives in general (Rotter, 1966). The differences between individuals distinguished by this factor could be expected to lead to widely-differing reactions to negative life-events in particular. This might be due to Externals' previous experience, where the individual has "learned" that his own actions are not effective, or that reinforcement is not contingent on his own behaviour. Such an individual, who sees events as beyond his control is likely to respond differently to life-stressors from one who feels more able to determine his own life, and the former should seem to be more inherently vulnerable.

The dimension appears to hold promise where individual predictors of vulnerability to stressors are sought. It could be expected that the individual who sees others as being in control of their life would also attribute blame for negative events to others, rather than to themselves. Common observation however does not necessarily support this.
Individuals suffering depressive symptoms have also been quoted, despite blaming themselves, as feeling out of control of their lives. Such an "inconsistency" of belief or perception might itself be a vulnerability factor when stressors are present, as it implies a certain cognitive ambivalence, if not dissonance, and appears worth investigating.

The aspect of blame also deserves investigation for its own sake, as well as in conjunction with attributions of control. Evidence of self-blame or internally-directed hostility in those suffering from depression has already been mentioned, psycho-dynamic, schools of thought holding this "intropunitiveness" to be causal of the illness.

Intropunitiveness, however can be observed in "normal" individuals, and could be measured in a normal sample as an aspect of their overall perceptions or attitudes. Any associations with negative responses to stressors could then be observed firstly in a micro-situation in order to query it as a vulnerability factor in the face of more extreme stressors.

Where depression is concerned, whereas this is frequently held to be associated with intropunitiveness, some researchers have noted evidence of extrapunitiveness, (e.g. Gershon et al, 1968). Hostility in general, apart from its direction, has frequently been held to be maladaptive, and to be associated with illness, alcoholism, suicide attempts, etc. (e.g. Ritson, 1971; Aitken et al, 1969; Philip, 1970).
What does seem to be probable is that individuals who habitually attribute blame either to themselves or others to an extreme degree are perceiving, interpreting and responding to everyday events very differently. In the face of major stressor situations, these differences could be presumed to be accentuated, and could lead to differential outcomes.

Psychophysiological measures of responsiveness may be valuable in the whole picture of reactions to stressors, and there has been some interest in linking individual personal differences with differential psychophysiological responsiveness.

It is possible that the psychophysiological differences themselves should rather be treated as genuine individual differences, and studied in their own right. It might be useful, for example, to define psychophysiological "over"- or "under-responders", perhaps on a particular psychophysiological dimension. This approach is considered a very valuable one, but it may also be useful to search for correlates between the psychophysiological variables and other measures of individual differences. While Lader and Wing's (1969) findings noted that retarded depressed patients showed low skin conductance reactivity, that work did not for instance have any data concerning the possible intro-punitiveness of those depressed.

It might be useful to query, e.g. whether depression, low psychophysiological reactivity and attitudes of self-blame are habitually found together. It might be more informative
to investigate, for example, whether in a range of "normal" individuals, those who show mild depressive mood reactions in response to micro-stressors also tend to have distinctive psychophysiological reactivity and/or self-blaming attitudes. It might however be even more informative to study whether "normal" individuals who rate at the extreme ends of intrapunitiveness (and possibly also extrapunitiveness) prior to stressor experience show more pronounced change towards negative mood states, or more pronounced psychophysiological changes. Such investigation might also prove worthwhile in a practical sense, as prevention of illness depends ultimately on prediction, and where predictors of stress-responsiveness including some aspects of depression in "normal" individuals are concerned, these are still conspicuously lacking.

It is proposed therefore to initiate work in a sample of normal subjects, to examine their responses to a minor stressor situation, in terms particularly of subjectively-experienced negative mood, including depression. The individual differences that it is proposed may determine the experienced "stressfulness" of the situation are those of the individuals' perceived lack of control, and the extent and direction of their attributions of blame or hostility.

Whereas most previous work points to intrapunitiveness as a probable maladaptive factor, in view of the work of Bullock et al., amongst others, the role of extreme extrapunitiveness will also be queried, as will overall levels of hostility in general.
Similarly, with perceptions of control, external perceptions have been those most frequently cited as a vulnerability factor in many situations. A few however have queried the possible role of extreme internal control as potentially maladaptive (e.g. Smith, 1970.) (It appears feasible that the individuals who see themselves as highly in control of their lives, when confronted by a novel uncontrollable stressor, may fail to cope), and extreme "internality" will therefore also be examined.

Particularly central to this investigation lies the query as to whether perceptions or attitudes of control and blame are in fact "consistent" or "inconsistent". If they should be found to be "consistent" then the individual with extreme attributions, (for example of internal control and internal blame) can be compared with the individual who is extremely external on both these attitudes, or with those with normal attributions in their responsiveness to a stressor. However if, as is hypothesized here, some attitudes are not consistent, then such inconsistency itself would appear to be a probable candidate for vulnerability, and the responsiveness of such individuals in particular can be examined.

The research does not adopt a specific theoretical stance, such as a behaviourist one (usually held to comprise the independence of behaviour and reinforcers where Externality is concerned), nor a psychodynamic one, asserting introjected hostility to be causative of depression. It is considered that, (at least initially), it will be most valuable to adopt an observational approach to any associations between the variables.
It is specifically hypothesized however:

That associations, (or lack of association) between perceptions or attitudes of control and blame need to be investigated, and that these may not prove to be consistent; of psychological parameters.

That attitudes mediating the impact of a stressor may include these perceptions or attitudes of control and the handling of hostility or blame; viz - it is suggested that those individuals extreme on perceptions of control, (especially on External views of control) and on attributions of blame or hostility (both internal and external) may be particularly vulnerable in manifesting a stress-response;

Further, it is proposed that these dimensions examined in conjunction may increase the ability to predict vulnerability to stress-response, to the effect that those extreme on both dimensions may be particularly vulnerable. These predictions apply to those extreme in a consistent direction (e.g. high on external perceptions of control, and external attributions of blame, and also to those high on both measures, but in an "inconsistent" direction.

The author’s interests, as may be apparent, lean towards examining depressed state in particular as a response to stressors, although it is acknowledged that some depression appears to manifest itself in the absence of obvious precipitors. The difficulties of investigating this, particularly prospectively, are apparent, but an initial approach observing
less severe depressive mood changes following minor laboratory stressors is feasible, and might possibly throw light on the precursors of more severe disorders.

Such an initial laboratory-based approach also allows for concurrent investigation of psychophysiological parameters. Of those thought to reflect an aversive reaction or "threat" response, one candidate is the recovery limb of the skin-conductance response. Whereas the "meaning" of this phenomenon is still unclear, skin-conductance activity is held to reflect aspects of psychological functioning, and lengthened recovery times of the skin conductance response in particular may be an indicator of (subjectively-experienced) threat, (Edelberg, 1971).

Psychophysiologists characteristically treat psychophysiological activity as the dependent variable reflecting the "real" (internal or subjectively-experienced) state of affairs. It may be useful therefore to assess whether such "threat" responses are consistently related to individual characteristics such as attitudes, or to subjectively-experienced responses to a stressor, such as mood-change.

The terms "stress", "stressor", and "stressfulness" are widely used with varied connotations, and it may be useful to clarify their use here. Whereas other definitions of the terms are recognized, the term "stressor" is used here to indicate an external provoking agent as Selye (1971) has done. "Stress" and "stressfulness" will be taken to imply that subjectively-experienced by the individual, and "stress-response" is used to indicate a negative reaction in the individual.
in terms such as in impaired subjective mood, lack of coping or mental or physical illness. It is recognized however that the term "stress" should not necessarily be used to imply a negative state, and that it can also be seen as a response state of the organism, (Christie, 1975), and there is no disagreement with this viewpoint. For the present purpose however, it appears to aid clarity to adopt the above suggested definitions.

It is also recognized that to regard depressive illness as a stress response could be controversial. It is not intended to imply that all depression should be regarded in this light. It is accepted that some depression may have, e.g. a genetic or biochemical trigger. However, depression does frequently occur in response to negative life-events such as loss, and minor transitory depressed mood is familiar to most individuals in response to minor traumas.

It is not contended by any means that the variables proposed for study here may account for all cases of depression; indeed it is considered probable that depression has many predisposing facets. The attitudinal styles outlined here are suggested as ones inclining to make the "normal" individual more vulnerable, although the nature of the causal chain of events still needs to be specified. If these attitudinal styles should prove to be possible precursors, then the inclusion of psychophysiological indices may serve to augment a profile of possibly vulnerable individuals. Should this be so, then ultimate preventive work might be possible.
The Control Dimension

This section will commence with a review of the literature concerning perceptions of control, and in particular the Locus of Control Scale.

2. Theoretical Interest in Concepts of Control

2.a. The concept of helplessness

Part I

2.b. Bajdram's empirical work and theoretical model

2.c. This section will commence with a review of the literature concerning perceptions of control, and in particular the Locus of Control Scale.

3. Extension of the hypothesis

In order to evaluate the influence of the control dimension on performance, it is necessary to examine the relationship between the control dimension and the performance variables. The control dimension is defined as the extent to which individuals perceive their environment as being controllable or uncontrollable. The literature on the control dimension suggests that individuals with a high sense of control are more likely to exhibit higher levels of performance than those with a low sense of control. This relationship has been supported by numerous empirical studies, which have demonstrated that individuals with a high sense of control tend to perform better in a variety of contexts, including academic, athletic, and occupational settings.

In conclusion, the control dimension is a critical factor in understanding individual differences in performance. By examining the relationship between the control dimension and performance, we can gain a deeper understanding of the mechanisms that underlie individual differences in performance. Furthermore, the control dimension provides a valuable framework for designing interventions to improve performance, by targeting strategies that enhance the individual's sense of control.
The Control Dimension

1. Theoretical Interest in Concepts of Control

1.a The concept of helplessness

2. Seligman's empirical work and theoretical model

2.a Aetiology

2.b Cure

2.c Prevention

3. Extension of the hypothesis

Walter's (1956) dimension of "competence" was also concerned with man's effectiveness in controlling his personal world, with implications of striving in this respect. An aspect common to the above formulations is that of instrumentality, or the contingency between acts and their effects (LeFcourt, 1956).

Sprunging from this same emphasis on instrumentality, and embedded in the general area of social learning theory, the most prolific contribution to investigating the control dimension using psychosocial techniques has been made by Rotter. The focus of his research has been on the individual's perception of his own control of his environment and his assessment of individual differences in these perceptions along a continuum; to the extent that control is perceived to lie externally or internally, so called this dimension the "Locus of Control". Predictions have been generated concerning these perceptions, and tested in a wide variety of situations and populations on his locus of Control scale, designed to measure the "externality" or "Internality" of individuals' orientations.
1. **Theoretical Interest in Concepts of Control**

There has been interest in man's ability to control his personal environment under various rubrics and from diverse orientations. These attempts at describing the extent to which an individual can control the important events occurring in his life-space have utilized concepts such as competence, helplessness, hopelessness, mastery and alienation (Lefcourt, 1966). Strodtbeck (1958) referred to "mastery", which stresses a belief in effectance. White's (1959) dimension of "competence" was also concerned with man's effectiveness in controlling his personal world, with implications of striving in this respect. An aspect common to the above formulations is that of instrumentality, or the contingency between acts and their effects (Lefcourt, 1966).

Springing from this same emphasis on instrumentality, and embedded in the general area of social learning theory, the most prolific contribution to investigating the control dimension using psychometrics has been made by Rotter. The focus of his research has been on the individual's perception of his own control of his environment and the assessment of individual differences in these perceptions along a continuum, to the extent that control is perceived to lie externally or internally. He called this dimension the "Locus of Control". Predictions have been generated concerning these perceptions, and tested in a wide variety of situations and populations on his Locus of Control scale, designed to measure the "externality" or "internality" of individuals' orientations.
As well as this psychometric approach, there have been attempts to examine the construct of control by projective measures (Dies, 1968), and by behavioural evaluations (Schneider, 1968).

A dimension which might appear to be related is that of "self-control", and links have been drawn between "internal" locus of control and control of internal impulses as well as of environmental events (Joe, 1971; Straits and Sechrest, 1963; James et al., 1965; Phares et al., 1968). Self-control is not however implicit in the theoretical formulation of the locus of control construct (Reid and Ware, 1974). A link has been made between it and perceptions of choice (Harris and Harvey, 1975). In situations where less control is perceived in terms of less choice, the latter could provide a means of abrogating responsibility.

Work on "person-perception" and "self-perception" has focused on environmental factors leading to the internality or externality of attributions rather than on characteristics of the individual, Rotter's thinking being considered to lie outside this tradition, (Collins, 1974).

The concept of "alienation" has been a pervasive theme in sociology, with five of its possible meanings suggested as powerlessness, meaninglessness, normlessness, isolation and self-estrangement (Seeman, 1959). Thus powerlessness can be conceived as an expectancy that the individual's behaviour cannot determine the occurrence of outcomes or desired reinforcements. Seeman may appear to differ from Rotter's view to the extent that he assumes that expectancies
will vary according to the particular situation, and that he does equate it with an index of personality adjustment - (i.e. it appears a less generalized concept).

Most of these emphases have been on "control" as perceived to be exercised by the individual. Some work has chosen to examine stimulus characteristics and has therefore focussed on the "controllability" of events or stimuli and their effect on individuals in general, or has examined controllable and uncontrollable events in interaction with individual differences in perceptions of control, e.g. (Glass et al., 1969, 1974).

1a. The Concept of Helplessness

From other areas of research, particularly from animal studies, interest has evolved in a concept that bears a relationship to that of perceived control - the concept of helplessness.

The phenomenon of sudden death was noted in wild rats who, after being squeezed in the hand until they stopped struggling, drowned suddenly when placed in a water tank (Richter, 1957), while unsqueezed rats survived for many hours. Mowrer and Viek (1948) found that rats treated under conditions of uncontrollable electric shock, were found to show more inhibition responses (fear) than when they were able to terminate the shock. Brady (1958) found however, when using yoked pairs of monkeys, that only the "executive" one responsible for terminating electric shock to both of them developed ulcers, rather than the "helpless" one with no control lever.
Mowrer and Viek, proposed that the element of fear is added to that of pain - i.e. fear that pain might continue indefinitely. This is also described as "fear from a sense of helplessness".

One group of animal studies has been extended both theoretically and empirically to humans, leading to a proposed model for the development of depression (Seligman, 1975). Seligman's initial observations were reported when, in the course of testing aspects of a particular learning theory, it was found that dogs who were pre-treated by shock under inescapable conditions did not attempt to escape when later given shock in a box from which they could escape (Overmier and Seligman, 1967). The experimental dogs "seemed to give up" after having had shock experiences over which they had no control, and it was theorized that it was not the trauma (shock) which had interfered with the responsiveness, but rather the experience of having no control over it. This was developed into the hypothesis of "learned helplessness". Two specific behaviours were defined - the failure to initiate escape responses (or to be slower at making them), and subsequent difficulty in learning that responding can be effective.

The phenomenon has been demonstrated in a number of studies with dogs (Overmier and Seligman, 1967; Seligman and Maier, 1967; Overmier, 1968). Rats have also been shown to display impaired escape behaviour and less initiation of aggression (Powell and Greer, 1969).
It has been noted that "helplessness" has a time course, transient interference resulting from a single trauma, but nontransient helplessness resulting from multiple inescapable shock sessions (Overmier and Seligman, 1967; Overmier, 1968; Seligman and Groves, 1970; Seligman, Maier and Geer, 1968).

Gross physiological deficits in terms of lower weight gain have been reported in rats after uncontrollable shock conditions (Weiss, 1968), more anorexia (Mowrer and Viék, 1948), and less whole-brain norepinephrine (NE) (Weiss, Stone and Harrell, 1970). This latter aspect cannot be asserted as a necessary or sufficient condition for learned helplessness, but was investigated in view of NE depletion as a hypothesized cause of depression in man (Schildkraut and Kety, 1967).

Seligman and Maier (1967) found that normal aggressiveness and competitiveness became deficient in animals who had succumbed to learned helplessness and likened this to the depletion of hostility in depressed patients. Seligman has noted how human depression is not well defined and therefore requires a model. The manifestations he considers central to its diagnosis are those of passivity, negative expectations and the sense of helplessness, hopelessness or powerlessness, quoting Beck (1967), Friedman (1964) and Melges and Bowlby (1969).
Other characteristics of depression in man that parallel learned helplessness are those of its time course, and its frequent dissipation in time as well as weight loss and anorexia, although Seligman (1973) elsewhere admits that helplessness does not always disappear over time, particularly with animals subjected to treatment from birth. Problems for building a model include those of the ability to draw a distinction between helplessness and hopelessness in humans (Engel and Schmale, 1967) which cannot be done with animals. Human sobbing and suicide have no clear infrahuman parallels, and sleep disturbance does not appear to occur in other species. Conversely, ulcers do not appear to occur with depression in man as they have in rats (Miller and Weiss, 1969) although ulcers have not been studied in depression.

2.a Aetiology

In respect of the aetiology of learned helplessness, Seligman believes that it is the lack of control over reinforcement which is central to the helplessness theory, rather than the effect of trauma per se. Where the probability of reinforcement does not differ, whether the response does or does not occur, this implies that responding and reinforcement are independent, and the "concept of control is defined within this instrumental training space". The learning that responding and trauma are independent i.e. that the trauma is uncontrollable - as the "heart of the learned helplessness hypothesis", and has 3 effects:-
Motivationally, the lack of incentive leads to the lethargy of depression. Seligman (1973) also believes that the lack of incentive leads to the lethargy of depression. Cognitively, the learned set makes it difficult for learning to be reversed, and may produce the "negative expectations" of depression. Emotionally, conditioned fear may arise and possibly weight loss etc., although it is admitted that this aspect does not follow directly from the helplessness hypothesis.

When considering commonalities with the aetiology of human depression, it is suggested that learning that actions are ineffective is followed by a sense of helplessness, for which responsibility is attributed to personal defects. Common precipitators such as job failure, loss of loved ones and growing old are cited as helplessness situations par excellence.

Seligman proposes that experiences such as rejections, loss and separations have in common a belief in one's own helplessness - and that this is what depression is. (This would apply to those who have a superabundance of rewards also, if these come independently of their own efforts - i.e. "success" depression).

2.6 Theories
2.6.1 Curing

In respect of cure, the only one effective for the animals was a forcible and repeated exposure to response-contingent reinforcement. Cures for depression are more problematical. Believing that the types of events that
set off depression parallel those that set off learned helplessness, Seligman (1975) also believes that the cure for depression can occur when the individual comes to believe that he is not helpless. He suggests that the success of some therapies may have little to do with theoretical underpinnings. However, (whereas not a test of the model), exposure to response-produced success may seem to be a consistent theme. Included in this would be Beck's (1970) therapy of manipulating negative cognitive sets to more positive ones, in order to help patients recognize unreachable goals and adopt more realistic ones, (Melges and Bowlby, 1969) by either psychoanalytic or behavioural techniques. Also the Tuscalossa Plan (Taulbee and Wright, 1971), assertive training, (Wolpe and Lazarus, 1969) and Burgess's 1968 positive reinforcement therapy - all of which centre on the patients' sense of efficacy.

The only truly reliable cure for helplessness in dogs was forcible "directive therapy" (although Seligman notes work to suggest that EOT - which is often used for the treatment of depression in humans - also seems to alleviate it in dogs).

2. Prevention

Where prevention is concerned, behavioural immunisation by previous escapable shocks eliminated the subsequent effects of inescapable shock in dogs (Seligman and Maier, 1967) and suggested that previous controlling experiences may protect organisms from helplessness in later inescapable trauma.
Whereas the prevention of depression is still not within reach, reasons why some individuals do or do not become severely depressed after uncontrollable traumas may be due to more or less previous experience of early inescapable traumas, leading to pessimistic or optimistic perceptions of the future. This could possibly be reconciled with the observations of depression in adults who lost a parent at an early age (Forest, Fraser and Priest, 1965).

Hannum, Rosellini and Seligman (1976) found that, not only did inescapable shock delivered to rats shortly after weaning impair adult instrumental behaviour, but that escapable early shock experiences prevented these deficits when exposed to inescapable shock in adulthood. The possibly adverse effects of constantly experiencing success and then being confronted by uncontrollable situations are suggested.

Tests of the learned helplessness paradigm with humans have tended to support the hypothesis (Hiroto, 1974; Hiroto and Seligman, 1975), although findings have not been conclusive (Roth and Bootzin, 1974).

3. Extensions of the hypothesis

One approach has been to investigate naturally occurring human depression by looking for the behavioural symptoms of learned helplessness in depressed individuals (Miller and Seligman, 1973).
Another has been to examine the effects of perceptions of control of stress (noise) on subsequent adaptation (Glass et al., 1969). When considering the stimulus characteristics of perceived control rather than individual characteristics, these authors were originally interested in adaptation to noise-stress, and in particular in greater energy expenditure when the noise-stress is unpredictable, as reflected in lower tolerance for frustration and impaired performance. More specifically, random (unpredictable) noise was hypothesized to arouse feelings of powerlessness which arouse anxiety and therefore greater energy expenditure.

Both behavioural performance measures and subjective responses indicated that unpredictable noise was more aversive, and also conditions where subjects were not given a "control" button, (although the "button" subjects never actually pressed them to terminate the noise). In their studies skin conductance was monitored during the noise to demonstrate that habituation did in fact occur and that post-task effects reflected the "cost" of this adaptation. (It was considered that an increase in tonic SC as measured by base line values was not the only reason for the decrease in responses, as the latter measure was not found in a no-noise control condition despite similar base-level scores).

As Geer et al. (1970) has noted, Glass et al.'s findings are relevant for the aspect of the potential for control, not the effectiveness of actual control. Geer, Davison and Gatchel (1970) extended the concept of control to that of a belief in control - and from that to incorrect beliefs
in control, with the investigation of whether this also
37 can be stress-reducing. They found that subjects who
(mistakenly) "perceived that they could reduce duration
of shock by increasing their reaction times, did in fact
show faster RTs, and also increased their post-pain
thresholds slightly." Autonomic responding (SC responses)
were also reduced over trials only for those who perceived
control, not for those where shock was similarly reduced
independent of their "control". Less "upset" was assumed
from the fewer SC fluctuations of the perceived control
group.

Glass et al. (1971) followed up their previous findings
by investigating perceived indirect control — i.e. access
to others who have control — by use of a confederate who
could be contacted to terminate the noise. Using performance
measures and SC amplitude as the criteria, physiological
adaptation to noise was found in all subjects regardless
of experimental condition. However, SC base levels during
noise indicated that these increased for all subjects except
those with perceived control. Post-stress performance
(proof-reading) decreased, especially for the no-control
subjects, (although actual "control" was not availed of
by those subjects who could succeed in getting the noise
stopped).

C latchell and Proctor (1976) noted claims of physiologic
al symptoms associated with depression, such as increased
in SC responses (Greenfield et al., 1975) and increased heart
rate (Reaven, 1973), which suggest the clinical presence of
retention — a "learned helplessness" not driven by a belief
Glass et al., note Selye's proposal that psychic resources are depleted during adaptation to a stressor, with reduced coping ability available for subsequent environmental demands - i.e. greater post-adaptive energy depletion, although they also integrate this with Mandler and Watson's (1966) interruption-anxiety theory and propose a "helplessness-energy depletion" formulation.

Differences between Geer et al.'s study and the work of Glass et al. are that differential effects were found by Geer during the stress, not only on post-stress measures. Also, Geer et al.'s subjects believed in the effectiveness of their control, not just in their potential control. Whereas the mechanisms of this stress-reduction are not known, comparisons are made by Geer with pain perception and anxiety. (Bowers, 1968) perceived control subjects as possibly having lower anxiety. Whereas the reduction in SC activity may suggest this lower anxiety, caution is exercised beyond assuming lower "arousal". Had motivational (shock-reduction) factors alone been responsible, higher arousal would have been expected (Malmo, 1965), and the results are considered more in line with placebo findings (e.g. Nisbett and Schacter, 1966). Geer et al., speculate that perhaps the next best thing to being a master of one's fate is being deluded into thinking that one is.

Gatchell and Proctor (1976) noted claims of physiological symptoms associated with depression, such as decrease in SC responses (Greenfield et al, 1963) and increased heart-rate (McCarron, 1973), which augment the clinical picture of retardation. A "learned helplessness" task given by Gatchell
and Proctor to normal individuals produced physiological patterns similar to those reported in depression.

Pre-treatment comprised inescapable noise, and the task measure was anagram-solution. Those administered inescapable noise rated themselves as having greater feelings of helplessness, and showed poorer anagram performance (than subjects in "escapable" or control conditions). There were also significant physiological differences. Examination of SC levels showed that they rose for all subjects during anagrams, were highest of all for the "escape" subjects during pre-treatment, and converged as all later produced successful solutions. Whereas SC responses did not differentiate subjects during the anagrams, they were highest during pre-treatment for the "escape" group, and lowest for the "no escape" group - which suggested to the authors - lower task involvement.

The results are interpreted in terms of a general "organismic" debilitation, transferring to cognitive tasks, and the lower SC indeces as suggesting reduced autonomic arousal, less task-involvement and lower motivation.
Rotter's Locus of Control Dimension

1. Theoretical Basis

2. Development of the Locus of Control Scale
   The following section will review Rotter's
   2.a. Reliability and Validity
       Locus of Control Dimension.
   2.b. Social desirability
   2.c. Sex differences
   2.d. Race and class findings
   2.e. Intelligence
   2.f. Possible confounding factors

3. Discriminant validity and "Adjustment"
   3.1. Relationship with other "personality" measures

4. Performance measures in laboratory situations
   4.1. Skill and chance situations
   4.2. Success and failure

5. Field studies in Stress and Illness
   5.a. Normal samples
   5.b. Patient populations

6. Chance and manipulation of LC scores

7. The issue of non-unidimensionality

8. Relation between Locus of Control and learned helplessness.
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8. Relation between Locus of Control and learned helplessness.
1. The Theoretical basis of Rotter’s Scale

The theoretical framework within which his dimension of control had its roots has been set out by Rotter (1966). Social learning theory provides this general theoretical background, reinforcements being held to strengthen expectancies that similar behaviours will be followed by such reinforcements on future occasions. Failure for reinforcement to occur subsequently would reduce the expectancy. Following from this, if reinforcement is not seen as contingent on the subject’s own behaviour, the occurrence of such reinforcement will not increase expectancy as much as if it were seen as contingent. Similarly, its non-occurrence, will not reduce expectancy as much as if it were seen as contingent. Such expectancies are held to generalize to situations perceived as similar, and both general to specific expectancies are held to affect behaviour choice.

These expectancies, attitudes or beliefs are therefore concerned with the nature of the causal relationship between one’s own behaviour and its consequences. Rotter proposes that they have functional properties, and "make up one of the important classes of variables in personality description" and might act to produce individual differences within a specific condition.
The effect of the reinforcement following behaviour is not a simple "stamping-in process", but depends on whether the person "perceives" a causal relationship between his own behaviour and the reward. Individuals may vary therefore in the degree to which they perceive reward to be contingent on either their own behaviour or independent of it - i.e. contingent on forces outside themselves.

Rotter hypothesizes this variable to be of major significance in understanding the nature of learning processes in different kinds of situations, and also that the individual differences in the degree of attribution of personal control to reward may be consistent. Rotter notes the concept of alienation in sociological theory which seems related at a group level to an internal/external control variable, and which has been linked specifically by Seeman (1959) as a psychological variable, referring to such alienation as "powerlessness".

Rotter suggests that the "need for achievement" dimension appears to be a related concept, individuals who are high on this probably having "some belief in their own ability to determine the outcome of their efforts", although the concepts are suggested as not being linearly related.

Field-dependency is yet another concept which he considered may be related, individuals differing as to whether they derive most of their cues from internal or external sources.
The relationship to the notion of "ego-control" is considered less clear, such a concept containing ideas of confidence and the ability to deal with reality. Individuals at both extremes of an internal versus external control of reinforcement dimension are seen as unrealistic and "likely to be maladjusted by most definitions", and there is therefore a curvilinear relationship suggested with ego control, to the extent that it is another type of definition of maladjustment.

Another concept of Riesman (1954) is suggested as more similar to Witkin et al.'s than to Rotter's own - that is, the degree to which individuals are actually controlled by internal or external forces, rather than the degree to which they believe that their behaviour determines the reinforcements received. Rotter considers that the general concept of causality had been neglected since Piaget's time, at least concerning individual differences in perceiving how causality is assumed to relate events; previous interests in it having been largely theoretical.

Rotter states his own hypothesis specifically:

"In its simplest form, our basic hypothesis is that if a person perceives a reinforcement as contingent upon his own behaviour, then the occurrence of either a positive or negative reinforcement will strengthen or weaken potential for that behaviour to recur in the same or similar situation. If he sees the reinforcement as being outside his own control, or not contingent - that is depending upon chance, fate, powerful others, or being unpredictable - then the preceding
behaviour is less likely to be strengthened or weakened". His early interest appeared to lie with problems of acquisition and performance, and the differences that individuals' concepts of chance or randomness have on the effect of reinforcement.

As the concept of control came to be embodied in a scale for its measurement, the attempt to assess where this control was perceived to lie is referred to as measurement of the locus of control (LC). A continuum is implied between 'external' and 'internal' perceptions of control, and individuals referred to as 'externals' or 'internals' (E and I).

Locus of control is generally presented as being an orientation or a learned dimension rather than as a "personality characteristic", although Joe (1971) refers to it in the latter terms, as well as "a consistent attitude". As it refers essentially to perceived control, it may be most appropriate to regard it as a perceptual or attitudinal dimension which has behavioural implications, but where the term personality is used here it will be in inverted commas, or used in the widest possible sense.

Rotter has asserted that reference to "externals" does not imply a typology, but merely one variable affecting behaviour. The scale itself is referred to as the Locus of Control (LC) scale, or the Internal/External (I/E) scale.
2. The Development of the Locus of Control Scale

The first attempt to measure individual differences in the expectancy or belief in external control as a psychological variable comprised a Likert-type scale of 13 external and 13 internal attitude items (Phares, 1957). A priori grounds determined its development, James (1957) reformulating the most successful items into a revised scale, with filler items. He found "external" subjects on this measure to behave similarly to "chance" groups in previous chance/skill studies.

The James-Phares scale was broadened by Rotter, Seeman and Liverant (1962). A hundred items were originally included and social desirability was controlled for by adopting a forced-choice presentation. Factor analysis reduced this to sixty items and subscales measuring specific factors such as achievement were eliminated. Item correlations with the Marlowe-Crowne Social Desirability Scale (Crowne and Marlowe, 1964) were still too high, so the scale was further reduced. Item validity was obtained from the studies of Seeman and Evans (1962) and Rotter, Liverant and Crowne (1961). The final version comprised 29 items, of which 6 were fillers to make its purpose more ambiguous, 23 items comprising the actual scale.

The final scale is said to deal with people's beliefs about the nature of the world, i.e. their expectations about how reinforcement is controlled, and is therefore a measure of "generalised expectancy", but not of a preference for internal or external control.
The studies of Phares (1965), Seeman (1963), McDonald et al. (1968), Seeman and Evans (1962), Strickland (1965), Phares, Ritchie and Davis (1968) and Ryckman et al. (1972) indicated that, in a number of different settings, internals showed more initiative in trying to attain goals, or control their environment. These included situations as varied as Union-involvement, smoking behaviour and commitment to Women's Liberation activities, although a few studies have found that I/E did not differentiate, e.g. between college volunteers in hospitals (Hersch et al. 1969) or political participation (Evans and Alexander, 1970).

2.a Reliability and Validity

Internal consistency estimates of the scale have been found to be only moderately high, but relatively stable, ranging from .65 to .79, (Rotter, 1966; Joe, 1971). However, it is noted that, as the test is an additive one, the items are not hierarchical or comparable, and that split-half reliability therefore tends to underestimate the internal consistency.

Test-retest reliability is considered to be consistent (Joe, 1971) reports varying from .49 to .83 (Rotter, 1966) .48 and .84 (Hersch and Scheibe, 1967; Harrow and Ferrante, 1969). Freedom from acquiescent response set has been confirmed (Mirels, 1970; Collins, 1974).

Discriminant validity is said to be good, in view of low correlations with variables such as intelligence, social desirability and political affiliation (Joe, 1971; Hersch and Scheibe, 1967; Minton, 1967), although it has been
suggested from the findings of Gurin et al. (1969), Lao, (1970), Mirela (1970) and Thomas (1970) that aspects indicating a personality trait should be distinguished from those reflecting societal norms (Joe, 1971).

2.b Social Desirability

Findings relative to social desirability have however been more contradictory (Joe, 1971). Rotter (1966) cited correlations ranging from -.07 to -.35 with the Marlowe-Crowne Scale, with a median of -.22 (for combined male and female student samples). Lack of correlation with the Marlowe-Crowne Scale has also been reported by Strickland (1965), Tolar (1967), Tolar and Jalowiec (1968), Crowne and Liverant (1963) and Seeman (1963). Significant correlations have however also been reported of -.42 (Feather, 1967) and -.34 (Altrocchi et al. (1968)). Berzins et al. (1970) reported a correlation of -.23 using the Edwards Social Desirability Scale.

Sex differences in social desirability effects have been reported (Altrocchi et al. 1968), low need for approval being found for external males only. Joe (1971) concludes that the scale is not totally free of the social desirability set as Rotter (1966) claimed, but Abramowitz (1969) considers that an association between the two measures does not invalidate them.

Marchine and Woodson (1971) examining the relationship between E/A and immediate affect state in student subjects found more positive affect reported for internals than externals. For the females, internality was related to
Sex differences are claimed to be minimal, (Rotter, 1966, 1967; Abramowitz, 1969), although one of Rotter's largest samples showed a significantly higher mean score for females, (students). However, Feather (1967) found I/E mean scores to be high for a group of young female Australian undergraduates. By contrast, female scores for an older group of students externally enrolled was lower than that of the males. These differences probably reflect cultural sex-norms, for the younger females, while the older ones would be expected to be more dependent on inner resources, being late students, some of them married and with previous work experience. The author advises that sex differences should be taken into account. Sex differences contributed to differences in social desirability correlations, externality being negatively related to social desirability for females only.

Hochreich (1974) found that only male and not female externals made significantly lower attributions of responsibility for failure outcomes (projected onto a story character) than in females or high trust externals. Failure, especially in achievement situations, is cited as being particularly salient for males who are "low-trust" externals (Hochreich, 1975).

Warehime and Woodson (1971) examining the relationship between E/I and immediate affect state in student subjects found more positive affect reporting from internals than externals. For the females, internality was related to
general feelings of life satisfaction, while for the males, it related to instrumental activities in a university setting. The research suggested to the authors that males and females may "feel that they have general control over their reinforcements for different reasons" — or — that internals may experience more positive affect because what they value most is perceived to be under their control. Levenson (1973) using 3 revised subscales of Rotter's scale (Internality, Powerful Others and Chance), found that male neurotic patients had higher internal scores than females.

2.d Race and class findings

A number of studies have indicated race and class differences, Negroes and lower social-class individuals generally having higher external scores than whites and those of middle class. (Battle and Rotter, 1963; Lefcourt and Ladwig, 1965). In the latter study scores from Negroes were reported as being higher independently of social class (although this population was one of offenders in institutions). Scott and Phelan (1969) reported hard-core unemployed negroes to be more external than white unemployed men. Levenson (1973) found no race differences between black and white psychiatric patients, but the scale used was one adapted from Rotter's original.
Gurin et al. (1969) and Lao (1970) have factor-analyzed negro responses and found independence between the control that subjects believed most people in society possessed and the control the subject believes he possesses personally; (using a revision of Rotter's original scale, which contained both aspects.) A distinction may need to be made between perceived control and actual probable control. It may be that those restricted by environmental barriers, or who feel subjected to limited material opportunities may develop high expectancies of external control. It is also possible that an individual's culture may influence his preferences for describing himself or national stereotypes on the I/E scale (Joe, 1971).

2.e Intelligence

Correlations with intelligence measures are said to be low (Hersch and Scheibe, 1967). Battle and Rotter (1963) however found the more intelligent children in a low socio-economic group of negro children to be more external, implying the contribution of powerful external forces combined with the perception of limited material opportunities to the development of external attitudes.

2.f Possible confounding factors

The findings, particularly with race and class differences, have been interpreted in 2 ways - either as a validation of the scale, in demonstrating correlations opposed to groups, although these conclusions are reached that would be theoretically predicted from it - or that such differences found in various populations make it an
unsuitable instrument for use in evaluating differences between individuals.

There have been suggestions that internality as measured by the scale may be related to political affiliation, and to conservative views in particular, and that this may invalidate its use as a "stable personality measure", (Thomas, 1970; Joe, 1971; Dies, 1968). It has also been argued that it may not tap all major aspects of personal control (Coan, 1974; Gurin et al, 1969). Joe suggests that ideally the scale should be modified to distinguish "personality trait" aspects from those reflecting societal norms.

3. Discriminant Validity and "Adjustment"

For discriminant validity, some relationship between internality and "good adjustment" is theoretically expected, (at least in Western cultures), but this might not be linear, in that it might not hold for extreme internal scores (Rotter, 1966). Whereas externality is seen as a possible adequate defence against failure, very high external scores are suggested as a defensiveness related to significant maladjustment - or - if true responses - a passivity in the face of difficulties which could result in maladjustment. Extremely maladjusted groups are also expected to have more variability of scores (Rotter considers the test to be limited in its ability to discriminate individuals as opposed to groups, although these conclusions were reached
on samples of college students who did not provide a great spread of scores outside the middle 50% of the distribution).

Smith (1970) has also considered the "intriguing possibility that extreme internals may be more likely to experience a crisis when their usual coping responses, (their means of controlling the environment) fail in a threatening situation, than those who view events as contingent on external factors". Whereas his study of crisis patients had no information regarding their pre-crisis scores, their 6-week recovery scores were markedly low, which might have reflected a return to their normal externality may not be a positive characteristic, in that orientation.

Abramovitz (1969) using a normal sample, found high internals to have the lowest depression scores, although the population was a student one, and curvilinear relationships were considered possible in more heterogeneous samples. Others have considered that the relationship between E and adjustment might not be linear. (Ducette and Wolk, 1972; Fontana, 1968; Epstein and Komorita, 1971).

Most studies concur concerning the maladaptive aspects externally, whereas exactly the reverse held for the more advanced problem children. This means the relationship between negative and positive subjects is highly maladaptive and realistic for both groups in that their over and under-estimations of depression in normal subjects, using the Beck Depression Inventory (BDI). Williams and Nickels, 1969 reported more potential suicide-proneness among externals than internals. Hersch and Scheibe (1967) report significant associations with a number of tests of "maladjustment" including scales of balance may be bad.
of the Minnesota Multiphasic Personality Inventory and a constellation of generally "unfavourable" personal characteristics on the California Personality Inventory (Gough, 1964).

On the other hand, data suggests that for negro students, the focus on external "system obstacles" may be a more realistic assessment of their situation, and might lead to more innovative behaviour than a sense of internal control, (Lao, 1970).

Ducette, Wolk and Soucar (1972) have queried whether externality may not be a positive characteristic, in that it might serve as a defense against negative self-evaluation, such as for extremely deprived individuals, in order to escape the "full impact of failure". They agree however that this would not ultimately be adaptive in that feedback from the environment would be reduced thereby - i.e. a short-term defensive effect versus long-term lowered adaptability. Tests of advantaged (white, high I.Q.) problem children showed that they attributed failure internally and successes externally, whereas exactly the reverse held for the dis-advantaged problem children. They argue that this discrepancy between negative and positive outcomes is equally maladjustive for both groups in that their over- and under-assumptions of responsibility for failure inhibit an adaptive and realistic use of failure. They argue therefore that neither internality nor externality is good (or bad) per se, but that a pattern of subjective perception for control which is out of balance may be bad.
3.1. Relationship with other "personality" measures

Attempts to test and demonstrate the validity of the scale have included correlations with other scales measuring aspects of "maladjustment", prediction of behaviour differences in real-life situations, predictions of performance in laboratory situations, predictions where aspects of the task are manipulated, and attempts to manipulate expectancies in both laboratory and field situations.

This section will consider the relationship of the scale to other aspects of "personality" characteristics where these would be expected to be theoretically related.

Anxiety. Whereas a number of workers have reported an association between externality and anxiety, (Watson, 1967; Ray and Katahn, 1968; Butterfield, 1964; Lefcourt, 1966; Feather, 1967; Hountras and Scharf, 1970; Tolor and Reznikoff, 1967), this has been most clearly presented in specific learning theory terms by Watson (1967) and Watson and Baumel (1967).

Anxiety is hypothesized as a function of externals' appraisal of being unable to complete organized response sequences (Watson, 1967). It may therefore occur when organized response sequences are interrupted, or no alternative response sequences are available (Mandler and Watson, 1966). The incongruity inherent in the situation is suggested as leading to anxiety, the orientations measured
by the LC scale being suggested as also indicating that Internals prefer internal control, and Externals prefer external control.

Relationships have been found between externality and facilitating anxiety (negative correlation) and with debili­
tating anxiety (positive but non-significant), Butterfield (1964), using the Achievement Anxiety Test (Alpert and Haber, 1960). Feather (1967) found a similar (significant) rela­
tionship with debilitating anxiety (for males only) and with test anxiety for both sexes, although Butterfield and Lefcourts' finding with facilitating anxiety are not replicated.

Feather suggested that greater test anxiety reported by his external subjects may indicate that the high-anxious (and high-neurotic) externals may have been less able to cope with stress situations in the past, and rationalize this failure to cope by blaming it on external circumstances which have examined anxiety (reactions to threat) have seen — i.e. some external attitudes may be a defence against failure learned in previous stress situations. He also associates, which are all self-report measures, as the however, suggests that the direction of causality might be reversed, externality determining a reaction of anxiety more concerned with failure than achievement. This fails to an unpredictable environment amongst other possible interpretations. As well as Test Anxiety, other measures anxiety, or vice versa. have been used, including the Manifest Anxiety Scale (MAS)

by Watson (1967).
His large sample (648) gives confidence in the association with debilitating anxiety, and also the negatively significant (although very low) correlation with facilitating anxiety. The possibility of item overlap has been considered. Ray and Katahn (1968) retested the LC, MAS, and also the Thematic Apperception Test (TAS) scales by item analysis, and found every LC item to correlate positively (although not significantly) with total MAS and TAS scores.

Factor analysis indicated that the correlations again found between total scores on the 3 scales was not composed of highly correlated individual items on the LC scale, indicating that the two scales measure conceptually separate variables which correlate with each other, rather than a hidden anxiety factor within the LC scale; they declined however from speculating on the direction of causation.

Williams and Butterfield (1959) found externals to be between the two. Joe (1971) however considers that studies such as those on the Hostility Inventory, suggest that those who have examined anxiety (reactions to threat) have been inconclusive. He interprets the overall anxiety/externality associations, which are all self-report measures, as the tendency of externals to describe themselves as anxious and more concerned with failure than achievement. This raises the question as to whether external beliefs may produce anxiety, or vice versa.

Hostility and Blame. Butterfield (1964) proposes that externals will react to obstacles seen as unsurmountable with frustration, placing blame either intro- or extra-.
punitive, as opposed to internals who will react constructively. Using a frustration inventory (Child and Waterhouse, 1953) a predicted relationship between externality and extrapunitive reactions was not found, leading Butterfield to suggest that extrapunitive reactions are based on "something other than perceived control over the situation". Externality was however positively related to intropunitive reactions and negatively to constructive ones, frustration reactions becoming "less constructive as LC becomes more external".

Following up Palmer and Altrocchi's (1967) findings, Altrocchi et al. (1968) found that internal males only attributed more unconscious hostile intent to hostile characters in a film, while Internal females attributed more responsibility to the hostile characters. Williams and Vantress (1969) found externals to be more hostile (on the Buss-Deukee Inventory), suggesting that they have experienced more feelings of powerlessness and frustration via external forces (Joe, 1971). Williams and Vantress were able to examine the clusters of responses and found that while guilt, negativism and assault did not differentiate the externals, items which did were: resentment, suspicion, verbal and indirect hostility and irritability.

Self-esteem. As high self-esteem could contribute to a potential for self-reinforcement, high self-esteem has been examined in relation to LC. Fish and Karabenick (1971)
found a low but significant association, using an inadequacy scale by Janis and Field (1959) with males only. Ryckman and Sherman (1973) found a similar association for both sexes independently. Externals have been found to report themselves as lower on dominance and self-confidence (Hochreis, 1974) and performance.

Repression-Sensitisation. Fodor and Reznikoff (1967) and Altrocchi et al. (1968) found that external males tended to be sensitizers on the Byrne Repression-Sensitization scale (Byrne, 1961). While internal scores were related to repression, and skill conditions, and these aspects will be reviewed in the following section on performance measures.

Trustfulness. Negative correlations between externality and interpersonal trust have been reported, (Hamsher, Geller and Rotter, 1968; Hochreis, 1963). Using a behavioural measure, Miller and Minton (1968) also found a relationship between externality and low interpersonal trust or suspiciousness (but none with Machiavellianism). Hamsher, Geller and Rotter found that interpersonal trust was negatively correlated with externality (but only significantly so for males).

Need-achievement. Externality has been cited by Lefcourt (1966) as being negatively related to need for achievement, (n-Ach) although the relationship found was a weak one. Feather (1967) used a projective test of n-Ach, but found no predicted negative relationship with externality.

Hersch and Scheibe (1967), Grindall et al., (1965), Hochreich (1974), Gurin et al., (1969) and Laé (1970), all found that
externality was related to need for achievement, Hochreich reporting that these differences were accounted for by "low-trust" externals. Extrapolating from the work of Gurin and Leo, Joe (1971) suggests that it is a sense of personal control, rather than control ideology which differentiates the motivation and performance.

Much of the work concerned with need-ach has been studied in performance situations, particularly under conditions of success and failure, or where "control" has been actually or supposedly in the hands of the subject, and under chance and skill conditions, and these aspects will be reviewed in the following section on performance measures.

Authoritarianism and Conformity. Links between externality and conformity have been noted, by Crowne and Liverant (1963) using an Asch-type situation. Baron (1968) found I/E to have no associations with authoritarianism, while Rotter, Seeman and Liverant (1962) quote a positive association, both having used the F scale. Clouser and Hjelle (1970) found externality to be associated with dogmatism. The studies of Getter (1966), Lichtenstein and Craine (1969), Baron (1966) and Strickland (1970) support Rotter's (1966) suggestion that internals are more resistant to external manipulation, such as in the form of subtle suggestion.

Self-Control. Reid and Ware (1974) have pointed out that "self-control" is not implied in Rotter's items, or implicit in the theory behind it, with the exception of this reference to the fact that "perhaps related to this feeling that one
can control his environment is also a feeling that one can control himself" (Rotter, 1966). They tested however for any association by factor-analysing scores on an I/E scale containing additional self-control items, finding E, I and self-control to be independent.

Field-dependence. As this dimension is concerned with whether individuals derive their cues from internal or external sources, associations between it and locus of control have been tested (Rotter, 1966; Feather, 1967; others, Willoughby, 1967). The measures were found to be unrelated, although Willoughby (using an alternative scale to Rotter’s) reported an association between field-dependence and external "locus of evaluation" – i.e. dependence on others for self-assessment.

Neuroticism was found by Feather (1967) using the Maudsley Personality Inventory (MPI) to be related to externality for groups of young Australian students, significantly so for females only. (Extroversion appeared to be related to performance measures which have been examined in the laboratory situation, using a range of situations in which to test externality, but not significantly).

Internality correlates have been found with dominance, tolerance, good impression, sociability, intellectual efficiency, achievement via conformance and well-being, using the California Psychological Inventory (Hersch and Scheibe, 1967), also with self-descriptions (on the Adjective Check List) of the self as assertive, achieving, powerful, independent, effective and industrious. Externality
correlates mirrored the converse characteristics. Hochreich (1974) however found associations between I/E and self-ratings of personal adjustment for males only and not for females.

Joe (1971) considers that the personality correlates with I/E form an orderly cluster, which is "logically and theoretically consistent with the construct of I/E control". Externals are depicted as being relatively anxious, aggressive, dogmatic, less trustful and more suspicious of others, lacking self-confidence and insight, having low needs for social approval and a greater tendency to use "sensitizing modes of defence".

4. Performance measures in laboratory situations

Other approaches to construct validity have comprised multi-method measurement, and the scale has been tested against a wide variety of non-questionnaire measures, and in a wide range of situations. This section will consider performance measures which have been examined in the laboratory situation, using a range of situations in which to test I/E predictions.

4.1. Skill and chance situations

Most research supports the argument that internals perform better under skill conditions and externals under chance-determined ones, e.g. Julian and Katz (1968) and Watson and Baumel (1967).
Rotter and Mulry (1965) suggested that internals value reinforcements contingent on skill, while Watson and Baumel proposed an "incertency" hypothesis, whereby the perception of control (i.e. skill-determination) would increase the anxiety of externals and they found similar I/E differences. Lefcourt et al. (1968) have suggested that the individuals' perception of control of the particular task needs to be taken into account to resolve this issue.

Julian et al., (1968) found, contrary to expectations, in a task where "control" was removed from the subjects (a blindfold darts game), that externals rather than internals found this to be more frustrating, thereby possibly supporting Rotter and Mulry's contention that it is the outcomes of skill situations which are of concern to internals, and those where performance is irrelevant that are of concern to externals.

4.2. Success and Failure

A number of studies have suggested that externals blame external sources more only after failure conditions, while success conditions do not differentiate them (Efran, 1964), Phares (1957), Phares et al. (1971), Davis and Davis (1972)). Where a fixed order of partial reinforcement was used for both right or wrong responses, Phares found the effects of success and failure were greater under the skill than the chance instructions - i.e. reinforcements were more
effective then for raising or lowering expectancies for future reinforcements, and these expectancies changed more often under these conditions. Under chance conditions, the gambler's fallacy was seen to occur.

Finding better performance on a recognition test from subjects told they could escape shock by performing well, Phares (1962) suggests that subjects who "feel they have control of the situation ... exhibit ... behaviour that will better enable them to cope with potentially threatening situations ..." Rotter considers that the findings from studies of skill and chance situations are fairly clear-cut:— when the task is perceived as controlled by chance, another or random conditions, "experience is relied upon less", consequently the subject may learn less and ..."may indeed learn the wrong things".

Contradictory findings however are also reported, when dividing externals into "high and low-trust" externality. Hochreich, 1974, 1975). The first study used a projection technique. Externals were found to make less mean attributions for failure to the "hero" than internals, and "defensive" externals less than "true" (or "low trust") internals (but similarly to high trust internals). When differences between "achievement" stories were examined, the differences above related only to achievement, not to non-achievement failure stories, while success outcomes did not differentiate. For females alone however the achievement—nature of the stories did not differentiate, while the trust
dimension did, low-trust females attributing success less than high-trust.

This was followed up by an actual failure situation (anagram-solving), Hochreich (1975) finding greater responsibility was attributed to the test by "defensive" externals under failure as opposed to success conditions. Internals had higher initial expectancies for success, than Externals, and after the first failure experience, low-trust (defensive) externals decreased their expectancies, as opposed to "congruent" externals.

5. **Stress and Illness**

Field studies of I/E control have assessed differences in normal samples in relation to health and health beliefs, to stress and illness, as well as assessing differences among patient samples. The former of these 2 aspects will be considered first.

5.a. **Normal samples**

One study, (using a devised control measure as distinct from Rotter's) (Kiescht, 1972) investigated perceptions of control in relation to health beliefs, using a measure devised to distinguish between expectancy for control and motivation for control. Measures of perceived vulnerability, and the perceived efficacy of preventive actions were also devised, and these related positively to expectancies for control. While the findings were not entirely clear-cut, the author suggests that those high in expectancy for control (Harrow and Berranza, 1983).
appear to reflect an ability to cope with health problems, while those high on motivation for control seem disposed to utilize any health resources available.

Prociuk et al. (1976), accepted Beck's identification of "hopelessness" as a core characteristic of depression and predicted that depression would be related to hopelessness in 2 normal samples. Correlations were found (of .35 and .42), (although both Inventories were devised by Beck and there appears to be some overlap between some of the items). They considered the association to have implications for the study of learned helplessness in man, and they accept the I/E dimension as indicating learned helplessness, which also related to depression in their study. They suggest however that it is the hopelessness which mediates the relationships between these variables.

Calhoun et al. (1974) found, when assessing a normal (student) sample's "periods of depression", using the Self-Rating Depression Scale (Zung, 1965) and an Adjective Check List that both indices were associated with externality (although the check list was only associated for males). A measure was taken of the perceived causes of depression and these were attributed internally only (significantly so) for the females.

5.b. Patient populations

It has been asserted that psychiatric patients score highly on the external dimension (Shybut, 1968, Distefano et al. 1971, Cromwell et al. 1961) although other findings suggest their scores do not differ from normals, (Harrow and Ferrante, 1969).
Smith (1970) assessed crisis patients with the LC scale, assumptions of crisis intervention treatment being that the individuals' usual coping mechanisms have failed, and that he is therefore ripe for large positive change in a short time. Such individuals were hypothesized to be likely to perceive themselves as relatively powerless to influence what happens to them. External scores were found to drop with crisis-resolution.

Seeman and Evans (1962) proposed that an individual's sense of powerlessness would affect his response to critical circumstances. Using a sample of white male T3 patients who scored high and low on an "alienation" scale (derived from items of Liverant's used in the I/E scale), they found that "high alienation" subjects had less objective knowledge about their condition. However, on wards where information was most difficult to obtain, such subjects were also less satisfied with this information.

Externality has been reported to be related to the severity of illness in psychiatric patients and to the degree of their emotional impairment (using both psychiatric ratings and the Mood Adjective Check List (Smith et al., 1971)). Shybut (1968) found externality to be higher in a psychiatric patient group than a normal group and highest for the most disturbed. Patients were found generally to have shorter time perspectives, especially externals (as were long-term patients). It is possible though that the relationship between patient-status, severity, length of hospitalization, shorter time perspective and externality to convey to others that they were normal, while others...
may simply reflect the expectancies associated with long-term hospital stay.

6. Change and Manipulation of LC scores

As the perception of control has been hypothesized as a learned dimension, the implications of this are that such perceptions could be amenable to change, or at least modification. Interest in this aspect has centred around whether, if changes in perception of control can be brought about, changes in behaviour will follow and vice versa. This has been investigated in laboratory studies where I/E attitudes are subjected to manipulation, and in patient samples. If external attitudes are related to illness or vulnerability then the usefulness of such studies might be that such insights could be incorporated into therapy to speed recovery, and also that the development of healthier attitudes might lead to a lower predisposition to illness in future.

Lefcourt and Ladwig (1965) suggest that the theory implies that alterations could take place by linking new goals cognitively to old successes, and Lefcourt (1967) has proposed that the crucial factor in the lower striving of externals is due to their lower perceptiveness of reinforcement which could be alterable, rather than to lack of motivation. Gillis and Jessor (1970) found psychotherapy effective in increasing attitudes of internal control. Fontana et al. (1968), studying schizophrenic patients found results to imply that those who were internal wished to convey to others that they were normal, while external
scores indicated a desire to convey illness, or a lack of responsibility for their behaviour.

Studies viewing the goal of therapy as an increased mastery over the environment have used the control scale in conjunction with assessments of improvement in patients (Smith, 1970; Dua, 1970; Gillis and Jessor, 1970). Their findings indicated that externality decreased with therapy, Smith finding this to be so for "crisis" as opposed to non-crisis patients only. He suggested that the patients may have learned and begun to use more effective coping mechanisms, coming increasingly to see themselves having some control over their life situation, and feeling less helpless. Using female student applicants to a Counselling Centre for interpersonal relationship problems (not patients), Dua found externality to decrease more in therapeutic action programmes focussing on specific behaviours, (as opposed to re-education programmes focussing on cognitive processes, attitude change and verbal interaction). Harrow and Perante (1969) however found no change in externality scores with improvement in a similar study.

Levenson (1973) found that Internality did not differentiate between committed and voluntary patients or type of diagnosis, but that it increased a month after the first testings at the time of admission. This suggested to her that it is the I scores which are most amenable to change, their original level possibly reflecting the function of hospitalization with its designated routine and lack of responsibility.
7. The Issue of Non-Unidimensionality

It was originally suggested (Rotter, 1966) that most of the variance in the scale was included in a general factor, with other factors only involving a few items, and not suggesting clear-cut sub-scales within the test. Most criticisms of the scale however have challenged its presumed unidimensional nature, and have suggested that it may be multi-dimensional, factors within it accounting for some of the contrary findings (Gurin et al, 1969; Lao, 1970; Mirels, 1970; Levenson, 1974; Reid and Ware, 1973; Hersche and Scheibe, 1967).

Where validity coefficients were small the query was left open as to whether the theory or the measure was to blame. Rotter (1966) had noted some item/total correlations not being high, as well as occasional low or inconsistent validity correlations.

Most criticism has been directed against the external end of the scale (Hochreich, 1974), suggesting that there may be 2 types of "externals". One type is seen as adopting an external view as a defence against failure, and being in fact highly competitive in structured situations, and therefore behaving more like internals than "typical" externals. Hochreich (1974) sees "true" externals as passively accepting their lack of personal control and having a kind of "built-in-defence", and therefore not "needing" to repress or deny failure experiences, which have to be rationalised by the other type of external, who "needs" to resort to defensive blame.
Mirels (1970) has suggested 2 separable components and refers to this division in terms of the "target" of the external control, as to whether this refers to the individual or the social system, and names them respectively Fatalism (F) and Social System Control (SSC).

Joe (1971) considers that the findings of Mirels, Gurin et al., and Thomas (1970) support the notion that the locus of control variable should be studied at a multi-dimensional rather than at a unidimensional level.

The number of behaviours to which the I-E scale has been related (ethnic group affiliation, belief in government publications, perceptions of the disabled etc.) led Reid and Ware (1973) to regard it as either unidimensional and very generalisable, or else much more complex and multidimensional. While with more recently devised and re-worded scales 2 distinct E factors seem to be measurable, this may not apply so clearly to the original scale.

Reid and Ware differed from Mirels concerning a similar distinction between Fatalism and Social System Control, emphasizing the "source" rather than the "target" of the control. Thus luck, chance or fortune are seen to be the source of control for the Fatalism (F) dimension, and social and political forces those of the Social System Control (SSC) one. The implication is that the individual himself is the target of control, while F and SSC are the sources. (This would seem to be a more reasonable distinction, although the argument may be merely a semantic one.)
Reid and Ware's other main quarrel is with a self-versus-other distinction. Most responses to Fatalism items implied personal control, whereas most SSC items concerned control over others. Thus I and E might confound the 4 possible aspects of Self, Other, F and SSC, it being therefore difficult to say where the true dimensions lie, or whether it might be a combination of these.

Reid and Ware had devised new items to comprise a 40-item forced-choice scale, with 10 buffer items, referring respectively to chance determinants of self and other, and SSC determinants of self and other. Factor analysis did not distinguish 4 separate factors, but rather 2 resembling F and SSC, not distinguishing between control of self and other, thus contradicting Mirels.

The greater variability of behaviour shown by externals has been cited as indicating possible heterogeneity of the external end of the scale (Hersch and Scheibe, 1967), although it would be possible to speculate on such variability as one of their attributes. The "defensiveness" suggested as characteristic of externals (Rotter, 1966) has been suggested as characterising one type of external, who uses verbal defence (Hochreich, 1974; Phares et al., 1971; Davis and Davis, 1972). They are seen as being achievement-oriented (as are internals) and as those for whom "failure is assumed to be particularly salient", thus engaging even more blame-projection - so that they show internal behaviour under some conditions, and an extremely internal fashion under others.
Correlations between Externality and Trust are typically negative (Hochreich, 1974), especially in males, both scores possibly representing a characteristic verbal technique of defense. It is hypothesized that such individuals being ambitious, but habitually projecting outwards after failure or undesired outcomes in order to maintain consistency in their belief systems, may eventually lead to an (at least verbally expressed) distrustful attitude towards others.

In their findings of generally "unfavorable" personality aspects associated with externality, Hersch and Scheibe (1967) also query the possibly simplistic theory behind the I-E dimension. Noting the homogeneity of the I performance correlates, they suggest a "diversity in the psychological meaning of E". Self-reports on E could be due to "actual" weakness or to self-descriptions influenced by competitive social situations, both of which would reflect a realistic and a pessimistic view. However, 2 other alternatives are also possible:—

A belief in a "fate" that is on one's side would be an unrealistic but an optimistic attitude, while feelings of persecution would indicate an unrealistic and pessimistic one. Thus, while I appears to be consistently related to social adjustment, the "diffuseness" of the E self-descriptions (indicating alternatives, e.g. of a benevolent or a malevolent fate), indicate to them the need for a theoretical and empirical differentiation of E.

Levenson had used some of Rotter's items and added others written specifically for the new scales, leading to a 34-item inventory in a Likert format rather than forced-choice, so that the 3 scales in it should be independent. Other differences between rotations include a fewer initially antithetical items.
Levenson (1973) theorized that those who believe that the world is unordered (chance) would behave and think differently from people who believe in a world that is ordered but controlled by powerful others. Patients with a "powerful others" orientation were reasoned to be less "sick" than those with a "chance" one, as their world would be less disordered, and the potential for anticipating events is there. The Rotter scale was therefore revised by her and three sub-scales formulated, of Internality (I), Powerful others (P) and Chance (C), which were administered to a psychiatric sample. Internality scores appeared to be similar for all types of psychiatric patients, and to a previous normal sample, while both the P and C scores were higher for the patients than normals.

As the patient sample was (judged to be) of low middle class and below, one third being black, and the normal sample was of high social class, 90% white and educated, it is admitted that the differences might not be due entirely to patient status, and the comparability of such samples seems unwise. The administration of a self-report test to severely-ill psychiatric patients might seem inadvisable, albeit by the card-sorting method used. It might however be in line with expectations that, where psychotics did not differ from neurotics on the Internal scale, both they and schizophrenics had higher beliefs in powerful others.

Levenson had used some of Rotter's items and added others written specifically for the new scales, leading to a 24-item inventory in a Likert-format rather than forced-choice, so that the 3 scales in it should be independent. Other differences
from Rotter's scale are that the statements are phrased so that they refer to the individual's feelings regarding himself rather than "people in general", and that no items are included indicating specific modifiability of systems.

Findings in a study of actual social action involvement indicated that the I scale corresponded to Rotter's Internal dimension, whereas P scores were significantly different from (and higher than) C scores for males only. Levenson (1974) considers that I and C do not occupy opposite ends of a continuum, as is implicit in Rotter's scale. Despite their correlation, the P and C scales are considered to be tapping "quite different beliefs" which should not be grouped together as extremality.

Levenson's dimensions thus seem most similar to Reid and Ware's, her C dimension resembling their P one, and her PO the SSC aspect. In her study also, it is the external agents who are the sources of control (with the exception of the I factor).

The external end of the dimension has been divided into 4 factors by Collins (1974) (using the original 23 items but in a Likert format of 46 alternatives with 42 additions). These distinctions were arrived at by the observation that the scale did not distinguish between the predictability (and therefore the controllability) of events and the locus of this predictability in the self or the environment.

A comparability of the Likert-format was made by also administering the original forced-choice scale of 23 items, which indicated that the responses were essentially identical, and the Likert item reliabilities were equally high. Collins' factor rotations revealed a first entirely external factor
comprised entirely of items in the original scale. Only 4 of these 11 items were related to luck or chance, and this factor appears to be a general one of "environmental difficulty". The second main factor comprises a distinction between a "just" and an "unjust" world, thus dividing Internality into 2 aspects. The third factor relates to the "predictability" or "fateful" aspects of the environmental, and again comprises largely external items. The fourth factor was one comprising both internal and external items, referring to belief in the political responsiveness of the environment (similar to Mirels' "system modifiability").

It is therefore the patterning of correlations, which differ between the external and internal alternatives, which leads Collins to suggest the separate examination of the Internal and External aspects, the representation of both rarely occurring in the same factor. Difficulty in ascertaining sub-scales previously are held to result from the pairing of internal items from one sub-scale against external items from another in the forced-choice format.

The 4 factors discerned are suggested as being superimposed on the current overall theme of his 46 alternatives. Thus Rotter is held to equate under externality beliefs that: the world is difficult, that it is "lucky", unjust and that government is unresponsive.

The issue of confounding predictability with controllability has already been mentioned. Even where attempts are made to separate these factors, and to provide situations which are controllable and uncontrollable and also predictable and unpredictable, a balanced design seems impossible.
It seems inevitable to leave an empty cell in any such design containing a controllable but unpredictable condition.

Investigation of possible factors within I and E might seem to require the construction of specific scales. Most researchers have continued to use the original scale, and this may appear to be the best course where any broad distinctions between E and I individuals are initially sought.

8. **Relation of Locus of Control and learned helplessness**

It may seem plausible from the preceding review that the locus of control concept may be a promising candidate for the proposed research, especially on the grounds of its link with maladaptive behaviour and depression.

The associated concept of learned helplessness may also be relevant, if the individuals' previous learning of their "ineffectiveness" is that which leads them to perceive the locus of control as lying externally – in other words in accounting for its aetiology. Although these two facets of research evolved independently, their initiators have recognized much common grounds, and both aspects have been integrated in subsequent research, such as that of Hiroto's (1974). Both concepts may be useful where the ultimate aim is not only to relieve depression, but also to predict and prevent it, as methodologies have arisen from both Seligman's and Rotter's work utilizing behavioural techniques and the inducing of cognitive change.
For the experimental work intended here, it is proposed to use the psychometric measure of locus of control to assess individuals' current attitudes prior to stressor experience. This approach does not query or investigate the possible genesis of such attitudes of lack of control or helplessness which may be the focus of others' research. The use of such a questionnaire scale is particularly suitable for investigating consistencies or lack of consistency between attitudes of control and blame, using a psychometric measure for the latter also.

Life-events which are normally considered potentially "stressful" are frequently those which are not under the individuals' control, or only marginally so. Whereas it is difficult to assign an exact degree of controllability over some potential real-life stressors (as for example in the case of losing a job), an "uncontrollable" minor stressor is feasible to incorporate into laboratory work, and provides an opportunity for making assessments before and after such a stressor. It may be that unpredictability is potentially even more traumatic than uncontrollability, as Glass and others have suggested, and it is proposed to incorporate both aspects into a minor laboratory stressor.

Gatchell and Proctor's work producing physiological patterns similar to those of depression followed a task where lack of control was manipulated and "learned helplessness" induced in normal subjects. It seems worth querying whether in a normal sample, Externals (as measured on the Locus of Control scale) might also display any characteristic post-stressor psychophysiological responsiveness, as well as
possibly depressed mood state, and this will be part of
the proposed investigation.

1. Interest in punitiveness and its direction

The literature concerning the other dimension relevant
for the research that of hostility and its direction, will
next be reviewed.

2. Measures of hostility and its association with
stress and illness

3a. Hostility in relation to depression

4. The problem of retrospection

5. The possibility of prediction

6. Hostility - cause or effect.
1. Interest in punitiveness and its direction

2. Measures of hostility

3. Correlates of hostility and its association with stress and illness

3a. Hostility in relation to depression

4. The problem of retrospection

5. The possibility of prediction

6. Hostility - cause or effect.
Interest in this dimension has arisen from the observation that individuals appear to attribute blame predominantly to themselves or to others, and that these tendencies seem to be consistent within individuals. If this observation is correct, then such a dimension presents itself as a promising candidate for investigating the general consistency of responsiveness, including possibly that of physiological responsivity. Further, if reactions to stress imply a response of the total organism, then an individual's perceptual set and possibly the accompanying physiological style, might enable predictions to be made of general stress responses -- or even of predisposition to specific illness syndromes.

One of the earliest researchers to pursue an interest in the direction of punitiveness was Rosensweig (1934), with the aim of describing typical modes of reaction to frustration that might serve as a basis for experimental research. "Extrapunitive" reactions direct blame against external sources or others, "intropunitive" ones being directed inwards, e.g. as in guilt. He proposed that the individual emphasizes what is in accordance with his "personal traits and needs". Only relatively consistent characteristic ways of responding were assumed, the classification being applied originally to mechanisms, rather than individuals. These processes were said to be conscious ones, rather than a description of whatever "unconscious" ones were also involved. Both extrapunitive and intropunitive
types of reaction are suggested as being aggressive in character, and as having a "special relation to memory" - the former remembering frustrations as if in anticipation of revenge, and the latter nursing wounded pride or "eating one's heart out".

Rosenzweig suggested that it seems as if aggressive impulses were being preserved to be expressed later against outer objects, or against the self. Both types are said to involve neither forgiving nor forgetting. Foulds, Caine and Creasy (1960) consider the linkage of his terms with psychoanalytic concepts unfortunate.

The essentially negative aspects of hostility have been stressed by Maslow (1943) and Siegal (1956). Maslow speaks of the necessity for hostility to exist within authoritarianism. Such individuals over-generalize in ranking others on a superiority-inferiority hierarchy and have a strong drive (or need) for power and prestige judged by external symbols. Siegal has suggested that hostility characterizes the authoritarian personality who tends to project hostility on the environment in a diffuse, intense and often irrational manner.

The concept of hostility has embraced many aspects. It has been noted as possessing a number of different meanings, including negative feeling states, destructive impulses, aggressive behaviour and a reaction to frustration (Buss, Durkee and Baer, 1956). Even "external" hostility
alone has been noted to subsume behavioural aspects, subjective affect and dispositional state, (Gottschalk et al., 1963).

A question that arises is whether hostility should be regarded as identical with aggression or anger. The three terms are frequently used interchangeably, but distinctions have been proposed by Buss (1961). While anger is suggested as an emotional reaction with autonomic components, and aggression as an instrumental response that administers punishment, hostility is proposed as a negative attitude defined in terms of implicit verbal responses. When the responses of perceiving, categorizing and evaluating stimuli are associated with anger reactions, these are defined as hostile responses. These negative language responses consisting of resentment, jealousy, etc. have been conditioned to anger, but persist after anger dissipates, and in that sense are "more or less substitute anger responses". Buss suggests that they resemble anger in their orientation towards injury and punishment, but that they lack the autonomic components.

Hostility is proposed as developing on the basis of the verbal labels identifying and categorizing stimuli, which explains its enduring quality. With some individuals, it may pervade their outlook towards everyone, an aspect which he suggests could be tested by responses to standard stimuli.
Hostility is defined as a dispositional response, as comprising enduring ill-will and related to the mulling over of rejections and disappointments - or "vengefulness". Hostility and aggression can however occur independently of each other. As hostility is said to be an enduring response that builds up and changes slowly, it is said to have no tension state comparable to the physiological arousal of anger - and therefore attack may not reduce tension states or autonomic arousal - unless hostility has led to anger. It is suggested that, for some individuals, anger may be closely associated with hostility, with recall (e.g. of resentments) quickly arousing anger.

Both hostility and anger are said to be present in most psychosomatic illnesses, although Buss considered the only consistent findings concerning conflicts over hostility and aggression to be those relating to essential hypertension and neuro-dermatitis. Hostility has been considered as either a perception of others as threatening - or as a state of readiness to injure others, (Newcomb, 1947). He also distinguished between hostile impulses and hostile attitudes.

The reason why attitudes persist is held to be due to the meaning of threat. Hostile impulses are aroused when interacting with others if the relationships are perceived as threatening. Communication with the other is then avoided and this isolation is seen as a common condition for the impulses to develop into more permanent attitudes; the conditions necessary for eliminating the hostile attitude do not occur.
These speculations bring to mind studies on prejudice and those who (tending to "bifurcation" or dichotomy in their cognitive operations) accentuate the distinction between in-group and out-group. Gordon Allport (1954) conceives of the prejudiced individual's failure to accept the crisscross of good and bad in his own nature and his chronic sensitization to right and wrong. This inner bifurcation becomes projected on the outer world. He gives approval or disapproval categorically. 

Buss's argument concerning the lack of autonomic correlates with hostility is not necessarily accepted here, although it may be that any such correlates could be attributable to the anger components of - or association with - hostility. It is also possible that the enduring negative set of attitudes such as resentment may have their own physiological concomitants which might be either less extreme than those of anger, or qualitatively different. The terms hostility and aggression are often used interchangeably in the literature, without making the previously mentioned distinctions. Emphasis will be placed primarily on those studies which refer specifically to hostility, those referring to aggression being mentioned where they appear relevant. The main interest will centre around one aspect of Buss's distinction - that is the more enduring and assumed negative nature of hostility. Thus, where "aggression" contains no such value judgement, hostility (and possibly extreme aspects of aggression) will be considered to be "maladaptive".
2. Measures of hostility

There have been a number of approaches towards assessing aspects of aggression and hostility, including projective measures such as the Rorschach Test, (Elizur, 1949), the T.A.T. (Morgan and Murray, 1935) and the Rosenzweig PF Test (Rosenzweig, 1943). Psychometric measures include the Edwards Personal Preference Schedule (E.P.P.S., Edwards, 1954), the Buss-Durkee Inventory, subscales of the Minnesota Multiaxial Personality Inventory (M.M.P.I., Hathaway and McKinley, 1943) and the Hostility and Direction of Hostility Questionnaire, (H.D.H.Q., Caine, Foulds and Hope, 1967).

Some approaches have used analysis of verbal samples for hostile content, (Gottschack et al. 1963, Gleser et al. 1961, Klerman and Gershon, 1970). Others have used self-report questionnaires, (Friedman, 1970), and the Brief Psychiatric Rating Scale (B.P.R.S.), (Overall et al. 1966, Weissman et al. 1971). The latter authors made multiple assessments of hostility including that evidenced at the interview and rated by a psychiatrist, and unco-operative assessment of the patients' reports of hostility and irritability to others (outside the interview) and a separate researcher's ratings of the patients' reports of overt friction with others on a Social Adjustment Scale. Clinicians have made their own assessments of hostility in patients usually on the basis of behavioural observations at interview, and sometimes amplified with other measures.
Laboratory tests with behavioural measures have also been used, although these have usually comprised measures to evoke aggressive responses within a brief time-span, and may be only indirectly related to more enduring hostile attitudes. The problem of assessing the whole range of hostile phenomena has been noted by Pilowski (1975) who considers that this indicates that "hostility" may refer to many different states and behaviours. His own measure was a single rating of feeling of anger on a visual analogue scale, and he considers that the relationship of his own measure to others cannot yet be established. The intensity of feeling only was measured, whereas he considered that how such anger is handled and its object is also important.

One obvious difficulty in assessing hostility is that there are at least behavioural differences relative to the testing situation, e.g. between behaviour at home and that displayed in a hospital or psychiatric setting, (Buss et al. 1962, Weissman et al. 1971). Psychometric measures may be less affected by such differences than behavioural or observational ones.

Attempts to measure aggression have been criticized on the grounds of lack of definition which fails to delimit the area under investigation, of criteria which do not command agreement or which are inappropriate, and of purported measures of global aggression which in fact only evaluate limited aspects of it (and therefore usually, although not explicitly, excluding "unconscious" aggression), (Cochrane, 1975).
Other criticisms are that even two different observer measures of aggression do not always correlate highly, if at all, (Spitzer et al. 1967), and that this may be even more marked when different approaches such as projective measures, self-reports, observer ratings and behavioural measures are compared (Goodstein, 1954, Buss, 1961, Charen, 1955). Single-interview ratings are considered unreliable by Cochrane, and demonstrations of reliability are rare, so that "enduring personality characteristics" may not in fact have been assessed. Aequinescence and social desirability factors have only been partially overcome by some measures (Merrill and Heathers, 1956, Buss and Durkee, 1957), and these may affect both test and interview situations. Cochrane considers that, although in tail order, the best measures of "induced" rather than "spontaneous" aggression (as advocated by Buss using responses to the ambiguous stimuli of projective measures) may not reflect the "basic aggression inherent in personality" (Cochrane, 1975). The clinical relevance of most measures is also queried as the classification of different kinds of aggression (Spitzer et al. 1967). These authors consider that all has not been based on specified tenets, and often utilizes intensity scores only (i.e. is quantitative). Where aggression has been sub-divided into categories, these may be unjustifiably quantified and weighted. Where measurement of the handling (i.e. the qualitative aspects) of aggression has been attempted, the distinctions, although clinically meaningful, are criticized as not doing justice to the variety of possible methods of handling aggression.
i.e. its conscious or unconscious experience, its distortions and possible range of defence mechanisms. Whereas attempted measures of "covert" aggression have been made, these are not considered synonymous with "unconscious" aggression. Reduced weighting given to these is considered unjustifiable, as the need for defence mechanisms to handle them implies a greater than normal intensity.

Rosenzweig's assumption was that reactions on the P.F. study mirrored the overt level of behaviour, although the strength of the relationship was not seen as evident. So the authors that clinical appraisals could be replaced by questionnaire evaluation.

The level of awareness of the hostility has been one of the most frequently queried aspects of its measurement, (Gottschalk et al. 1965). These authors consider that all inventories tap primarily conscious attitudes which the subject finds sufficiently acceptable to acknowledge, and that their usefulness in studying repressed anger is therefore limited. Their own interest lay in assessing immediate and changing levels of affect, or the "hostility-anger portion of the hostility concept" by the means of analysing verbal samples.
Buss et al. (1956) proposed several dimensions of hostility derived from a "rational analysis of hostile behaviour". These were: resentment, verbal hostility, indirect hostility, assault and suspicion. Interview observer-ratings by 3 judges showed that all these correlated significantly with scores on the Iowa Hostility Inventory in a group of psychoneurotic patients. Overall hostility ratings also correlated with the Iowa, although the strength of the relationship was not such to suggest to the authors that clinical appraisals could be replaced by questionnaire evaluation.

Five scales to assess intro- and extra-punitiveness have been derived from the Minnesota Multiphasic Personality Inventory by Foulds, Caine and Greasy, (1960). These were then developed into the Hostility and Direction of Hostility Questionnaire, (HDHQ, Caine et al., 1967). The fifty-one items comprising the five subscales are: Acting-out hostility (AH), Projected hostility (PH), Criticism of others (CO), Self-Criticism (SC) and Guilt (G). The first three scales comprise an extra-punitive (Ext H) measure, and the latter two an intro-punitive (Int H) one. A rating of overall hostility (H) is obtained by adding scores on all the five sub-scales, while a Direction of Hostility score (Dir H) is obtained by the formula (2 SC + G) - (AH + PH + CO), (Caine et al. 1967).
This measure therefore comprises the intropunitive score minus the extrapunitive one, the resultant score being either plus or minus, Dir H scoring in an intropunitive direction. (An alternative method has been to use the intro- and extrapunitive scores separately and not combine them, (Philip 1971, Blackburn, 1974).)

It has been part of Foulds’ overall thesis that there is a continuum from normal through to psychiatric states. Embedded within this is the concept of “Personal Illness”. Those who are mildly disturbed are seen as being “personally ill” and all more severe psychiatric states are conceived as also containing illness of the “person” (Foulds 1961, 1965). It has also been a part of his work to distinguish between psychiatric “symptoms” and less labile “personality” characteristics. The Hysteroid-Obsessoid Questionnaire (Caine, 1965) was designed to measure the latter more enduring characteristics, while the H.D.H.Q. is said to be more sensitive to change and therefore to be more related to state. It may not be necessary to enter into an argument as to whether the H.D.H.Q. measures more or less enduring characteristics.

An intriguing area of enquiry is whether the way that

If the aspects of hostility and its direction are those of interest, and an empirical and observational approach rather than a strongly theoretical one is adopted, then differences in any dependent variable observed to be associated with extreme values of H, Int H or Ext H may be worth pursuing. As a corollary to such investigations, if
changes in the measures themselves occur under certain conditions, this may also be both interesting and informative.

Comments relating to the HDHQ scale have been that re-test correlations rather than internal consistency have been demonstrated. Indirect measures of assessing validity have been those of testing the scores of normal, neurotic and psychotic groups. Numbers tested have not yet usually been large. Studies of validity are still being extended, (Foulds 1959, Foulds et al. 1960, Foulds 1968, Mayo 1967, Philip 1968, 1971, Blackburn 1974).

These studies have so far shown the measures to be able to differentiate between patient groups, between psychiatric patients and normals, and between good and poor recovery from illness. It is considered a worthwhile research tool for experimental or clinical research on hostility, (Bjerstedt, 1965, Lorr, 1972).

3. Correlates of hostility and its association with stress and illness

An intriguing area of enquiry is whether the way that individuals handle their hostility or feelings of anger may relate to the way that they are able to cope with stress situations, to their proneness to develop illness and possibly to their type of illness predisposition.
The prediction of illness development would be of immense value in terms of preventive medicine as well as being of theoretical interest. The "choice of target organ" is still largely speculative in the debate as to why, under stress, one individual may develop depressive symptoms, another cardiovascular disorders, gastric ulcers or other "psychosomatic" syndromes. Few studies have distinguished between hostility and aggression in this area, and they will be considered together. Most have considered the degree of aggression as important, often implicitly assuming an optimal level for this, with extreme aspects of it being maladaptive.

Psychophysiological correlates are relevant; both these and studies that have examined behavioural correlates have focussed largely on rapidly-evoked responses to frustrating situations. Inevitably, most studies are laboratory-based, but some suggestive findings also come from field studies. Most laboratory studies have examined correlates of aggressive behaviour, rather than those specifically of hostility. Situations include those of the emulation of real-life stresses and of the provocation of frustration or anger. Since Cannon (1932) suggested that anger and fear reactions were part of the "fight or flight" response, others have attempted to differentiate the "anger" component by physiological or endocrine measures.
Funkenstein et al. (1954) advised taking into account the direction of emotion. Using self-reports of anger taken after a laboratory-stress situation scored by two interviewers, he found that "anger-in" subjects had faster pulse-rates, while "anger-out" subjects had a pattern of responses that was differentiated from both "anger-in" and "anxious" subjects. Considerable interest has been expressed in the relative secretion of adrenalin and nor-adrenaline. Funkenstein (1955) suggested that the former is associated with depression or anxiety, and the latter with outwardly-directed anger.

Ax (1953) used a large number of physiological measures and found seven of them to differentiate between anger and fear-producing situations in the laboratory, the former being associated with more frequent uses in diastolic blood pressure, more heart rate decreases and skin conductance responses. It was suggested that this pattern bore a resemblance to the changes found when injecting both adrenaline and nor-adrenaline, (whereas a "fear" response resembles that occurring after injection of adrenalin only). However, Levi (1965, 1972) showed that increased catecholamine output accompanied "arousing" stimuli which were pleasant as well as unpleasant, suggesting an undifferentiated "arousal" response.
When an experimental situation was manipulated to induce anger or euphoria after injection of adrenalin, it was possible to induce either mood, indicating that aspects of the situation influenced the type of subjective response, (Schacter and Singer, 1962). This could be interpreted as indicating that sympathetic-adrenomedullary arousal is non-specific, and that only external factors determine the subjectively-experienced nature of the response. Or it could be viewed as an indication that under normal and not manipulated situations, individuals will make their own cognitive appraisals of situations according to their perceptual style, and that these appraisals will differ between individuals when the external factors remain the same.

There would appear to be limitations in arguing from an adrenalin-injected situation where the external cues are varied, to one where the spontaneous secretion of catecholamines occurs in response to controlled or varied external factors, and where this idiosyncratic response can be evaluated. Frankenhauser and Patkai (1965) found constellations of personality variables to be related to patterns of catecholamine excretion, but these did not indicate an aggression/anxiety dichotomy.

When examining cardiovascular measures and using analysis of verbal samples for hostility ratings, Gottshalk et al. (1963) found that intropunitive hypertensive women had higher diastolic and systolic blood pressure and extra-
punitive significantly lower initial levels. The extra-
puitive showed greater increases in both measures after
producing a verbal sample of personal experiences.

Oken (1960) found higher blood pressure levels in psychia-
tric (normotensive) patients who inhibited anger in an
interview-stress situation. Findings from studies which
have aimed to frustrate subjects and to allow them the
chance to show aggression have been inconsistent.

Hokanson et al. (1963) found greater arousal (in terms
of heart-rate and blood pressure) after frustration, which
could be decreased by the expression of aggression, (by
shock administration) towards the frustrator only, and only
if the circumstances were "appropriate". Burgess et al.
(1968) however found the opposite results in depressed
patients. Sex differences appeared to be important,
females showing the presumed "adaptive" response of faster
vascular recovery after friendly rather than aggressive

Raab and Krzywanek (1965) were concerned with the
recognition of "coronary-prone" individuals by objective
criteria of cardiac sympathetic nervous activity. Using
a laboratory stress situation, a sympathetic adrenergic
reaction was observed (cardiac acceleration and shorter
isometric tension period) and this was ascribed primarily
to those with personality patterns which included irrit-
ability and resentment, (as rated on self-evaluation
questionnaires). This emotional irritability appeared to
be more important than that of the external "stressor's"
Physiological indicators specific to aggression have not yet been successfully isolated, (Cochrane, 1975), factors affecting this appearing to include the intensity of aggression, as well as its expression or repression, amongst many other factors. The frequent interdependence of emotions and their rare occurrence in "pure" form is held to contribute to their problematical assessment, while individual differences in the physiological manifestations of aggression may contribute to inconsistent findings. (It is possible that these individual differences themselves might be important - or might even throw light on the underlying processes). Cochrane notes that most physiological work has been concerned with transient and evoked aggressive states, not with the more enduring aggressive components of personality, determined by internal psychological factors which are of interest to the clinician.

Evidence that "unconscious aggression" might be measurable physiologically has not been entirely encouraging, as it seems possible for physiological responses to be inhibited by psychological defences (Sachar et al. 1963, Wolff et al. 1964).

The previously mentioned studies have sought to establish patterns of responding in normal individuals which might suggest that endocrine or physiological correlates of aggression in the laboratory might be early indicators of those whose habitual responding might ultimately
be maladaptive, (e.g. in terms of adrenergic over-activity and therefore of cardiovascular disease). Another approach has been to study those who have already manifested extreme stress responses or specific illness, and to attempt to investigate the possible pre-disposing role of hostility in these.

"Psychosomatic" disorders, such as duodenal ulcers and hypertension have been suggested as being linked with conflicts of hostility and dependence by Ryle (1966). Where general mental health is concerned, decreases in feelings of hostility to others, and in feelings of inferiority and guilt have been described as "traditional therapeutic goals", (Martin and Caine, 1963) - i.e. less extra- and intropunitiveness.

Aggressiveness has been one of the components of the "Type A" behaviour pattern said to be shown by those at greatest risk for cardiovascular disease, (Friedman and Rosenman, 1959, 1971). They provide prospective data on normal subjects which relate coronary heart disease incidence significantly to the previously-attributed "Type A" individuals.

High levels of hostility have been reported in alcoholics (Ritson, 1971, Walton, 1968) using the H.D.H.Q. Ritson found that those with the highest hostility scores tended to have a poorer prognosis, while the actual scores did not change significantly after treatment. While no one personality type was defined as pre-alcoholic and much of the disorganis-
sation apparent in alcoholics was attributed to their addiction, some were said to show a failure in relationships which could not be ascribed solely to alcohol. The sub-scores indicated that it was the impulsive alcoholic, acting out his feelings rather than the self-critical one who had the poorest prognosis. Poor prognosis was also related to high hostility levels in the spouses of the alcoholic out-patients.

Ritson considers that the H measure is a useful prognostic one in selecting alcoholics and predicting response, and also agrees with Foulds' hypothesis that this score is not readily changed by treatment.

Watson claimed that the H.D.H.Q. also discriminated between "loss-of-control" alcohol addicts (who were more hostile and feared their own impulses), and inveterate drinkers, when both types were monitored during abstinence. He did not categorically claim that "ingrained" personality characteristics accounted for this, as either the drinking patterns or a tendency to refer to alcohol-influenced behaviours might have influenced the inventory scores. Theoretical links between aggression and suicide have been made, proposing that the ultimate act of aggression against the self is suicide, (Priest, 1977). Epidemiologically, Kendall (1970) notes an inverse relation between suicide and homicide.
Studies have borne out an association between high hostility and suicide attempts, using the H.D.H.Q. (Vinoda, 1966, Philip, 1970). Weissman, Fox and Kleinman (1973) also found high hostility in suicide attempters, using a Social Adjustment Scale for measurement. An early study of Foulds (1959) had found "symptom" measures to be differentiated from "personality" ones on objective tests, and to change more, which suggested to him that therapies directed at personality reorganisation and attitude change should produce more profound and enduring change than those aimed at symptom relief only. (This study used psychiatric diagnosis for both the "symptom" and the "personality" measures). Using the three extrapunitive and the two intropunitive scales from the M.M.P.I. which were later incorporated into the H.D.H.Q. Martin and Caine (1963) found both extrapunitive and intropunitive to decrease over treatment in neurotics in a therapeutic community - i.e. changes at the "attitude-belief" level (as opposed to "personality" as measured by the Hysteroid-Obessoid Questionnaire (H.O.Q., Caine, 1965).

High hostility has been noted in asthmatic patients (using the H.D.H.Q) by Aitken et al. (1969), who found them not to differ significantly from normals, but to consisteiitly between the score for normals and neurotic patients on H, Int H and Ext H. Some studies have stressed the direction of hostility, not just the level of punitiveness. It has been suggested that intropunitive and somatisation may be alternative forms of coping, (Foulds, 1966).
He found that psychiatric patients who complained predominantly of somatic symptoms scored lower on overall hostility and intropunitiveness (using the H.D.H.Q.), while the reverse held true for those who complained mainly of psychic ones. This was considered to be in line with dynamic views that somatisation of symptoms "drains off intropunitiveness" and provides an alternative outlet for intropunitiveness at a more covert level.

Friction and domination/submission conflicts in marriage have been linked with neurotic illness and psychosomatic disorders (Ryle, 1966). Although the direction of causation is hard to establish, the spouses of psychiatric patients have a high rate of psychiatric disability partially reflecting inter-personal conflict, (Klitman, 1964, Nielson, 1964). Using the Symptom-Sign Inventory (S.S.I. Foulds, 1965), the H.D.H.Q. and the Marital Patterns Test (M.P.T. Ryle, 1966), Hall-Smith and Ryle (1969) found that in a sample of dermatological patients, the most hostile women had the least satisfactory marriages, had higher scores on personal illness and appeared to give less affection to their spouse.

Shenken (1973) has attempted to make a rapprochement between the disciplines of psychiatry and ethology. He notes how frequently the term "dominant" comes up in long-term psychotherapy, where marital attitudes reveal conflicts concerning dominance/submission.
3a. Hostility in relation to depression

In 1954, Lewis observed the presence of resentment or hostility in melancholic patients, as well as the more commonly observed humility and resignation, and Hunt (1967) noted that "resentment plays an important part in non-psychotic depression". There has been frequent reference to aspects of hostility during depression, including theoretical speculations, e.g. by Kendall (1970) and Pilowski (1975). Clinical observations and more recent psychometric evaluations have lent support to the view that there are high levels of hostility during depression. Pilowski (1975) notes how theoretical interest has stemmed from the writings of Abraham and Freud, the latter refining Abraham's view of frustration leading to the repression of violent feelings by proposing the factor of loss as common to both melancholia and grief.

A classic psychoanalytic position would view introjected hostility as precipitated by the loss of a loved one. Alternative dynamic views see depressive anxiety as provoked by conflict (of hostile feelings as well as love towards the mother). Others see depression as stemming from frustration which leads to the inhibition of aggression, (Kendall, 1970). The concept of inwardly-directed hostility was invoked as causative in explaining the origin of depressive disorder, and this view remained prominent during the larger part of this century, comprising a key concept still held by those with a psycho-dynamic orientation. However, since the
psychiatric services have expanded into the community and encountered a greater diversity of depressive disorders, observations of overt hostility rather than guilt during depression indicated a need for re-examining the relationship between hostility and depression. Pilowski considered that observations of less overt hostility in patients may have been partly due to the hospitalization process encouraging passivity.

Kendall (1970) proposed re-formulating psychoanalytic theory to enable it to be susceptible to disproof. Assuming that aggression was fundamentally a response to frustration, he proposed that depression (either as mood or syndrome) should be high where aggression was aroused but its expression prevented or socially inhibited. This would apply to women (who do have a higher depression rate) and groups such as prisoners, those from upper classes, and societies with taboos against physical violence. However, where consistent associations are observed, many other factors could account for these.

Amongst empirical investigations, Cochrane (1975) used a projective method of analysing verbal responses to ambiguous pictorial stimuli. He found that intensity of depression was related to degree of aggression, but not in a linear fashion, the most depressed patients showing slightly lower aggression scores than the moderately severely depressed.
Others have also reported on the importance of symptom-patterns, hostility being associated with a non-endogenous symptom patterning, (Rosenthal and Sugar in Gudeman, 1967). These authors used their own rating measures of hostility. Among studies using the Direction of Hostility (Dir. H) measure of Caine, Foulds and Hope, (1967), Foulds and Mayo (1967) also used the Symptom-Sign Inventory (S.S.I., Foulds 1965). They found that non-psychiatric patients, even with considerable symptomatology of "personal illness" on the S.S.I., still scored less highly on intropunitive than diagnosed "neurotics". They consider that either this intropunitive increases the likelihood of entering psychiatric treatment - or - that those who have acknowledged themselves as being sick tend to blame themselves.

Lexer (1964) is among those who stress the presence of intropunitive in depression as a causative factor. He conceives of projection and introjection as mechanisms available in everyone's repertoire, with one response pattern being more characteristic than the other for each person. Using his own scale for measuring direction of blame assignment, derived from asking depressed patients what they thought had brought them to their present condition, he found that those who were in very low mood showed devalued self-concepts only if they were self-blaming, and not if they were extrapunitive. Treatment. Using the M.D.M.Q., the patient group scored higher than the normals on overall hostility, higher than
Although querying the ability of measures of hostility to differentiate between depressed and non-depressed states, Pilouski (1975) found greater (self-reporting of) anger in the most non-endogenous patients. Asserting the importance of elucidating whether and why depression is accompanied by extra- or intro-punitive behaviour he recognizes the problems of sampling bias, such as the frequent concentration in most studies on inpatients only. Treatment-seeking behaviour may also be a factor. The hospitalisation process was considered to be a factor which might have accounted for the low anger ratings he found, and also possibly for the general tendency to equate depression with intro-punitive-ness. He considers the latter factor may determine the type of depressive symptomatology, rather than being causative. The depression measure was his own, and his measures of anger a visual analogue scale. Although only three patients appear to have been classified as "very angry", it may be of interest that only these subjects were also "very sad".

It is generally acknowledged that much mental ill-health in the population is "hidden", and does not reach official sources for diagnosis (Foulds and Mayo, 1967). Mayo (1969) has compared normal subjects with a group of neurotic (mostly dysthymic) patients and also one of "normal" subjects who had neurotic symptoms (as assessed by the Symptom Sign Inventory (SSI), but who had not sought treatment. Using the R.D.H.Q., the patient group scored higher than the normals on overall hostility, higher than
both of the other groups on intropunitiveness and higher
than the "symptom" group on Self-Criticism (SC). Hostility
was significantly and positively related to intropunitiveness
in this patient group only. The symptom group scored
higher than the normals on intropunitiveness, highest of
all the groups on overall hostility and higher than the
patient group on Criticism of Others (CO).

The symptom-group also showed an association between
extrapunitiveness and a measure of poor home adjustment,
which Mayo sees as being in line with predictions that high
criticism of others in the home would adversely affect
interpersonal relations. It was of interest however that
it was the extrapunitives in the symptom-group who reported
the best occupational adjustment, (or the intropunitives the
worst). Here Mayo suggests that work satisfaction may give
an alternative area of satisfaction for extrapunitives who
have poor interpersonal relations at home.

Individual subjects in the symptom-group who were
almost as intropunitive as the patient sample reported good
interpersonal relations at home. A comparison with the
extrapunitive subjects in the same group suggested that their
patterns of coping were different - the latter possibly
coping at the expense of interpersonal relationships at home
while others might rely on just these relations as an
alternative to seeking medical help.
It is asserted that "few psychiatric groups have been identified with a predominance of extrapunitiveness" (Blackburn, 1974), with the exception of "selected paranoids" (Caine et al. 1967) and manic patients (Blackburn). A number of studies have however indicated that depressed individuals are characterised by what appears to be more overtly expressed hostility or extrapunitiveness (Gershon et al. 1968; Bullock et al. 1972; Weissman et al. 1971).

Foulds and Caine (1958) noted a view held by many that most reactive depressives blame others. They suggested that such patients may be of a hysteroid type of personality, while the few who direct blame inwardly may be obsessive personalities. Weissman et al. (1960) proposing that differences between pathological and normal depressed mood phenomena are primarily those of degree rather than of type, found, contrary to their expectation, that extrapunitiveness was higher (using the Rosensweig FF Test) during depression, in a small sample of college females. (Opinions will vary as to whether "normal" subjects in very low mood should be distinguished from those suffering from undiagnosed mild depression).

Some conflicting patterns of extra- and intropunitiveness have been observed to co-exist. Using their own ratings of hostility, its presence in depressed patients has been found to be associated with both blame of the environment and self-pity, using factor-analysis and cluster analysis (Rosenthal and Gudeman, 1967; Paykel, 1971).
Pilowski (1975) considers that extrapunitiveness and self-pity tend to be found in agitated patients and in "neurotic" rather than "endogenous" form of depression.

Some of the discrepancies may be partially accounted for by Weissman et al. (1971)*, who found that the expression of hostility increases with the intimacy of the relationship and can be presumed to reduce in a psychiatric interview setting. They found direct expression of anger, contrary to classic dynamic theories.

Using an interview format of a Social Adjustment Scale, Bullock et al. (1972) report an increase in overt hostility in a group of depressed women, rather than a decrease, including resentment, but also accompanied by guilt and submissiveness. Bullock et al. consider that their findings are consistent with Gershon et al.'s findings of overt hostility and contrary to a simple "anger-in" hypothesis of depressives. They identified two distinct groups:

Those with an adaptive premorbid marriage appeared to withdraw to protect the spouse from the effects of the depression, which they saw as caused by problems outside the marriage. Those with a maladaptive premorbid marriage saw hostility in relation to marital frictions, depression. Some however saw themselves as controlled by the husband and as submissive, and had more marital friction. This group saw the depression as being caused or worsened by marital problems. Withdrawal by the wife intensified the domestic tension and her increased resentment appeared to reflect a hatred of both others and herself for not having expressed her inner feelings.
The authors stress the need for involvement of the spouse in treatment, and that this should relate to whether or not the premorbid marriage was adaptive.

Such research raises the question as to whether the characteristically hostile woman is likely to generate a marriage fraught with friction - or whether the characteristics of the husband or of an unsatisfactory marriage are in fact contributory causes to the depression, as some of the women indicated.

When considering the association between depression and hostility, to a certain extent, these discrepant observations may be due to different measurements of hostility used, and also to differing criteria of depression. In this area, theoretical stances differ widely and may influence the criteria adopted for investigation. It is also possible however that hostility does not vary consistently with depression, accounting for the discrepant findings. The assessment of the depressed individual is likely to present problems on many measures during the illness.

Yet another approach has been to examine changes in hostility in relation to recovery from depression. Most studies in this area indicate that "punitive" measures decrease in patients when they are clinically improved, using the H.D.H.Q. (Foulds, 1965; Priest, 1977).
These findings have been replicated in a number of studies and are considered sufficiently reliable for a decrease in punitiveness to be a reliable indication of improvement (Ross and Priest, 1970). However, whereas Mayo (using the H.D.H.Q.) and Friedman (using the Buss-Durkee inventory) found that overall hostility and intropunitiveness decreased on recovery, Kleiman and Gershon (1970) found only a slight (n.s.) decrease in intropunitiveness on recovery. (This study used only three patients however, and the situation was the evaluation of a drug said to "mobilize" hostility).

Gershon et al. (1968) found hostility to increase with severity of depression and to reduce on recovery in "hysterical" patients only, but not for those with obsessive features. Both the latter studies used scores obtained from verbal free association samples, based on scales by Gottschalk and derived from psychoanalysis.

Extrapunitiveness has been found to be more stable, and not associated with improvement in depression (Mayo, 1967; Philip, 1971). Both these authors used an alternative scoring system for the H.D.H.Q. of measuring Extrapunitiveness (Ext H) and Intropunitiveness (Int H) separately, by the respective formulae of \((AH + CO + PH)\) and \((SC + G)\).

Mayo (1967) found that both general punitiveness \((H)\) and intropunitiveness \((Int H)\) fell in a group of depressed patients when they were recovered. Whereas scores on all the subscales fell, only the intropunitive ones \((SC \text{ and } G)\) did so significantly.
The findings were contrasted with those of the Hysteroid-Obssessoid Questionnaire (HOQ) scores, which are assumed to measure "personality" as opposed to aspects of illness, and these scores as predicted, did not change. It is observed however that Direction of Hostility (Dir H) has been "to some extent associated with personality in previous studies", hysteroids tending to Ext H, and obsessoids to Int H. To the extent that Int H changes significantly with improvement, it is considered to be "behaving diagnostically", but its association with personality is also noted, in view of its significant negative correlation with the HOQ scores on admission. As this correlation is slightly higher still on recovery, the hysteroid personality in this study is noted as tending to Ext H, and the higher association on re-testing is interpreted as a reduction of the illness effect on Int H.

The implications are held to be that the depressed patient is more likely to improve if of a hysteroid rather than an obsessive personality - and if Int H is high on admission, (coupled with a low score on Personal Illness). H scores are considered to be a very sensitive indicator of the severity of a depression, and also as "one of the many channels through which the total energy available to a person is utilised". If H and Int H increase in depression, then it is suggested that less energy is available for other areas of a person's life and hence the depressives' withdrawal from inter-personal interaction.
A study using the H.D.H.Q. found that a group of depressed patients who improved on a drug trial (of imipramine and pramindole) were lower on intropunitiveness on admission than a non-improved group (Philip, 1971) and their intropunitive scores fell more on improvement. The extrapunitive scores were similar between the groups and changed little (as Mayo (1967) found). Blackburn's (1974) study has been one of the few to indicate a shift in extrapunitiveness, only manic patients (both bipolar and unipolar), having lower scores on recovery compared with high levels during illness. However, as Blackburn notes, these scores were obtained cross-sectionally and not longitudinally from the same patients. Scores of the recovered group suggested that the manics' Ext H might be specific to the illness period, and not a "permanent feature of their personality". High intropunitiveness was again found in depressed subjects when ill (compared with scores for Philip's normal sample).

The majority of studies have indicated that in most patients, hostility changes are accounted for by the intropunitive factor, which decreases on recovery, (Mayo 1967; Caine 1960; Caine et al. 1967; Blackburn 1974; Priest and Netter 1975; Priest 1977). This has led Philip and Foulds to speculate, as Ext H is more stable than Int H, that the two dimensions are measuring "something different", the former behaving more like a trait measure, and the latter like a state measure.
Querying whether high levels of extra- or intro-punitiveness are a consequence of patients' illness or a "more long-lasting feature of their personality", Blackburn proposed the former explanation. This was because recovered unipolar and bipolar depressives and manic patients had lower Int H scores than those still ill; also because manic patients, who had high Ext H scores while ill, showed significantly lower scores in a recovered group. Blackburn is amongst those who regard hostility as important in the dynamics of illness. If the link between mood states and hostility is causal, it might be (a) that the former cause the individual to construe himself or his environment as hostile - or (b) that such hostile construction might lead to the development of abnormal mood states. She recommends the H.D.H.Q. as being sufficiently sensitive to use in frequent interval studies to examine the temporal relationship between the two, as to whether e.g. depression increases before direction of hostility alters.

Using the subscales, the best outcome (to antidepressants) has been found in patients with the lowest initial scores on Sc, Co and Ph - i.e. aspects of both extra- and intro-punitiveness, (Priest and Netter, 1975).

A number of factors appear to be at work in determining the expression of hostility, and among these may be those of sex, age and socio-economic differences (Bennet and Cohen 1959; Friedman and Gramick 1963; Haas 1966).
Pilowski considers that the evidence supports the view that the presence or absence of anger is an important variable in the genesis of depressive syndromes. It might be speculated on the basis of ethological work that depression might be associated with extremely low aggression. If Harlow's findings of depressive-type behaviour in monkeys have relevance for human primates, these might have some significance for depression at least in males. (The vast majority who present with depression however are females). There have been few speculative tests on the possibly maledaptive aspects of extremely low aggression (which may not be the same as very low hostility). It may also be that depression in males could have different antecedents from those in females.

Whereas psychophysiological correlates of aggression — if not specifically of hostility — have received investigation, the 3 aspects of hostility, depression and physiological responsiveness do not appear to have been investigated together. Depression has generally been conceived of as a state of "low arousal", while aggressive expressiveness could be identified with the former state, differences in resting levels from normals, and found that overall hostility (including both aspects of its direction) are considered to be consistently related to depression, then predictions become unclear. Further, if the hostility is considered to be characteristic pre-dating the depression, (whether or not of an aetiological nature) then it would be
of interest to know whether e.g. "arousal" levels are unusually high prior to the depression and fall to a low level during the illness.

The physiological correlates of depression noted have included those of less skin conductance (SC) responsivity (McCarron 1973; Greenfield et al. 1963). Measures have included those of SC levels, of size and frequency of amplitude, and of habituation, and situations have included aversive stimuli such as noise-stress, shock and the cold pressor test.

Whereas agitated depressives have been found to maintain responding and not to habituate, some retarded depressives have such lowered responsivity that it is barely measurable (Lader and Wing, 1969). This lack of responsivity (lower SC level and fewer fluctuations) has been found to be related to the severity of depression, and especially to that of an endogenous type (Noble and Lader, 1971, 1972). Byrne (1975) distinguished between psychotic depressives who showed a similar profile of low arousal, while neurotic depressives showed a reverse pattern of high SC levels and more fluctuations. Zuckerman et al. (1968) found depressives had no differences in resting levels from normals, but found they had more fluctuations in response to a cold pressor test, presumably to the aversive nature of the stimulus. Thus, although depressed individuals have generally been conceptualised as under-responsive, there is some evidence of greater responsivity, possibly to aversive stimuli.
Lewinsohn et al. (1975) found depressed subjects to have higher skin conductance levels (during anticipation of electric shock) and a greater response during it, as well as poorer adaptation over trials (for females only). This confirmed their hypothesis that depressed individuals are more sensitive to aversive stimuli—although it should be noted that large individual differences in skin conductance levels were found, making across-group comparisons dubious. The criterion of depression adopted was the Byrne (1961) scale, used for screening college students to select a group of depressives, and also a "psychiatric" group.

Depressives have been reported to have faster pulse-rates, increased heart-rate, greater muscle tension and hypoventilation (McCarron 1975; Kelly and Walter 1968, 1969; Goldstein 1965). These indications of "sympathetic dominance" may appear incompatible with the SC findings, indicating parasympathetic dominance, although they might be compatible with a state of "environmental rejection", or preoccupation with internal events.

4. The problem of retrospection

The need to distinguish between an individual's personality pattern and his psychiatric symptoms when ill has been emphasized by Foulds (1965) and Metcalfe (1968). Where psychiatric illness is concerned in particular, attributions of "pre-morbid personality" are frequently made as imputed forerunners of — (and pre-disposers to) — psychiatric illness.
Such evidence however has to be collected from psychiatric interview data from the patient while ill, from relatives who may be biased and unreliable sources of information and from medical records noting previous impressions. The problem of retrospection has be-devilled the whole area of the investigation of the previous characteristics of those who are ill. It has been suggested that "personality" variables should be distinguished from signs, symptoms and syndromes, the former implying the relative consistencies in behaviour, and the latter aspects the discontinuities or breaks in the continuity of normal behaviour (Foulds, 1961).

Adams and Foulds (1962) have argued that it is never clear how the clinician is supposed to separate data used to make inferences about pre-illness personality from data involving criteria for diagnosis. Following up this implication that the universe of discourse may sometimes be changed in psychiatric diagnosis between symptom and personality clusters, several studies have indicated that the two can be separated on the basis of measures which assess aspects of illness and which yield changing scores on recovery, as distinct from those that are relatively stable (Foulds, 1959, 1961; Foulds and Caine, 1958, 1959; Sandler and Hazari, 1960).

For obvious reasons, prospective studies of personal characteristics which might be associated with specific illness development are hard to undertake, although the
practical clinical usefulness of finding measures which might have predictive value has been stressed (Priest and Better, 1975). It may be that the personal features noted during illness and recovery constitute significant pointers to aspects which could be formulated into a predictive hypothesis. 2 aspects which are of both theoretical and practical importance are those of:-(a) features which may comprise a general vulnerability to stress or illness, and (b) those which may be associated with specific illness syndromes and therefore have relevance for the enigma surrounding the "choice of target organ" in illness.

Findings which may be relevant to the "choice of target" debate are those of Caine and Smail (1968) and Smail (1970), who found preference for type of treatment to be based on attitude and personality differences in patients, psychiatrists and nurses. From this Smail queried whether a similar influence might not be at work in psychiatric patients concerning the "choice" of physical or psychological symptoms. Smail considered an underlying homogeneity in personal characteristics, it would be of interest to observe to be expected between an individual's conception of himself, his interpersonal environment and his experience of stress or "neurotic" symptoms. A person's hypotheses concerning himself are thus considered to be unlikely to differ fundamentally from those concerning others or his symptoms. Such applications might need to remain at a speculative level, unless field-studies can overcome the problem of obtaining a sample prior to life-stress.
5. The possibility of prediction

If the dimension of hostility - including its direction or pattern - is to be examined as a possible predictor then several settings suggest themselves as suitable testing situations for this. In the laboratory it should be feasible to investigate whether the hostility dimension is predictive of "physiological style" in normal subjects, in conjunction with their responsiveness on behavioural measures in mildly stressful situations. It might then be possible to integrate the psychophysiological or the behavioural aspects of responsiveness into a hypothesis which could be tested on those yielding extreme scores on some aspects of the hostility dimension. Or it might be that all three aspects - that is the hostility characteristics, the physiological and the behavioural responsiveness might appear to represent a coherent pattern in terms of general "coping style".

Treating both physiological and behavioural responses as dependent variables, it would be of interest to observe whether such responses were consistent within individuals. If any consistency were also found between this responsiveness and the handling of hostility, then there might be applications for illness-development or stress responses. Such applications might need to remain at a speculative level, unless field-studies can overcome the problems of obtaining a sample prior to life-stress.
Predictive approaches that have been employed in the laboratory (such as Hokanson's) would appear to have used a theoretical and empirical approach more appropriate for the investigation of rapidly-evoked aggression rather than the presumed more enduring ill-will of hostility.

In a number of experiments, the choice of overt or verbal aggression as the most common dependent variable, may limit the outcome to ones not necessarily of the greatest interest or importance. It may be more fruitful to ask:— in what ways do individuals who are high in hostility, extra- or intropunitiveness differ when confronted with a situation of general, albeit minor stressfulness— rather than limit the observations to those hypothesized or contrived as "anger-producing". If the general "negative set" of hostility as proposed by Buss is of interest, then the evocation of anger may be too limited a view of the ways in which hostile individuals may vary in response to stress. Those that have invoked hostility as such more closely have tended to employ projective measures to assess this (e.g. Buss).

A scale such as the H.D.H.Q. would appear to be an eminently suitable instrument for the measurement of the degree and direction of hostility, at least as an initial measure. It is recognized that the authors of the scale distinguish between this measure and the Hysteroïd-Obsessoid Questionnaires which they consider measures more enduring "personality" characteristics. Studies which have shown that H.D.H.Q. scores change during or after illness are also noted (Foulds and Caine, 1965) and Mayo, (1967).
However, the fact that such scores change in the course of illness or in the face of life-stress does not necessarily invalidate them as possible predictors. If an empirical approach is adopted to investigate the differential effects of stress (if any) on those with high hostility and high extra- or intropunitiveness, and the responses are in fact consistently differentiated, then such an observation is itself of interest. Observations of whether such scores also change during or after illness, and whether or not they revert to their previous levels, may throw further light on their predictive value. Blackburn suggests that frequent-interval studies might indicate whether, e.g. intropunitive scores increase before a person gets depressed and that the H.D.H.Q. seems to be a sufficiently sensitive measure to use to this end.

Field-studies which have attempted predictive approaches have generally focussed on aspects of the external stressors, rather than on individual characteristics (Holmes and Masuda, 1974; Rahe, 1972). However it has been recognized that similar life-events differ in their "meaning" or stressfulness for the individual - also that predisposing factors of personal vulnerability must be important in their interaction with life events, (Paykel, 1974). There would appear to be a strong argument for evaluating individual differences in response to similar stressors.
Where depression in particular is concerned, Chodoff (1974) has suggested that personality structure may have a bearing on depressive illness by providing possible predisposing factors and also by colouring the depressive illness itself. (The latter aspect may indicate how personality structure affects rather than causes depression.) Chodoff has also however considered the possibility — assuming that psychological forces are operative in depression — that the "more or less visible personality structures into which these forces crystallize does exist and that these structures constitute a middle stage, a kind of intervening variable between the forces and actual depressive illness". He considers that the task for research is to find ways to test present hypotheses about predisposing personality factors.

6. Hostility — cause or effect

The pervasive role of hostility throughout much maladaptive behaviour and illness in "normal" subjects and depressed patients is striking.

Everyday observation would tend to indicate that many individuals are consistent in projecting their blame either internally or externally. Where this happens to an extreme degree however, it may be pertinent to query the "cost" of these extreme attitudes. One might for instance query the differential effect of certain stressors on those high on overall hostility, or on extreme extra- or intropunitiveness.
Inevitably most work has been conducted on aspects of hostility found during or after depression or other illness. The fact that some hostility probably exists in all individuals, and that the direction of its attribution may vary along a continuum however makes its prospective measurement possible, at least prior to laboratory stressor situations.

It is not necessary to adopt a theoretical position as to whether hostility levels and direction of hostility are "stable" personality characteristics or to be regarded more as state measures to utilize them in this context, although subsequent investigation of their relative stability or change would be rewarding. As Blackburn has speculated, it might be that low mood states lead to hostile construing - or that hostile constructions might lead to abnormal mood states.

The psychometric measure of the HDHQ previously reviewed has the advantage of measuring both overall hostility and its direction. It is appropriate for normal as well as clinical samples and is considered by Bjersted and others to be a worthwhile tool for research. It is proposed to use this measure in the forthcoming research.
Part II

Laboratory Studies.
Part II

Introduction

The psychological dimensions reviewed in the previous sections could be viewed as describing the individual's perceptual or "attitudinal style". It might be that individuals are also characterized by their "physiological style". This might reflect their habitual mode of responding in the presence of neutral or minimally-stressful stimuli, which might be accentuated in more stressful situations.

The subtle bodily changes of interest to psychophysiologists are thought to reflect psychological factors, rather than grosser aspects of bodily maintenance, and some have been invoked as indicators of a "stress-response", or of "threat" experienced by the individual.

Whereas the relevance of such psychophysiological changes might be apparent where "aggression" is concerned, it may not be appropriate, as has already been mentioned, to equate aggression with hostility. However, as both hostility and certain psychophysiological parameters have been noted independently in association with depression, any correlates observed between hostility and psychophysiological measures might be worth examining. If any such correlates are found, this might amplify the overall "personal and physiological style" of extreme-scoring individuals, especially in response to stressor situations.

Selection of an appropriate psychophysiological variable would need to be made from amongst a large number of possible candidates. A prerequisite would be that the aspect chosen
was capable of being measured concurrently or immediately following an applied stressor, and that it was one considered to indicate subjective experience of "threat". In this respect, the sensitive measure of skin-conductance activity appears to be a promising candidate, and amongst its several aspects, that of recovery time of the skin conductance response has been postulated as a subtle indicator of a "threat" response.

To attempt to delineate a profile of possibly "maladaptive" characteristics in "normal" individuals, the research proposes to investigate such a psychophysiological parameter in conjunction with attitudes of control and blame. To indicate their possible usefulness, a brief review of the relevance and use of psychophysiological measures, especially skin-conductance, will follow.
Introduction

Those who have sought to link physiological activity with behavioural characteristics or with environmental factors have tended to adopt two differing approaches to this.

There are those who view the physiological, biochemical or neuronal changes as the real events, with characteristics of the individual or the situation comprising the dependent variables contingent on these.

In contrast, some view some of the physiological psycho-

a. Introduction

b. The Arousal concept

c. The Recovery concept

d. Individual differences

e. Electrodermal measures

The Use of Psychophysiological Indices

of the individual or the situation comprising the dependent variables contingent on these.
a. **Introduction**

Those who have sought to link physiological activity with behavioural characteristics or with environmental factors have tended to adopt two differing approaches to this.

One view of psychophysiological mechanisms was developed by Cannon (1934), who stressed the "organizing" or "dynamogenic" value of the actions. This view is essentially a short-term response to stressful conditions. The physiological reactions are seen as the "real" events, with characteristics of the individual or the situation comprising the dependent variables contingent on these.

In contrast with this view of the physiological psychologist, those who regard themselves as psychophysicists invert this order of events. Individual characteristics, life events and psychosocial situations are seen as the independent variables - (in many cases as the main focus of interest) - while physiological indices are treated as the dependent variables.

In the relatively young discipline of psychophysiology, theoretical formulations are still often regarded as being premature, and it has been considered more appropriate initially to observe correlates between behaviour, physiological functioning and subjective report of experience. "The capacity to study events in three universes of discourse at once is the hallmark of the psychophysiolgist", this approach not necessarily involving discussion of causation, but rather "a sort of naive parallelism" (Gale, 1973).

Attempts to investigate psychophysiological changes should ideally take a holistic view of the interaction between the organism and the psychosocial environment.
While some workers are primarily interested in "stress" or illness, views on how the organism functions under conditions of stress may also yield insights into "normal" behaviour.

One view of responsiveness under stressful conditions was developed by Cannon (1929), who stressed the "energizing" or "dynamogenic" value of the emotions. He proposed an integrated response mechanism that was originally "adaptive" for primitive man. When situations are perceived as threatening, fear or anger are experienced and the accompanying physiological changes prepare the organism for the appropriate physical activity - i.e. to fight or flee. This "fight or flight" response is essentially a short-term response activated in "emergency" situations, and Cannon's interests lay in metabolic processes, particularly in the mobilization of adrenalin and glycogen to these ends for the immediate production of energy - i.e. to make the organism more "efficient" in the short-term. In times of stress, functions which normally support bodily reserves are checked, and these reserves are drawn on to augment power in attack or flight. An individual who allows anxieties, e.g. to disturb the digestive processes when there is "nothing to be done", is seen as allowing the body to "go on to a war footing, when there is no war to be waged".

Real differences in attitudes that could be considered mental differences in attitude that could be considered.

The hormones of the adrenal medulla act on all organs of the body innervated by the sympathetic system. They produce effects similar to, and are often accompanied by increased sympathetic nervous activity in general. It is now thought that the adrenomedullary hormones act more
directly on the CNS, by adrenalin crossing the blood-brain barrier in the region of the hypothalamus (Schildkrant and Kety, 1967).

Cannon's interest in the sympathetic-adrenomedullary system has been extended to investigations of noradrenaline as well as adrenalin (Frankenhauser, 1975) and of plasma free fatty acids (Back and Bogdonoff, 1965), which are an index of neuro-hormonal and sympathetic arousal.

Cannon's view essentially describes an anticipatory situation, where there is a preparatory mobilization of resources for expected requirements in threatening situations. This early view could be linked to the interests of psychologists in individual perceptions and attitudes. Given that individuals differ in their perceptions of events, and whether or not they are regarded as threatening, perceptual style may be relevant for psychophysiological responding.

As extreme conditions of danger and a physical struggle for survival now rarely exist for Western man, this original response pattern with its surplus requirements for physical energy may now be maladaptive, (Darrow, 1936; Raab, 1968; Carruthers, 1974; Friedman and Rosenman, 1971).

It might seem promising in view of this to explore correlates between psychophysiological responsiveness and individual differences in attitudes that could be considered "maladaptive". Duffy (1951) was interested in mobilization of the organism, in both normal and "stressful" conditions, as was Cannon. She objected however, (Duffy, 1934, 1941) to invoking the term emotion as such, and suggested that differences in degree rather than kind accounted for phenomena observed, and that changes in the level of energy or degree
of reactivity of an individual might be more accurate and descriptors. She proposed that all responses possessed three qualities only—direction, response to relationships (or "meaning"), and level of energy, and later reduced these to the first and last of these only (Duffy, 1949).

The term "stress" could be a contentious or at least an ambiguous one and various definitions of it have been attempted. Lader (1971) suggests the definition that "stress occurs when the stimulus raises the activation of the organism faster than adaptation can lower it" (a view which would indirectly appear to favour the importance of "recovery" as an adaptive feature).

Kagan (1971), while suggesting that the term stress does not need to be used as such, notes that it is assumed to be the "mechanism" by which stimuli cause disease. He therefore stressed the need to discover the relevant pattern of mechanisms along with the provoking stimuli, and the different "patterns of protective or predisposing factors". Harmful and Wolf (1971) also dislikes the term stress, and prefers to refer to "adaptation", referring to an individual's behaviour and bodily equipment in response to environmental changes, and in this respect, individual behaviour could presumably be seen as adaptive or maladaptive. Where psychosocial forces are concerned, Wolf emphasizes that their force depends on the meaning these have for the individual, so it would seem that differences in perceptions might deserve attention. event is merely a stimulus or a stressor, also

Oken (1962) views these "organismic-environmental trans-actions" as the development of a state of affective arousal concomitant with a situation where a strong and vital need,
motive or value is blocked or threatened. Levi (1965) and Patkai (1971), using the index of adrenalin excretion, have drawn attention to the evidence that "pleasurable" experiences may elicit extreme responsivity, and not merely negative or unpleasant ones, indicating that care may need to be exercised over the use of the term "stress".

Selye's early (1936) work with animals led to the proposal of a "general adaptation syndrome" or biologic stress syndrome. The discovery of "objective indices of stress" was seen as the extension of this non-specific syndrome, viewed as the body's response to any change in its environment (Selye, 1971).

It may be helpful to distinguish between "stress" and "stressors", as Selye has done, applying the former term to non-specific bodily responses, and the latter to causative agents (either chemical, physical or nervous). He has emphasized that it is not excessive demands per se which constitute the stress - (which is not necessarily harmful and which is also linked to normal demands) - excessive use merely intensifying the development of stress manifestations.

Groen (1971) prefers to distinguish between a stressor and a stimulus, the latter being merely any environmental change, while a stressor may be one large enough to require "more than the usual adaptation and defence reactions" to maintain life or homeostasis. He suggests that it is the sensitivity of the organism at the time that determines whether an event is merely a stimulus or a stressor, also that the term stressor applies to a change in relation to the total organism, and not to isolated organs or tissues. He considers that most inter-human conflicts threaten the
homeostasis of the central nervous system, and therefore of the total organism.

Some workers have focussed on the role of external "stressors" or life events in the aetiology of illness (Holmes and Masuda, 1974, Brown, 1974a). The latter has also attempted to assess the degree of "threat" of such events, asserting that examinations of individual differences are not necessary where stress responsiveness is concerned.

Christie (1975) suggests that stress be viewed as a response state of the organism, when the mechanisms maintaining the internal environment are strained. The "stone-age" preparation for physical activity may lead to a surfeit of mobilized metabolic resources, thus putting strain on homeostatic mechanisms.

In view of possible confusions in terminology, it seems preferable to refer to specific physical, psychological or social stimuli as "stressors". The terms "stress" or stressfulness can then be applied to the individuals' internal state, and their responses assessed in terms of physiological, behavioural or psychological changes which indicate strain, including subjective and experimental ones.

A number of workers have focussed their attention on the controlling mechanisms which may be implicated in this strain, (Montagu and Coles, 1966; Martin and Venables, 1966; Edelberg, 1971), although that will not be the focus of this work.
b. The Arousal concept

Reference to internal responsiveness to stressors and to mobilization of resources would seem to imply that the organism is being activated or aroused, and many psychophysiological changes have been cited to support this notion of general "energy" mobilization.

Duffy (1951) who had been interested in levels of "energy" since the 1930s, presented a concept of "activation" which could be described both in terms of general mobilization of energy, but which also took into account the direction of that energy, or its goal.

The term "arousal" came particularly to the fore with Moruzzi and Magoun's (1949) physiological work on the brain stem reticular system and its role in sleep and wakefulness. Block and Bonvallet (1959, 1960) demonstrated the role of the brain-stem by showing that direct stimulation of it evoked electrophysiological responsiveness and waking patterns of EEG.

Early theoretical conceptualizations prior to this had envisaged behaviour as energized by "drives". When it became evident that there was continual spontaneous activity in the c.n.s., and that cells were not inert until "driven", Hebb proposed a separation between a level of nervous system arousal and the pattern of its activity (Hebb, 1949). He later (Hebb, 1955), separated "cue function" from the arousal function, the latter being proposed as synonymous with a "general driven state", giving the drive conception an "anatomical and physiological identity". Hebb was one of those who proposed an optimal level of arousal, which he
considered a significant behavioural concept, actual "physiologizing apart", and this newer view of arousal was identified with earlier concepts of "drive". He also drew attention to physiological (cortical) feedback to the arousal system, which in psychological terms he expressed as the immediate drive value of cognitive processes.

Duffy (1962) stressed that her earlier concept of activation or arousal did not arise from EEG work, which rather made the terms familiar. Another "activation" theory is that of Lindsley (1951, 1957) who proposed an intensity scale ranging from sleep at one end to diffuse excitement or emotion at the other, relating this particularly to the activation pattern of the EEG. Duffy considered this corresponded to her own proposals of "energy mobilization". She made clear that she was not referring specifically to "activation" as measured by the EEG, but to the "arousal or excitation of the individual as a whole, as indicated roughly by any one of a number of physiological measures". In her view, the degree of arousal seemed best to be indicated by a combination of measures. Terms such as emotion and thought were considered not to be useful scientific concepts. She most recently stated activation to refer to release of energy into the physiological systems to prepare for overt activity, rather than referring to the overt activity itself, which "may never need occur, but if it does, activation is its constant internal accompaniment and sustainer" (Duffy, 1972). It is not synonymous with the "ready availability of preparation energy", although this is an essential antecedent. It is considered to be both general and specific, and its patterning varies
according to conditions, such of those differentiating "anger in" from expressed anger, which maybe special cases of a broader principle (Duffy, 1962). The aspect of degree or continuum is however stressed most. Arousal is seen as a "physiological intervening variable ... controlled by the neurohumoral system".

She considered that the study of biochemical factors holds forth the hope of ultimately understanding behaviour in chemical terms, even if the "chemical condition may result from external environmental factors".

Malmo (1959) pointed out that activation has been approached from three sources: from learning theorists' search for a measure of "drive"; from physiological studies of the energetics of behaviour and from neurophysiology and the EEG.

Both Hebb and Malmo propose an inverted -U relationship between activation and efficiency. Malmo (1959) notes that behavioural evidence and the "energetics" concept of Duffy and Freeman had stressed the importance of an intensity dimension in behaviour, and the existence of some brain mechanism like the ascending reticular-activating system (ARAS), before its existence became known.

The continuum of activation he proposed was a function of the amount of cortical bombardment by the ARAS. He considered the drive concept to have come close to the activation principle, and suggested that physiological measures should be applied increasingly to non-aversive drives, not merely aversive ones, these physiological measures eventually replacing actual drive measures. His activation concept was
seen as being broader than merely "emotion", and not possessing a steering function, as being mediated through the "intensity system" of the ARAS, and as being quantifiable by physiological measures.

Lacey (1967) has been one of those who have questioned "arousal" as a concept applicable to autonomic activity in general, (as well as distinguishing between autonomic, electrocortical and behavioural arousal). The concept, and sometimes the very term have provoked considerable argument, particularly in view of Lacey's cited examples that activity in some autonomically-innervated systems such as skin conductance may increase while at the same time others such as heart rate may decrease.

Lacey has attempted to relate the nature of the demands or the behavioural goals to the type of responses, rather than just to their intensity as a single dimension. He proposed rather different patterns of responding relative to different stimulus-situations, including differences in attitudes as subjective stimulus-situations, although the stimuli are objectively the same.

Duffy (1972) disagreed with Lacey's (1967) views of the dissociations of physiological systems, as she considered that low correlations between measures may be due to variations in their latencies, and the points at which they are measured. While allowing that inter-correlations between different physiological measures were not always high, due to a "patterning in the excitation of the individual", she considered the "generality" of the excitation sufficient to justify a general concept of arousal or energy mobilization. The organism itself, not the individual measures (e.g. of autonomic and
higher nerve centre functioning) is that which is said to show this arousal. She asserts that it occurs along a continuum, rather than distinguishing between categories or types of behaviour. It is accompanied by variations in overt response or quality of performance, which might be described in terms of an inverted-U shaped relationship, as Hebb and Malmo have proposed.

Such a U-shaped relationship might underlie apparent lack of associations between measures, but is not held to be crucial to her activation theory, e.g. in the associations between performance and degree of activation. She was concerned to argue that a.n.s. functioning should not be considered separately from that of the cortex. The presumed central control of sympathetic responses could thus be approached by examining changes, e.g. in peripheral activity.

Funkenstein (1956) had attempted to demonstrate qualitative differences in emotional states, higher adrenaline excretion being associated with an anxious state, and higher noradrenaline with an aggressive one. More recent work indicates that both catecholamines, but especially adrenaline, are related to the intensity of emotional reactions. Noradrenalin is held to be unassociated with emotional quality and where adrenaline is concerned, the quality of the emotion is determined by cognitive and situational factors (Frankenhauser, 1971).

Eysenck (1967) has been one of those to propose a specific formulation selective to nervous system functioning. He uses the term "arousal" to refer to the reticular activating system, and applies that of "activation" to the limbic system.
It is claimed that the two aspects are separable and measurable in terms of individual differences. The former is said to be measurable in terms of differences in Introversion/Extraversion. Introverts are held to have intrinsically higher levels of cortical arousal, and can therefore only tolerate lower levels of external stimulation. Physiological measures are claimed to reflect this arousal under minimal stimulation, and to reflect Extraversion/Introversion differences, e.g. in attentional measures.

Autonomic functioning is held to be measurable by a "neuroticism" dimension, "neurotics" having different thresholds of arousal in the visceral brain, and being more labile. The two dimensions are claimed to be orthogonal, but this has been disputed (Claridge, 1970).

Roessler (1973) views autonomic responsivity rather differently. High levels of responding including those of catecholamine excretion and electrodermal responses are seen by him as an adaptive feature. The "adaptive" subject is held to respond to novel situations and tasks by appraising them, rather than by invoking defences that might be necessary to defend the ego against threat. Where resting levels are concerned, an adaptive response is to achieve lower levels more rapidly, in line with other "homeostatic" views.

However, a "maladaptive" approach of lower initial responsivity to stimuli may reach similar homeostatic levels at greater expense of "energy" in the process, as situations seen as possibly threatening lead to defensiveness being invoked. Such an approach is held to utilize "greater intensity activating and deactivating forces", and it is
argued that resting levels which may be similar do not reveal possibly different activating processes by which these are reached.

As different measures of "arousal" may not correlate with each other, it seems advisable for workers to specify which physiological index they are using, and further, which choice of measure within this, e.g. skin conductance levels may not be highly correlated with non-specific electrodermal responses (Zahn et al. 1968).

Among many physiological indeces used to examine responsiveness in "stressor" situations have been:- plasma and urinary analysis of adrenaline, noradrenaline and 17-hydroxycorticosteroids (Frankenhauser, 1975; Handlon, 1962; Levi, 1965), salivary flow and salivary analysis (Palmai and Blackwell, 1965; Busfield and Wechsler, 1961; Venables and Christie, 1974; Wenger, 1966), EEG measures (Gale, 1973), heart rate changes and blood pressure responses (Malmo et al, 1951; Raab, 1968), electrodermal measures (Edelberg, 1972) and many others.

Some workers pursue an interest in the "under" or "over-activity" of indices that can be presumed to be maladaptive in view of damage done to or suffering experienced by the organism (e.g. Raab, 1968), and which might over time predispose to particular illness. Another approach is to examine individuals with specific illness syndromes and to investigate whether they possess psychophysiological characteristics distinguishing them from others, (Venables, 1975).
High tonic skin conductance levels, larger amplitudes and longer skin conductance recovery have been amongst those indices which have been cited as measures of "activation" or general "arousal" or of "anxiety" (Malmo, 1959; Bull and Gale, 1971), and electrodermal measures have been amongst those used to evaluate illness syndromes including psychopathy, schizophrenia and depression, although many findings in these areas are inconsistent (Stern and Janes, 1973). When extreme cases are taken, such as Lader and Wing's (1964, 1966) psychiatric patients whose main symptom was anxiety, such patients showed higher skin conductance levels and more spontaneous skin conductance fluctuations than normals.

However, even where anxiety is concerned, there are no clear-cut correlations with electrodermal responsivity (Martin, 1961; Roessler, Burch and Childers, 1966; Neary and Zuckerman, 1974). Additional problems when assessing patient samples is that of distinguishing the direction of causation where the illness is concerned.

Some workers have investigated normal populations on specific physiological parameters, and have noted extreme responsiveness assumed to distinguish "maladaptive" from adaptive behaviour (e.g. Roessler, 1973), or have noted characteristics or correlates associated with variations across normal groups, e.g. in aspects of social interaction (Schwarz and Shapiro, 1973). Yet others have investigated characteristics of external stimuli associated with consistent variations in physiological indices across subjects (e.g. Turpin, 1971).
As a general approach, it is considered more important to relate physiological response patterns to psychological patterns of functioning, rather than to brain centres, (Martin, 1973). so be invoked to assess "recovery" from the effect of stressors. This could apply to recovery following the minor brief stressors common in everyday life which might be mimicked in the laboratory (Raab, 1968; Bull and Gale, 1971; Bull and Nethercott, 1972; Johanson and Frankenhaus, 1973).

Recovery following longer-lasting trauma and that of real-life experiences is also highly relevant, although less easy to investigate (Farmer and Chambers, 1928; Christie and Vansbies, 1974).

The aspect of recovery can be seen as implicit in Cannon's and Selye's views of the homeostasis of bodily functioning (Cannon, 1942). It could be presumed that, as it is appropriate to mobilise bodily resources quickly and efficiently for normal life-demands or under extreme conditions, so it should be appropriate to reduce high levels of functioning as quickly as possible when the need for them has passed, or when "relaxation" is the appropriate state.

For equilibrium to be achieved as quickly and economically as possible following unimportant stimuli or major stressors would appear to be an adaptive feature (Rossler, 1973).

An early worker (Freeman, 1939) referring in particular to the increase of noradrenalin referred to the need for, and absence of a "painless shock", or some objective criteria of the individual's "integrative control", so that "rather than in carrying on neurological apparatus the pain replaced by
c. The Recovery concept

If measures indicating that the system is aroused or activated under conditions of stress are useful, such measures can also be invoked to assess "recovery" from the effect of stressors. This could apply to recovery following the minor brief stressors common in everyday life which might be mimicked in the laboratory (Raab, 1968; Bull and Gale, 1971; Bull and Nethercott, 1972; Johansson and Frankenhauser, 1973).

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An early worker (Freeman, 1939) referring in particular to the increase of neurosis, referred to the need for, and absence of a "plimsoll mark", or some objective criteria of the individual's "integrative control", so that "rather than
waiting for the ship to sink, one might steer the over-reactive into less turbulent channels of life before actual breakdown occurred. He drew parallels between advisable levels of physical exertion for cardiac patients and the logic of being able to determine ability of the higher nervous centres to withstand exertion. To that end he investigated physiological recovery from experimental loads in order to estimate individual ability to withstand conflict and other everyday types of nervous strain. Assuming the human organism to mobilize bodily resources in varying amounts, the speed with which it returns to its pre-load reactivity level within a given time "probably constitutes the best single measure of inherent nervous stability". He designated this index the "physiological recovery quotient", and utilized skin resistance readings to determine it. Data on recovery from experimental stressors suggested to him that those who could not withstand "experimental loading" recovered less quickly from its effects, whereas the "stable system... is more resilient, reacts adequately but not excessively... maintains available energy for any additional loads... shows little residual tension following load-discharge, and as a fact generally rated is well-balanced". (Frankenhaeuser, 1973).

Duffy (1957) considered that speed of recovery from arousal was an "extremely significant aspect of response, deserving further investigation".

Oken (1962) considered, while thinking concerning psychological stress which derives from concepts developed by physiologists does not imply a discrepancy between the two areas, that the concept of homeostatic adjustment, which is central to physiological approaches has been neglected by
psychological views which usually emphasise the disruptive effects of "arousal" at the expense of compensatory counter forces. He points out that it is manifestly impossible to "consider separately either side of the transactional relationship".

Some interests in longer-term recovery have focussed on endocrine factors, and these may also be relevant for electrodermal measures, as the slow latency of sweat gland responding to aldosterone implies that the effects of stimuli on the latter may not be reflected in electrodermal measures for some hours (Venables and Christie, 1973).

Venables and Christie (1974) suggest that "stressors" experienced, e.g. the previous day, could show the aftermath of endocrine balance effects which might modify electrodermal activity, in view of the fact that the endocrine system has a slower and more diffuse action than the nervous system.

There are large inter-individual differences, not only in catecholamine output, but also in the time taken for adrenalin secretion to return to baseline levels after a stressor, and these time differences may be important in determining whether or not the adrenalin has a harmful effect (Frankenhauser, 1971; Johansson and Frankenhauser, 1973). These authors suggest that a rapid return to baseline indicates "good adjustment", as "rapid decreasers" had lower neuroticism scores and better performance scores in their studies.

A slow decrease in return to baselines might be a preferable measure of "adaptive" responding, rather than that of responses during stimulation. Bull and Nethercott (1972) have argued in favour of skin conductance recovery as a
"reliable aspect of autonomic functioning", and also found recovery of heart rate following a brief fitness test to be associated with higher neuroticism and anxiety scores, whereas basal heart rates themselves did not discriminate.

Although Roessler has emphasized responsiveness per se, the recovery concept seems implicit in his (1973) speculations. Adaptive behaviour is held to quickly appraise new situations as being non-threatening and to return to low resting levels by "decreasing the intensity of activating effects".

An aspect of electrodermal activity, which has received less attention is that of skin potential. Unlike skin conductance levels which continue to fall with decreasing arousal, skin potential levels normally reach a nadir after a period of relaxation. The time taken to reach this nadir or basal point has been invoked as a useful measure of post-stressor relaxation, and one which reflects individual differences (Christie and Venables, 1974).

Edelberg has been the theorist to contribute most towards invoking electrodermal measures as important indices of recovery. His interests have focussed on proposing models concerning the underlying mechanisms and also on testing propositions relative to individual differences. His proposals concerning mechanisms and his recommendations regarding measurements will be referred to shortly, when electrodermal measures will be described in more detail. His interests in recovery have been applied to that of the briefly-occurring skin conductance response to specific stimuli, and are not related to the recovery of tonic levels over longer periods of time, as investigated by Freeman and Katzoff (1942).
He has suggested that fast recovery of the skin conductance response serves an adaptive function. Examining the sensitivity of recovery time to changes in "behavioural set" (Edelberg, 1970), conditions under which it appeared to differentiate - i.e. in which recovery times were shorter - included those of responses to a stimulus light with signal properties as opposed to those with no signal properties, responses to reaction time tones as opposed to passively received tones and those during an "aggressive" game when compared with spontaneous responses before and after the task.

These findings encouraged his view that recovery times could be used to distinguish between responses to the same physical stimulus which were qualitatively different, i.e. which denoted different "sets" or states such as whether individuals are mobilized for goal-directed behaviour or not. These observations were made across all subjects, but inter-subject differences were also noted, those subjects with the fastest recovery times appearing to have response amplitudes that habituated more slowly during the task.

The proposals concerning the occurrence of faster recovery times during goal-orientated conditions were extended to conditions which would specifically elicit slower recovery times. It had been observed that despite the speeding of recovery with goal-directed behaviour, there was a slowing when task instructions were given. This dilemma suggested to him that slow recovery might occur under aversive conditions.

When this hypothesis was tested (Edelberg, 1971), recovery times during a reaction-time task were found to be longer when a threat (of shock) was superimposed on an otherwise goal-directed situation. Recovery times were also
found to be longer to disturbing words as opposed to neutral ones on a word-association task, and these findings led him to propose that an aversive element introduced into an activating situation "causes a retardation of recovery ... or prevents the usual acceleration ... which accompanies mobilization for task performance".

He also reported (Edelberg, 1972) comparisons between a goal-directed task (mirror tracing), and responses on a cold pressor test. Both tasks are proposed as being highly activating, the latter on account of reported pain, and this condition showed slower recovery. It is suggested that fast recovery is not therefore related to activity per se but specifically to goal-directed activity, and that this comparison was able to evaluate "another form of activation". It might therefore be a qualitative, not just a quantitative discriminator. (75) suggests that psychophysiology is an interface between the two traditions of "experimental workers attempting to give a nosophistic account of the generalized mind or average case and clinicians who attempt an idiographic understanding of individual cases. Whereas individual differences are a source of noise to the traditional experimentalist, for psychometrists who may stand midway between the two approaches above, they are the data base itself. Lykken suggests that, while experimentalists may move into psychophysiology to search for general laws, others such as "refugees from the swamps of personality research" may be looking for more objective measures of individual differences. One way of measuring everyday life events might thus involve measuring psychophysiological responses to meaningful interpersonal and situational variables as social realities have a "discursive"
d. Individual differences

Attempts to link observed individual differences with aspects of bodily functioning pre-date Western civilisation, with Galen's attributions of temperamental differences to body humours, and current biochemistry may represent a modern counterpart to this, with the tools available to examine hormonal activity, whether or not this is considered to be the basis for "temperament" (Williams, 1956).

Type theories based on specific physical characteristics may now seem to be naive and of less potential interest (Kretschmer, 1925; Sheldon and Stevens, 1942).

In general the field of "personality" research has been pursued separately from that of psychophysiological differences, as with many relatively discretely-studied areas of psychology, to comprise cognitive beliefs, affects and overt behaviour. Lykken (1975) suggests that psychophysiology is an interface between the two traditions of "experimental" workers attempting to give a nomothetic account of the generalized mind or average case and clinicians who attempt an idiographic understanding of individual cases. Whereas individual differences are a source of noise to the traditional experimentalist, for psychometrists who may stand midway between the two approaches above, they are the data base itself. Lykken suggests that, while experimentalists may move into psychophysiology to search for general laws, others such as "refugees from the swamps of personality research" may be looking for more objective measures of individual differences.
Greenfield et al. (1963) take as a conceptual framework that "psychological and physiological responses are inseparable parts of a unitary process of adaptation". Despite attempts to provide findings with the appearance of "hard data", most psychophysicologists are keenly aware that at the present measurement outstrips theoretical formulations, and that "pure" or hard data is as difficult to obtain in this area as in most others. There seems to be a good case however for attempts to be made to provide a bridge between the two areas, and at least initially to adopt a correlational approach for this purpose, while recognizing the lack of statistical strength that this implies (Gale, 1973).

Schwarz and Shapiro (1973) note that as attitudes are generally held to comprise cognitive beliefs, affects and overt reactions, the use of physiological measures to assess differences in these is justifiable. Whereas psychophysical investigators tend to specialize in either the exploration of stimulus characteristics or those of the subject, the two areas of interest tend to overlap where studies of "stress" are concerned.

Duffy (1949) felt that, where the study of individual differences was concerned, early clinicians were uninterested in theory, and general psychology was too inexact to describe the behaviour of the organism as a whole. Confusion of the direction of behaviour with its intensity led to concepts including personality "traits" which she felt were unrewarding. She asserted that activation theory has never claimed that the individual responds as a massive undifferentiated whole. A "patterning" of action rather than a "dissociation".
of physiological systems is envisaged, where individual differences may be observed, and here intra-individual correlations are suggested as more fruitful than inter-subject ones (Malmo, 1959). Duffy (1951) stressed particularly the concept of an energy mobilization as the primary dimension which ought to be the most fruitful for the study of consistent individual differences.

Where susceptibility to myocardial disease is concerned, work on individual differences which has received most attention is that of Friedman and Rosenman's. "Type A" individuals were said to have higher cholesterol levels and more general sympathetic activity than the more placid "Type Bs", the original studies being retrospective and using interview data. Assessments of the "Type A" behaviour pattern have been developed from the original interview methods into a test questionnaire, the Jenkins Activity Survey (Jenkins, Rosenman and Friedman, 1967), and this has been administered prospectively, (Jenkins, Rosenman and Zyzanski, 1974), and is held to be highly predictive of future incidence of coronary disease, including acute myocardial infarction, unrecognized infarction or angina pectoris.

The "coronary-prone behaviour pattern" (Type A) is said to comprise perfectionism, striving towards achievement, inability to relax, extreme job-commitment, aggression, time-urgency, competitiveness and hyperalertness. This "torrent of life" is usually manifested in dedication to work, with neglect of family life and relaxation. The pattern is "not a personality trait or stress reaction" but the "observable behaviour that emerges when a person predisposed by his character structure is confronted by a "triggering situation". 
The scale is not considered to classify sufficient individual subjects correctly to justify its use in clinical settings, but the behaviour pattern that it measures is held to be a genuine precursor of coronary heart disease, reflecting some factor whose "biologic properties are not as yet well defined".

Obrist's work originally focussed on heart rate changes relative to behavioural states, and then on the mechanisms of blood pressure control relative to environmental stressors, which latter he cites as holding more promise (Obrist, 1976). Whereas individual differences as such were not measured, active and passive methods of coping appeared to be distinguished, the cardiovascular effects in the latter particularly appearing to be "metabolically unjustified", possibly indicating how life stresses might contribute to the aetiology of cardiovascular disease. Greater cardiac output would be more significant early in the development of elevated pressure when it tends to be labile, making therapeutic intervention more important early in the disease process, where neurogenic control rather than intrinsic control of blood pressure is presumed more important.

Interest in degenerative heart disease has been investigated concerning its precursors which might affect the metabolic pathology of the heart muscle (Raab and Krzywanek, 1965; Raab, 1968). Mild sensory stress of simulated everyday "annoyances" showed that this produced a rise in heart rate, systolic and diastolic blood pressure and plasma cortisol during morning hours (when plasma cortisol levels would normally be falling).
Using their own assessment on a nine-item self-rating scale of "emotionally excitable individuals", they showed that subjects with extreme scores on this had a more pronounced cardiovascular adrenergic response pattern (greater cardiac acceleration and rise of systolic blood pressure and an unusually prolonged rise of plasma cortisol). These reactions of emotional testability were said to be stable in the same individuals over a period of several years.

If it could be shown that subjects in a "normal" population who are characterized by extreme scores on some measure of individual differences tend to display certain types of responses on one or more psychophysiological measure, then some contribution might be eventually made to the "choice of target organ" debate - i.e. the presumed predisposing factors which incline one individual to show e.g. a specific type of over-activity within the cardiovascular system, and another gastric disorder, the assumption being that such tendencies may be idiosyncratic and may become pronounced over time and under stressful conditions.

Sloane et al. (1961) found that subjects in a normal group who had high serum cholesterol, were more aggressive, guilty, anxious and out-going but self-critical and also happened to have a high familial incidence of coronary disease, while those with low cholesterol levels were more easy-going, friendly and self-satisfied.

Mai (1968) considers that attempts to identify personality types at risk for coronary disease have been most successful for angina pectoris, such individuals being characterized by being driving, ambitious, aggressive and compelled to meet deadlines.
The "uniqueness" of physiological patterns found in response to stress stimuli has been emphasized by Fox et al. (1961) who also suggested personality correlates with adrenal steroid excretion, those with high 17-hydroxycorticosteroid levels being characterized by emotional reactivity, and those with low levels by strong control over their feelings and guardedness. Handlon (1962) also asserts that the range of hormonal output within which an individual tends to operate is stable and consistent over time, "almost as if each individual responds within his own physiological frame of reference, showing variability within that frame of reference in response to the daily stresses of everyday living".

The idea of intra-individual consistency is an intriguing one, and Frankenhauser (1971,1975) asserts that there is considerable intra-individual consistency as well as large inter-individual differences in catecholamine output, some individuals showing large and some negligible increases in response to psycho-social stressors. Frankenhauser postulates that, as well as possible genetic differences in adrenomedullary sensitivity to stimuli, that of individual "coping-style" may be an important psychological factor.

In contrast to this however, Mefferd and Pokorny (1967) have demonstrated the inadvisability of placing reliance on any single measure, (of chemical elements or compounds in body fluids) as great variability was found in individual subjects over time in a study closely controlled for possible confounding factors. Serum measures of creatinine, potassium, cholesterol and copper and urinary assessment of 17-hydroxyecorticosteroid were used, and the authors pointed to the danger of interpreting change on such measures as indicating changes, e.g. in pathology.
Roessler, Burch and Mefford (1967), using subjects asked to passively attend to neutral sounds and lights, examined individual differences in "ego-strength" (Barron, 1956). There were no overall differences between basal and "stress" (examination anticipation) conditions, but high ego-strength subjects showed greater catecholamine (epinephrine and norepinephrine) excretion in the stress condition, when used as their own controls - i.e. they appeared to show "appropriate responsiveness".

Many studies have used amplitude of the skin conductance response as their chosen index. Using the initial response or orienting reflex, subjects scoring highest on a sensation-seeking scale (Zuckerman et al, 1964) were found to have larger initial responses to novel visual and orienting stimuli. This was interpreted as being in line with Russian views of subjects with large orienting responses showing a predominance of excitatory processes over inhibitory ones in the nervous system.

The same study found that low, not high (state) anxious subjects gave larger responses (whereas trait anxiety did not predict). They considered this to be consistent with the view that the orienting response is a perceptual and alerting one, not an index of emotional reactivity, and that high anxiety could be expected to interfere with this, not augment it.

Roessler (1973) however found that subjects highest on (trait) anxiety, were least responsive. As anxiety was negatively correlated with high ego-strength, the former characteristic was controlled for in further studies, and
then only high ego-strength individuals showed greater electrophysiological responsiveness. As depressive mood has frequently been cited by clinicians to be characterized by a generalized hyporesponse, Greenfield et al. (1963) used both patients and normal subjects and found that those most depressed (in terms of mood rather than psychiatric classification or "underlying character structure") had lower skin conductance amplitudes to noise stimuli, which they attributed to a "generalized impairment of responsivity" rather than reduced attentiveness or motivation.

Intra-individual consistency is held to be high for the measure of basal skin potential level, as well as for the time taken to reach this basal point during relaxation, and individuals with higher mean skin potential values have been found to score higher on neuroticism and introversion (Christie and Venables, 1974).

Eysenck's dimension of extraversion has been applied mainly to testing differences in conditioning, particularly of electrodermal responses and the eye-blink response, introverts being held to condition more quickly (Eysenck, 1965).

It would appear that to pursue an interest in individual differences including psychophysiological measures, it may be useful to consider "recovery" for several reasons. The problems of comparing differences in tonic levels across subjects has been referred to, where other factors apart from the psychological ones of interest may be implicated (Lykken, 1975). Similar problems beset measures of response amplitude, e.g. with electrodermal responses where differences in tonic levels may confound these, and make across-subject comparisons problematical.
Utilization of a recovery measure, specifically that of the recovery limb of the skin conductance response, avoids some of these problems, being a time measure rather than one that measures "degree" of responding as well as holding promise as an indicator of individual differences in response to stress.

Edelberg speculated that anxious individuals might behave as if permanently stressed. Suggesting that these individuals, who perceive their everyday world as vaguely threatening, might show slower recovery as an individual characteristic, he found that slower recovery times were correlated with higher scores on the Spielberger Trait Anxiety Quotient (Edelberg, 1971).

Extending the findings to consistent psychophysiological differences between subjects, these were found to be characteristic across tests: "Fast-recovering subjects are consistently fast and slow-recovering subjects are consistently slow" (Edelberg, 1972). Bull and Gale (1971) had also asserted that recovery (as well as amplitude and latency) were reliable within subjects.

Stressing the index of slow recovery as a "threat" response, Edelberg considered the possibility that distraction from a task by introducing an aversive aspect could have affected goal-orientation and its characteristically fast recovery. He prefers the interpretation that slower recovery reflects a "protective" type of response, indicating a defensive process. Such claims appear to make this recovery index a potentially fruitful one in exploring the area of individual differences. In view of this, the possible mechanisms underlying electrodermal phenomena and the methodology of its measurement will be briefly reviewed.
e. Electrodermal measures

There are probably a number of reasons why electrodermal activity has attracted considerable research interest. The meaning of the minute electrical changes measurable of the skin's surface are still not completely understood.

The observation that these changes are extremely sensitive to small variations in the environment or in the internal psychological state has been one factor that has attracted psychologists to investigating them. They appear to be unlike other measures, such as cardiovascular ones, which occur briefly and which are usually investigated in which are primarily concerned with sustaining overall bodily function, and the changes are capable of measurement without invasive procedures.

Electrodermal activity was first noted by Pára (1888), who observed the ecectometric resistance between 2 sites on the skin when a small current was passed between them. This resistance increased when the subject was stimulated. In 1963, Eysenck noted the ecectometric differences in potential relatively simple, but it was assumed that the sweat response was stress-related or measured some subjective emotional aspect (Schwarz and Shapiro, 1973).

The phenomenon has attracted attention from those who are concerned to attempt to elucidate the underlying mechanisms involved (Darrow, 1927; Hemphill, 1942; Wilcott, 1966; Martin and Venables, 1966; Edelberg, 1968; Christie and Venables, 1971). The majority of psychological researchers however are concerned with charting observed correlates with specific stimuli including psychosocial factors.
It is necessary to distinguish between the endosomatic method of measuring the electrical potential differences between the inside and outside of the skin itself, and the exosomatic procedure of passing a minute current through the body between two points on the skin by external means, and then measuring the skin's resistance to it (skin resistance). It is customary to report this measure in terms of skin conductance, which is its reciprocal. For both methods, measures can be made of tonic levels over periods of time and under varying circumstances, and of phasic responses which occur briefly, and which are usually investigated in association with specific stimuli administered to evoke them. These measures will be referred to again later.

Electrodermal activity was first noted by Féré (1888), who observed the exosomatic resistance between 2 sites on the skin when a small current was passed between them, this resistance decreasing when the subject was stimulated. In 1890, Tarchanoff noted the endosomatic differences in potential between 2 body sites, which also responded when stimuli were applied.

The eccrine sweat glands have generally been held to be largely responsible for skin resistance levels and responses, although it has been asserted that the measures do not necessarily depend initially on sweat emergence, but rather on pre-secretory activity of sweat gland membranes (Darrow, 1927; Wilcott, 1967). Sweat glands which are distributed over the body, develop in the foetus, those on the palm, which are densely concentrated appearing first, and skin resistance is apparent a few days after birth (Venables and Christie, 1973). The relatively slow nature of the electrodermal response with its latencies typically ranging from 1.3 to 2.5 seconds
suggested that this was consistent with slow autonomic pathway conduction, and it has been established that these sweat glands are sympathetically innervated (Chalmers and Keele, 1952), although electrodermal activity should not necessarily be too closely equated with other sympathetically-mediated functions (Lacey, 1967; Miller, 1969).

Whereas the sweat glands possess an obvious thermoregulatory function for controlling body temperature, they respond to psychic as well as thermal stimulation. Those on the palm and sole of the foot show a greater response to psychic stimulation - i.e. to stimuli originating from brain centres than to thermal stimulation, thus making them of interest to psychophysiologists (Wilcott, 1967).

Darrow (1933, 1936) suggested that the back of the hand, which shows less electrodermal response than the palm, is mainly concerned with temperature control, as with other non-palmar surfaces. Palmar sweating however is suggested as functionally related to "manipulative, perceptual and self-preservative functions". Secretion of sweat makes the palms and soles more pliable, allowing for tactile sensitivity and a firmer grip and therefore better contacting and manipulating of the environment. The electrodermal responses to a startle stimulus could reflect this mobilization of the organism for action. in interests in the orienting response (Wortis, 1966).

Darrow saw many of the body's physiological changes as primarily preparatory and facilitative ones, in anticipation of future activity, and both electrodermal and blood pressure responses were considered significant because of their peripheral indications of readiness for response of the whole organism.
The fact that the palms are dry during sleep unlike other areas of the body, but are moist under conditions of anxiety is held to be significant, and the need for grasping in fight or flight conditions is thought to be the adaptive explanation of this.

More recently Edelberg (1971, 1972, 1973) has proposed that slow recovery of the skin conductance response denotes a "defensive" reaction, and Raskin (1973) concurs with such a view, as when sweat reabsorption is inhibited and the skin is more moist, it is less susceptible to injury. Edelberg views electrodermal activity as a selective preparation for the needs of the organism, with optimal hydration for appropriate defence or manipulation.

Attempts to answer the question of what electrodermal activity actually indicates have considered tonic levels as distinct from phasic responses. The former have most generally been viewed as indices of activation or arousal (Freeman, 1948; Raskin et al. 1969), a view supported by the fact that skin conductance levels accompany the diurnal rise in the cycle of activation in man (Malmo, 1959, 1962; Niimi, 1967; Christie and Venables, 1973).

Where responses are concerned, most research has viewed these as indicators of either "emotion" or of "attention" as reflected in interests in the orienting response (Martin, 1961; Sokolov, 1963).

It may therefore be helpful at this point to refer briefly to the mechanisms involved in electrodermal activity.

There are considered to be central, hormonal and peripheral aspects of relevance for electrodermal activity. The fibres innovating the peripheral (sweat gland) activity of the skin
are those of the sympathetic branch of the autonomic system (Venables and Martin, 1967). Cortical regulation is held to be important in controlling electrodermal activity (Wang, 1964) which is often viewed as part of the orienting reflex implicated in information intake and processing (Sokolov, 1963). Work on the brain stem focussed interest on the reticular activating system (Moruzzi and Magoun, 1949; Bloch and Bonvallet, 1959; Lindsley, 1951). The lower portions of the reticular formation have been cited as responsible for changes in levels of reactivity (Sharpless and Jasper, 1956), and the upper portions for the briefer attentive processes (responses).

It is considered that subcortical centres are the site of origin of most phasic electrodermal activity, and that cortical activity is responsible for attenuating the responses i.e. determining non-specific activity and habituation processes (Sokolov, 1963).

Central mechanisms have been studied most in relation to brief electrodermal responses, as their contribution where tonic levels are concerned is more complex, interacting with hormonal factors.

It is accepted that tonic skin conductance levels increase (and skin resistance levels fall) with CNS arousal (Lykken, 1975), and this rise in conductance (or fall in resistance) has been shown to accompany an increase in sweat gland activity (Adams, 1966; Adams and Vaughan, 1965), contributors to these levels including the number of sweat glands and their activity as well as epidermal hydration and water reabsorption from the sweat ducts.
Phasic responding may require a more complex interpretation. Where skin resistance responses are concerned, these are thought not to depend primarily on the increased emergence of sweat increasing conductivity and thus lowering resistance to a current, but rather that there may be a change in the pre-secretory activity of the sweat glands which may make the cell membranes involved in conductivity more permeable (Darrow, 1927; Wilcott, 1967). Hormonal mechanisms have tended to receive less attention, although these also affect sweat gland functioning (Collins and Weiner, 1968). Adrenalin is thought to affect sweat gland activity, and the mineralocorticoids such as aldosterone which retain salt may be relevant for suggestions of salt reabsorption as well as water reabsorption, which could increase the negativity of skin potential levels (Fowles and Venables, 1968, 1970). These authors suggest that mechanisms determining skin potential include: a secretory one in the sweat glands, which would contribute to the association between sweat gland activity and skin potential responses; passive diffusion of a semi-permeable epidermal membrane, allowing for high skin potential levels found when there is no sweat gland activity; and also a potential across the epithelial membrane forming the wall of the sweat ducts, possibly associated with the reabsorption of sodium but not potassium. It is not clear whether or not this latter is associated with stress, but they consider it may suggest important connections between the endocrine system and presumed sympathetic electrodermal activity (sagittal wave followed by a slower positive wave). This suggests that an active mechanism might be involved and not simply passive diffusion of water into the corneum.
One hormone that may affect sweat gland function is that of progesterone, which decreases sweating (McKinnon, 1954, 1964), and there are fewer active sweat glands in the second half of the pre-menstrual phase of the menstrual cycle, when progesterone levels are low.

Filling of the sweat ducts and the passive diffusion of water alone are not thought to be adequate explanations for skin resistance responses, and Edelberg (1971) suggests an epidermal mechanism which might make "biological sense" out of the slowing of the recovery limb in situations of threat. An active reabsorption process is seen as a second control, in addition to secretion, to adjust the hydration of the skin at an optimal rather than a maximum level for manipulative purposes. In such situations, no increase in secretory activity, but rather an inhibition of a reabsorption mechanism would suffice to flood the surface and protect against mechanical injury. He proposes the probability that a response originally intended for such situations may have effected a transition to a defense against psychological injury more relevant for our current complex social situations.

One of the reasons behind Edelberg's suggestions lay in the observation of skin conductance responses, which although also registered from dorsal areas, were only accompanied by sweat gland activity on the palm (Edelberg, 1964, 1966, 1971, 1972).

Another factor lay in the "recovery" characteristics of the responses. Skin conductance responses can show a very fast recovery slope, and those of skin potential frequently show a fast initial negative wave followed by a slower positive wave. This suggested that an active mechanism might be involved and not simply passive diffusion of water into the corneum.
If such a separate epidermal mechanism exists, no separate innovation has yet been shown.

It may be helpful at this point to illustrate typical skin conductance and skin potential responses. (Fig. 1).

The convention is for "what may be loosely called increases in arousal or activation" to be recorded on the polygraph output in an upwards direction, i.e. increases in tonic skin conductance levels (falls in resistance) are shown as rising on the record, as are short phasic responses. For this reason, it is most convenient to record skin potential in the same way - that is increasing negativity recorded in an upwards direction, so that (uni-phasic) skin potential responses follow the same direction.

The skin potential response however often assumes a bi-phasic form (Fig. 1), with the initial negative component being followed by a positive wave. The occurrence of these bi-phasic skin potential in conjunction with fast recovery limbs of the skin conductance response was one factor that Edelberg considered could not be accounted for by simple passive diffusion of water.

He developed a model for the electrodermal response as being governed by a dual mechanism comprising the two components of (a) a slow sweat response and (b) a faster membrane reabsorption response, the two aspects being independently controlled.

The reabsorption mechanism is therefore seen to fulfil a more active role than a single mechanism would imply, (Edelberg, 1970; Wilcott, 1966).
Skin Conductance Response

stimulus onset

recovery limb

latency

amplitude

Skin Potential Response (Bi-phasic)

Initial negative wave

Secondary positive wave

Fig. 1.
Whereas Darrow (1964) had also pointed to the influence of hydration on skin potential, he had not included an epidermal component, which Edelberg suggests as the second component of his dual model. Other suggestions have been those of a sodium reabsorption mechanism in the dermal part of the sweat duct, containing a direct source of negative potential (Fowles and Venables, 1970).

Edelberg considers that dual control of the electrodermal response makes it a more sensitive psychosocial discriminator than that of response amplitude, and views the recovery limb as an intrinsic index of the rate of a "recovery process" not just an expression of the steepness of the recovery slope.

It is also suggested that, being a time measure, the recovery index avoids some of the pitfalls associated with the more commonly used measure of response amplitude. The maximum skin conductance response of which each individual is capable will vary and depends on many factors other than the psychological ones which are usually of interest; external temperature, density of sweat glands beneath the electrode and thickness of the epidermis also show considerable individual variations (Lykken, 1975), although these are not related to the psychological processes.

Apart from this, there may be possibilities of "ceiling" effects in amplitude, as well as the statistical aspect of how to compare response amplitudes between subjects whose responses do not originate from similar tonic levels.
Skin Conductance Responses

(a) with fast recovery  (b) with slow recovery

Response which does not recover fully, with further responses superimposed

Measurement of half-time recovery ($\frac{1}{2} RT$)

Fig. 2.
Recovery time itself presents some problems of measurement, as not all responses recover fully to their original baseline. In many cases, subsequent responses are superimposed on recovery slopes, or tonic levels may rise then (Fig. 2). The recovery phase approximates to an exponential form (Darrow, 1937), and Edelberg recommends the use of the recovery half time measure (½ RT) - i.e., the time taken for a response to reach 50% recovery - and this helps to overcome problems of measurement of those responses which do not recover fully (Fig. 2).

The previous comments apply to phasic response measures. Where measures of tonic levels are concerned, skin potential has been less frequently measured than skin resistance.

This endosomatic measure records the level of the skin's own electrical activity, and does not involve the passing of a current through the skin as does the measurement of resistance. Potential measurements from the palm are most frequently negative, and when sweat gland activity reduces under relaxation or with lowered arousal this negativity decreases, and may sometimes become positive (Christie and Venables, 1974).

Skin potential levels are unlike those of skin resistance in that they exhibit a nadir or basal point under conditions of relaxation, below which potential readings fall no further, but rather rise while skin conductance goes on falling. There are individual differences in these basal values which are not necessarily attributed to differences in arousal (Lykken et al., 1966).
Skin potential may therefore measure different aspects of the organism from skin resistance. Whereas sweat gland activity is known to be involved in contributing to skin resistance, it may not be directly concerned in determining skin potential. The two measures have been found to be related, but not so highly that they appear equivalent.

"Whereas the underlying mechanisms are still not entirely clear, they could be consistent with potential comprising an autonomic variable" (Venables and Sayer, 1963).

Non-sudorific influences may also be involved here. In situations of relaxation, as well as a fall in tonic skin conductance levels and skin potential levels, there is usually a decrease and then an absence of phasic skin conductance and skin potential responses, indicating that the sweat glands have become quiescent. At the point at which skin conductance levels continue to fall but where skin potential reaches a basal point and then rises gradually, the potential measure is considered to indicate factors other than arousal. One possibility is that individual differences in tissue fluid electrolytes are being reflected (Martin and Venables, 1966; Christie and Venables, 1971a). Interest in possible mechanisms apart, the basal level of skin potential normally reached by subjects after a period of rest may make it a useful index for comparing other "resting" data across subjects, as may also the slope, or time taken to reach this basal point. Individual differences within this are reported as being relatively consistent within subjects (Christie and Venables, 1974).
Tonic skin resistance levels are frequently reported, usually as an index of "arousal", and as such they may be useful as a relatively crude indicator of whether a subject is relaxing. However, not only do other factors than psychological ones contribute to this measure, but also, in common with response measures, across-subject comparisons of raw tonic levels are not necessarily appropriate.

It appears that higher levels of skin conductance are usually accompanied by spontaneous responses or fluctuations - i.e. those that appear to occur spontaneously, and not in response to specific or observable stimuli. Some workers have included the number of spontaneous fluctuations among indices used (e.g. Lader and Wing, 1966), to indicate an anxious or aroused state, and the absence is these in conjunction with falling levels of conductance can be taken as indicator that subjects are becoming de-aroused or relaxed.

In answer to the question as to what can be inferred from measures of electrodermal activity, Venables and Christie (1974), conclude that it may be considered as an index of "something other than a piece of behaviour in its own right, although it is not all that easy to say what". It is perhaps for this reason that it has attracted so much interest, both from those who are concerned to try to identify the underlying mechanisms, and from those more concerned to examine correlates with "psychological" variables.

The equipment most frequently used for recording electrodermal and other physiological activity is the polygraph. This gives a paper print-out record providing a visual indication of the subjects' responding and requires manual scoring of actual values. Alternatively - or additionally -
the information may be collected by a tape-recorder, and then analysed by computer. Although this method relieves time-consuming hand-scoring, it may be less useful as it does not allow the experimenter concurrent awareness of how subjects are responding, eliminating possibly useful insights of such observations. Specific stimuli can be synchronized and recorded on the polygraph output for scoring evoked responses and latencies. Silver-silver chloride electrodes are commonly recommended for use (Lykken and Venables, 1971), with care being taken that the outer silver chloride layer is completely intact in order that no abrasions result in raising bias potentials.

It is essential to use a pair of electrodes with a minimal bias between them, and pairs with a bias of between 100 and 250 μV are acceptable. For the finer measurement of skin potential, closely matched pairs are even more essential and these are also likely to drift less with use. Control of electrode area is important, as the number of active sweat glands may contribute to skin resistance readings. As dry electrodes can allow the surface sweat to spread over a larger area with time, a viscous electrolyte is recommended which can be restricted to covering the actual electrode area by a hard mounting rim on the electrode or by use of masking tape. As the skin surface/electrolyte system in skin potential measurement forms an integral part of the process by which the potential differences between different parts of the skin is produced, the choice of electrolyte is particularly important for skin potential measurement, both in choice of salt and its concentration.
The principal electrolyte constituents of sweat and internal body fluids are sodium and potassium in the form of chlorides, and sodium chloride or potassium chloride are recommended, as being most closely compatible with the skin's own electrolyte, potassium chloride being particularly recommended for use in a .5g solution, (Venables and Martin, 1967; Venables and Christie, 1973).

For measuring skin conductance responses a "bi-polar" electrode placement is recommended (i.e. using two "active" sites) in order to maximize changes in conductance.

The sites having the most common skin conductance activity are those of the two inner fingers or the two outer fingers of the same hand, and these are also convenient and not disagreeable for the subject. The readings are commonly expressed in terms of (\(_{\text{mhos}}\)) to allow for differences in area of electrodes, and typical tonic values range between 5 and 20 \(_{\text{mhos}}\). 

For the measurement of skin potential an active and inactive site are selected and a convenient placement is to choose an active site (i.e. one showing electrodermal activity) on the finger, and an inactive site on the forearm (i.e. one showing no electrodermal activity). The range of tonic skin potential levels from such an active palmar site will normally be between 100 mv (negative) and 30 mv (positive) with respect to an inactive site on the forearm (i.e. one of zero potential).

The use of a skin drill or sandpaper on the skin beneath the site of the inactive electrode is recommended to allow ions from the electrolyte to pass freely in either direction.
so that there is a lack of production of potential - i.e. the achieving of a zero potential point. This also helps to reduce possible interference from skin resistance. For the measurement of resistance and potential at the same time, it is preferable to use separate hands to avoid possible interaction. For measuring resistance from 2 active sites, these should be on the same limb to avoid heart artefacts.

There are some laterality differences in electrodermal activity (Obrist, 1963), and for measuring skin resistance, control for handedness is recommended in electrode placements.

Racial differences in electrodermal activity may exist, and it may be difficult to disentangle possible physiological differences such as the number of active palmar sweat glands from possible ethnic differences in autonomic responses to specific stressors and differences in social interaction. (Tursky and Sternbach, 1967; Rosenthal, 1966; Johnson and Corah, 1963; Juniper and Dykman, 1967).

Subject age needs to be controlled for, both because of central and peripheral nervous system changes, including factors such as fewer sweat counts with age, but also again on account of subject-experimenter effects on social interaction. (Rosenthal, 1966; Rosenthal, 1967; Rosenthal and Rosenthal, 1967).

Similar considerations apply to using male and female subjects indiscriminately, not only because of hormonal differences, but also because of sex differences in social interaction (Mason and Brady, 1965).
Where female subjects are used, stage of the menstrual cycle should be controlled for, presenting considerable methodological problems (Redgrove, 1971). Unless the menstrual cycle changes are themselves the area of investigation (e.g., Bell, Christie and Venables, 1975) it may be prudent to avoid using female subjects unless or until sex comparisons become essential. Abstain from drugs including caffeine.

Diurnal variations underlie most physiological functions including electrodermal phenomena; skin resistance being the earliest physiological function to show a diurnal variation a few days after birth (Rutenfranz, 1961). For by early skin conductance levels peak (i.e., skin resistance levels show a nadir) during the early afternoon, while it has been reported that the lowest (basal) values of skin potential are at their lowest then (Hirai, 1967; Christie and Venables, 1973). It is advisable for this reason to control recordings for time of day, unless the diurnal variation itself is under investigation. Control of the more obvious artefacts may be seasonal differences in electrodermal activity which may be due to changes in temperature (Wenger, 1962; Christie and Venables, 1971b) and external (laboratory) temperatures should be controlled; ideally to between 20° and 27° (Venables and Martin, 1967), as heat and cold can affect skin resistance levels. Unduly hot or cold conditions might also unintentionally arouse the subject due to discomfort.

One problem with the use of the polygraph is that a laboratory situation is essential. As well as controlling temperature, a room relatively free of external noise is desirable. The laboratory environment should ideally remain...
unchanged throughout experiments, and should provide an unstimulating neutral background. It is also desirable to control for prior levels of arousal in subjects who may have been engaged in previous activities with differing degrees of activation (Wilder, 1967). The experimenter can control these to a certain extent by asking subjects to abstain from drugs including caffeine, nicotine and alcohol the evening before the experiment, and avoiding an unduly late night.

On the day of the experiment, differences in immediately preceding activity and temperature can be controlled for by allowing a short time for subjects to rest and acclimatize to the laboratory before the experiment. There may be salt concentrations on the skin surface due to evaporated sweat residues, and it is recommended that all subjects wash their hands with soap and water to control for such possible error (Venables and Martin, 1967). However, such attempts at "control" of the more obvious artefacts still allow for laboratory situations to reflect many aspects other than the subject's responses to intended stimuli.

The problem of the experimental procedure affecting the very aspects which are under investigation applies as much to psychophysiological procedures as to other measurement techniques. Rosenthal (1966) drew attention in particular to the effect of the experimenter himself on his own results. Variations in psychophysiological measures including electrodermal activity have been associated with such factors as age and race of the experimenter and amount of their social interaction with the subject (Schwartz and Shapiro, 1973).
The use of a laboratory environment, however controlled, might arouse negative affect because of its very clinical appearance, and the use of procedures such as applying electrodes and connecting subjects to equipment could represent a threat at least to some subjects. It would seem to be incumbent on the experimenter to reduce the threatening nature of the equipment and procedures as much as possible.

Given that aspects of "arousal" interest the psychophysiological researcher, some of the possible unintentional determinants of this have been amusingly suggested by Gale (1973), who has described how an individual may perceive the demands of an experiment from his viewpoint as a subject. His possible reactions to being "wired up" might well appear to make nonsense of "resting levels". A constructive approach to the problem has been put forward (Christie and Venables, 1971a) of using subjects for psychophysiological studies who have been previously habituated to the laboratory environment.

These workers also stress (1973) the inadvisability of referring to the "galvanic skin response" (GSR) in an undefined way.

The researcher needs to specify whether measurement is of potential or resistance and whether of responses or levels. Within the response measure, choice still exists as to whether spontaneous or elicited responses, amplitude, latency or recovery time are the chosen index, and this needs to be specified.

While a few workers still report findings in terms of skin resistance, any confusion regarding this can be clarified by specifying, e.g., skin resistance (SR) levels as distinct
from skin conductance (SC) levels. In view of probable differences that exist between the skin conductance amplitudes of which each subject is capable, some workers are concerned that the reporting of these raw values may be inadvisable, and that it is more appropriate to express them as a proportion of the maximum response of which that subject is capable (Lykken, 1975). He suggests that such readings should be converted to allow for the maximum response which that subject demonstrates, and advocates using the formula:

\[
\frac{S{'s \text{ Specific response}}}{S{'s \text{ maximum response}}}
\]

Similar considerations apply to the reporting of skin conductance levels, and for these Lykken recommends the formula:

\[
\frac{S{'s \text{ skin conductance level}}}{S{'s \text{ maximum level}} - S{'s \text{ minimum level}}}
\]

Where an experimental procedure includes demands which probably elicit values near the maximum or minimum, then these values are considered adequate for the formula. Failing this, Lykken has used the strategy of asking subjects to blow up a small balloon until it bursts to elicit maximum skin conductance levels. Such a procedure might be thought to be rather extreme, and possibly to affect subsequent measures and it is not commonly used.

Further treatment of raw data is not usually employed, some workers advocating conversion to log skin conductance scores, although this is not considered necessary (Venables and Christie, 1973).
In the initial part of the research, laboratory explorations are planned with a view to examining individual differences in responsiveness in a simulated stressor and attribution of blame (or hostility) have tended to be pursued separately, and within different theoretical frameworks. Prior assessment will be made on the psychological dimensions of interest - those of perceptions of control, and of hostility and its direction.

It will then be made a matter of observation as to whether there are any associations between these aspects of "attitudinal style" and those of "psychophysiological style". It could be supposed however that if individuals are expected to attribute blame to themselves.

The responses to the minor stressors employed in this pilot work will be scrutinized for any significant patterning of consistent attitudes. of responsiveness in terms of the psychological and psychophysiological characteristics, and of subjective mood, suffering from ineffective coping, stress or depression (Fouls, 1970; W. Smith & Kyle, 1969; Taylor, 1970; Smith, 1970). It seems appropriate to examine scores on these dimensions in a group of normal subjects to investigate whether attitudes on these dimensions are in fact consistent.

Initial experimental work utilizing the aspects which have been reviewed will now be described. It was hypothesized that attitudes might be "inconsistent", and that scores on the measures used to assess these would not be highly related. Both dimensions may also be worth examining in conjunction with psychophysiological responsiveness for any associations between them.

Inability to take advantage of demand-free situations may relate to impairment of "recovery" when stressors are present, when levels of functioning are higher, and more
Pilot work with the dimensions of control and blame

Introduction

Interest in the dimensions of attribution of control and attribution of blame (or hostility) have tended to be pursued separately, and within different theoretical frameworks.

It could be supposed however that if individuals attribute control of their lives predominantly to outside forces then they should logically also attribute blame externally. Similarly, if they perceive themselves as being in control of their own lives, then they should be expected to attribute blame to themselves.

It might be however that individuals do not have such "consistent" attitudes.

As extreme scores on both the dimensions of control and of blame have been invoked where individuals are suffering from ineffective coping, stress or depression (Foulds, 1966; Hall-Smith & Ryle, 1969; Mayo, 1969; Smith, 1970), it seems appropriate to examine scores on these dimensions, in a group of normal subjects to investigate whether attitudes on these dimensions are in fact consistent.

It was hypothesized that attitudes might be "inconsistent", and that scores on the measures used to assess these would not be highly related. Both dimensions may also be worth examining in conjunction with psychophysiological responsiveness for any associations between them.

Inability to take advantage of demand-free situations may relate to impairment of "recovery" when stressors are present, when levels of functioning are higher, and more...
rapid recovery over time is desirable for homeostasis. The effect of a "de-activating" period on mood state was examined in one group by assessing anxious and depressed mood before and after a relaxation period. It was speculated that those scoring as extreme on the questionnaire dimensions would handle a period of relaxation less well, as reflected in higher post-relaxation scores on depression and/or anxiety.

The Subjects

Two pilot groups of subjects were used, the first consisting of 20 students, and the second of 27. All the subjects were tested individually. All the subjects were males, as it was intended also to examine psychophysiological responsiveness, and menstrual cycle variation make this problematical with females (Redgrove, 1971). Electrodermal results will not however be reported here; faults in the "home-made" electrodes produced meaningless records which had to be discarded. The second session did however serve as a habituating situation for future psychophysiological testing, all subjects being introduced to the laboratory and having spent half an hour relaxing while wearing electrodes connected to a Grass polygraph. The subjects reclined on a couch, and were told that they were to use the time to relax, as part of an investigation into resting electrodermal levels.

The Tests

All the subjects completed the Locus of Control Scale (Rotter, 1966) and the Hostility and Direction of Hostility Questionnaire (HDHQ), (Caine, Foulds and Hope, 1967).
These were completed at the start of the sessions. In addition, the 27 subjects in the second group completed a Nowlis Mood Adjective Check List before and after the half-hour relaxation period, during which electrodermal measurements were being recorded.

The Findings

Raw scores on the measures for both samples are given in the Appendix (Tables A1 and A2). The means on the questionnaire scales for the two samples were:

<table>
<thead>
<tr>
<th></th>
<th>Group I (n=20)</th>
<th>Group II (n=27)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locus of Control</td>
<td>11.85 4.28</td>
<td>11.63 3.57</td>
</tr>
<tr>
<td>Hostility</td>
<td>15.4 7.08</td>
<td>15.18 5.59</td>
</tr>
<tr>
<td>Direction of Hostility</td>
<td>0.692</td>
<td>-1.37 6.01</td>
</tr>
</tbody>
</table>

Spearman non-parametric correlations were performed between the questionnaire measures for the two groups separately, with the following results:

<table>
<thead>
<tr>
<th></th>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locus of Control</td>
<td>.29</td>
<td>.14</td>
</tr>
<tr>
<td>Hostility</td>
<td>.29</td>
<td>.22</td>
</tr>
</tbody>
</table>

None of the scores were significantly related.
Scattergrams were also plotted for both groups to examine whether there were any non-linear associations between the Locus of Control and Direction of Hostility scores, but none were apparent (Figures 1, 2).

The scores of the two groups were tested to examine whether these were consistent. Unrelated t-tests showed that there were no significant differences between the two sets of scores (Table 3).

<table>
<thead>
<tr>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrelated t-tests on the 2 groups</td>
</tr>
<tr>
<td>Locus of Control</td>
</tr>
<tr>
<td>Direction of Hostility</td>
</tr>
<tr>
<td>Hostility</td>
</tr>
</tbody>
</table>

Group II

Scores on the mood measures provided by the second sample before and after the relaxation period are given in the Appendix (Tables A3 and A4). The mean scores were:

<table>
<thead>
<tr>
<th>Mood Measure</th>
<th>Before</th>
<th>After</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>1.74</td>
<td>.44</td>
<td>-1.29</td>
</tr>
<tr>
<td>Depression</td>
<td>.66</td>
<td>.40</td>
<td>-.33</td>
</tr>
</tbody>
</table>

A large number of subjects indicated scores of zero on these measures, and correlational analyses were not appropriate. All the mood ratings were dichotomized into those scoring zero, and those scoring one or more. When considering the mood change scores, as those who scored zero prior to relaxation could not show a drop in mood ratings, it was decided to combine as one group these subjects with those who indicated a mood score of one or
Figure 1

Scattergram of the association between locus of control and direction of hostility scores.

Group I

Direction of Hostility

Locus of Control scores
Figure 2

Scattergram of the association between locus of control and direction of hostility scores.

Group II

Direction of Hostility

-16
-14
-12
-10
-8
-6
-4
-2
0
+2
+4
+6
+8
+10
+12
+14
+16

Locus of Control scores
more before relaxation and a zero score afterwards. Those who showed a mood rating of one or over after but not before relaxation were then combined with those who indicated mood scores of one or more both before and after relaxation as a second group for comparison. (This was done for the anxiety and depression scores separately).

The questionnaire scores were dichotomised at the median, and 2 by 2 analyses performed against all the mood measures. No significant associations were found with anxiety or depression following relaxation or with changes in these before and after.

Depression scores before the relaxation session were associated with high hostility scores ($X^2 = .006$) and with Direction of Hostility (high Intropunitiveness) which fell just short of significance ($X^2 = .06$, Figure 3).

**Discussion**

The findings provided initial confirmation of the main hypothesis, that attributions of control and blame would not be associated. The correlation between the two measures was in fact negative in the first group ($R = -.29$, Table 2), indicating that external locus of control was related to externally-directed hostility. Whereas the low correlation was positive for the second group (but negligible), both sets of scores confirmed that there was not the strong positive association between the two measures, that might be "logically" expected.
Figure 3

Results of Chi-squared Tests between mood and the questionnaires

Hostility and Depression (pre-relaxation)

<table>
<thead>
<tr>
<th>Hostility</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>

$X^2 = < .006$

Direction of Hostility and Depression (pre-relaxation)

<table>
<thead>
<tr>
<th>Direction of Hostility</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>9</td>
<td>11</td>
</tr>
</tbody>
</table>

$X^2 = < .06$
The scattergrams (Figs. 1 and 2) appear to confirm that this lack of significance is not masking any non-linear associations between these variables. Whereas the lack of association as hypothesized was confirmed, there is no immediately apparent explanation for the differing correlations between the two groups, and it can only be concluded for the moment that associations between the two measures may vary considerably.

The two samples were composed of similar student populations, and the scores were reasonably consistent between them, those of Direction Hostility varying most (Table 1) but not significantly so.

The samples were quite small, and these results could not necessarily be generalized to groups other than students, nor to female samples. It was observed that the correlation between locus of control and hostility was positive in both groups, although non-significant in both cases. No hypothesis had been made concerning this, but the relationship between these two measures may be worth observing in other samples.

When the mood scores for the second sample are examined, it can be seen that there was a tendency for mean mood state to be less anxious and depressed after the relaxation period than before it (Tables A3 and A4, Appendix). When a considerable proportion of the sample has zero scores on these measures before relaxation, there are obvious problems in attempting to measure mood change. It is only possible here to query whether the pre-existing association of depressed mood with high hostility and intropunitive activity might be meaningful.
Another consideration that emerged on questioning subjects afterwards was that many of them found half an hour's inactivity too long to be "relaxing". Whereas some enjoyed it, some confessed to having their mind on future activities and being anxious to leave. It might be preferable in future work to limit activity-free periods to a maximum of about twenty minutes.

Conclusions

Whereas the questionnaire measures remain untested against psychophysiological data, the "relaxation" session has at least served its purpose as a habituator of the subjects to psychophysiological procedures, and makes their inclusion in future studies desirable. It was decided to obtain reliable electrodes to this end for future work. The replicated lack of association between the attributions of control and blame may be of theoretical importance, and appears to warrant follow-up.
Further Laboratory Work.

One of the original intentions in the pilot work had been to test any characteristic psychophysiological responsiveness relative to the psychological dimensions in response to simple noise stimuli. Rather than attempt to replicate this experiment with the reliable equipment, it was decided to proceed to the next stage envisaged for the pilot work, and to incorporate stimuli that would also serve as a minor stressor.

The next stage of the pilot work will now be described.
Introduction

It is open to discussion as to whether findings of stress-simulation studies in the laboratory can be generalised to real-life stress situations. Fieldwork studies generally suffer from the problem of retrospective approaches to pre-stress or pre-stressor conditions and characteristics. Laboratory studies on the other hand may suffer from the artificiality of the stressor, from its lack of application to acute or chronic stresses and from unrepresentative sample populations.

Given that much behaviour in micro situations may be itself of intrinsic interest, it was thought inappropriate at least initially, to adopt an approach to laboratory work which was largely observational and speculative, rather than formally hypothesis. If the observations should themselves prove of interest, or if the findings are in the general direction of the speculations, then more explicitly hypothesis formulation work to reassure to field-work might be appropriate.

It was proposed therefore in this work to examine individual differences in response to a laboratory stressor. The dimensions chosen for examination were those of attribution of control and of hostility and of expectation. The stressor comprised brief auditory tone presented and subjects' "Failure" in terminating them.

The aspects selected as dependent variables were those of skin conductance recovery time to the stimuli, subjective mood following the stressor, direction of attributions for outcomes of the task, and differences in these attributions for "success" and "failure" outcomes.
Introduction

It is open to discussion as to whether findings of stress-simulation studies in the laboratory can be generalised to real-life stress situations. Field-work studies generally suffer from the problems of using retrospective approaches to pre-stress or pre-illness conditions and characteristics. Laboratory studies on the other hand may suffer from the artificiality of the stressor, from its lack of application to more molar stresses and from unrepresentative sample populations.

Given that much behaviour in micro-situations may be itself of intrinsic interest, it was thought appropriate at least initially, to adopt an approach to laboratory work which was largely observational and speculative, rather than formally hypothesized. If the observations should themselves prove of interest, or if the findings are in the general direction of the speculations, then more explicitly hypothesised follow-up work or extension to field-work might be appropriate.

It was proposed therefore in this study to examine individual differences in response to a laboratory stressor. The dimensions chosen for examination were those of attribution of control and of hostility and its direction. The stressor comprised brief aversive noise stimuli and subjects' "failure" in terminating them.

The aspects selected as dependent variables were those of:- skin conductance recovery time to the stimuli, subjective mood following the stressor, direction of attributions for outcomes of the task, and differences in these attributions for "success" and "failure" outcomes.
Investigation will be made of whether individuals vary in the prevalence of negative mood state after a post-stress "recovery" period has been allowed. It might be surmised that those who attribute outcomes of the task to external factors would experience more anxiety or depression, (Feather, 1967; Prociuk et al., 1976). The relationship between high hostility, high intropunitiveness or extrapunitiveness and stress responsiveness (such as reflected in depressed mood even in a normal sample), will be examined to investigate whether individuals high on these dimensions utilize a post-stress recovery period less well to regain "equilibrium".

Skin-conductance measures may be of interest as Edelberg (1972) has proposed that slow recovery of the electrodermal response denotes a defensive reaction to a noxious stimulus or to threat, while shorter recovery limbs may indicate greater task-orientation.

It is therefore predicted here that mean recovery times following "successful" termination of an aversive noise will be shorter than those following failure to terminate it. In view of Edelberg's findings of slow recovery following an "activating" but non goal-oriented stressor, it is also predicted that a noxious tone passively received as indicating relative failure in noise-aversion will elicit longer recovery times than a previous unsuccessfully-averted task stimulus-tone.
As Edelberg has proposed that differences in recovery time are consistent within individuals, and as external locus of control, high hostility and extreme scores on direction of hostility are hypothesized here as potentially maladaptive, high scores on these measures will be examined for possible associations with slower recovery times.

A motivating task where "success" is pre-determined gives the opportunity to examine the effect of "failure" as potentially threatening, in association with these individual differences. Those with their belief in personal control lowered by experimental manipulation may be more adversely affected by aversive events (Geer et al., 1970). Here it is suggested that those with low pre-existing perceptions of personal control (Externality) may demonstrate greater threat and lower goal-orientation by longer recovery limbs, particularly as they fail to control the aversive stimuli.

As hostility cannot be clearly equated with aggression, there are no clear predictors of accompanying physiological behaviour.

Depressed patients may show overall lowered skin-conductance reactivity (Lader, 1975) and depressed patients or individuals have been asserted to be intropunitive (Foulds and Mayo, 1967; Mayo, 1969), or more rarely extrapunitive (Bullock et al., 1972).

It is speculated here that normal subjects with extreme scores on overall Hostility and on Direction of Hostility might be "inappropriately" aroused by a minor stressor as reflected in longer recovery limbs and that this may be accentuated under increasing "failure".
Where attributions are concerned, it has been suggested that only "failure" situations differentiate the attributions of externals, who blame external sources more than internals (Efran, 1964; Phares, 1971; Davis and Davis, 1972).

Attributions for outcomes will be measured here, and it is predicted that externals will make less overall attributions towards self. It will be a matter of observation as to whether any such tendency increases with "failure", or whether attitudes are "unrealistic" in attributing success to self and "failure" to others.

It could be expected that on the direction of hostility dimension extrapunitives would make more overall attributions for outcomes in the direction of "other", and intro-punitives more in the direction of "self”. It is suggested that any such tendencies might be accentuated under "failure" conditions.

There are no clear predictions for those high on overall hostility, and the direction of their attributions will be a matter of observation. Similarly, whether attributions change according to conditions of success or failure will be the subject of observation in those high on hostility.

Design

Subjects were selected from those who had taken part in the previous habituation session, so that they were acclimatised to the laboratory setting.

Recording sessions were arranged during the mornings, and the subjects were previously instructed to avoid excessive alcohol, drugs or too little sleep the previous
night, and to abstain from caffeine, a heavy breakfast or smoking on the morning of the experiment.

Subjects were brought into the laboratory half an hour before the recording session, during which time they completed questionnaires. A stimulus tape had been prepared containing mildly aversive bursts of noise. Subjects relaxed in an easy chair wearing headphones, while their skin conductance was recorded. They were given a pair of response keys, with instructions that selection of the correct key for each tone would have the effect of terminating the noises they were to hear. They were given a response sheet on which they were asked to indicate whether or not they succeeded in the task after each tone. They were also asked to indicate the extent to which they felt their success or failure was due to themselves or not after each tone, on a visual analogue scale.

Control of the noise was actually determined by the experimenter in a pre-determined sequence, allowing all subjects to "succeed" in only 2 instances. The use of an adjoining laboratory to separate the recording and control equipment from the subject's room made this possible. The subjects were instructed that after the stimuli comprising the task were delivered, they would hear a final tone whose volume would be matched to their relative success on the task, being louder the less "successful" they were. This tone had also been previously determined to be slightly louder than the stimulus tones for all subjects, to imply relative "failure". The stimulus period was preceded and followed by a quiet period.
Immediately after the end of the experiment, a mood check list was completed by all subjects. A check was made of whether any subject had suspected that they were not always in control of the stimuli. All were then informed about the actual control of the stimuli by the experimenter.

Method

Of the male subjects previously habituated to the laboratory, 23 were available to take part. On arrival at the laboratory, they were asked to wash their hands. Electrodes were attached to the first and second fingers of the non-dominant hand, so that use of the dominant hand for responding was not interfered with.

Matched silver/silver chloride Beckman electrodes were used, 1 cm² in diameter, with 0.5% KCL as the external electrolyte.

The electrodes were plugged into the connecting-post on the chair, to record on the Grass 7D polygraph in the adjoining laboratory. Attachment of these prior to starting the experimental session enabled the subject to habituate to the effect of the electrode placements.

During the ensuing half hour, correct recording of the equipment was checked by the experimenter, while the subject was asked to sit quietly and complete questionnaires including further completions of the Locus of Control scale and the Hostility and Direction of Hostility Questionnaire (HDHQ).
The experimental room was illuminated by subdued daylight, with the subject's chair facing away from the window to avoid outside distractions, a lamp being provided near the response keys where necessary. Temperature in the room was maintained at approximately 21-24°C.

Subjects remained in the easy chair for the experiment itself. On a low table alongside were placed 2 response keys and a duplicated response sheet.

Instructions for the experiment

Instructions were then given to the subject as follows:

"You are asked simply to relax as much as possible for the first part of the experiment, for approximately 10 minutes. You will be wearing light-weight headphones, and you will then hear some noises. There will be 2 noises at first, a medium-volume tone which will rouse you if you have become drowsy, (A), and then a loud one about 30 seconds later, (B). Each will last 2 seconds. You are not required to do anything about these 2, but they will warn you that some tones will be following that you do have to respond to. The second tone (B) is of the same volume as those that are to follow; however the following ones will last longer, for 5 as opposed to 2 seconds. You will have an idea therefore of what is to follow, and you may find them rather unpleasantly loud. Your task will consist of trying to turn them off. 9 tones will then follow after 45 seconds. There are 2 control keys beside your chair. In order to terminate the noise you must select the right key and press it, and you must also respond sufficiently quickly. I am not able to tell you what the criterion for
the reaction time is. You will know whether or not you have succeeded for each tone. If you have, the noise will stop when you press the key, and you should keep it pressed down for the duration of the 5 seconds to keep it off. If you have not, that tone will continue for the 5 seconds. You may make only 1 choice for each tone, and may not make a second choice if unsuccessful. You may operate one strategy throughout, or change strategies as you proceed, but I am not able to give you any clues as to the successful strategy.

Also by your chair is a response sheet, which you will see is numbered 1 to 9. After each tone, please tick in the appropriate box whether or not you succeeded in terminating the noise on that occasion. Also, on the given line, please indicate with a mark the extent to which you feel your success or failure on that occasion was due to you or not.

The intervals between the tones will be 30 seconds. During this time you have to tick one of the boxes, mark the line below it, and decide your choice of key for the next response, so you will need to respond fairly quickly in those intervals also. You will know you have had all the 9 tones when you have got to the end of the sheet. After this, there will be no more to respond to. You will however hear one final tone, (C). The volume of this will be matched to your performance on the task, and will be softer if you have been relatively successful, and louder if you have been relatively unsuccessful. After this there will be no more noises, and you are asked to simply relax.
again as much as possible for the remainder of the time, which will be approximately 10 minutes. Please keep the hand with the electrodes on as still as possible while using your other hand to make the responses. You will be told when the experiment is over. If you should find the noise too unpleasant you can always remove the headphones and discontinue the experiment. I hope that you will not, but I also hope that you will find it sufficiently unpleasant to be motivated to succeed in the task".

Subjects were then asked if they had understood the instructions, which were repeated again, and any queries answered.

They were asked to make sure that the response keys were in the most accessible position, so that they could respond without needing to move except for the dominant hand. The response sheet was positioned on the same low table beside the keys, so that it was also easily reached. They were asked to position the hand with the electrodes as comfortably as possible, and a pillow on their lap was provided for those that preferred it. Having confirmed that the subject was comfortable and had fully understood the instructions, the experimenter left the room. The tape-recorder was switched on in the adjoining laboratory, providing the mild background noise for the subject during the relaxation period.

The noise stimuli were synchronized to commence after 10 minutes.

The stimulus tape

Intensity of the first tone (A), was 70 db. The second tone (B) and the following 10 tones were 95 db and the final
tone 100 db. The frequency was 1 Khz in all cases.
The first 2 stimuli (A and B) lasted 2 seconds, and the
remainder 5 seconds.
Inter-stimulus intervals were:
30 seconds between the 1st 2 stimuli
45 seconds after the 2nd stimulus
30 seconds between the remaining response tones
45 seconds between the 2 final stimuli.

Control of the stimuli

The volume of the stimuli was adjusted manually by the
experimenter during the task. The control switch for
toning the noise on or off was also operated by the
experimenter during the task. For stimuli nos. 2 and 5
of the 9 'Response' tones, control of the noise remained
operational from (either of) the subject's response keys.
For the remaining stimuli, the experimenter operated the
control switch, rendering both the subject's control keys
ineffectual, and determining continuation of the noise
stimuli.

Thus all subjects 'succeeded' in terminating the noise
for the response stimuli nos. 2 and 5, and 'failed' to
terminate it for all the remaining tones.

A trigger-box operated the event-marker on the poly-
taken to recover (4, RT) following the recommendations of
stimuli thus being synchronized for subsequent measurement
of the responses.

Scoring

The recovery limbs of these skin-conductance responses to
the stimuli that were measurable were scored for half time
The raw scores of these and the questionnaire scores
are given in the appendix.

At the end of the second relaxation period, the
experimenter then entered the subject's room and told him
that the experiment was finished and that he could remove
the headphones. He was immediately asked to complete a
Subjects were asked before leaving not to divulge the nature of the experiment to others. They were questioned to ascertain that they believed their response keys to be operational throughout, and that they had fully participated in the task. They were then told about the actual control of the stimuli by the experimenter.

Results

(a) GROUP FINDINGS

Of the 23 subjects, one found the noise sufficiently unpleasant to discontinue the experiment.

When the subjects were questioned afterwards to check whether they had been aware that control of the stimuli was determined by the experimenter, two subjects had surmised this might be so, and their records were not included in the results.

Scoring

Scores of the remaining 20 subjects were analysed. The recovery limbs of those skin-conductance responses to the stimuli that were measurable were scored for half time taken to recover ($\frac{1}{2} RT$) following the recommendations of Edelberg (1970).

The raw scores of these and the questionnaire scores are given in the appendix.

The results will be presented under sub-headings.
Table 1
Mean half-time skin-conductance (\(\bar{x}_{1/2}\) RT) for the group on those responses that were measurable.

<table>
<thead>
<tr>
<th></th>
<th>(\bar{x}_{1/2}) RT</th>
<th>n</th>
<th>outcome*</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Warning&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tones</td>
<td>A         8.25</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B         6.46</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>&quot;Stimulus&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tones</td>
<td>1         4.01</td>
<td>8</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>2         2.73</td>
<td>9</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>3         3.56</td>
<td>11</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>4         3.66</td>
<td>13</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>5         3.32</td>
<td>12</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>6         4.36</td>
<td>11</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>7         4.04</td>
<td>14</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>8         3.35</td>
<td>12</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>9         3.02</td>
<td>11</td>
<td>F</td>
</tr>
<tr>
<td>&quot;Punishing&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tone</td>
<td>C         4.00</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

* S indicates "success" response
F indicates "failure" response
Half-time Recovery

Scores on those responses that were measurable are shown in Table 1 and Figure 1. For the first two "warning" tones (A and B), half-time recovery was only measurable for two and three individuals' responses respectively, and these readings are not subject to analysis.

The mean group recovery times are significantly shorter for the mean of the two "success" responses than for the mean of the "failure" responses, as predicted (Table 2 and Table 3(a) (t = 3.38, p < .002, 1-tailed), responses being measurable for 14 of the 20 subjects.

Table 2
Mean half-time skin-conductance recovery for the group and means for the "success" and the "failure" responses.

<table>
<thead>
<tr>
<th></th>
<th>$\bar{x}$ RT</th>
<th>$\bar{x}_{1/2}$ RT (failure)</th>
<th>$\bar{x}_{1/2}$ RT (success)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.09</td>
<td>4.15</td>
<td>3.27</td>
</tr>
<tr>
<td>N</td>
<td>19</td>
<td>18</td>
<td>14</td>
</tr>
</tbody>
</table>

Mean recovery times were significantly longer after the final "punishing" tone (C) than after the last response tone (9). (Figure 1 and Table 3(b), t = 2.0, p < .05, 1-tailed) but responses on this were only measurable for 8 subjects.

Mean recovery times for the four final "failure" responses were observed to lengthen following the second "success" response (stimulus 5), and then to shorten progressively, (stimuli 6, 7, 8 and 9) (Table 1 and Figure 1). The number of responses that could be measured to provide this information varied between 11 and 14.
Figure 1.
Mean group skin-conductance recovery rates ($k_{RT}$) for the
nine stimulus-responses and the final "punishing" tone.

3(a) Differences between mean half-time recovery
for the "success" and the "failure" responses.

<table>
<thead>
<tr>
<th>Stimuli</th>
<th>X</th>
<th>S.D.</th>
<th>t</th>
<th>N</th>
<th>P (1-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;success&quot;</td>
<td>4.27</td>
<td>2.13</td>
<td>4.35</td>
<td>6</td>
<td>0.008</td>
</tr>
<tr>
<td>&quot;failure&quot;</td>
<td>3.76</td>
<td>1.02</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No. of measurable responses: n = 8 9 11 13 12 11 14 12 11 13

S indicates the "success" responses
F indicates the "failure" responses
Table 3

T-tests performed on the mean skin-conductance half recovery times of those whose scores were available for comparison

3(a) Differences between mean half-time recovery for the "success" and the "failure" responses

<table>
<thead>
<tr>
<th></th>
<th>$\bar{x}$</th>
<th>s.d.</th>
<th>t</th>
<th>N</th>
<th>p (1-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;success&quot;</td>
<td>3.27</td>
<td>1.12</td>
<td>3.38</td>
<td>14</td>
<td>&lt;.002</td>
</tr>
<tr>
<td>&quot;failure&quot;</td>
<td>3.76</td>
<td>1.02</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3(b) Differences in half-time recovery between the last response tone (9) and the "punishing" tone (C)

<table>
<thead>
<tr>
<th></th>
<th>$\bar{x}$</th>
<th>s.d.</th>
<th>t</th>
<th>N</th>
<th>p (1-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tone 9</td>
<td>3.12</td>
<td>.67</td>
<td>2.0</td>
<td>8</td>
<td>&lt;.04</td>
</tr>
<tr>
<td>Tone C</td>
<td>4.38</td>
<td>2.13</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Questionnaire Findings

Raw scores on the questionnaires are given in the Appendix.

*Mean scores for the group were:

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th>s.d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locus of Control</td>
<td>12.35</td>
<td>3.03</td>
</tr>
<tr>
<td>Hostility</td>
<td>14.55</td>
<td>5.96</td>
</tr>
<tr>
<td>Direction of Hostility</td>
<td>-1.9</td>
<td>5.93</td>
</tr>
</tbody>
</table>

Association between the Direction of Hostility and Locus of Control Scores

A non-parametric correlation (Rho) was again performed between the two measures and this proved to be non-significant, 

\[ R = .10, p < .64, \text{ 2-tailed, Table 4} \]

Table 4

Non-parametric (Spearman) correlations between the 3 Questionnaire measures, for the sample (all 2-tailed),

\[ n = 20 \]

<table>
<thead>
<tr>
<th></th>
<th>Locus of Control</th>
<th>Hostility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostility</td>
<td>R = .09 (p &lt; .68)</td>
<td></td>
</tr>
<tr>
<td>Direction of Hostility</td>
<td>R = .10 (p &lt; .64)</td>
<td>R = .21 (p &lt; .36)</td>
</tr>
</tbody>
</table>

These 20 subjects were of course among the 27 tested in the previous session, who provided fresh scores on the scales.)
The Attribution results

The range of scoring for these was from 0 (indicating all attributions to self), to 9 (indicating all attributions to other).

Raw scores are shown in the Appendix.

The mean group scores were:

\[
\begin{array}{ccc}
\bar{x} & \bar{x} & \bar{x} \\
5.36 & 4.65 & 5.57 \\
\end{array}
\]

Overall causation was thus slightly attributed in the direction of "other", the "failure" responses appearing to account mainly for this. The means for the 2 "success" responses were lower than for any of the "failure" responses individually (Table 5) (i.e. directed more towards "self").

Table 5

Mean group attribution scores for the nine task outcomes

<table>
<thead>
<tr>
<th>Responses</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome</td>
<td>F</td>
<td>S</td>
<td>F</td>
<td>F</td>
<td>S</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>Attribution Score</td>
<td>6</td>
<td>4.81</td>
<td>5.17</td>
<td>5.35</td>
<td>4.92</td>
<td>5.6</td>
<td>5.5</td>
<td>5.52</td>
<td>5.52</td>
</tr>
</tbody>
</table>

F indicates "failure" response
S indicates "success" response

The difference between the "success" and "failure" responses, using a related t-test was not significant (t = 1.94, Table 6). As no predictions were made concerning the group responses, a two-tailed test was used. The means of the four final "failure" attributions were observed to remain almost constant, (Stimuli 6 to 9, Table 5).
Table 6

<table>
<thead>
<tr>
<th>Attributions</th>
<th>X</th>
<th>s.d.</th>
<th>t</th>
<th>n</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;success&quot;</td>
<td>4.65</td>
<td>3.00</td>
<td>1.94</td>
<td>20</td>
<td>.068</td>
</tr>
<tr>
<td>&quot;failure&quot;</td>
<td>5.57</td>
<td>2.68</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Mood Scores

The mood check list is scored on a scale from 0 to 3 on each adjective contributing to the mood score, scores on the adjectives being summed. Raw scores on depression and anxiety are given in the Appendix. The mean group scores were:

<table>
<thead>
<tr>
<th>Anxiety</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>x = 0.85</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Most subjects scored 0 on these measures.

(b) RESULTS - INDIVIDUAL DIFFERENCES

The Questionnaire measures and half-time recovery

Spearman non-parametric correlations performed on the external locus of control scores showed low positive association with longer mean recovery times and with mean recovery times on the "success" responses. These correlations however did not reach significance level. Contrary to prediction, there was no association between externality and longer recovery times for the "failure" responses (Table 7).
High scores on hostility were positively associated with longer mean recovery times as predicted ($R = .34$, Table 7), although this just failed to reach significance. High scores were also positively (but non-significantly) associated with longer recovery times for the "success" responses, while the strongest association was with longer recovery times for the "failure" responses. As predicted, this correlation reaching significance ($R = .39$, $p < .05$, Table 7).

Direction of hostility (Intropunitiveness) was not associated with longer recovery times for the failure responses, and positive associations with longer mean recovery time and longer recovery for the "success" responses were low and non-significant (Table 7).

It would seem that the general trend is for the associations between high scores on the questionnaires and longer recovery times to be positive, in line with the predictions, but (apart from high hostility) most of the associations are too low to reach significance level.

### Table 7

<table>
<thead>
<tr>
<th>Locus of Control (externality)</th>
<th>$\bar{x}$</th>
<th>$\bar{x}$ (&quot;success&quot;)</th>
<th>$\bar{x}$ (&quot;failure&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n = 19)</td>
<td>.24</td>
<td>.36</td>
<td>.09</td>
</tr>
<tr>
<td>Hostility (high)</td>
<td>.34</td>
<td>.29</td>
<td>.39*</td>
</tr>
<tr>
<td>Direction of Hostility (Intropunitiveness)</td>
<td>.18</td>
<td>.19</td>
<td>.07</td>
</tr>
</tbody>
</table>

* $p < .05$
The Questionnaire scores in association with the Attribution data
Non-parametric correlations showed that Locus of Control was not associated with the mean attribution scores nor attribution scores for "failure", nor for "success", (Table 8), these predictions not being fulfilled. High Hostility was positively associated with mean external attribution scores only at a very low level, (Table 8). No definite predictions had been made concerning this. Positive associations between hostility and external attributions for "failure" responses were negligible, while those with longer recovery for the "success" responses were stronger, but still non-significant (R = .34, Table 8).
Intropunitive's made more mean internal attributions as predicted, although this association did not reach significance (R = -.26, Table 8). There was no association for the "success" responses, but the association was higher for the "failure" ones, as predicted, although this just failed to reach significance (R = -.36, Table 8).

Table 8
Spearman non-parametric correlations between the Questionnaire scores, the mean attributions, and the mean attributions for "success" and "failure" responses

<table>
<thead>
<tr>
<th></th>
<th>Attributions</th>
<th>X &quot;success&quot;</th>
<th>X &quot;failure&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locus of Control</td>
<td>.13</td>
<td>-.12</td>
<td>.13</td>
</tr>
<tr>
<td>Hostility</td>
<td>.19</td>
<td>.34</td>
<td>.15</td>
</tr>
<tr>
<td>Direction of Hostility</td>
<td>-.26</td>
<td>.01</td>
<td>-.36</td>
</tr>
</tbody>
</table>

(all n.s.)
The general lack of association between locus of control and each attribution response can be seen in Table 9.

When examining the three questionnaire measures in association with each occasion of attribution separately, a slight patterning emerges which might be suggestive.

When observing the associations between hostility and the attributions, the "other-directedness" of the latter can be seen to fall to near zero over the sequence of the four final "failure" responses (Stimuli 6 to 9, Table 9).

When examining the Direction of Hostility correlations, the predominantly inner-directedness of the attributions in intropunitive ness can be seen to increase over the four final "failure" responses, (Table 9).

The Questionnaire scores in association with the ratings of depressed mood

As most subjects indicated scores of zero on the mood measures, correlational analyses of these was not appropriate. The mood ratings were dichotomised into those who scored zero, and those who indicated a score of 1 or more on these measures. These scores were examined in association with the questionnaire scores divided at the median, using Fisher's Exact Tests. The anxiety scores were unrelated to high or low scores on all three questionnaire measures.

More subjects with high Direction of Hostility (Intro-punitive) scores indicated positive depression ratings (of one or over), but this difference was not significant, (Figure 12). Locus of Control and Hostility scores did not differentiate those with positive depression ratings.
Table 9

Spearman non-parametric correlations between the Questionnaire measures and each attribution score.
(The attribution measure is scored in the direction of "other")

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Attribution Response No.</th>
<th>Locus of Control</th>
<th>Hostility</th>
<th>Direction of Hostility</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>1</td>
<td>.22</td>
<td>.12</td>
<td>-.31</td>
</tr>
<tr>
<td>S</td>
<td>2</td>
<td>-.11</td>
<td>.26</td>
<td>.08</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
<td>.27</td>
<td>.14</td>
<td>-.10</td>
</tr>
<tr>
<td>F</td>
<td>4</td>
<td>.20</td>
<td>.18</td>
<td>-.24</td>
</tr>
<tr>
<td>S</td>
<td>5</td>
<td>-.08</td>
<td>.34</td>
<td>-.08</td>
</tr>
<tr>
<td>F</td>
<td>6</td>
<td>.03</td>
<td>.45&lt;sup&gt;+&lt;/sup&gt;</td>
<td>-.32</td>
</tr>
<tr>
<td>F</td>
<td>7</td>
<td>.07</td>
<td>.32</td>
<td>-.44&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td>F</td>
<td>8</td>
<td>.20</td>
<td>.15</td>
<td>-.38&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>F</td>
<td>9</td>
<td>.15</td>
<td>.02</td>
<td>-.45&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*<sup>p</sup> < .05, 1-tailed

**<sup>p</sup> < .02, 1-tailed

<sup>+</sup><sup>p</sup> < .05, 2-tailed

F indicates "failure" response

S indicates "success" response
Figure 2.

Results of Fisher's Exact Tests performed on Depression scores

<table>
<thead>
<tr>
<th>Direction of Hostility</th>
<th>Mean ( \bar{b}_\text{RT} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>High Depression</td>
<td>5</td>
</tr>
<tr>
<td>Low Depression</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

\( p < .07 \) (1-tailed)

<table>
<thead>
<tr>
<th>Mean Attributions</th>
<th>&quot;Success&quot; Attributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>High (Other)</td>
<td>Low (Self)</td>
</tr>
<tr>
<td>High Depression</td>
<td>1</td>
</tr>
<tr>
<td>Low Depression</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

\( p < .14 \) (2-tailed)

<table>
<thead>
<tr>
<th>&quot;Failure&quot; Attributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>High (Other)</td>
</tr>
<tr>
<td>High Depression</td>
</tr>
<tr>
<td>Low Depression</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

\( p < .14 \) (2-tailed)
Associations between the remaining variables

When the anxiety scores were dichotomised, they showed no associations with any of the recovery-time measures.

When the depression scores were similarly treated, more of those subjects with longer mean recovery times indicated depression scores of 1 or over, but this finding failed to reach significance ($p < .09$, Figure 2). No associations were found between recovery times for the "success" and "failure" responses, and anxiety and depression scores.

Anxiety scores were not associated with any of the attribution measures.

More of those subjects who indicated depression scores of 1 or over had given greater mean attributions towards self and greater attributions towards self in the "success" and "failure" conditions, although this was only significant for the "success" conditions ($p < .04$, 2-tailed, Figure 2).

There were no significant correlations between mean recovery times and mean attribution scores, nor when these were analysed for the "success" and "failure" responses separately (Table 10). Locus of Control scores were not related to those of Hostility. (Table 4).
Table 10
Spearman inter-correlations between the recovery time measures, attributions and mood scores.

<table>
<thead>
<tr>
<th>Recovery Time</th>
<th>Attributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\bar{x}_{RT}$, $\bar{x}_S$, $\bar{x}_F$</td>
<td>$\bar{x}$, $\bar{x}_S$, $\bar{x}_F$</td>
</tr>
</tbody>
</table>

Recovery Time

<table>
<thead>
<tr>
<th></th>
<th>$\bar{x}$</th>
<th>$\bar{x}_S$</th>
<th>$\bar{x}_F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\bar{x}$</td>
<td>.79**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\bar{x}_S$</td>
<td>.92**</td>
<td>.83**</td>
<td></td>
</tr>
</tbody>
</table>

Attributions

<table>
<thead>
<tr>
<th></th>
<th>$\bar{x}$</th>
<th>$\bar{x}_S$</th>
<th>$\bar{x}_F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\bar{x}$</td>
<td>-.20</td>
<td>-.18</td>
<td>-.01</td>
</tr>
<tr>
<td>$\bar{x}_S$</td>
<td>-.10</td>
<td>-.14</td>
<td>.07</td>
</tr>
<tr>
<td>$\bar{x}_F$</td>
<td>-.22</td>
<td>-.09</td>
<td>-.03</td>
</tr>
</tbody>
</table>

* $p < .01$ (2-tailed)

** $p < .002$ (2-tailed)
Discussion

It is advisable to consider first any factors which may cast doubt on placing confidence in the findings.

One subject found the noise too unpleasant to complete the experiment, whereas others when asked afterwards varied from finding it quite aversive to only mildly aversive, so individual differences in sensitivity to noise thresholds per se should perhaps be taken into account, and should possibly have been previously controlled for. The findings might reflect largely these differences in sensitivity thresholds as well as, or rather than the variables of interest.

It is not possible to be certain that the actual volumes were precisely as specified due to shortcomings in the metering equipment.

Lack of credibility in the task does not seem to have been a factor. Those two subjects who were not convinced of their control of the stimuli were excluded from the analysis, and the remaining subjects appeared from subsequent questioning to have been convinced of their own effectiveness, and to have been motivated to participate fully in the experiment.

The lack of scorable records of recovery time for all subjects on all occasions indicates one of the problems with the measurement of skin conductance activity. The findings need to be treated with some caution therefore, as they do not represent scores of the whole group.
It was hypothesized following Edelberg's (1972) argument that half-time recovery would be slower following noxious stimuli or threat, that group mean skin conductance recovery times should be longer after "failure" than "success" responses, and longer after the final "punishing" tone than after the preceding task stimulus tone. These predictions were supported, although some caveats should be observed.

The primary interest had been in examining responses in a preponderantly "failure" situation. For this reason, only 2 "success" responses were included, which were considered just sufficient to allow credibility in the subjects' assumed control. Whereas this appeared to have succeeded in most cases, a comparison between 2 "success" responses and 7 "failure" ones may not be considered to be well-balanced.

It can be observed (Fig. 1) that mean recovery times are shorter after each "success" response than for the previous "failure" response, and that they lengthen again for each "failure" response following a "success" one.

The findings however do not contribute to clarifying what the recovery time may be measuring. It would be of most interest if it could be shown that longer recovery was elicited specifically to "threat". Here outcome of "failure" was also accompanied by a lengthened noise-stimulus, and the longer recovery times could be as much a reflection of the more noxious nature of this and of its increased duration (5 seconds).
The same considerations apply to the final tone where the lengthened recoveries might reflect the increased volume rather than, or as well as the "threatening" nature of the stimulus.

Whereas no specific predictions were made concerning the sequence of the four final "failure" responses, it might be presumed that, as the noise-stimulus remained the same in each case but the situation could be viewed as increasingly "threatening" (both in terms of increased "failure", and therefore in view of the "punishing" tone to come) that a lengthening of recovery limbs over this sequence would be a clearer indication of "threat". If however they shortened, this might be a reflection of increasing task-orientation to combat failure. Here the recoveries progressively shorten over this sequence (Fig. 1).

For these four final "failure" responses, the number of records that could be analysed for recovery time ranged from eleven to fourteen, i.e. those of only just over half the group on some of the responses, a consideration which should be borne in mind when attempting an interpretation.

Whereas it cannot be firmly substantiated, the author leans towards the view that these recovery times which progressively shorten do reflect increasing task motivation on the part of the subject. The fact that the subjects were undergraduates who all appeared to enjoy the challenge of trying to find the correct strategy argues in favour of this.

Further exploration of this would probably require a design employing success and failure conditions involving both active and passive responding.
Within the limitations that have been mentioned however, and given the uncertain "state of the market" concerning the meaning of the recovery limb, reports of individual differences within this may be useful.

When considering individual differences in the half recovery measure, interpretation of the statistical results might vary. Correlations between longer recovery times and high scores on the three questionnaire measures are positive in all cases; however, the correlations are low and non-significant. The predictions that "failure" outcomes would elicit longer recovery times for the high scorers was supported only for those high on hostility, (this dimension appearing to be the most promising also concerning longer overall mean recovery times). For both high locus of control and for introjective subjects the findings of the "failure" responses were in the opposite direction, these recovery times being shorter than for the "success" responses.

The design had not comprised the selection of high and low scorers on the questionnaire measures. Had a large group of potential subjects been screened on these measures, and then selected for their extreme scores, comparisons of these on the dependent variables might have been more impressive.

One approach that could have been made to investigating individual differences, and which could still be pursued, is to view the psychophysiological measures themselves as the differences of interest, and to pursue a search for "physiological style". As well as larger subject numbers this would require at the least participation by the same subjects.
in repeated procedures to investigate the individual consistencies suggested by Edelberg (1972) and Bull and Gale (1971).

The attribution measure is not considered to have been a very satisfactory index of the subjects' actual attributions for each outcome. It could be supposed that the outcomes should all have been attributed to chance (not self), rather than to a theoretical mean on the scale, as even had there been a strategy which could have succeeded, it would have been a matter of chance had the subject lighted on the successful strategy. It would appear from the data that some (7) of the subjects adopted this philosophical overview, indicating attributions to "other" throughout, while others made attributions totally to self throughout.

It could also be supposed that to attribute failure outwards and success to self would in fact be realistic rather than "unrealistic" as originally proposed - in other words it might be reasonable to attribute success to self when a strategy appeared to have paid off, and failure outwards when it did not - i.e. to attribute this to the vagaries of luck.

It would have been preferable to question subjects afterwards as to why they made their attributions, especially those made entirely to self or entirely to other. These apparently pre-determined views may or may not have affected the usefulness of the measure.

It seems advisable not to place too much reliance on this data, as only a proportion of the sample did not stick to one direction of attribution. Thus whereas it may be of
passing interest that the sample's mean attributions were directed more towards themselves under "success" conditions and outwards under "failure", these mean scores may not reflect a true overall picture of subjects' actual apprehensions of the outcomes. This would also apply to the observation that the attributions did not become increasingly inner or outer-directed over the final "failure" sequence (Table 5).

It might have been expected however that external locus of control subjects would have had higher overall externally directed attributions, and particularly under "failure" conditions. Although the results showed a slight tendency to go in this direction, the findings were far short of statistical significance, and it might be appropriate to query the sensitivity of one or both of the measures. The change that can be observed (Table 9) of negligible negative (inner-directed) attributions only for the 2 "success" responses, (the remaining "failure" responses all being positive or outer-directed) is probably too slight to be important.

The findings might seem a little more encouraging for the hostility dimension, although the other-directedness of the attributions occurred more under the "success" conditions than under the predicted "failure" conditions, and no adequate explanation of this can be given. Nor does there seem to be any adequate interpretation of why the attributions over the final "failure" series should gradually become less outer-directed (Table 9), unless external attributions seem more appropriate when the subject still has strategies to try, but internal ones when these have been tried without success.
If one were to attempt a highly speculative interpretation of this data at face-value, it might appear that the more hostile subjects were becoming increasingly less "confident" with repeated failure, and tending to accept the outcomes as less contingent on outside sources. If something to the above effect were happening in the micro-situation, might there be some pointer towards vulnerability to real-life stress in hostile individuals?

The attribution findings were a little more encouraging for the intropunitive dimension. As predicted, intropunitives did make attributions more towards self throughout, and particularly for failure outcomes. As opposed to the hostility findings, these attributions were most inner-directed over the final "failure" series (Table 9).

It would be interesting to know whether the reflections of hostility and intropunitive ness seen in attributions at this micro-level represent consistent modes of perceiving and handling other events. It may be worth comment that intropunitive ness, slightly associated here with high inner-directed attributions over the "failure" series was also associated with depressed mood following the task, even though these associations did not reach statistical levels of significance.

The mood scale was a relatively crude and insensitive measure. As well as the statistical problems of handling a large number of zero scores, another shortcoming was that mood was not measured before as well as after the task (although this had proved equally problematical in the previous session).
The task was likely to have involved the subjects' full attention at the time, and might have been reflected in measures taken immediately afterwards (particularly after the "failure" and "punishment" responses). However, such transitory mood might have dissipated after the relaxation period, and might by then have reflected factors other than those of the preceding task. The subjects might have had time to dissipate any negative mood and to transfer their attention to forthcoming events, in which case boredom, irritation or pleasurable anticipation etc., might be experienced due to the relaxation period, or to immediate future rather than past events.

Alternatively, it would be possible to interpret mood measures taken when a relaxation ("recovery") period had followed a minor stressor as being indicative of individual difficulties in gaining equilibrium. However it is also possible that mood did not change before and after the task, and that where depressed mood was indicated, those subjects were already depressed.

Conclusions

One of the intentions of the investigation was to observe whether any patterns of responding could be observed in a normal sample in a micro-stress situation which might be fruitful for following up in other situations, and especially to test predictions of the questionnaire measures of individual differences.
The investigation suffered from the common shortcomings of laboratory studies: a "normal" sample composed only of male college students, small subject numbers and therefore a limited range of scores on the psychometric scales, whereas extreme scorers on these would most adequately test the hypotheses. Added to this are the doubts as to whether a laboratory stressor reflects even at a low level the characteristics of real-life demands and stresses, the acknowledged "soft" nature of psychometrics as investigative tools and the equally problematic nature of psychophysiological measures, with their problems of missing data; also uncertainty as to whether the physiological responses are occurring in response to the presumed stressor or to other aspects of the total situation.

The author has another reservation concerning the use of task procedures designed to deceive the subject. Whereas none of these subjects expressed disapproval when disabused concerning the true control of the experimental stimuli, such manipulations are likely to prejudice subjects against participating on future occasions and make it difficult to obtain genuine responses from them.

Although no firm conclusions can be made on the basis of the present data, the author leans towards looking for findings that may be suggestive, rather than taking statistical significance as the sole criterion.

In this respect, it is suggested that aspects worth pursuing may be found among the following summarised constellations of related aspects:
Although the correlations were low and non-significant, high scorers on all three questionnaire measures tended to have longer mean skin-conductance recovery times; although the results were not significant, more of those who had longer mean skin-conductance recovery times indicated some depressed mood following the task; those who indicated depressed mood tended to make more attributions for outcomes to self in all conditions; more of those who scored highly on intropunitiveness indicated depressed mood.

To pursue differences between the measures of individual differences, intropunitive subjects' attributions tended to be directed towards themselves, and those of the most hostile directed outwards.

It is suggested that the psychometric dimensions are worth pursuing to follow up the tentative associations between high scores on these and post-stressor depressed mood, and also possibly the greater "threat" implied in the slightly longer recovery times.

It is also suggested that it might be valuable to pursue differences between high scorers on the three questionnaire measures, as differences in attributional style might be relevant for the handling of stress situations. The apparent dissociation between attribution of control and blame deserves follow-up with a larger sample, and the role of hostility and its direction may be particularly important.

As only males were tested here, a female sample would also need to be used for any findings to be more generally applicable, particularly if these were to be generalized to stress-response in the real-life situation or depression, where women appear to be more vulnerable.
Choices of further investigation would need to be made primarily between pursuing a series of laboratory explorations, and attempting to replicate and extend the current findings, ideally with the same sample initially, and then with a different population - or to test the individual differences in field work.

The former possibility would suffer from the inherent problems of laboratory studies already referred to, and of these perhaps the most disturbing is the uncertainty as to whether responses, especially psychophysiological ones are occurring in response to the presumed stressor or to unrelated aspects of the situations, as Gale (1973) has suggested.

The preference of the author leans towards some aspect of field work, with all its alternative attendant difficulties, where the "stressor" at least is real, an ideal methodology being to find some method of assessing individuals prior to onset of such stress.
Part III

Introduction

The previous research has suggested that there are inconsistencies in the way that some individuals perceive and attribute control of emotion of events, and blame or hostility concerning them.

It may be helpful at this point to depict possible variations in these "perceptual styles".

Internal  |  External
---|---
Internal (Introjective) | a  | b
Hostility  |  |  
External (Extrapjective) | c  | d

It can be seen that possible attributions could include those which are extreme in a consistent direction, e.g., external forces or others are seen as being in control of events and are blamed for them, as in style (d), or events are seen as being determined by the self, and the self is therefore blamed for them, style (a).

It is possible to speculate as to whether individuals holding either of these attitudes to an extreme degree might be particularly vulnerable in the face of life-stressors, and if so, which might be the more vulnerable - and further, whether the type of stress-reaction or illness predisposition might be different for both. For example, might type (a) be more vulnerable to depression and type (d) to cardiovascular disorder?
Introduction

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<table>
<thead>
<tr>
<th>Control</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal (Intropunitive)</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Hostility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External (Extrapunitive)</td>
<td>c</td>
<td>d</td>
</tr>
</tbody>
</table>

It can be seen that possible attributions could include those which are extreme in a consistent direction, e.g. external forces or others are seen as being in control of events and are blamed for them, as in style (d), or events are seen as being determined by the self, and the self is therefore blamed for them, style (a).

It is possible to speculate as to whether individuals holding either of these 2 attitudes to an extreme degree might be particularly vulnerable in the face of life-stresses, and if so, which might be the more vulnerable - and further, whether the type of stress-reaction or illness predisposition might be different for both. For example, might type (a) be more vulnerable to depression and type (d) to cardiovascular disorder?
It would also be possible to ask whether extreme views of internal determination and self-blame of type (a) would be more potentially maladaptive than, for instance, those of type (b), who would appear to blame themselves, despite seeing themselves as not being in control of what happens to them. Might not this "inconsistency" indicate a vulnerability factor where depression is concerned?

Interests in internalized hostility and in lack of control or learned helplessness have developed from widely-differing theoretical standpoints, and whereas both aspects have been invoked as relevant for the development of depression, they have not normally been pursued together, and the apparent discrepancy between them has only rarely been commented on. Much of the work invoking these attributes independently has been speculative or retrospective, due to the obvious problems of conducting prospective field-studies of stress-reactions or depression.

To speculate here it could be envisaged that those individuals with extreme scores in the categories depicted above would adopt differing coping mechanisms in everyday life and in the face of stressor events, and that those with extreme "consistent" attributions might differ from those with "inconsistent" attitudes, these styles possibly predisposing to differing patterns of illness or breakdown.

The choices of further investigations open to the author following the exploratory studies have already been referred to.

Having expressed a preference for field-work, the problem arises of how to assess individuals prior to a real-life stressor situation.
At this point, an opportunity presented itself to take part in field-work in an area which had already been tentatively considered. Following childbirth, a proportion of women are known to experience a depressive reaction which may vary from being mild and transitory to being disabblingly severe and long-lasting.

Whereas it may be an open question as to whether this syndrome should be considered a "stress" response, it is apparent that pregnancy, child-birth and early infant rearing comprise a constellation of potent life-events, whether the events are themselves considered to be positive or negative ones. It would appear to be important to query why such depression seems to afflict normal and previously well-functioning women.

A methodological advantage of such research is that the time-course and time of onset of the life-event can be specified beforehand, allowing for predictive work to be undertaken. Whereas any findings would only be applicable to the female population, and possibly only to the specific potential stressor of childbirth, this field of inquiry has the advantage of defining its own parameters as well as of having potential practical value.

The literature of post-natal depression will next be reviewed.
Post-Partum Depression

1. Introduction. Observations of post-partum disturbances.
   1.a The possible impact and importance of puerperal depression.
2. The issue of specificity of puerperal illness.
3. The incidence of puerperal disorders.
4. Distinctions within post-partum syndromes.
   4.a Post-partum psychosis.
   4.b "Maternity blues".
   4.c Criteria of puerperal depression.
4. Distinctions within post-partum syndromes.
5. Factors suggested as causative; overview.
   5.1 Biological factors.
   5.1a The role of obstetric complications and labour problems.
   5.1b The influence of parity.
   5.1c The influence of age.
   5.1d Hormonal factors and menstrual characteristics.
   5.1e The recurrence of puerperal depression.
6. Psychosocial factors.
   5.2a Wishedness of the pregnancy.
   5.2b Parental relationships.
   5.2c The marital relationship.
   5.2d Environmental factors, occupation, class, and the influence of roles.
   5.3 Personal characteristics of the mother.
   5.3a Anxiety.
   5.3b Neuroticism.
   5.3c Hostile attitudes.
   5.3d Other personal characteristics.
5.4 Characteristics of the infant.
5.5 The possible role of sleep factors.
6. Review of methodologies and criteria for assessing depression.
1. Introduction

Observations of Post-partum Disturbances

It is as well, when proposing to investigate post-partum depression, to establish the extent to which its existence as a phenomenon has been observed. It is pertinent therefore to enquire whether depression is seen to occur specifically after child-birth before proceeding to examine the possible contributory nature of the birth event, or any qualitative differences observed from those of depression occurring at other times.

Observations of depression post-partum have originated within the context of general mental disturbances seen at this time. Pitt (1968) comments: "It is common knowledge that women often get depressed after childbirth. Yet there has till recently, been little evaluation of this depression". Seager, in 1960, noted that puerperal insanity has been described for many centuries. Yamasots and Kinney (1976) mention speculations about emotional influences during pregnancy going back as far as the Hippocratic writings and the Vedas, dating to 400 to 500 B.C. Writing in the 1950s, Martin (1958) observes that mental illness is still a common condition after childbirth. An editorial in the Lancet (1969) states: "There is now good epidemiological evidence that child bearing is associated with an increased risk of severe mental illness, and that this cannot be explained away as a rebound phenomenon following exceptional well being during pregnancy."
The article asserts that childbirth provides the best (but not the only) systematic evidence that a period of stress is associated with an increased risk of developing a functional psychosis. Turnbull (1969) notes how puerperal mental illness has fascinated men for centuries.

Most of the surviving references refer to aspects such as mania and delirium, and the speculations as to causation were invariably of a physical nature, and frequently dramatic. Turnbull also quotes a reference to an 18th writer, Thomas Denham however, who considered that "the prudent and intelligent conduct of the attendants has undoubtedly in many cases contributed more to the recovery of the patient than the most powerful medicines". His appeal was for supportive talking to patients after delivery. Apart from this, most opinions leaned towards physical explanations of the phenomena until the 1920s, when the "psychodynamic" movement made itself felt.

It is of interest that Turnbull observed that until the invention of obstetrical forceps, management of pregnancy and the puerperium lay mainly in the hands of women. One view suggests that women have an increased vulnerability to "psychological decompensation" in the first 3 months, and particularly the first few weeks post-partum (Brown and Shereshefsky, 1972). As they note, this does not constitute an explanation, but rather requires one. They consider that we are not much closer to understanding the interaction between experience, physiology and psychopathology in the
post-partum period than when Hippocrates speculated on "lochial discharge carried towards the head".

Reactions to childbirth have been described as ranging from transient weepiness to full-blown psychosis, with an "intriguing variety" of reactions between these, duration being from a few days to over a year (Pitt, 1975). It has been suggested that "classical puerperal psychosis is but the tip of an ice-berg", and that between 20,000 and 100,000 women in England and Wales probably suffer from depression after childbirth (Grundy and Roberts, 1975). On the basis that every general psychiatrist regularly sees women referred soon after childbirth who are probably only the most severe cases, they consider that childbirth is definitely associated with an increased risk of mental illness, and that the size of the problem is still underestimated.

The possible impact and importance of puerperal depression

Given that mental disturbances do occur post-partum, it seems relevant to inquire whether these give sufficient concern to justify their investigation, or whether their impact is relatively minor. One relatively rare and spectacular aspect that has drawn attention to the possible after-effects of childbirth, has been that of cases of infanticide (Seager, 1960; Arboleda-Flores, 1975). Such cases raised the question as to whether the mothers were to be considered responsible for their actions, or whether the birth itself led to mental incapacity.
Whereas infanticide may be relatively rare, cases of "baby-battering" are less so. It has been suggested (Pitt, 1975) that some cases of baby-battering occur not just in those with disordered personalities, but in those suffering puerperal depression.

Others have suggested links between depression and child-abuse (Lynch & Roberts, 1975, 1977; Wolff & Action, 1968; Richman, 1976). Depression which may have escaped treatment is cited as a characteristic of abusing mothers (Lynch & Roberts, 1977). Even where actual abuse does not take place, a parent's depression could have long-term effects on emotional well-being, and will certainly impair the emotional and physical resources the mother requires to respond to the infant's demands (Richman, 1976).

Richman also draws attention to the fact that depressive thought may centre around a child, which, where older children are concerned, may cause suffering to the child, although possible effects on infants can only be speculated upon.

Mothers have themselves occasionally admitted feelings of aggression towards their infants which they have found difficult to restrain (Seager, 1960), and it has been proposed that a method should be developed for identifying those who have the potential for abusing their offspring (Schneider et al., 1972).
Whereas abuse or aggression towards infants may be relatively uncommon, other causes for concern lie in the extent and duration of depression originating post-partum. Pitt (1975) found that 4% of a random sample of maternity patients experienced depression which had not remitted a year after the birth. Kendall et al. (1976), provided evidence that, not only did psychiatric incidence increase sharply after childbirth, but that it rose consistently over the following 2-year period, indicating an increasing amount of distress, originating in the child-bearing period, and not reducing thereafter.

There are indications that women who have been previously (non-puerperally) depressed have more obstetric problems and have infants who are in poorer condition at birth, with a higher infant mortality rate (Zax & Sameroff, 1977). It cannot yet be ascertained whether there may be a future effect of the mother's depression (whether puerperal or non-puerperal) on her subsequent offspring's condition.

Apart from such findings, it seems desirable that the new mother should have some attention paid to her mental and emotional needs during this life-event, as well as her physical needs. Sclare (1955) considered that feminine psychology was much less well understood than that of the male, and that studies of childbirth can easily lose sight of the woman as a person.
Commonsense indicates that mental disturbance in a wife and mother, particularly at this time, must impose a strain on the family unit, when faced with this inexplicable emotional and physical incapacitation at a time when maximum coping ability is required. If the condition remains hidden, the husband may bear the burden of being the only one aware of the problem. The mother herself may suffer accentuated guilt, being aware that her reaction is "inappropriate" to her situation, and self-recrimination may feed a vicious depressive circle. At the very least, depression at this time will spoil the mother's enjoyment of her new infant.

2. The issue of specificity of puerperal illness

An initial query that must be raised relates to whether mental illness occurring after child-birth is quite distinct from that which occurs in non-puerperal situations. Attempts to answer this have focussed largely on a) the relative incidence found after childbirth, as compared with that observed at other times and b) whether the qualitative aspects distinguish puerperal cases from others. A factor which has confused clarification of the latter aspect has been the diversity of aspects of mental illness, and the problem of their classification which has changed over time and still varies between different cultures, and to a lesser extent between individual diagnosticians.
Historically, the traditional view in the mid-18th century was to regard pregnancy, the puerperium or lactation as causal of the puerperal psychoses, and this changed in the early 20th century to identifying them with the 2 main existing diagnostic groups of schizophrenia and depression, and to relating them to parturition itself rather than pregnancy (Zilboorg, 1957; Tetlow, 1955). Zilboorg was one of the first to challenge the prevailing view in the 1920s of the specificity of puerperal illness, viewing the physical events as precipitating agents rather than as determinants, and this view is in line with a more recent one (Seager, 1960).

The disorders occurring puerperally have been claimed to be no different from those occurring at other times (Boyd, 1942; Strecker & Ebough, 1926). Other studies however have indicated that the incidence of disorders alter in relation to child-birth, being disproportionately high then (Pugh et al. 1963; Kendall et al. 1976). The lack of unanimity concerning the part played by pregnancy in producing mental illness has been noted (Seager, 1960), although "puerperal insanity" is currently not generally recognized as an entity.

While one view holds that there is no relationship between the puerperium and mental illness, several other viewpoints have been noted, (Seager, 1960; Tetlow, 1955). One has seen the puerperium as acting causally, leading to a presumed unique pattern of illness, while another
views it as acting as a stress situation, precipitating illness in those predisposed. The latter view still allows 2 interpretations:—that the puerperium acts as a simple stressor, producing illness of the same type, with the same history and response to treatment as other stressors; or alternatively that the stress is unique and distinct from those stresses which affect non-puerperal patients, so that although the general pattern of illnesses is similar, differences in symptomatology or outcome might be expected.

Tetlow (1955) observed distinctions between views of the puerperium as either a fundamental etiological causation, or as a precipitator. Where the puerperium, pregnancy, lactation or other physical factors have been seen as significant events in the history of the breakdown, there may still be divergences of opinion as to whether these events are seen to act through physical factors, (such as hormonal disturbance), or through psychological causes.

The power of tradition, the occasionally dramatic onset of symptoms immediately after delivery and changing diagnostic fashions over time have been held to account for some of the views of specificity of the illness, (Madden, 1958; Brown & Shereshefsky, 1972; Wilson et al. 1972). Madden et al. (1958) considered that the acceptance of the designation of "post-partum psychosis" may have stemmed partly from the greater social acceptability of
a mental illness which appears attributable to an unusual stress, than that of the stigma of one arising without an apparent cause. The psychological content of the illness, often relating to the circumstances of maternity, may also lend aid to the concept. They noted for instance that a diagnosis of "psychoneurotic reactions" in patients hospitalised for post-partum mental illness seemed to be increasingly made since the 1920s. It is still open to interpretation as to whether this reflects an increase in such reactions, an increasing recognition of their existence, or yet again a change in diagnostic fashion. Brown & Shereshefsky do not consider that the prevailing official view of American psychiatry (that post-partum syndromes are phenomenologically identifiable with those occurring at other times) is grounded in clinical investigation. They claim that post-partum patients are difficult to place in standard nosological categories, and also that there is a great paucity of studies using psychological or physiological variables to identify the potentially disturbed post-partum woman while pregnant.

Such data as is cited is usually obtained retrospectively from medical records, and ambiguity of findings is partly attributed to the vagueness of the rubric "post-partum". Different investigators include under this a wide variety of psychiatric syndromes of precipitating circumstances and times of onset. To quote them: "It is difficult to generate knowledge about prediction, aetiology and phenomenology without stringent, meaningful criteria for the
definition of post-partum disorder, and for differentiating one post-partum disorder from another".

Wilson et al. however consider that historical tradition is responsible for the entrenchment of the terms "post-partum psychosis" and "post-partum depression" within the vocabulary of psychiatry, and that the belief in such distinct syndromes is unjustified. Garner (1964), while considering that paranatal mental disturbances were those one would expect to find in any group of patients, proposed that several factors did relate significantly to their development at this particular time.

Frotharoe (1969) has noted the difficulty in using diagnostic terms to describe clinical syndromes which may imply an acceptance of the aetiological concepts which it is the researcher's object to investigate. His own view concluded that puerperal psychosis occurred in women who were predisposed at all times, and that the illness was not different in kind. His study of psychiatric admissions over 35 years is relevant for clarification of the differing aspects of puerperal illness, which will be discussed in section 4.

In an attempt to investigate the issue of specificity, Foundeur et al. (1957) compared female mentally ill patients for whom the illness was "judged to have been precipitated by childbirth" with a matched group of non-puerperally mentally ill women. Psychoneuroses, manic depressions and
dementia praecox were found to occur with equal frequency in both groups, the former aspects being very common, and easily overlooked if only more dramatic symptoms were focussed on. Previous mental illness did not appear to characterise the puerperal group, the conclusion being that the illness was not unique and occurred in otherwise healthy women who "reacted abnormally to motherhood".

Concurring with Limm (1941) and Smalldon (1940), that the illness was not primarily related to the birth of a first child, Founder concluded there was no objective connection between the experience of childbirth itself and subsequent mental illness. He therefore disagrees with Boyd's (1942) and Jacob's (1943) claims that post-partum illness is a specific mental disorder.

3. The incidence of puerperal disorders

The examination of incidence of disorder occurring post-partum has been one approach to studying the possible nature of the effect of childbirth on mental disorder. (Ryle, 1961; Barzilai & Davis, 1972; Pugh et al. 1963).

Ryle found in his general practice population that the incidence of endogenous depression was higher in the parturient than the non-parturient women. As endogenous depression is held to increase with age, and as it did not automatically recur with subsequent births, he interpreted the birth as acting as a "provocation" rather than specifically as causation. Ryle's findings however are not in agreement with other findings which suggest that "neurotic"
but not endogenous depression is more common puerperally, (Pitt, 1968).

Barsilai and Davis calculated the expected incidence of mental illness for women of child-bearing age from the known fertility rate statistics in Jerusalem, which were approximately 10%. A distribution of illness unrelated to childbirth would therefore assume that approximately 10% of psychiatric cases would occur in puerperal women. However, in women hospitalized for mental disorder, almost 50% of the cases occurred post-partum. Pugh (1963) also found child-bearing women to have higher first-time mental hospital admissions than those who were non-child-bearing.

Kendell et al. (1976) interpret Pugh's findings as indicating childbirth as a genuine causal factor, (at least as far as psychosis is concerned). Their own study of the incidence of new episodes occurring in the 2 years before and after childbirth showed that the distribution rose sharply in the 3 months after the birth for all diagnostic categories, including functional psychoses, and all depressive illness.

The most important preliminary for approaching the problem of specificity of disorder relative to the puerperium has recently been recognized as that of distinguishing between different post-partum disorders (Pitt, 1975). Earlier examinations only of hospitalized psychiatric cases have tended to ignore the occurrence of the relatively
milder disorders such as depression, which may be referred only to a general practitioner, and much of which may not even be recognized or treated at all (Pitt, 1975). Noting that annual prevalence rates for disorder in women of "menstrual" child-bearing age have been cited as 9% (Kessel, 1960) or and 10% (Ryle, 1960), a rate 6 times greater would have been needed to account for Pitt's own findings on the rate of incidence, if chance alone were responsible.

While puerperal depression is the particular subject of interest, reference will shortly be made to 2 other puerperal conditions which can be differentiated from it—those of "psychosis" and of "maternity blues". These distinctions are necessary in order to isolate puerperal depression for specific study, and to enable evaluation of previous studies which may or may not be relevant for this. Some of the discrepancies between estimates of incidence reflect the lack of specificity of the type of mental disturbance under investigation, of the criteria concerning onset and of the method of screening, (e.g. by psychiatric ward admissions, general practice consultations or maternity clinic surveys). There also remained a possibility that the actual incidence may vary over time or in relation to cross-cultural differences.

Noting the wide variation between the 2% cited by Strother & Ebaugh (1926), 12.7% (Smalldon, 1940), 14.4% (Boyd, 1942) and 58.6% (Hemphill, 1952), Madden et al. (1958) query whether post-partum illness is increasing or perhaps gaining more recognition. Annual prevalence
rates of 10% of mental disorder in women of child-bearing age in a general practice sample have been compared with a lower rate (4.8%) for puerperal women (Ryle, 1961). A division of the disorders into "reactive" and "endogenous" cases indicated that the parturient women showed a higher rate for the latter (2.6% as opposed to 1.9%), and that the reverse was true for the non-parturient women, (0.5% compared with 9.5%). Another general practice study has indicated an incidence of 2.9% for depression (Tod, 1964), while a Swedish study, (Jacobson et al. 1965) showed an incidence of 15% for depressive symptoms.

Not only have the populations chosen varied, but the time-period of monitoring and the criteria used for assessing depression have varied, the latter study employing a 9-month post-partum period, and using self-ratings on a number of depressive symptoms. Another Swedish study has reported an incidence of 24% of "mental handicap", but if impairments during pregnancy were also taken into account, only 37% of the sample were totally free of symptoms before and after the birth, (Uddenberg & Nilsson, 1975). The assessments here were obtained by means of a semi-structured interview.

Severity of the disorder and the method of its diagnosis may affect the estimates of incidence. Bees & Lutkins (1974) reported incidences ranging from 4% to 30% of depression, according to whether the condition was mild, moderate or severe. Moderate depression showed an incidence
of approximately 10% which compares with other findings, (Pitt, 1968). Their incidence of severe depression of 4% can be compared with those of Ryle's (3%), and Tod's (2.9%). Meares et al. (1976) also report an incidence of 10%. If adopting the criterion quoted by Dalton as the need for treatment, their incidence rose to 16% (compared with Dalton's incidence of 7%). When including women with "severe and lasting mood-changes" but not considered as clinically depressed, their incidence was 28% and this is compared with Dalton's incidence of 34% of women with milder depression not needing treatment.

In an Irish population, 14% has been reported, (Martin, 1977), all of them of "neurotic" or "atypical" and not endogenous depression, (although the incidence in pregnancy was almost as high, some women who were puerperally ill appearing to have been already unwell in pregnancy). Rates derived from in-patient, out-patient attendances, general practice or community surveys have been noted to vary in relation to the method of evaluation (Richman, 1976). The implications of Dalton's findings, where diagnosis was confirmed but hospitalization was not recommended, appear to be that hospitalized samples would yield considerable under-estimates of incidence, at least as far as depression is concerned.

Post-partum psychosis is not the focus of the present study, and mention will be made of it here simply to distinguish its characteristics which distinguish it from those of depression. Pitt (1975) has provided the most recent differentiation, although not implying that he considers the 2 as necessarily quite distinct, but rather that they may "lie along a continuum".
In addition to a 10.8% incidence, Pitt (1968) reported a further 6.2% classified as doubtfully depressed, and considered that these were probably under-estimates. He considers that the discrepancy between these (rates over 2 months) and the annual prevalence rates of mental disturbance (9-10%) being 6-fold is too great to be accounted for by chance. An unpublished later maternity department survey is said to show a similar incidence, and a home delivery screening an increased one of 15% (Pitt, 1974).

The probable under-reporting of post-partum disorders has contributed to the problem of its investigation (McGowan, 1977). Such under-reporting is not surprising in view of the frequent absence of any post-natal care of the mother in terms of her psychological well-being, and of her own lack of mobility and the demands of the new infant.

4. Distinctions within post-partum syndromes

The differing illnesses which may occur post-partum will next be briefly reviewed.

4a. Post-partum psychosis is not the focus of the present study, and mention will be made of it here simply to define some characteristics which distinguish it from those of depression. Pitt (1975) has provided the most succinct differentiation, although not implying that he considers the 2 as necessarily quite distinct, but rather that they may "lie along a continuum".
It will not be argued here as to whether or not they should be considered discrete. The criteria adopted by Pitt will be followed to warrant their exclusion from the current investigation. Psychosis normally occurs within a few days of the birth (Melges, 1968; Madden et al., 1958), the condition is usually severe and followed by psychiatric admission. Incidence is cited as relatively rare: (.2% (Pitt 1975), .2% or .3% (Protheroe 1969), .19% slight (Grundy & Roberts 1975)). Distribution of its onset in women has been noted to peak in the first month post-puerperal (Paffenberger, 1961), suggesting the "removal of some protective barrier existing during pregnancy", or a hormonal imbalance (Venning & Pack, 1959). It is generally held to be no different from psychosis occurring at other times (Grundy & Roberts, 1975; Protheroe, 1969; Pitt, 1975).

The official rubric has been that no use of the term "post-partum psychosis" is justified to warrant identification of a distinct illness, and in clinical practice no distinction puerperal depression, but have assumed that with the is made between the psychoses occurring non-puerperally, "mixed" psychosis. A few studies have investigated the (Protheroe, 1969). A conditional predisposition is generally "lines" specifically (Pitt, 1969), leading many to an assumed for psychosis, and this is not thought to be a more 1970). The condition is observed outside the first few specific factor for psychosis occurring post-partum (Protheroe, 1969), those women who develop it resembling other non- of shorter onset in cases where there is a puerperal psychotic in personality and family history (Pitt, 1975). A cyclical feature has occasionally been noted (Protheroe, 1969; Grundy & Roberts, 1975) as with psychosis occurring non-puerperally.
The rapid endocrine and metabolic changes of the immediate post-partum days have been commented on (Melges, 1968). Whereas a "protective latency period" of 3 days before major hormone decrement occurs has been suggested (Karnoeh & Hope, 1957), some of Melges' cases occurred on the first post-partum day. A high recurrence rate for subsequent deliveries has been noted (Protheroe).

Diagnostic fashions may affect the rates cited to a slight degree (Faffenerberger, 1964), but the condition is generally so severe as to be unmistakable, and to include schizophrenic reactions, mania, delirium and violent or bizarre behaviour. Recognition of the condition is therefore usually apparent while the woman is still hospitalized, unlike depression which appears often insidiously over the following weeks, and may go undiagnosed.

4.b Maternity Blues

A number of studies have purported to investigate the condition of individual variation present in depressions, but have confused this with the blues syndrome. A few studies have investigated the syndrome more specifically, rather than the whole "blues" specifically, (Pitt, 1968; Robin, 1962; Nott et al., 1976). The condition is observed within the first week after the birth, when mood may be labile or low including in that of short-lived depressed mood. Mental acuity is lower at this time (Kane et al., 1968) and a degree of suggestibility considered sufficient for hypnosis (Robin, 1962). These investigations have been held to show a continuum of disturbance, rather than a dichotomy (Nott et al., 1976).
Mood changes include depression, anxiety, tearfulness and excitability, (Pitt, 1973; Robin, 1962; Kane et al. 1968). A scale was constructed for the specific measurement of the Pitt's (1966) "blues" symptoms. The sudden drop in hormone levels has been cited as probably causative of the condition, (Dalton, 1971; Pitt, 1975). (Although Dalton does not limit this hypothesis specifically to the "blues" period, but more generally to depression).

The observation that comparable mood changes and mild mental clouding are experienced pre-menstrually, although to a lesser degree, has lent some support to a "hormonal" hypothesis, the change in hormone levels being much more extreme post-partum (Robin, 1961; Dalton, 1971). Similar considerations apply to problems noted with lactation (Pitt 1968). Evidence to support the hypothesis is still however lacking, despite one intensive study (Nott et al. 1976), comprising measurements of plasma LH and FSH and prolactin.

A high degree of individual variation presented problems of analysis and the investigation of specific symptoms was suggested as more profitable, rather than the whole "blues" syndrome.

An organic contribution however seems a probability in view of the commonness of the syndrome (Pitt, 1968, Robin, 1961) and personality predisposition probably irrelevant (Pitt, 1968). The incidence has been noted to vary between estimates of 15% (Oppenheimer, 1962) 34% (Dalton, 1971), 50% (Pitt, 1968) and 80% (Robin, 1962), although it has also been held that there is a continuum of disturbance, rather than a dichotomy (Nott et al. 1976).
Factors which differentiate the "blues" can be defined as follows:

- Duration, ranging from an hour to several days.
- Time of occurrence, usually between the 3rd and 10th day post-partum.
- Incidence, possibly as great as 80%.
- Previous predisposition, probably unrelated.

Symptomatology includes tearfulness, mild depression or anxiety, mental confusion, rapid mood changes.

Regarding causation, possibly associated with the immediate drop in hormone levels. Concerning need for treatment unnecessary as the condition is self-terminating (with the exception of warning the expectant mother beforehand of these temporary mood changes and giving overall support)


4.4 Criteria of puerperal depression

Writing in 1966, Pitt comments on the neglect of evaluating depression after childbirth, despite the common knowledge of its occurrence. He has articulated most clearly the appreciation of the different syndromes occurring under the general rubric of post-partum depression, or post-partum mental disorder. His terminology should help to avoid confounding the syndromes in the future, although confusion does still occur. (This is probably due to the fact that the "blues" occurs frequently, is observed while the mother is still hospitalized, and is seen to remit rapidly with no ill-effect. Assumptions, may therefore be made, that this is the extent of any puerperal depression, which is of no great import).
Pitt's own research sprang partly from a Health Visitor's request for guidance regarding the causes and assistance needed for the frequent depression she found in the new mothers she visited. A questionnaire was devised for screening for depression in mothers before and after birth, and of 305 women, 10.9% were diagnosed as suffering from puerperal depression. Criteria here were a pre-specified rise in depression scores on the questionnaire after delivery and for the symptoms to be unusual for the individual, disabling and of more than 2 weeks' duration. Those considered as potentially depressed were also, where possible, given a clinical interview and a rating on the Hamilton Scale (Hamilton, 1960).

Previous studies examining psychiatric admissions only are unlikely to have reached a similar population, and to have sampled only those most severely ill and who reported illness or were referred for treatment, or prepared to be hospitalized while caring for a young baby. Pitt considers that psychiatrists are likely to see several women at outpatients who may have been unwell since the birth of a previous child for every one who has been admitted, and yet studies of the former group are virtually non-existent, at least by psychiatrists. Pitt found an incidence of 10% which he contrasts with that of 50% for those experiencing "the blues". Most of the women had not experienced a similar depression before.
Pitt's screening took place in a hospital, and only 5 of the 35 depressed women were known to be receiving any direct treatment at the time of the study. As a further 19 were classified as possibly depressed, there are implications for the large number of women who undergo considerable distress but who may not come to the notice of any doctor or psychiatrist, except when studies such as this are conducted. Judged by a follow-up questionnaire sent 1 year later, 39% of the total sample (or 43% of the depressives) had failed to recover.

Pitt notes that his 10.8% overall incidence is higher than was expected, or than had been previously reported. He does not consider the finding a chance one, on the basis of comparing his incidence with annual prevalence rates for psychological disorders in women of child-bearing age. In fact he considers it more probable that as the questionnaire instrument was a rather "blunt" one, some cases were probably missed. On the basis of his findings, he considers that the type of depression as described by him must be one of the principal components of the puerperium. With the exception of 2 cases, the symptoms tallied with those described as "Atypical Depression", West & Dally (1959), Sorgant (1961) and Pollitt (1965), so-called because this relatively milder depression frequently seen in younger or immature women tends to show "neurotic" symptoms of anxiety, with late (as opposed to "classical" early) waking and worsening.
The relationship with "the blues" remained unclear, as although many of the depressed women had suffered from this, it was not possible to entirely separate it from the increased incidence of depression. There were no clear predictors of the cases that did not improve after a year, and only 2 of them appeared to have received any treatment. Pitt distinguishes depression by its onset occurring from a few weeks after delivery, its duration of more than a month, its impact as being unusual in the experience of the woman concerned, and as being at least partially disabling.

Following the distinctions made by Pitt, the differentiation between the 3 disorders will be adhered to in the future discussion. The term "psychosis" or psychoses will be used to refer to the severe mental reactions normally occurring shortly after the birth, including such features as hallucinations and schizophrenic behaviours. The aspect of interest to be subsequently investigated is specifically that of depression occurring post-partum, and the criteria for this will be those suggested by Pitt.

5. Factors suggested as causative: overview

Factors that have been considered with regard to causation have covered a wide range from the molecular to the molar situation, from organic genetic or biochemical aspects to psychological and psycho-social ones. Some have stressed the "biological role" of women and seen depression as a failure in adaptation. The problem of isolating one aspect for investigation becomes apparent when the inter-
related changes within which childbirth occurs are considered.

The awareness of pregnancy is accompanied not only by a changed internal milieu, but by the attendant emotions which may be extremely positive, negative or ambivalent. There may be implications for the relationship with the husband or partner, and it may represent the achievement or threatening of personal goals. Changes in location and work situation will probably be precipitated and therefore in social milieu. After the birth, for primiparae, as well as physical "homeostasis", role-change from that of wife or partner to that of mother also is required. Both partners find themselves no longer just in a dyad, but in an extended unit with its more complex social interplay.

For the woman particularly however the change in daily routine is probably most striking. However diverse the previous life-styles of women, care of a new-born infant makes a uniformity of demands which may require much greater adaptation for some for whom the new schedule and life-style is most discrepant from their norm. In the constantly changing network of interactions, it may be difficult to disentangle what affects the woman from her own effect on the situation. Distinctions have been made as to whether the puerperium should be seen as causal in mental disturbance or rather as acting as a stress situation or precipitant (Seager, 1960).
Huckell's et al. (1972) have criticized causative models assuming mono-ethiology which is typical of the germ theory model. Pointing out how, even in animal studies, variations in the social milieu can lead to varied, not single pathological conditions, which include social as well as physical deviations, they suggest that social factors may enhance susceptibility to disease in general, rather than there being a specific relationship between the two. They also note the role of available sources of support in modifying the pathological effect of any social process in both animals and humans. They propose that measurement would therefore ideally take into account the balance between potential stressors and the nature and strength of supportive or protective elements.

Views of "normal" maternity may vary widely between theorists (Westbrook, 1975), being viewed as a developmental goal from an analytic point of view, failure to adjust thus being interpreted intra-psychically.

A psychosomatic approach has its roots in obstetric research, stressing problem-free pregnancy and delivery, while sociological approaches stress cross-cultural differences and invoke "society" rather than the individual where adverse responses occur. Supposed norms have been criticized by Westbrook as representing unrealistic and idealized goals against which to measure "effective" childbearing behaviour.
McGowan (1977) favours a holistic view of post-partum disturbance as a stress response, or a total organismic response to a life-event, in contrast to those who see the birth as a precipitator, or the disturbance as having an organic base. She also queries the supposed "norm" of good adaptation, when cognitive and affective changes have not been adequately separated and observed in pregnant and parturient women for these to be established. Suggesting that the metabolic changes that occur are physiological stressors in a total process, she invokes Selye's (1950) view of stress as the total change caused by function or damage, including the re-establishment of homeostasis. Such a model can integrate endocrinological changes and stressfully perceived life-events. The term "stressor" can thus include physiological, environmental and psychic stress. The successful negotiation of this particular event might therefore be determined by constitutional and acquired "host" traits in interaction with the environment — a view which might be supported by the observation that post-partum disturbances do not tend to recur in the same women.

From the holistic point of view of the integrity of the body, it may be unimportant as to whether a particular stress is classified as physical or mental (Thomas & Gordon, 1959). Selye's broad definition can still be accepted, with stress assumed to be of physical origin and to arise from emotional and psychic sources. Its role in the genesis of mental disturbance could be seen as operating in 3 ways:—
as a single stress, or a total of repeated stressors, or an accumulation of minor stresses followed by a sufficiently large one. For practical purposes, Thomas and Gordon view child-bearing as primarily a physical stress, while an unwanted pregnancy would constitute a primarily psychic stress. In their view, studies of child-bearing are a direct approach to the general problem of stress in the causation of mental disorder. They observe that childbirth could operate in 3 ways in the complex of causation:— as a significant event in the history of the breakdown (whether the causes are physical or psychological); as one precipitator in interaction with a predisposed host constitution; or as revealing a host deficiency (physical or personal) specifically relating to sexual or reproductive life. They have commented on the possible effects of culture and discipline on theories of causation, most studies up to that time having been conducted by psychiatrists in Scandinavia and by sociologists in America.

The areas which have been suggested as causative, precipitating or at least associated with post-partum depression will now be reviewed.
5.1. Biological factors

5.1a The role of obstetric complications and labour problems

It might be assumed initially that the trauma of the labour or birth itself might be significant for later readjustment and particularly so if these or the pregnancy have proved difficult. (There also exists a possibility that a difficult birth might affect the infant in ways which make him more difficult to handle, and therefore more stressful for the mother in the early days of mother-infant interaction).

Obstetric difficulties have more commonly been examined in relation to psychosis or more severe forms of mental disorder. Associations between abnormal obstetric history, previous stillbirths, congenital abnormalities and depression, have been noted (Tod, 1964), although others have found no such association (Barsilai & Davies, 1972; Meares, Grimwade & Wood, 1976). As Tod also found an association between puerperal and previous mental disorder, the depression might reflect the "end-result of a long-established maladjustment" as he suggests. In view of this previous mental disorder, and the probability that his cases of depression were probably only the most severe ones, it is not clear whether such factors would be relevant for puerperal depression in previously healthy women.
Post-partum disturbances have been linked to previous abortions (Jacobson, Keij & Nilsson, 1965), and to pregnancy symptoms such as nausea. The abortions were assumed to be spontaneous, although confirmation of this might be a crucial factor. Findings from this Swedish study are not necessarily applicable cross-culturally. Although the symptoms included aspects of depression, the measures were of "mental" symptoms more generally. Length of labour and more complications of delivery have been noted in association with depression (Dalton, 1971), despite the fact that 2/5 of her original sample with obstetric abnormalities were excluded from consideration, the remainder thus being defined as obstetrically normal.

There are indications that parity does not differentiate.

Others however have found no such association with length of labour (Martin, 1977; Jacobson et al. 1965), nor with toxaemia (Martin, 1977). Pitt (1968) found later depression to be associated with fewer complications in pregnancy. Complications of delivery did not differentiate, although depressives tended to have (non-significantly) longer labours. They also had more previous dysmenorrhoea, while a lower incidence of anaemia has been noted in depressives for unexplained reasons (Martin, 1977).

5.1b The influence of parity

Parity has been considered an important factor for a number of reasons.
The primipara woman could be considered significantly different from the multiparous woman biologically. This raises the question as to whether it may be more appropriate to classify those who have miscarriages with multiparae, and to examine the effects of gravidity as well as parity. Abortions may present problems as while those with previous abortions could be classified with multi-gravidae biologically — whether the pregnancy is terminated spontaneously or deliberately could be presumed to hold different psychological implications. Information concerning the reasons for termination are not necessarily available on hospital records.

There are indications that parity does not differentiate (Seager, 1960) while others have found more primiparae to be depressed (Founder, 1957; Pitt, 1968). Pitt's findings however were not significantly different and Founder's could admit a different interpretation. Whereas he found twice as many reactions to the birth of a first, as opposed to a second child, incidence inevitably decreases with birth rank because of the inverse relationship between rank and number born. His findings could thus equally be interpreted as showing equal numbers of primiparae and multiparae to have adverse reactions — or — as showing that approximately half the women reacted only after a second or later pregnancy. There may be a realisation that another child will probably consolidate any unhealthy interpersonal dynamics; also that the woman will have less opportunity to change her situation in the future, including a return to work.
It has been argued that initial psychological stress and subsequent changes in life-style should be much greater for primigravidae (Kendell et al.), although these workers were only able to speculate on this and did not have access to information to compare primigravidae and multiparae. Even where first births are more strongly related to depression, many reasons apart from biological ones could be proposed. The advent of a first baby might appear the more obvious challenge to re-adjustment. Where the partners are married, the marriage will be more recent, and may not have established its own equilibrium. Current attitudes concerning wantedness of the infant may be more ambivalent, particularly in recent years for the currently working woman, where loss of occupation or changes in home and environment may be precipitated. Economic or housing problems may be accentuated. Curtailment of activities generally follows, and lack of personal mobility may put normal sources of support and social interaction physically beyond her reach - although at a time when her inexperience or relative social isolation may require increasing support.

Other studies have however suggested that greater parity is more predictive (Kaij et al., 1967; Tod, 1964; Martin, 1977). Intuitive reasons could again be advanced for this. If relationships with the partner are unsatisfactory, there may be a realization that another child will probably consolidate any unhealthy inter-personal dynamics; also that the woman will have less opportunity to change her situation in the future, including a return to work.
Financial or housing strains may be increased. For women who found the birth or infant-care particularly distasteful, there might be a reactivation of previously experienced stress and a cumulative stress response observed.

Kaij et al. proposed organic and/or emotional factors to be at work, noting that those with 3 or 4 children (but not more than 4) had more psychiatric symptoms. As previous psychiatric history and unplanned pregnancies were also associated, but not age or social class, they rejected the possibility of a "worn-out mother" syndrome. Tod considered that the cumulative strains of child-rearing were at work, particularly for the "abnormal", but that hormonal factors could also be involved.

5.1c The influence of age

The influence of age has been examined, although it presents problems in view of its statistical relationship to parity. Increased age at the time of a first birth is known to be more problematical obstetrically, and there is also a rise in (non-puerperal) depression in women in the general population with increasing age. Comparisons with non-puerperal depression are difficult in this respect, post-partum syndromes being self-limiting in terms of the child-bearing years, the maximum ages at which some women conceive overlapping with those of the onset of the climacteric in others.
A number of studies have suggested that age is unrelated to puerperal depression (Jacobson et al., 1965; Pitt, 1968; Yalom et al., 1968). Others have suggested that the older woman is more vulnerable for post-partum mental disturbances (Paffenbarger, 1961; Thomas & Gordon, 1959). It has also been proposed that age at marriage rather than at parturition may be significant (Paffenbarger, 1961; Barzilai & Davis, 1972). The latter study (whose depressed subjects were matched with controls for age per se) found that many depressives had married before the age of 20. These women were therefore also less likely to have any occupation, and the authors suggest that attempts to solve dependence-independence conflicts may have been at work.

5.16 Hormonal factors and menstrual characteristics

In view of the hormonal changes that occur in normally menstruating women, during pregnancy and after child-birth, it is not surprising that these changes have been invoked as contributory to post-partum syndromes. Hormones are also implicated in the parturient woman's ability to breast-feed.

Jawah-Zadeh et al. (1969) are among those who have considered biological factors which might be of significance. Where psychological and endocrine factors are thought to interact, changes in the metabolism of adrenal steroids have been speculated on. One such endocrine factor suggested is that of changes in adrenal cortico-steroid metabolism.
When large amounts of oestrogen are present, there is usually also an increase in cortico-steroid steroids, not all of which are thought to be bound. When cortico-steroids are administered exogenously, affective changes such as depression and euphoria have been noted. As cortisol secretion rates are lower in pregnancy (Cohen & Steifel, 1958), a delayed response to termination of pregnancy, or a "cortisol withdrawal" state has been suggested.

Other factors suggested as important are the gonadal hormones, oestrogen and progesterone, and their action on catecholamine metabolism. Research on affective disorders has concentrated on the altered metabolism of noradrenaline in particular, much of this work having observed the effect of drugs which alter amine metabolism. Here, connections with previous or concurrent depression have been noted (Bunney & Davis, 1965). The "catecholamine hypothesis" of depression (Schild-Kraut & Kety, 1967) proposes that at least some depressions may be associated with a relative deficiency of norepinephrine at brain receptor sites, and elation with an excess of it.

One suggestion is that the action of oestrogen and progesterone may be dependent for their action on biogenic amines (Myerson, 1964). Animal studies appear to demonstrate that mechanisms governing sexual and reproductive processes are bound up with the function of these amines.
Progesterone is commonly referred to as a central nervous system depressant, producing anaesthesia especially in female experimental animals and sleep in humans by exogenous administration. Physiological and psychological changes in females over the menstrual cycle require further investigation and may help to elucidate the relationships between hormonal activity and mood changes (Bell, 1973). From areas such as these across which observations have been made Jarrahi-Zadeh et al. have drawn the deduction that the hormonal changes which take place in pregnancy would be expected to produce alterations in catecholamine metabolism. It is not thought likely that alteration in any one neuro-hormone will be associated directly with a feeling state, but rather that they may determine its intensity - its quality more probably being dependent on the significance of the setting for the individual. One view is that the neuro-hormones such as noradrenaline and serotonin might be particularly important (Kety, 1967). Jarrahi-Zadeh's speculations focussed on the changes taking place in pregnancy in particular and whereas those which occur after childbirth also have certain physiological parameters which can be broadly specified, it may be that the individual variation in this period of return to "homeostasis" still requires investigation. The "beneficial" nature of hormonal changes during pregnancy have been accepted by Tod, and puerperal breakdown linked to the disappearance of this protective factor.
Dalton (1971) has been one of the prime exponents of the "hormonal hypothesis". Pointing out that the placental steroid levels are highest during pregnancy (when elation was noticed) and that the depression in the puerperium is at a time when there is a marked loss of placental steroid output, she relates these implications to her own work on the menstrual cycle. Asserting a causal relationship between varying levels of the menstrual hormones over the monthly cycle (and mood changes experienced as pre-menstrual tension, depression or impaired mental ability and behaviour), Dalton extrapolates from these relatively minute hormone swings to the massive increase and decrease in placental steroids during and after pregnancy. Arguing that these huge differences in hormone levels call for "remarkable adjustment capabilities on the part of the woman", she queries whether puerperal depression is not "but a failure to adjust adequately to this hormonal change".

She links her argument with the findings of Malleson (1953) and Hegarty, (1955), who noted the high incidence of the pre-menstrual syndrome - at least following puerperal depression. It is argued that women who find it difficult to "adjust" to the differing hormone levels of the pre-menstruum will find it even more difficult to adjust to the hormone levels of the puerperium.
A number of researchers have accepted the hormonal hypothesis, although its direct investigation remains problematical. Meares et al. (1972) view their own, Dalton’s and Tod’s (1964) findings of ante-natal anxiety and Dalton’s observation of ante-natal elation, as support for a hormonal basis for affective state changes, and therefore for puerperal depression. They suggest that the differing physiological conditions of pregnancy and the puerperium might induce anxiety and depression successively in the same individual.

The role of the female hormones oestrogen and progesterone have been cited (Wilson, Barglow & Shipman, 1972), their relative deficiency at this time suggested as leading to "hormonal imbalance". Others however relate this hormone drop to the immediate post-partum "blues" period, and not to later depression (Pitt, 1973). Yet again others have queried the supposed absence in symptoms during pregnancy, and observed more depression, anxiety or sleep-disturbance than immediately post-partum (Jahani-Zadeh et al.).

Menstrual histories have been examined and associations found with pre-menstrual tension (Dalton, 1971) and with change in duration of the cycle and more painful menstruation (Jacobson et al., 1965). Others have found no such associations with the exception of dysmenorrhoea (Pitt, 1972). Pitt found that the depressed women in his study had more lactation problems, but Jacobson et al. did not find this, nor did they find any difference in duration of breast-feeding for the depressed women.
Among the few studies which have actually investigated biochemical factors has been that of Treadway et al. (1969). Higher levels of 17 OHCS and epinephrine were found post-partum in all women, but assessments were made a few days after delivery. Norepinephrine appeared to be lower both in pregnancy and post-partum, neuroticism scores also being higher in pregnancy, and feelings of depression being greater for both pregnant and post-partum women than controls. They tentatively suggest the lower epinephrine levels as probably attributable to the gonadal hormone changes and responsible for the feelings of depression – with 2 caveats. An assumption would be required that this depression was similar except in degree to more severe clinical depression; also that the lower excretion of norepinephrine in urine results from both its central and peripheral decreases – components which cannot as yet be separated out.

They suggest progesterone as the gonadal hormone most likely to be responsible for the lower norepinephrine, in view of its c.n.s. depressant effect. They propose that the low norepinephrine may indicate an increased biological susceptibility to affective disorders in pregnancy and the puerperium, and their increased incidence post-partum to a "lack of rebound from the biochemical changes of pregnancy" (as well as to general maternal and environmental stress). Their speculations are extended to later post-partum depression, and they propose a lingering depletion of brain norepinephrine caused by the sustained higher levels of progesterone during pregnancy.
Whether even positive findings of assessments during the "blues" period are relevant for later post-partum depression is still open to question. In the most recent and thorough investigation of hormone levels post-partum, Nott et al. (1976) found no clear association with depressed mood, despite frequent monitoring before and after birth. The post-partum period was again that immediately after the birth, when the clearest changes might have been expected to be observable. Their study highlights the problems of being able to obtain a sufficient number of blood samples from the patients in pregnancy to establish baseline values, before making comparisons with post-partum data. They advocate the examination of hormonal factors in association with specific symptoms, rather than with the whole post-partum syndrome. Their specific measurements were of plasma LH and FSH and of total oestrogen and progesterone. They took only 5 plasma samples pre-delivery, which they felt were insufficient for post-delivery comparisons. Individual variations were so large as to obscure other possible changes.

Another aspect which has lent credence to a hormonal causation has been the cyclic nature of some depressions. A group of women with recurrent depression that appeared to have been initially activated at the time of childbirth has been noted (Hegarty, 1955). Accurate accounts of the onset were however difficult to obtain and the relevance of the puerperal period may be lost. Subsequent investi-
The determination of women apparently recovered from puerperal depression is lacking over time. Hegarty's cases were characterized by menstrual features such as tension and irregularity, all showing a cyclic nature, some of these being associated with menstruation. The patients had been well-adjusted before the first illness, and Hegarty considers them as variants of a manic-depressive type, similar cases not occurring in post-menstrual women. Such cyclic variations have seldom been observed with relation to puerperal depression, the phenomena more usually being associated with psychotic disorders.

In view of the methodological problems of testing the hormonal hypothesis, and the present lack of evidence to substantiate it, it remains still an area of speculation. Although attempts to investigate it by assessments during the "blues" period (when maximum hormone changes would be expected to be observed) have yielded no clear findings, the applicability of the hypothesis still appears more relevant for this immediate post-partum state of affective changes than for depression which follows after several weeks. Also, in view of the methodological problems of making assays, it may be that data concerning menstrual history constitutes the best available "indirect" assessment of hormonal fluctuations at the present time.
5.1a The recurrence of puerperal depression

One aspect which might throw light on whether some women are pre-disposed (whether or not for genetic reasons), is clarification of whether or not the condition occurs in the same women with repeated pregnancies. The main consensus of opinion appears to indicate that this does not happen (Foundeur et al. 1957; Pitt, 1975; Dalton, 1971), and that the illness can occur in previously healthy women.

Some studies have also examined previous non-puerperal mental illness of puerperal patients. Martin, in 1958, assessed the overall recurrence rate probability as 1 in 5 for all psychiatric reactions observed post-partum, but as Martin (1977) has noted, little evidence is available concerning the recurrence of specifically diagnosed illness, such as depression. However, for purposes of expediency in the light of the number of studies examining a wide range of features, there will be reviewed here those studies undertaken with an arbitrary distinction upon their examination of "personal" characteristics and those exploring "environmental" aspects. It would appear that studies following up the subsequent experiences of women depressed puerperally are lacking.

Where retrospective data are concerned, access to adequate information concerning psychiatric history may determine whether associations with this are observed. There would appear to be no firm evidence to show that puerperal depression as such recurs, with the probable exception of a few women.
5.2. **Psycho-social factors**

When considering factors other than those which are specifically biological or physiological, the contribution of aspects which are "psychological" or "psychosocial" become hard to differentiate. Some studies have emphasized factors extrinsic to the individual, such as socio-economic ones, housing etc. Others have examined intra-psychic variables - attitudes, personality and the dynamics governing behaviour. Yet others have looked at the individual in interaction with the environment, social situations, or significant relationships.

If individual differences or "personality" are seen as essentially interactive in nature, then such distinctions between intra-personal and inter-personal factors are not entirely acceptable. However, for purposes of expediency in the light of the number of studies emphasizing a wide range of features, these will be reviewed, making an arbitrary distinction between those emphasizing "social" factors and those emphasizing "personal" characteristics. Studies will be included under the former which have examined family relationships (past and present), occupational and cultural factors.

5.2a **Wantedness of the pregnancy.**

One of the factors which might intuitively be expected to affect a woman's mental state when delivered of a new baby is the extent to which the birth was wanted or not.
If the birth was a definitely unwanted event, and the woman committed to all the rigours of infant care against her will, it would not seem surprising for depression to ensue. Such attitudes may present difficulties of assessment even in the more open climate of the present day, where it is accepted that many couples will only start a family by positive planning.

Thus "plannedness" of a birth might or might not provide an indication of wantedness. Unplanned births are not necessarily unwanted ones. Further, many women may be ambivalent about the event, experiencing the emotions of both wanting and not wanting the baby. These attitudes themselves may change over pregnancy or after the birth. Whether the woman has considered an abortion for this pregnancy or has had previous abortions might reflect her attitude most accurately. However, here also ambivalence is probably frequently present, both before and after an abortion. Such statistics are also not necessarily readily available, some hospital records indicating all abortions similarly, which would include "spontaneous" ones, miscarriages or advised terminations.

It might have been thought until recently that illegitimacy might inevitably imply that the single woman did not desire the pregnancy. However, not only may this not have been true for a small number of single women, but assessment of this would be difficult in today's climate, where many couples set up home, but do not marry by mutual consent.
Concerning illegitimacy, Seager (1960) noted that Tetlow's (1955) patients included many who were single or had illicit unions, and Kendell et al. (1976) (whose sample contained a high percentage of illegitimate births) found a (non-significant) increase in psychiatric symptoms before and after the birth in these mothers, but not more in the post-partum period alone. There is therefore likely to be no simple relationship between the two, Kendall's study being the most comprehensive evaluation of this; most studies containing too few cases for analysis.

Some studies have indicated that wantedness of the pregnancy (or plannedness) was no prognosticator of later depression (Dalton, 1971; Pitt, 1968; Uddenberg & Nilsson, 1975). Pitt's assessment of wantedness was taken retrospectively. Uddenberg et al. found more post-partum disturbance in those who "paid less attention to their pregnancies", which is interpreted as a defence mechanism to keep the pregnancy out of consciousness and avoid decompensation.

Others have however proposed unwanted pregnancies as a poor prognosticator (Roth, 1975; Martin, 1977; Braverman & Roux, 1978; Kaig, Jacobson & Nilsson, 1967). Martin's sample was a low socio-economic one, Kaig et al's puerperal patients were largely those with 4 or more children already, and the retrospective nature of their measure led them to cast doubt on it as a causative factor. They had previously noted (Jacobson et al. 1965) that those with previous
abortion were more vulnerable, but it was not known if these abortions were spontaneous or induced. Despite Braverman & Roux's findings, whereby 2 direct questions concerning wantedness and plannedness of the pregnancy predicted highly, this aspect remains to be tested - (as they observe) - as to whether such "honesty and compliance" concerning these areas can be achieved in other populations.

5.2b Parental relationships

The woman's relationship with her own parents and particularly her mother, has been hypothesized as crucial for her own reactions to motherhood. This is stressed particularly by those who emphasize woman's "biological role", and see her previous life as a preparation for motherhood (Solare, 1955). The motherly qualities of the woman's own mother and the father's acceptance of his daughter's femininity are said to contribute to the woman's own attitudes to her own femininity and to childbearing. Psychoanalytic views have hypothesized conflict over assuming the mothering role due to an unwillingness of the patient to identify with her own mother (Melges, 1963), from data gathered from severely-ill psychiatric post-partum patients, (not just depressives), using verbalizations taken at face value. Roth (1975) concurs with such a view, and suggests that the conflict activated by care of a non-communicative infant may lead to identity confusion. This has been evaluated in a few women only
(Markham, 1961), the stress in the reproductive functioning appearing to reactivate genetically earlier conflicts.

Describing a too-close, rather than a too-distant mother-relationship, Douglas (1965) details a case history of one patient whose mother appeared to be dominant and over-competent, leading to feelings of inadequacy and compliance in the daughter.

Anderson (1967), using projective measures on a small sample, found inter-personal conflict (and a lack of maternal identification) to be related to depression.

An extremely high incidence (over 50%) was found using ratings from a structured interview, although the D scale of the MMPI indicated an incidence of 10%. Part at least of the conflict appeared to relate to the patients' mothers.

5.2c The marital relationship

It is not surprising that the woman's husband has been considered as playing a crucial role regarding her well-being before and after the birth, and that the quality of the relationship should be seen as relevant. It has been suggested that the woman's dependency needs may not be met at this time, and that the new infant may also present a competitive threat to the husband (Kaplan & Blackman, 1969), although their own cases were of more severe psychiatric reactions and of long-standing personality or familial problems.
An indirect attempt to evaluate the stressfulness of a disrupted relationship was made by Helper, Cohen, Beitenman & Eaton (1968), employing the methodology of Holmes & Rahe (1967) in the rating of stressful life-events. Factors rated as being most stressful in pregnancy by all their groups of women (not only a pregnant sample), were disruption of the marital relationship and rejection of the child by the father or society. The authors note that this does not demonstrate that the events rated as most stressful for child-bearing women do actually result in more disturbance.

Findings from non-puerperal depression in women may also be relevant, the more intimate the relationship, the greater the impact of any friction experienced for the woman (Weissman & Faykel 1974). More "negative reactions" to child-bearing by new mothers (evaluating experiential aspects), have been reported in relation to an absence of positive marital relationships (Westbrook, 1978). Martin (1977) reported marital discord to differentiate those women who suffered puerperal illness. However, although statistically significant, only 5 of her 50 depressed women reported marital discord, compared with 2 of 253 controls, so that statistical significance may need to be treated with caution. Also, the sample was a low socio-economic one, where unplanned pregnancies, previous psychiatric illness and other stresses also differentiated.
Similar considerations apply to the study by Braverman & Roux. Direct questions concerning marital discord and feelings of being unloved by the partner discriminated the puerperally-ill group, but there were also many separated couples and unplanned pregnancies, and the relationship between these factors is not reported. It would be difficult to determine whether the women were actually not loved, or whether they had abnormally high dependency needs or were generally unprepared for motherhood.

5.2d Environmental factors, occupation, class and the influence of roles

There has been much discussion in recent times concerning the changing role of women in many societies, including our own. The rate of change has been sufficiently rapid for the values and the coping strategies of one generation of women to be no longer relevant for the following generation. It may still be possible in less developed societies for a woman to hand down to her daughter the same set of values recognized by her and her society. It may also be possible for her generation of women to teach ways of adapting to the roles of marriage and motherhood which satisfy that society, but which also allow satisfaction to the woman herself. The demands made on young women today may however be totally dissimilar to those made on their own mothers, and problems may have to be faced with no recourse to the experience of other women.
Because the change has been truly a role change fundamental to being a woman, it is difficult to select aspects of the changes contingent on this that might be most salient in their potential for inducing stress responses. One of the most obvious changes — that of the change from being a housewife to having a paid occupation after marriage — may make demands which still differ between women. For some the problem may be the enforced need to work where choice would decide otherwise; for others the problem may be the choice itself, and uncertainty regarding its implications. Where children are born, or are planned, such choices have even more far reaching implications. The dilemma may be one where neither decision is satisfactory for the woman herself and where society as a whole and her more immediate society pull her in opposite directions.

The issues regarding whether or not to work may however reflect deeper issues, such as "independence", economic freedom and mutuality within the marriage or partnership, and unless such issues have also been faced by her partner and some degree of agreement reached, any lack of awareness on his part may constitute a problem, even if the woman herself has a clear view of her optimal path. With the institution of marriage itself coming under question, it is hardly surprising that motherhood should reflect some of the uncertainties.
Investigation of role-strain as such is less straightforward than that of aspects in which it may be reflected, such as the need to work or not to work. Richman (1976) has mentioned the need to consider how the problems and conflicts regarding women's roles today contribute to the development of depression. While her main observations relate to mothers of pre-school children, the effect of work on women's health has been cited such role-conflict might be expected to become acute after the birth of a child. In view of Pitt's observations that much puerperal depression probably goes undiagnosed, Richman considers that this may partially account for the high rates of depression found in women with young children (Brown et al. 1973). Commenting on the role-conflict on type of housing being held in assumptions by clinicians, especially of women with young children, she observes that illness cannot be separated from these demands and it does not yet seem possible to predict those apparently 'normal' women who will become depressed during the puerperium.

When considering values held, Richardson & Guttmacher (1967) have noted how these may vary with regard to health care generally. A relationship is proposed by them whereby values are said to influence social customs and practices, which in turn influence reproductive behaviour — the chain of influence then returning via the customs and practices to influence the values. They have suggested that the values that a woman learns with regard to sex, reproduction, children and family life influence her in many profound ways before and after pregnancy; also that these may cumulate into a consistent pattern of influence of which she is only
partially aware, as her behaviour conforms so closely to the value system and to various expectations. For some women there may be conflict as the values she herself holds and those to which she is exposed are discordant. Such conflicts could occur for example regarding an unwanted pregnancy.

The effect of work on women's health has been cited as generally beneficial, the employed having lower sickness rates than housewives (Nathanson, 1975), in a U.S.A. survey which did not, like earlier surveys, exclude puerperal illness from the statistics. Women with pre-school children reported more illness than others, the isolation contingent on type of housing being held to contribute to morbidity. Illness cannot however be categorically separated from illness-reporting behaviour.

Puerperal illness has been found to be greater in those with a college education, but where the education was not completed in an American study, (Gordon et al. 1959). The affected women had also had more moves. Housing problems were also found to discriminate by Martin (1977). Gordon et al. noted that their patients had less help immediately after the birth, and had husbands who were not available then, in a predominantly middle-class sample.

Examination of the effects of moving with regard to non-puerperal depression in women may be relevant. There are suggestions that moving may comprise a number of "loss" factors, even where it is undertaken voluntarily for the
Weissman & Paykel (1972) found that many moves were necessitated by the husband's career and that tangible goals did not compensate for other areas of satisfaction for the wife, who frequently felt helpless concerning it. The women themselves attributed their depression, not to the move, but to factors such as increased isolation, which were by-products of the event. Social pressures inhibited overt reactions to the stress which were internalised, resulting in self-blame and feelings of personal inadequacy.

Weissman & Paykel query the supposed ease with which Americans have adapted to contemporary geographical mobility, which may even be more stressful because of cultural expectations. Educated housewives faced particular problems, as they realised that accommodating to their husband's career made their own work history fragmented, and precluded present or future job-satisfaction. This exclusion from being "socialised into a profession" may also have inhibited the development of a personal image and competence. Immigrant mothers have been studied, the social, economic and cultural stresses being presumed to be greater for them (Barzelai & Davies; Kendall et al.). The former study, conducted in Jerusalem, did not find that immigration to Israel differentiated those who became ill. Lower educational level did however discriminate, as did poor housing areas, and their husbands' lack of employment or extreme religious involvement. In a London borough,
Kendell et al. found more mental illness among the daughters of skilled manual workers than higher or lower socio-economic occupations (but during the 2 years before and after child-birth). When examining a pre-specific post-partum illness, this was found to be much higher for immigrants born outside the U.K. While recognizing the cultural and housing stresses to which immigrants are frequently subject, they had no explanation as to why this should apply particularly post-partum. They expressed the view that such social stresses should operate equally before and after childbirth, not specifically in the 3 post-partum months.

It might however be possible to take issue with this. Cultural norms for women from less developed countries might lay great emphasis on the birth and infant care, for example within the context of an extended family and environmental network, and with strong social support for the new mother herself at that time. Gordon et al. (1959) do not consider it surprising that general social strains were more strongly related for puerperal than other patients, regarding pregnancy and child-bearing as an "acute social event". Their disturbed mothers had more stressful life experiences, but responded better to changes in the environment than non-puerperal patients with more chronic problems. Other stress factors indicated as puerperal predisposers have included financial or housing problems, family illness or bereavement (Martin, 1977).
Huckella et al. (1971), (in a study concerned with problems of pregnancy and childbirth rather than depression) assessed women's "adaptive potential" in conjunction with life change scores, and found that their combination predicted whereas neither measure had done so independently. Their findings of a poor prognosis for "low psycho-social assets" in conjunction with high life change scores lead them to propose a model of enhanced susceptibility to environmental stressors, rather than a causal one.

McGowan also speculates on the possibility that potential predisposers may themselves be modified in their salience by the psycho-social aspects of life-events, and in line with life-stress research, suggests a cumulative effect of multiple stressors.

5.3. **Personal characteristics of the mother**

This section will include personal characteristics associated with puerperal depression using this definition loosely, aspects such as "anxiety" being open to classification as a personality characteristic, a mood state, physiological state or pathological condition. A more general approach to any individual differences observed might be to consider them as "attitudinal" or "coping styles", taking this to include both "mental and emotional" attitudes and responsiveness.
Noting that psychological reactions and attitudes have been observed to relate to obstetric conditions, the dearth of studies of personality attributes measured before pregnancy and emotional reactions to child-bearings have been commented on (Grimm, 1967). The problem of the "choice of target" is as relevant for puerperal as for pre-partum conditions. Thus, although Grimm suggests that patterns (rather than specificity) can be observed, (such as an association of hostility with hypertension in pregnancy), there appear as yet to be no clear predictors of those who will succumb specifically to depression. She proposes that correlations which are sufficiently strong are adequate, and indeed vital for initiating intervention programmes.

5.3a Anxiety

One of the few characteristics measured before the birth which has been found to predict later depression in several studies has been that of anxiety (Tod, 1964; Dalton, 1971). Tod's study was conducted in general practice over 5 years and used interviews for assessment. This "pathological anxiety" in pregnancy was found in every mother who developed depression and was suggested as an absolute criterion. It should be noted however that Tod's incidence of depression was low (2.9%), and probably comprised only extremely severe cases. They had more psychiatric and medical histories, more abnormal marital conditions and all had "inadequate personalities". Tod therefore suggested
depression as the end-result of a "long-established maladjustment", with the puerperium acting as the stress leading to breakdown in the predisposed woman. He labels such women as "abnormal", but one of the intriguing and problematic aspects of the condition has been the observation that it appears to affect previously "normal" and well-adjusted women.

Dalton had found an association between puerperal depression and anxiety expressed in the first trimester of pregnancy only; the same subjects showing more elation later in the pregnancy. As Pitt had failed to find any association with pre-partum anxiety, Dalton suggests this could have been due to his assessments being made late in pregnancy. Meares et al. (1972) found both anxiety and neuroticism to be higher pre- than post-partum. However, this represented measures taken from 2 different groups, not the same sample assessed before and after, and the post-partum monitoring took place within 7 days of the birth. The aim was to examine mental health in pregnancy as well as post-partum, and they suggest that it may not be good before the birth for women in general, as the distribution of the scores was uni-modal rather than containing a vulnerable sub-group of high scorers.

A subsequent study (Meares et al. 1976) assessed anxiety in the 2nd and 3rd trimesters and found this to be related to later depression (6 to 9 months post-partum). They criticise both Dalton's and Pitt's measures of anxiety,
holding this to be a reason for Pitt's failure to find any relationship, their own measure being the Manifest Anxiety Scale.

Others including Garner (1964), Boyd (1942) and Hemphill (1952) have stressed the role of anxiety from the standpoint of clinical experience and observation, rather than from that of experimental findings. Garner has suggested that pregnancy and childbirth are specific for creating anxiety in females. If anxiety relates to uncertainty concerning the woman's capacity to manage inner sexual or aggressive impulses, maladaptive behaviour may utilize defences to bind these to the extent that less capacity is available to respond to additional stresses. Some, e.g. Zilboorg (1957) have repudiated psychological tools as being inferior to clinical evaluation, thus partially accounting for the lack of measurable data in this area.

Others, using approaches which were retrospective, have suggested that those who suffer puerperal illness include those who have experienced recurrent disabling anxiety, (Brown & Shereshefsky, 1972; Seager, 1960).

Other evidence not directly concerned with post-partum depression but possibly of tangential interest has indicated that high anxiety measured in pregnancy was associated with poorer maternal and child-rearing attitudes measured at 8 months post-partum (Davida, Holden & Gray, 1963; Pitt, 1975; Davida, Holden & Gray, 1963; Garner, 1964; Zilboorg, 1934). Such hostility is proposed as being
Flt (1959) originally reported an association between depression and introversion and neuroticism on the M.P.I. However, this was measured post-natally, when the depressives were already depressed and subsequent investigation of pre-natal M.P.I. scores (1972) showed no such association. There has been controversy concerning whether those who succumb to puerperal illness have premorbid personality structures. Brown & Sharesehsky (1972) compared findings on a) those women who were previously functioning well, b) those functioning adequately although with neurotic symptoms, c) those with long-standing character problems; however their case studies were too few and the illnesses too varied for clarification of depressive predispositions as such.

Mosewald & Stonehill (1972) presupposed pre-morbid personalities and asserted that schizoid features characterized those who broke down shortly after the birth, and that "narcissistic" types were more prone to later disturbance. Barsilai & Davis suggested that younger marital age may be an indirect measure of pre-morbid personality structure.

5.3c Hostile attitudes

Some studies have focussed on attitudes towards the child which may be ambivalent, negative or hostile (Westbrook, 1975; Pitt, 1975; Davids, Holden & Gray, 1963; Garner, 1964; Zilboorg, 1931). Such hostility is proposed as being
largely unconscious (Zilboorg, 1951), or as the mother's interpretation of her own turning away from her child who cannot adequately supply her own need of gratification Garner (1964). Aggression has also been cited as directed towards the self, or to the patient's mother (Anderson, 1961). There have been speculations concerning the interaction of aggression and anxiety. Hostility reflecting an inability to relate to others, may contribute to emotional upset and anxiety (McDonald & Christakos, 1963), unconscious hostility towards the child may take the form of anxiety in the father as well as the mother (Zilboorg, 1957).

5.3d Other personal characteristics

"Immaturity" has been proposed as a predisposing factor (Brown & Shereshefsky, 1972; Boyd, 1942). There seems a danger of a tautological argument here however, as "maturity" itself could be behaviourally defined as the successful weathering of life-events. Hemphill (1952) has proposed rigid, obsessional characteristics as pre-disposers, also dependence; while Douglas (1963) has noted compliance and Tetlow (1955) "inadequacies specifically related to sexual and reproductive life".

Despite the predisposing personality constellations that have been postulated, few have been validated by study (McGowan, 1977). She has noted the difficulty of separating the unique responses of individual women from the "social and intrapsychic reorganisation" required from
all women on becoming mothers, and proposes that attempts at identifying a high-risk population would be more fruitful (although suggesting hormonal characteristics in this respect).

5.4. Characteristics of the infant

An aspect which has commanded very little research interest has been that of possible effects of characteristics of the infant on the mother with regard to puerperal depression. Pitt (1968) found that anxiety concerning the infants of depressed mothers was not justified in terms of ill-health, but that infants who would not sleep and kept crying were found "hard to love, with consequent guilt and anxiety". Dalton (1971) however found that the infants of the "blues" mothers tended to vomit more and keep their mothers awake, but not those of the depressed mothers. (Sears et al. 1968). Since a sleep appears to ensure

It is commonly accepted that there are "easy" babies and those that are difficult to handle (with presumed greater stressfulness or lack of gratification for the mother) in ways such as crying or vomiting more and refusing to feed or sleep, and being hyperactive. Such aspects might deserve more attention, although the direction of causation between mother and infant might be difficult to determine.
5.5. The possible role of sleep factors

An area related to the previous one is that of sleep-deprivation in new mothers and in differences in their sleeping patterns. A tentative theoretical link exists with depression, as regard its presumed effect, not causation - viz. that "classical" depression is usually categorized in terms of early morning wakening and milder "atypical" depression by problems in getting to sleep at night. Most puerperal depressives appear to show symptoms of atypical depression (Pitt, 1966; Martin, 1977). Sleep disturbance "over and above that inevitable with a new baby" was reported by a third of Pitt's depressed women, with greater general distressed mood in the evenings.

One study has attempted to examine "normal" sleep patterns in pregnancy and the puerperium by EEG monitoring (Karacan et al., 1968). Stage 4 sleep appeared to reduce during late pregnancy and to reach normal levels again 2 weeks after the birth. They comment on findings of less stage 4 sleep in depressed patients and of depressed mood in normal subjects experimentally deprived of stage 4 sleep. (Sex steroids, especially progesterone, have been cited as inducers of stage 4 sleep).

Karacan et al.'s methodology permitted the assessment of only a very few women and those under considerably artificial conditions of sleeping in the hospital in pregnancy and "controlling" the infants' wakening of their mothers, and the latter's cat-naps. The authors did not hypothesize
sleep-disturbance as either possible cause or effect of clinical syndromes, but stress the link between the sex hormones and sleep. Monitoring sufficient numbers of women to obtain sufficient cases of depression for analysis by these means does not appear feasible, even if the methodology were less intrusive.

The author would like to suggest 3 aspects of sleep disturbance which may deserve further examination. The first is clear differentiation between sleep-loss caused directly by the infant’s demands and that which appears as a "symptom" in depression and is not directly related to the infant. The second concerns the extent of sleep-deprivation that should be considered "normal". The extent and nature of sleep loss for many new mothers would be considerably greater than that considered tolerable for "experimental" purposes. Given that sleep deprivation per se can result in the breakdown of normal mood and behaviour, some mothers might even be suffering directly from this stress. The extent to which such sleep loss is considered "normal" may be partly a function of the typical western nuclear family, where infant-care devolves more squarely on the mother alone. The third possibility is that some individuals – possibly those who normally require more hours of sleep – may be particularly sensitive to the sleep-loss of the early puerperium, and for them this may act as a highly potent stressor, whether or not in conjunction with other factors.
6. Review of methodologies and criteria for assessing depression

considerable time after the birth, such that the depression would probably not be at its worst.

This section will review studies which have purported to investigate puerperal depression, as to the appropriateness of their criteria and their methodologies. Studies will first be considered in the light of 2 criteria which are related:-- a) those of a diagnosis of depression as distinct from the blues, psychosis or other more severe disorders; and b) those of the time of onset of the illness. The criteria proposed by Pitt (1963, 1975) will be followed. "irth" as the ideal. Baum's & Boux (1970) presented findings intended to indicate those applicable.

A number of studies which have evaluated depression at 6-week post-partum, but only those taken at the 4th have done so during the first few days or 2 weeks after delivery, and thus whatever changes have been observed, these too no substantial difference between the two, which should be considered to be of relevance only for severe depressions. Keeves et al. (1971) used the period the "blues" syndrome, e.g. (Jayah-Zadeh et al. 1967; between 6 to 12 months after the birth, see & James, Treadway et al. 1969; Nott et al. 1976; Keeves et al. 1971). Those delivered "during the previous year", and 1972).

Keeves et al. (1965): Four different groups delivered by C. Dalton's assessments took place at 10 days, 6 weeks and 6 months post-partum. No differences are reported between the evaluations taken at these times, merely that diagnosis was confirmed after the 6-month assessment.

While recognizing Pitt's "blues" distinction, she discusses this in terms of severity of illness, and there is no information concerning cases of mild depression which remitted after the 10th-day monitoring, or of more severe depression which appeared later.
Other studies have used assessments which have taken place a considerable time after the birth, such that the depression would probably not be at its worst then, and some cases might already have remitted. Gordon et al. (1959), e.g., making assessments at 4 months post-partum, as did Uddeberg & Nilsson (1975).

Brown & Shereshefsky (1972) criticized the variety of times on onset used by other workers, but themselves used the criterion of the period within 6 months of delivery, while recommending that of "very close contiguity to childbirth" as the ideal. Braverman & Roux (1978) have included several variants of postnatal onset criteria (although, including some used at depression) should be considered only in so far as they refer to illness, Brown & Shereshefsky's (1972) criticized finding as presented findings imputed to indicate those applicable at 6-weeks post-partum, but only those taken at the 4th day assessment actually are given, it being claimed that there was no substantial difference between the two, which appears surprising. Neaves et al. (1976) used the period between 6 to 18 months after the birth, Rees & Lutkins (1974) those delivered "during the previous year", and Jacobson et al. (1965) four different groups delivered 3, 6, 9 and 12 months previously. Wilson et al. (1972) monitored up to 6 months post-partum, although "peak onset" occurred within the first 2 weeks, and is therefore more relevant for the "blues" syndrome, it appearing from scrutiny of their data that onset between the 3rd and 8th week occurred for only 12% of their cases.
A number of studies have presented findings that:
a) apply to more severe disorders, b) that include such
disorders with those of depression, or c) that do not
provide details of the illness. Tetlow's (1955) study
has been criticized for its lack of clinical details of
the psychiatric illness by (Seager, 1960), who however
used post-partum women hospitalized for a mental illness
from the first week to 2 months after confinement, and
whose findings (although including some cases of depression)
should be considered only in regard to more severe illness.
Brown & Shereshefsky (1972) have criticized studies which
have included a great variety of psychiatric syndromes as
well as times of onset, e.g. (Paffenbarger, 1961; Pugh,
1963), or used broad diagnostic categories without stating
criteria for assignment to them, e.g. Paffenbarger and
Strecker & Knaugh (1926).

Studies which have utilized patients who have been
admitted to a psychiatric hospital, e.g. (Barzilai & Davis,
1972) can be assumed to be more relevant for extreme dis-
orders, rather than for an adequate appraisal of depression
as such. The methodology which seems most appropriate
therefore is the follow-up of all women delivered over a
specified interval to include the 2nd post-partum month,
and therefore to utilize a maternity hospital or general
practice population, e.g. (Pitt and Dalton's studies).
Some have favoured the use of controls in the form of non-puerperal mentally-ill women, of puerperal healthy women, or of a group of non-puerperal healthy women of child-bearing age (Keen & Lutkins, 1971; Seager, 1960; Treadway et al., 1969), while others repudiate the wisdom of attempting this (Kaij et al., 1967). The author's agreement lies with the latter, and it appears difficult to envisage an entirely appropriate population for use as controls, other than using puerperal women in the same sample who do not succumb to depression.

Sizes of samples have varied considerably from those as small as 21 (Treadway et al., 1969), to those as large as 305 (Pitt), 412 (Martin) and 700 (Tod). Some studies have suffered from extremely high drop-out rates, Meares et al.'s study losing 80 of an original sample of 129, and Dalton's losing 321 of an original sample of 500. Sample size will be dictated by a number of factors and will partially determine the number of variables that it is possible to examine concurrently. Minimum sample size however is important in this area, if an incidence of depression of approximately 5% to 10% is expected. If sample sizes are smaller than 100, too few cases of depression may be expected for any evaluation of them to be made.
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Overlapping with the consideration of sample size is the use of between or within subject comparisons. Jacobson et al. (1965) attained a sample size of 404 by using 4 groups of women who had been delivered at intervals from 3 to 12 months previously, and used retrospection to make comparisons between the pregnant and parturient state, as well as between these different post-partum periods. Meares et al. (1972) compared a group of ante-natal women with another group recently delivered. In this field it would appear essential, when examining changes in women's state relative to childbirth, to monitor these in the same women before and after the birth. Within subject changes are essentially those of interest and the known intervening life-event of the birth and the time course of pregnancy provides an optimal methodology for examining these. Using a self-devised questionnaire, with a clinical interview to outline or validate diagnosis, Meares et al. have conducted prospectively or retrospectively. Some studies have used case records of mental illness post-partum with no evaluation of possibly predictive factors in pregnancy, e.g. (Wilson et al. 1972), while others have used assessments of the women themselves after delivery, but have used retrospective methods to obtain background data that might be predictive (Martin, 1977; Jacobson et al. 1965). It is generally agreed that a prospective approach is optimal and a number of studies have adopted this (Meares et al. 1972; Braverman & Roux, 1973; Dalton, 1971; Pitt, 1968; Tod, 1964; Gordon et al. 1959; Uddenberg & Nilsson, 1975).
Methods used for assessing depression post-partum have varied, and in some cases have not been clearly specified e.g. (Dalton, 1971) — although here psychiatric evaluation was conducted "to confirm diagnosis" — and Tod (1964) where post-natal general practice appointments can be assumed to have been used for the evaluations, which sometimes required "exhaustive probing" to ascertain them. In one case, psychiatric interviews have been employed (Martin 1977), and a criterion of illness has been given as "notable deterioration of social and interpersonal functioning", and less severely of "painful mental symptoms" (Uddenberg & Nilsson, 1975). Interviews have been used in conjunction with questionnaire measures, Pitt using a self-devised questionnaire, with a clinical interview to confirm or exclude diagnosis. Pitt's criteria included those of depressive symptoms which had developed since delivery, were unusual in the woman's experience and to some extent disabling, and of more than 2 weeks duration.

Others have used questionnaires which were specially devised for completion by the nurse conducting the post-partum check-up (Braverman & Roux), a specially devised questionnaire covering a range of mental symptoms posted to the women post-partum (Jacobson et al.), and the Beck Depression Inventory (Bees & Iutkins). Meares et al. (1976) used a questionnaire composed of visual analogue scales,
said to be an improvement on those measuring mood alone by including measures of hopelessness, guilt and self-

It may be apparent from the previous review that the questionnaire actually contained 4 areas of neuropsych depression in one where relatively little statements which required a response in terms of presence work has been undertaken. Little progress has been made and severity of the items, and also a direct question in clarifying the reasons for most mal depressive reactions, concerning the duration of depression, if experienced. except possibly in those already manifestly vulnerable.

Studies which have used psychiatric hospital admissions as criteria are not considered here, for reasons which have already been specified.

As the problem of neuropsych depression has not been investigated these, and the relevance of the psychological dimensions already utilized may be apparent. Whereas the nature of the presumed biological 'stressor' is vastly different, extension from laboratory studies to clinical work is always inevitable eventually if it is to be validated, and it seems appropriate at this point to examine whether the tentative associations found between the psychological dimensions, their confounded with each are with superficially depressed mood are stronger than even more.

The prospective field study in general is now proposed will now be described.
The Field-study

It may be apparent from the previous review that the area of puerperal depression is one where relatively little work has been undertaken. Little progress has been made in clarifying the reasons for post-natal depressive reactions, except possibly in those already manifestly vulnerable.

As the possible approaches to the problem are numerous, and those of the individuals’ characteristics have not been explored to any extent, there seems every justification for investigating these, and the relevance of the psychological dimensions already utilized may be apparent. Whereas the nature of the presumed potential "stressor" is vastly different, extension from laboratory studies to field work is always inevitable eventually if it is to be validated, and it seems appropriate at this point to confirm whether the tentative associations found between the psychological dimensions, their associations with each and with superficially depressed mood are relevant for this syndrome.

The prospective field-study on puerperal depression will now be described.
Introduction

It is apparent from the existing literature on post-partum depression that clear prediction in pregnancy of the women who may be vulnerable is still lacking.

Whilst an ideal methodology might be to examine intra-personal, psycho-social and physiological aspects concurrently, such a strategy is rarely possible.

It is proposed in this study to investigate individual differences in a sample of pregnant women on 2 particular dimensions. It may be a matter of choice as to whether these dimensions are designated as "attitudes" or as "personality".

The preference of the author leans towards regarding them as attitudinal, personal or "coping" styles.

Numerous references have been made to the possibly maladaptive aspects of hostility in relation to illness, e.g. (Caine 1970; Foulès 1966; Foulès 1971; Priest 1977). Its coexistence with a depressed state has frequently been noted e.g. (Cochrane and Neilson 1977; Priest 1977).

Many clinicians also stress the essentially intro-punitive nature of this hostility, with its manifestations in self-blame and guilt (Mayo, 1967; Priest 1977; Foulès, Caine and Creasy 1960). A few however have noted that hostility or aggression appears to be directed outwards during depression (Bullock et al, 1972; Weissman and Paykel 1974; Blackburn 1974).

Understandably, it has not previously been possible to examine whether this hostility, directed either inwards or outwards, would predict future depression.
Without making assumptions as to whether or not post-partum depression is to be qualitatively equated with depression occurring at other times, the time-course of pregnancy and the puerperium gives an opportunity to examine the possibly predictive value of assessments made during pregnancy for depression occurring post-partum.

It is hypothesized here that high hostility and also high intropunitiveness or extrapunitiveness (which are seen as generally "maladaptive") could render women vulnerable in the face of life stress, and that they might predict the woman who succumbs to post-partum depression.

It will also be queried on a two-tailed hypothesis whether extremely low hostility (which might indicate a lack of aggression) might be maladaptive and might be associated with post-partum depression.

The perception of a lack of control over events has also been proposed as a maladaptive feature (Rotter 1966; Seligman 1975). Such perceptions of lack of control might be accentuated in the puerperal state, where women actually experience being increasingly "controlled" by the recent events of childbirth and infant care. For the woman disposed to view herself as under "external" control, such perceptions might be accentuated and lead her to "give up" completely.

It is therefore hypothesized that women rated as high on perceptions of "external" control (using Rotter's Locus of Control Scale), will be more vulnerable in the face of major life stress, and that this might predict their vulnerability to post-partum depression.

It might however also be argued that the extremely "internally" controlled individual might also be vulnerable if facing life events over which perhaps for the first time,
she has been unable to exercise complete control. A two-tailed hypothesis will therefore also examine whether any women who score as extremely internal might also be vulnerable for post-partum depression.

Whereas these two dimensions of attribution of causality or control and of blame are not theoretically related, it could be expected that both attributions should logically lie in the same direction (i.e., externally or internally). It is hypothesized however that scores on these two dimensions will be unrelated. It is also proposed that four possible attitudinal styles might be identifiable by these two scales — viz:—

a) Internal causality and internal blame
b) External causality and internal blame

c) Internal causality and external blame
d) External causality and external blame.

It is tentatively suggested that each of these four styles might have their correlates in differential illness predisposition and possibly in different physiological responsiveness.

It is therefore proposed to examine if sufficient women are represented by high scores in the four categories — whether there is an association between high scorers on both dimensions in any of the four categories and puerperal depression. The personal styles envisaged as most likely to be related to depression are those of:—

(a) The woman who feels that she has caused the events in her life, and that she is to blame for them, as she might suffer from an excess of guilt and self-recrimination.
and (b) The woman who feels she has no control over what happens to her (and therefore cannot determine events) and yet blames herself for their outcome. Such a woman might be vulnerable through viewing events as inevitable and incapable of being altered, and therefore be lacking in resolution which an introfuputive attitude might further drain of any resolve. The paradoxical nature of this attitude would appear to make it difficult for such an individual to adopt any constructive approach to weathering life-crisis.

Permission was given for a team from St Mary's comprising 2 psychologists and a psychiatrist under the direction of Professor Priest, and a biochemist and psychiatrist under the direction of Professor Sandler from the Department of Chemical Pathology at Queen Charlotte's Hospital, to study patients from the main ante-natal clinic. Permission was given for access to the medical records for patients' addresses and background data.

The psychologists were given the status of honorary clinical psychologists for the duration of the study. The work took place concurrently with an investigation screening for the occurrence of post-natal depression in the family planning and post-natal clinics of the same hospital, which will not be reported here.

The time-span of the postpartal period to be investigated was selected (not by the author) to commence at the 30th week of pregnancy (i.e. approximately 10 weeks before delivery) and to extend up to the 6th week after delivery. Permission was given for subsequent assessments of depression to be made during the first post-partum year, if this should seem feasible.
Design

The study of pregnant and post-partum patients was made possible by cooperation between St Mary's Department of Academic Psychiatry and Queen Charlotte's Maternity Hospital. Permission was given for a team from St Mary's comprising 2 psychologists and a psychiatrist under the direction of Professor Priest, and a biochemist and psychiatrist under the direction of Professor Sandler from the Department of Chemical Pathology at Queen Charlotte's Hospital, to study patients from the same ante-natal clinic. Permission was given for access to the medical records for patients' addresses and background data.

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The time-span of the puerperal period to be investigated was selected (not by the author) to commence at the 30th week of pregnancy (i.e. approximately 10 weeks before delivery) and to extend up to the 6th week after delivery. Permission was given for subsequent assessments of depression to be made during the first post-partum year, if this should seem feasible.
The nursing staff in charge of the ante-natal and post-natal clinics were visited and informed of the nature of the investigation. They were consulted as to the hospital procedure for making appointments, and the method of approaching patients was decided upon that would entail the least inconvenience for the nursing and reception staff.

A small room in an adjacent block was made available on the occasions when physiological recordings were to take place, and this housed the Grass polygraph.

Selection of patients was made on the basis of extracting weekly from the appointments file all those women from one ante-natal clinic who were not less than 30 and not more than 36 weeks pregnant. The patients were not otherwise selected for parity, race of any other variable. Size of the sample was not pre-determined, the aim being to include all patients who were willing to participate from this clinic over a period of approximately 1 year.

Whereas therapeutic intervention was not part of the author's investigations, provision was made for offering treatment to women who might be depressed in this (or the concurrent post-natal screening) sample by one of the psychiatrists in the team.

The overall design of the study comprised:-
A) Psychological assessments of all the women at approximately the 30th week of pregnancy by psychometric measures. The psychometric measures selected for the investigation comprised:
- B) Follow-up of the same women at 6 weeks post-partum to assess the presence of depression, using a self-reporting questionnaire scale.

C) It was also aimed to investigate in greater depth a small sub-sample of the women, selected on the basis of the psychometric measures for further investigation (not by the author, and not reported here):
- psychophysiological responsiveness
- menstrual characteristics
- circadian rhythm patterns
- wantedness of the pregnancy
- family and social relationships

D) A biochemical assessment, involving the analysis of urine samples was conducted by the biochemist in the team on as many of the whole sample as were willing to participate. Selection of this measure was made independently and did not relate theoretically to the psychological or physiological aspects of the study, only to a biochemical factor which might possibly pre-dispose to depression. This aspect will not be reported here.

The method will now be described in detail.
Method

The psychometric measures selected for the investigation comprised:

1. The Hostility and Direction of Hostility Questionnaire (HEHQ), (Caine, Foulès and Hope 1967)
2. The Locus of Control Scale, (Rotter, 1966). This contained minor amendments to the original scale, reducing the number of questions to 25.
3. The Delusions-Symptoms-States Inventory (DSSI), (Bedford, Foulès and Sheffield, 1976) (not chosen by the author). This yields a score on anxiety, and also one on depression.
4. The Self-Rating Depression Scale (SRS) (Zung 1965)

Whereas post-partum depression was the variable under investigation, it was considered desirable to administer the same measure of depression pre-natally in order to assess post-partum depression. The SRS is claimed to be able to distinguish depressed patients from normals and to correlate highly with the D scale of the MMPI and the Depression Adjective Check List.

A brief description of the study was typed on a small card attached to each envelope. This was in order that a form of the D scale of the MMPI and the Depression Adjective Check List. Whereas post-partum depression was the variable under investigation, it was considered desirable to administer the same measure of depression pre-natally in order to assess depression occurring specifically since the birth.

For the post-natal screening, the questionnaires administered could be completed on one occasion only (with the exception of the sub-sample), and would not involve more than approximately 45 minutes of the patients' time.
It was thought that the probability existed, (due to missed or changed appointments or premature births or hospitalization) that patients who did not complete all the questionnaires at this appointment might not be available at a subsequent one. More probably however, if the time taken to complete them amounted to an hour or more and became tedious, some refusals would be encountered or unfinished questionnaires, and the aim was to maintain an acceptance rate as near to 100% as possible. Selection of the questionnaires administered ante-natally was therefore restricted to the 3 scales mentioned above.

Selection of the patients was made by visiting the hospital the day prior to the selected clinic day. The files of all the patients due for appointments the following day were extracted, and the names, hospital numbers and appointment times of all those who were 30 to 36 weeks pregnant were noted. Envelopes containing the questionnaires were made up, the patients' hospital number only appearing on the envelope for subsequent identification.

A brief description of the study was typed on a small form attached to each envelope. This made it clear that a research project was being conducted in which there was no compulsion to participate. This study was described as an examination of how women feel before and after childbirth. It was explained that it entailed completing 3 standardised questionnaires while they waited for their medical appointments, and one questionnaire post-natally. Normal confidentiality was assured.
On the morning of the clinic the women selected were approached as they checked in at the reception desk for their appointment. The study was briefly described to them, and their attention also drawn to the description appended to the envelope. Their assistance was requested, and it was explained that there were other aspects of the study in which they might be asked to participate, if they were willing. Those that accepted were given the envelope and asked to return it the same day if possible.

Most of the women completed the questionnaires as they awaited their medical appointments. A few took them home and returned them at their subsequent appointment.

181 women were approached over the period of approximately 1 year. 172 agreed to take part. Of these, 6 women had language problems with spoken or written English, and these were not given the questionnaires, leaving 166 participants. Of the 166 envelopes returned, 5 of these contained some questionnaire responses which were not complete. Full pre-natal data was thus available on 161 subjects and partial data on 166.

Only a small percentage of the women were due to return to the hospital for their routine post-natal examination at 6 weeks post-partum, many of them living a considerable distance away. The files were scanned weekly for delivery dates of all the women in the sample. The SDDS was then posted to them in the 6th week after delivery, with a stamped addressed envelope and a short note to elicit their cooperation in returning the questionnaire. 127 women returned the SDDS completed and these comprised the final sample from whom both pre- and post-natal scores were obtained.
Results

The mean age of the 127 women was 28.62 (Table 1).

Table 1
Ages of the sample (n = 127)

<table>
<thead>
<tr>
<th>minimum</th>
<th>maximum</th>
<th>mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>41</td>
<td>28.62</td>
</tr>
</tbody>
</table>

65 women were primiparous, 59 were multiparous, and records on 3 were missing. Scores on the main variables and age distributions are shown in the Appendix. Results of the statistical tests will be presented under sub-headings for convenience.

(a) Post-partum depression ratings

Using Zung's criterion of moderate to severe depression (SDS scores of 48 or over), 7 of the 127 women (5.5%) met this criterion.

A further 21 had SDS scores indicating milder depression (scores of 40 to 47) comprising a further 16.5%. The total of those suffering from mild or more severe depression was therefore 28 women (22%) (see Table 2). Of these, 16 were primiparous, 11 were multiparous, and records on one were missing.

Table 2
Number of subjects falling into Zung's categories of non-depressed, mildly depressed and more severely depressed.

<table>
<thead>
<tr>
<th>SDS scores</th>
<th>20-39</th>
<th>40-47</th>
<th>48 &amp; over</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of women</td>
<td>99</td>
<td>21</td>
<td>7</td>
<td>127</td>
</tr>
<tr>
<td>%</td>
<td>78</td>
<td>16.5</td>
<td>5.5</td>
<td>100</td>
</tr>
</tbody>
</table>

A chi-square analysis between those who were mildly or more severely depressed and external locus of control scores greater than the mean and this was significant. 

\[ \chi^2 \text{ (corrected for continuity)} = 7.48, p \leq 0.005 \text{ (Table 6).} \]
The Locus of Control Scores and the depression ratings

The mean locus of control score for the whole sample was 10.65 and the mean score for those who returned the SDS was 10.75. These means were not significantly different, nor were the means of those who did not return the SDS significantly different on the other questionnaire measures, and only the scores of those who returned the SDS will be used in the analysis.

Table 3
Mean scores on the questionnaires for the sample (n = 127)

<table>
<thead>
<tr>
<th>Locus of Control</th>
<th>Hostility</th>
<th>Direction of Hostility</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \bar{x} )</td>
<td>10.75</td>
<td>15.61</td>
</tr>
<tr>
<td>s.d.</td>
<td>3.17</td>
<td>6.07</td>
</tr>
</tbody>
</table>

A Pearson correlation showed that the pre-natal External locus of control scores correlated significantly with the post-natal depression ratings as hypothesized, although the correlation was a low one (\( R = .23, \ p < .005 \), Table 4).

The second tentative hypothesis had proposed a possible association between extreme Internality and high SDS scores, but this was not upheld, a scatterplot showing that there were no highly Internal subjects who were depressed post-partum (Figure 1). (See also Figure 2 and Table 5).

It was also appropriate to compare the locus of control scores of the women who were severely or mildly depressed with those who were not.

A chi-squared analysis showed that of the 28 women who were mildly or more severely depressed, 21 had external locus of control scores greater than the mean, and this was significant. \( X^2 \) (corrected for continuity) = 7.48, \( p < .005 \) (Table 6).
Table 4

Pearson Correlation Matrix of the Main Variables
(n = 127)

<table>
<thead>
<tr>
<th>Hostility</th>
<th>Direction of Hostility (Intropunitiveness)</th>
<th>Locus of Control Scores</th>
<th>SDS Scores</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostility</td>
<td>.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direction</td>
<td>.34**</td>
<td>.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>of Hostility (Intropunitiveness)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locus of Control</td>
<td>.38**</td>
<td>-.001</td>
<td>.23*</td>
<td></td>
</tr>
<tr>
<td>SDS Scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.17+</td>
<td>-.001</td>
<td>-.06</td>
<td>-.22</td>
</tr>
</tbody>
</table>

1-tailed probabilities

* p < .005
** p < .001

2-tailed probabilities

+ p < .05
++ p < .005
Figure 1.

Figure showing the SDS scores of the group with high, medium and low Locus of Control scores (divided at ±1 S.D. from the mean).

Association between Locus of Control and SDS Scores

SDS Scores

0 1 2 3 4 5 6

LOcus OF CONTROL SCORES

0 1 2 3 4 5 6

Low LC Scores

('Internals' n=19)

SDS = 21.5

n = 19
Figure 2. Figure showing the SDS scores of those with high, medium and low Locus of Control scores (divided at \( +1 \) s.d. from the mean)

<table>
<thead>
<tr>
<th>SDS Scores</th>
<th>Low LC Scorers</th>
<th>Medium LC Scorers</th>
<th>High LC Scorers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(&quot;Internals&quot;, n=19)</td>
<td>(n = 77)</td>
<td>(&quot;Externals&quot; n=31)</td>
</tr>
<tr>
<td>SDS ( \bar{x} )</td>
<td>31.5</td>
<td>33.41</td>
<td>35.45</td>
</tr>
<tr>
<td>( n = )</td>
<td>19</td>
<td>77</td>
<td>31</td>
</tr>
</tbody>
</table>

SDS scores: 30, 32, 34, 36

Not depressed: 40-47
Mildly depressed: > 48
Table 5.

Table showing the mean scores on the questionnaires of those defined by the SDS scores as not depressed, mildly depressed or more depressed

<table>
<thead>
<tr>
<th>SDS scores</th>
<th>Locus of control</th>
<th>Hostility</th>
<th>Direction of Hostility</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 40</td>
<td>10.41</td>
<td>14.63</td>
<td>1.82</td>
</tr>
<tr>
<td>(Not depressed)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-47</td>
<td>11.81</td>
<td>17.91</td>
<td>0.19</td>
</tr>
<tr>
<td>(Mildly depressed)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 48</td>
<td>12.29</td>
<td>22.71</td>
<td>3.57</td>
</tr>
<tr>
<td>(More depressed)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 6.

**SDS scores**

<table>
<thead>
<tr>
<th>LC scores</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 40</td>
<td>57</td>
<td>43</td>
</tr>
<tr>
<td>&gt; 40</td>
<td>7</td>
<td>21</td>
</tr>
</tbody>
</table>

|  | 63  | 64  |
| 44.1% | 16.3% |
| 33.9% | 16.5% |

\[\chi^2 (O/F/C) = 7.48 \quad p < .005\]

Table showing the number of women who were mildly depressed post-natally and who were above and below the mean locus of control score.

The Direction of Hostility scores and the depressive ratings

The direction of hostility measure is scored in an Intropunitive direction. A high (positive) score therefore indicates Intropunitiveness, and a low (negative) score indicates Extrapunitive, the theoretical mean being zero.

The mean Dir H score for the whole sample was 1.41 (and that of those who returned the SDS was 1.64).

Initial examination using a Pearson correlation indicated that there was no linear association between the Dir H scores and the SDS scores. \((r = 0.01, n.s., \text{Table 4})\).

When examining the scores of the 22 mildly or more severely depressed, 15 of these had intropunitive scores (above the mean on Dir H), and 13 had extrapunitive ones.
(c) The Hostility scores and the depression ratings

The mean hostility score for the whole sample was 16.01 (and the mean for those who returned the SDS was 15.61, which was not significantly different).

A Pearson correlation showed that high hostility ratings and high SDS scores were significantly associated ($R = .38, p < .001, 1$-tailed, as hypothesized (Table 4). This linear association is illustrated in Figure 3 indicating that those low on hostility did not tend to have high SDS scores (see also Figure 4).

When considering the 28 women who were mildly or more severely depressed, 20 of these had a hostility score above the mean, compared with 8 who had a score below the mean, and this difference was significant on a chi-squared test, $x^2$ (corrected for continuity) = 7.23, $p < .01$, (Table 7).

(d) The Direction of Hostility scores and the depression ratings

The Direction of Hostility measure is scored in an Intropunitive direction. A high (positive) score therefore indicates Intropunitiveness, and a low (negative) score indicates Extrapunitiveness, the theoretical mean being zero. The mean $Dir_H$ score for the whole sample was 1.41 (and that of those who returned the SDS was 1.64).

Initial examination using a Pearson's correlation indicated that there was no linear association between the $Dir_H$ scores and the SDS scores, ($R = -.001$, n.s. Table 4).

When examining the scores of the 28 mildly or more severely depressed, 15 of these had intropunitive scores (above the mean on $Dir_H$), and 13 had extrapunitive ones,
Figure showing the SDS scores of those with high, medium and low Hostility (H) scores (divided at ± 1 s.d. from the mean)
FIGURE 4
Table 7

**SDS scores**

<table>
<thead>
<tr>
<th>&lt; 40</th>
<th>&gt; 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>67</td>
</tr>
<tr>
<td>46.5%</td>
<td>6.3%</td>
</tr>
</tbody>
</table>

**Hostility**

<table>
<thead>
<tr>
<th>40</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>31.5%</td>
<td>15.7%</td>
</tr>
</tbody>
</table>

$\chi^2$ (CPC) = 7.23, $p < .01$

Table showing the number of women who were mildly depressed post-natally and who were above or below the mean hostility score.

The mean postal score $\bar{x}$ for women who were severely of mildly depressed post-natally was calculated from Table 5.

The mean postal score $\bar{x}$ for women who were severely or mildly depressed post-natally was 20 and 20 respectively. The mean was divided at the value of 40, and the sample was divided into two groups. The sample mean for further analysis was greater than the mean for intrapunitive and extrapunitive as separate groups. The sample mean for further analysis was divided at the value of 40, and the sample was divided into two groups. The sample mean for further analysis was greater than the mean for intrapunitive group, $\bar{x} = 40$, and the extrapunitive group, $\bar{x} = 60$.

Separate correlations performed for these 3 groups between their HT scores and SDS scores showed that for the intrapunitive group, Dir N was still unrelated to depression, ($r = .05, p > .05$). That is to say, the more intrapunitive subjects did not appear to be more depressed than those with scores nearer the mean on Dir N (Table 7 (a)).

When examining the extrapunitive group, however, their Dir N scores were negatively related to the SDS scores, ($r = -.29, p < .01$). In other words, the more extrapunitive a subject the higher her depression rating tended to be, although the correlation is a low one (Table 7 (b)).

There appears therefore initially to be no support for the hypothesis that high intrapunitive scores might be related to later depression, but some support for that proposing that extrapunitive scores are associated.

Figure 5 illustrates the association between Dir N and SDS scores.
(\(x^2 = .20\) corrected for continuity), which was not significant (Table 8).

The mean pre-natal scores on Dir H of those severely or mildly depressed are summarized in the previous Table (5).

However, as some investigators have examined Int H and Ext H scores separately, and as there appears to be some justification for regarding intropunitives and extrapunitives as separate groups, the sample was divided at the sample mean for further analysis. This yielded an intropunitive group of \(n = 61\) and an extrapunitive one, \(n = 66\).

Separate correlations performed for these 2 groups between their Dir H and SDS scores showed that for the intropunitive group, Dir H was still unrelated to depression, \((R = .05, \text{ n.s.})\). (That is to say that the most intropunitive subjects did not appear to be more depressed than those with scores nearer the mean on Dir H) (Table 9 (a)).

When examining the extrapunitive group, however, their Dir H scores were negatively related to the SDS scores, \((R = -.28, p .01)\). In other words the more extrapunitive a subject the higher her depression rating tended to be although the correlation is a low one (Table 9 (b)).

There appears therefore initially to be no support for the hypothesis that high intropunitiveness might be related to later depression, but some support for that proposing that extrapunitiveness may be associated.

Figure 5 illustrates the association between Dir H and SDS scores.
Table 8

SDS scores

<table>
<thead>
<tr>
<th>Direction</th>
<th>In</th>
<th>Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostility</td>
<td>36.2%</td>
<td>41.7%</td>
</tr>
<tr>
<td>Severity</td>
<td>20.5%</td>
<td>21.3%</td>
</tr>
</tbody>
</table>

Table showing the number of women who were mildly or more severely depressed post-natally and who were extrapunitive or intropunitive.

\[
\chi^2 (df) = 0.20 \text{ (n.s.)}
\]

The Interpersonal Score (IPS)
Table 9 (a)

Inter-correlations between the measures for the Intropunitive and Extrapunitive groups separately.

<table>
<thead>
<tr>
<th>SDS</th>
<th>Locus of Control</th>
<th>Hostility</th>
<th>Degree of Intropunitiveness (Dir H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS</td>
<td>Locus of Control</td>
<td>Hostility</td>
<td>Degree of Intropunitiveness (Dir H)</td>
</tr>
<tr>
<td></td>
<td>.32*</td>
<td>.19</td>
<td>.42+</td>
</tr>
<tr>
<td></td>
<td>.05</td>
<td>.17</td>
<td>.15</td>
</tr>
<tr>
<td>Hostility</td>
<td>.19</td>
<td>.42+</td>
<td></td>
</tr>
<tr>
<td>Degree of Intropunitiveness (Dir H)</td>
<td>.05</td>
<td>.17</td>
<td>.15</td>
</tr>
<tr>
<td>Age</td>
<td>-.15</td>
<td>-.07</td>
<td>-.15</td>
</tr>
<tr>
<td></td>
<td>-.13</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1-tailed probabilities

* p < .01
+ p < .005

The Intropunitive Group (n = 61)

Table 9 (b)

<table>
<thead>
<tr>
<th>SDS</th>
<th>Locus of Control</th>
<th>Hostility</th>
<th>Degree of Intropunitiveness (Dir H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS</td>
<td>Locus of Control</td>
<td>Hostility</td>
<td>Degree of Intropunitiveness (Dir H)</td>
</tr>
<tr>
<td></td>
<td>.13</td>
<td>.56**</td>
<td>.27+</td>
</tr>
<tr>
<td></td>
<td>-.28*</td>
<td>.04</td>
<td>-.33++</td>
</tr>
<tr>
<td>Hostility</td>
<td>.56**</td>
<td>.27+</td>
<td></td>
</tr>
<tr>
<td>Degree of Intropunitiveness (Dir H)</td>
<td>-.28*</td>
<td>.04</td>
<td>-.33++</td>
</tr>
<tr>
<td>Age</td>
<td>-.36+++</td>
<td>-.04</td>
<td>-.21</td>
</tr>
<tr>
<td></td>
<td>.23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1-tailed probabilities

* p < .01
** p < .001
*** p < .005

The Extrapunitive Group (n = 66)
Figure 5: Scattergram illustrating the association between DTR H and SDS scores.
The contribution of the 5 sub-scales which go to make up the Dir H, Ext H and Int H measures were also examined separately. Most of these sub-scales had a small range and Kendall non-parametric correlation were therefore used. These showed that high scores on all five measures were positively and significantly associated with post-natal SDS ratings, the strongest associations being those of Acting-Out Hostility (AH), Projected Hostility (PH) and Self-Criticism (SC) – i.e. two components of the Ext H measure and one of the Int H. (Table 10 (a)).

These associations were re-examined for the Extrapunitive and Intropunitive groups separately.

Non-parametric correlations showed that for the Intropunitive group, associations between the five components of hostility and post-natal depression were all low and non-significant, with the exception of AH (Acting-Out Hostility) which just reached the 5% significance level (Table 10 (b)).

For the extrapunitive group however, all the hostility components except PH were significantly correlated with the depression ratings, the highest associations being those of CO (Criticism of Others), AH (Acting-Out Hostility) followed by SC (Self-Criticism), (Table 10 (c)).

(e) Age

The age of the subjects was also examined. A Pearson's correlation performed between this and the SDS ratings showed that depression was significantly associated with younger age ($R = -.23, p < .01, 2$-tailed, Table 4). When examining the extrapunitive and intropunitive groups separately, it appeared to be the extrapunitives only who were accounting
Table 10 (a)

Kendall non-parametric correlations between the SDS scores and the five sub-scales of the HDHQ. (1-tailed)

<table>
<thead>
<tr>
<th>SDS Scores</th>
<th>CO</th>
<th>PH</th>
<th>AH</th>
<th>G</th>
<th>SC</th>
</tr>
</thead>
<tbody>
<tr>
<td>.14**</td>
<td>.15**</td>
<td>.20****</td>
<td>.11*</td>
<td>.16***</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05 1-tailed
** p < .01 1-tailed
*** p < .005 1-tailed
**** p < .001 1-tailed

Table 10 (b)

Non-parametric correlations for the Intropunitive Group

<table>
<thead>
<tr>
<th>SDS Scores</th>
<th>CO</th>
<th>PH</th>
<th>AH</th>
<th>G</th>
<th>SC</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.06</td>
<td>.191</td>
<td>.203*</td>
<td>.06</td>
<td>.147</td>
<td></td>
</tr>
</tbody>
</table>

Table 10 (c)

Non-parametric correlations for the Extrapunitive Group

<table>
<thead>
<tr>
<th>SDS Scores</th>
<th>CO</th>
<th>PH</th>
<th>AH</th>
<th>G</th>
<th>SC</th>
</tr>
</thead>
<tbody>
<tr>
<td>.471***</td>
<td>.184</td>
<td>.426***</td>
<td>.249**</td>
<td>.394***</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05, 1-tailed
** p < .02
*** p < .001

The author notes that the scores were not related to depression.
for this association (Table 9a and 9b). The importance of this variable will therefore be examined in following sections in relation to the other measures. Parity (not examined by the author) was not related to depression.

(f) **Pre-natal Depression ratings (Delusions-Symptoms-States Inventory, DSSI)**

The sub-scale of this measure which yields a score on depression has a small range, and the scores found in this sample when measured pre-natally ranged from 0 to 8, most subjects scoring 0.

It may need to be queried whether those depressed post-natally were already depressed in pregnancy. Scores of 6 and over on this measure are considered to denote "personal illness", and only 5 subjects had such scores pre-natally. Of these, 1 scored over 48 on the SDS post-natally and 2 scored over 40. It should therefore be taken into account that these 3 women may have been depressed pre-natally, rather than having had a post-partum reaction. The 2 measures of depression are not amenable to direct comparison, but a t-test was performed between those who scored below 6 and those who scored 6 or over on the DSSI. This showed that the mean SDS scores of those few subjects rating as personally ill in pregnancy was slightly higher although this failed to reach significance, \( T = -1.70, p < .09, \) Table 11).
T-Test on the post-natal SDS scores of those scoring over and under 6 on the DSSI pre-natally.

<table>
<thead>
<tr>
<th>DSSI</th>
<th>n</th>
<th>XSDS</th>
<th>S.D.</th>
<th>T</th>
<th>P</th>
<th>Hostility</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 6</td>
<td>121</td>
<td>33.37</td>
<td>7.38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 6</td>
<td>5</td>
<td>39.20</td>
<td>10.75</td>
<td>-1.60</td>
<td>.09</td>
<td></td>
</tr>
</tbody>
</table>

Locus of Control findings in association with the unhypothesized variables.

As age was significantly associated with post-natal depression, the extent to which it might be influencing the hypothesized variables was examined.

The association between the locus of control and the SDS scores was therefore re-tested after partialling out the effect of age. This showed that the correlation remained significant between the 2 variables, $R = .22, p < .01$, 2-tailed) (Table 12). (The locus of control scores and age were not themselves associated, $R = -.06$, n.s. Table 4).

In case the fact that the few women who rated as disturbed on the DSSI/cAD depression subscale in pregnancy were influencing this association between LC scores and SDS ratings, these 5 women were omitted, and a further correlation performed only on those who did not rate as disturbed in pregnancy, and this indicated that the association remained significant ($R = .21, p < .01$, Table 13).
Table 12

Pearson Correlation matrix of the Questionnaire measures after the effect of Age has been partialled out.

<table>
<thead>
<tr>
<th></th>
<th>Hostility Direction of Hostility (Intropunitive-ness)</th>
<th>Locus of Control</th>
<th>SDS Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostility</td>
<td>Hostility Direction of Hostility (Intropunitive-ness)</td>
<td>Locus of Control</td>
<td>SDS Scores</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>.32</td>
<td>.09</td>
<td>.22</td>
</tr>
<tr>
<td>SDS Scores</td>
<td>.34</td>
<td>-.002</td>
<td>.22</td>
</tr>
</tbody>
</table>

1-tailed probabilities 2-tailed probabilities

* p < .01 + p < .005
** p < .001
**Table 13**

Pearson Inter-correlation matrix of the Questionnaire measures, excluding those subjects who scored \( \geq 6 \) on the DSSI pre-natally (\( n = 121 \))

<table>
<thead>
<tr>
<th>Hostility Direction of Hostility (Intropunitive-ness)</th>
<th>Locus of Control</th>
<th>SDS Scores</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostility</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direction of Hostility (Intropunitive-ness)</td>
<td>.33( ^+ )</td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>Locus of Control</td>
<td>.35( ** )</td>
<td>-.01</td>
<td>.21( * )</td>
</tr>
<tr>
<td>SDS Scores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.17</td>
<td>-.01</td>
<td>-.06</td>
</tr>
</tbody>
</table>

1-tailed probabilities 2-tailed probabilities

\* \( p < .01 \)
\** \( p < .001 \)
\( + p < .005 \)
(h) The hostility findings in association with the non-hypothesized variables

Similar analyses were performed to examine factors that might be influencing the correlation between the hostility and the SDS scores (of $R = .38$, Table 4).

SDS scores had been significantly associated with age ($R = -.22$, $p < .005$, 2-tailed), and age and hostility were also associated, ($R = -.17$, $p < .05$, 2-tailed, Table 4).

A partial correlation was performed to partial out the effect of age from the association between hostility and SDS scores. This showed that the association remained significant even when age was removed, ($R = .34$, $p < .001$, Table 12).

The possible effect of pre-natal disturbance (as measured by the DSSI) on the association between hostility and SDS scores was also examined. Omitting the 5 pre-natally disturbed women, a correlation showed that hostility and SDS scores were still associated for those who were not disturbed pre-natally, ($R = .35$, $p < .001$, Table 13, as compared with $R = .38$, $p < .001$ for the whole sample, Table 4).

(j) Direction of Hostility findings in association with the unhypothesized variables

Dir H itself was not associated with age, (Table 4).

The extrapunitive and intropunitive groups were again examined separately, and there was found to be no association between age and Dir H in the intropunitive group ($R = -.13$, n.s. Table 9(a)). There was a stronger association between the two for the extrapunitive group, although this just failed.
to reach significance on a 2-tailed test, \((R = .23, p < .06)\) (Table 9b). Only among those women above average on extrapunitiveness had Dir H been found to be (negatively) associated with high SDS scores (Table 9b and Figure 5).

The extrapunitive and intropunitive groups were therefore re-examined, partialling out the effect of age from the associations, (Table 14 a and b). A partial correlation showed that the association was still significant between Dir H and SDS scores for the extrapunitive group \((R = -.22, p < .05)\), Table 14 (b).

Although age and Dir H were not found to be associated in the Intropunitive group, the association between Dir H and SDS scores was re-tested in this group, partialling out age and the correlation was then \(R = .01\) (Table 14 a), n.s., compared with that of \(R = -.13\) (n.s.), before partialling out age, (Table 9a). Table 14 (b).

In order to evaluate the possible effect of pre-natal depressive state on these findings, further correlations were performed, omitting those subjects who scored 6 and over on the DSSI, and also partialling out age. It can be seen (Table 15a) that, for the Intropunitive group, External Locus of Control scores are still associated with post-natal depression ratings although to a slightly lesser degree than for the whole sample \((R = .27, p < .02)\).

In the Extrapunitive group (Table 15b) extreme extrapunitiveness is still associated with depression, although to a slightly lesser degree \((R = -.21, p < .05)\), while the association between hostility and depression in this group remained, \((R = .52, p < .001)\). (The associations between hostility and locus of control remained similar for both groups).
Table 14 (a)
Inter-correlations between the measures for the Extrapunitive and Intropunitive groups separately, after partialling out age

<table>
<thead>
<tr>
<th>SDS</th>
<th>Locus of Control</th>
<th>Hostility</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locus of Control</td>
<td>.31*</td>
<td></td>
</tr>
<tr>
<td>Hostility</td>
<td>.16</td>
<td>.42+</td>
</tr>
<tr>
<td>Degree of Intropunitiveness (Dir H)</td>
<td>.01</td>
<td>.17</td>
</tr>
</tbody>
</table>

1-tailed probabilities 2-tailed probabilities
* p < .01 + p < .005

The Intropunitive Group (n = 61)

Table 14 (b)

<table>
<thead>
<tr>
<th>SDS</th>
<th>Locus of Control</th>
<th>Hostility</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locus of Control</td>
<td>.11</td>
<td></td>
</tr>
<tr>
<td>Hostility</td>
<td>.52**</td>
<td>.27+</td>
</tr>
<tr>
<td>Degree of Intropunitiveness (Dir H)</td>
<td>-.22*</td>
<td>.04</td>
</tr>
</tbody>
</table>

1-tailed probabilities 2-tailed probabilities
* p < .05 + p < .05
** p < .001 ++ p < .01

The Extrapunitive Group (n = 66)
Table 15 (a)
Tables showing the correlations between the measures for the Intropunitive and Extrapunitive Groups separately, after omitting subjects who scored 6 and over on the DSS1, and after partialling out age

<table>
<thead>
<tr>
<th>SDS</th>
<th>Hostility</th>
<th>Degree of Intropunitiveness (Dir H)</th>
<th>Locus of Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.09</td>
<td>.00</td>
<td>.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.27*</td>
<td>.41+</td>
</tr>
</tbody>
</table>

* $p < .02$ (1-tailed)  
+ $p < .005$ (2-tailed)

The Intropunitive Group

Table 15 (b)

<table>
<thead>
<tr>
<th>SDS</th>
<th>Hostility</th>
<th>Degree of Extrapunitiveness (Dir H)</th>
<th>Locus of Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.52**</td>
<td>-.21*</td>
<td>-.28+</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.13</td>
<td>.27+</td>
</tr>
</tbody>
</table>

* $p < .05$ (1-tailed)  
+ $p < .05$ (2-tailed)  
** $p < .001$ (1-tailed)

The Extrapunitive Group
Inter-correlations between the independent variables

Both hostility and locus of control scores were associated with the depression ratings, and both these measures were also found to be related to each other ($R = .34$, $p < .005$, 2-tailed, Table 4); (that is to say that the more hostile women tended also to be more external).

When the sample is divided into extrapunitives and intropunitives, significant correlations are found between hostility and locus of control for both groups, the association being strongest for the intropunitives ($R = .27$, $p < .05$ and $R = .42$, $p < .005$ respectively), both 2-tailed, (Table 9 (a) and (b)).

Direct H and H scores are derived from the same scale but it is possible for H scores to be high while Direct H scores are low, and vice-versa. There was no linear association between the two measures for the whole sample here ($R = .07$, n.s.) (Table 4). A scatterplot confirms this lack of association (Figure 6). It would appear that attributions of control and of blame are not consistent as hypothesised, at least in this sample.

The extrapunitive and intropunitive groups were examined separately for possible associations between these measures and Pearson correlations showed that they were not associated in the intropunitive group ($R = .15$, n.s., 2-tailed), but that they were negatively related in the extrapunitive group ($R = .33$, $p < .01$, 2-tailed, (Table 9 (a) and (b)). (As Direct H is scored in a positive direction to indicate introversion, this means that the most extrapunitive women also rated most highly on overall hostility).

Although Direct H alone had not been associated with SDS scores for the whole sample, a (negative) association had been found in the extrapunitive group only, Table 9 (b).
When this group's scores were further analysed, not only was extrapunitiveness significantly associated with later depression, but in this group only the correlation between overall hostility and SDS rose (from $R = .38$ for the whole group) to $R = .56, (p < .001)$ (Table 9 b). The strongest association between the pre-natal measures and SDS scores would appear to be that of high pre-natal hostility in extrapunitive women.

(1) The Locus of Control and the Direction of Hostility Scores

It had been hypothesized that these 2 measures would be unrelated, and a correlation showed that this was so ($R = .09$, n.s.) (Table 4). (When examining also the scores of those who did not return the SDS ($n = 166$), this correlation was $R = .03$, also n.s.).

A scatterplot confirms this lack of association of extrapunitiveness with external control or of intropunitiveness with internal control (Figure 6). It would appear that attributions of control and of blame are not consistent as hypothesized, at least in this sample.

It had also been hypothesized that certain combinations of scores on the direction of the Locus of Control and Dir H dimensions would be most predictive of depression, viz: in those women who were (a) intropunitive and high on internal control and (b) intropunitive and high on external control. One method of examining this was to analyse the extrapunitive and intropunitive women's scores separately.
Figure 6

Scatterplot showing the association between Direction of Hostility and Locus of Control scores.
When the intropunitive group was examined, the association between external control and the SDS ratings was significant ($R = .32$, $p < .01$, 1-tailed, Table 9 (a)). It would appear that it was these intropunitive women who accounted for the overall correlation between locus of control and high SDS ratings. Thus there appears to be some support for hypothesis (b) but not for hypothesis (a).

When examining the extrapunitive group, those with high locus of control scores did not have higher SDS ratings, the correlation between their LC and SDS scores being unrelated ($R = .13$, n.s., Table 9 (b)). It would seem that extrapunitive women who had higher LC scores did not have higher SDS ratings. It would appear that extrapunitive women who had higher LC scores did not have higher SDS ratings. Thus there appears to be some support for hypothesis (b) but not for hypothesis (a).

As the sample was not pre-selected for high scorers on the dimensions, a statistical approach to these findings does not seem the most appropriate. It may however amplify them to depict the direction of the locus of control and the Dir H scores of the 28 women who scored 40 and over on the SDS. It can be seen (Table 16) that of these 28 women, 21 scored above the mean on the dimensions, a statistical approach to these findings does not seem the most appropriate.

When examining the intropunitive group, those with high locus of control scores did not have higher SDS ratings, the correlation between their LC and SDS scores being unrelated ($R = .13$, n.s., Table 9 (b)). It would seem that extrapunitive women who had higher LC scores did not have higher SDS ratings. It would appear that extrapunitive women who had higher LC scores did not have higher SDS ratings. Thus there appears to be some support for hypothesis (b) but not for hypothesis (a).

When examined on a Fisher's Exact Test, neither of these distributions however yields a significant difference. (p < .125 in each case).
Assignment of the 28 high SDS scorers to the 4 proposed coping styles, on the basis of scores on both dimensions, divided at the mean.

### Locus of Control

<table>
<thead>
<tr>
<th>Int. LC</th>
<th>Ext. LC</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>b)</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
</tr>
</tbody>
</table>

Table showing number of women rated as depressed on the SDS who had extreme scores in a or b (one side test). Fisher's exact test, p < .125

Fisher's exact test, p < .125

Assignment to the 4 proposed coping styles, omitting the 3 women who rated personally ill on the DSSI in pregnancy.

<table>
<thead>
<tr>
<th>Int. LC</th>
<th>Ext. LC</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>b)</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
</tr>
</tbody>
</table>

Table showing number of women rated as depressed on the SDS who had extreme scores in a or b (one side test). Fisher's exact test, p < .125

Fisher's exact test, p < .125
When considering the extreme scores (those of more than ±1, s.d. from the mean) on the 2 questionnaires separately, 8 of the 28 women had external locus of control scores, and one an internal locus of control score of more than 1 standard deviation from the mean. 8 of the 28 women had extrapunitive, and 6 had intropunitive scores more than 1 standard deviation from the mean (Table 17).

Table 17
Table showing number of the 28 women who rated as depressed on the SDS who had extreme scores (±1 s.d. from the mean) on Locus of Control and Direction of Hostility.

Locus of Control

<table>
<thead>
<tr>
<th>Extreme Externality</th>
<th>Extreme Internality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number women</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1</td>
</tr>
</tbody>
</table>

Direction of Hostility

<table>
<thead>
<tr>
<th>Extreme Extrapunitiveness</th>
<th>Extreme Intropunitiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number women</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

When considering the combination of both scales, for the 28 high SDS scores (i.e. those who had both locus of control and Dir H scores more than 1 standard deviation from the mean in either direction), 5 women fulfilled this criterion. Of these: 1 was in category (d) External control and extrapunitiveness, 4 were in category (b) External control and intropunitiveness, (the latter category being one of those hypothesized). (Fig. 8). (Of these 5 women one of those who was intropunitive and external scored as disturbed on the DSS/SAD pre-natally).
In category (a), Figure 8, the 5 high SDS scorers who had both LC and Dir H scores, more than 1 s.d. from the mean assigned to the 4 proposed categories: Intropunitiveness and Extrapunitiveness, of these four extreme scorers rated as Internal Control and five did not. In category (d) Intropunitiveness and Extrapunitiveness, the only other group to meet this criteria, of the eight extreme scorers, four rated as depressed and four did not, i.e., 50% of the women on this category.

The whole sample was examined for all the extreme scorers on both dimensions. There were 20 such extreme scorers. Of these:-

Two were in category (a) Intropunitiveness and Internal Control
Eight in category (b) Intropunitiveness and External Control
Four in category (c) Extrapunitiveness and Internal Control
Six in category (d) Extrapunitiveness and External Control.

Summary of Findings

Table 18

<table>
<thead>
<tr>
<th>Category</th>
<th>(a) Int LC &amp; Int H</th>
<th>(b) Ext LC &amp; Int H</th>
<th>(c) Int LC &amp; Ext H</th>
<th>(d) Ext LC &amp; Ext H</th>
</tr>
</thead>
<tbody>
<tr>
<td>n =</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDS =</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n =</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 18

The extreme Dir H and Locus of Control Scorers on both dimensions shown as depressed (SDS > 40) or not depressed post-natally.

Summary of Findings

2) Whereas analysis of the whole sample did not indicate any association between Direction of Hostility and post-natal depression, separate analyses showed that post-natal depression was significantly associated with extreme extrapunitiveness.
In category (a), (Internality and intrapunitiveness), neither of the two extreme scorers rated as depressed on the SDS (thereby refuting one of the hypotheses). In category (c), (Internality and extrapunitiveness), none of the four extreme scorers rated as depressed. In category (d) (Externality and extrapunitiveness), one subject rated as depressed and five did not. In category (b), (Externality and Intropunitiveness), (the other hypothesized style), of the eight extreme scorers, four rated as depressed and four did not - i.e. 50% of the women in this category.

The one extreme Extrapunitive/External woman was multiparous, while 3 of the Intropunitive/External women were primiparous, the fourth having no record on parity. Finally, in view of the apparent importance of treating the extrapunitives and intropunitives as separate groups, multiple regression analyses were performed on these 2 groups, inserting the three hypothesized dimensions. These showed that for the extrapunitive group, the best-fit model was that of high hostility, while for the Intropunitive group it was that of high external locus of control, (Table 19).

Summary of Findings

The main findings will now be summarized.

1) Those who were post-natally depressed rated as more hostile in pregnancy, but it was the extrapunitive women who directed their hostility outwards who accounted for this finding.

2) Whereas analysis of the whole sample did not indicate any association between Direction of Hostility and post-natal depression, separate analyses showed that post-natal depression was significantly associated with extreme extrapunitiveness.
Those who were depressed equally likely in terms of

Results of multiple regression analyses, showing the best-fit model of the questionnaire variables with the post-natal depression ratings, for the Extrapunitive and Intropunitive groups, were depressed tended to score higher on

External Locus of Control in pregnancy. Separate analyses showed that this was significantly so only for Intropunitive women, and it would appear that depression may be associated with an external view of control in women who direct hostility towards themselves. This was not true of the intrapunitive group.

**The Extrapunitive Group**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-Efficient</th>
<th>S.D.</th>
<th>T-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locus of Control</td>
<td>-.015</td>
<td>.226</td>
<td>-.07</td>
</tr>
<tr>
<td>Hostility</td>
<td>.537</td>
<td>.120</td>
<td>4.49*</td>
</tr>
<tr>
<td>Direction of Hostility</td>
<td>-.213</td>
<td>.217</td>
<td>-.98</td>
</tr>
</tbody>
</table>

* p .0005, 1-tailed

**The Intropunitive Group**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-Efficient</th>
<th>S.D.</th>
<th>T-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locus of Control</td>
<td>.831</td>
<td>.387</td>
<td>2.15*</td>
</tr>
<tr>
<td>Hostility</td>
<td>.087</td>
<td>.221</td>
<td>.40</td>
</tr>
<tr>
<td>Direction of Hostility</td>
<td>-.057</td>
<td>.292</td>
<td>-.20</td>
</tr>
</tbody>
</table>

* p .025, 1-tailed.

1) High scores on all the subscales contributing to the depression ratings, for Eg. the hostility score were associated with post-natal depression and it was predominantly for intrapunitive women who accounted for this finding. The scoring of younger age did not account for the finding.

2) The depression association with the questionnaire measures and the depression ratings, as these correlations held up when age was partialled out.

3) Projected Hostility were significantly associated.

4) A few of the post-natally depressed women may have already been unwell in pregnancy, but these few women do not appear to have accounted for the associations between the questionnaire measures and the post-natal depression ratings.
Those who were depressed were equally likely in terms of numbers to be extrapunitive or intropunitive (below or above the mean on Direction of Hostility). Intropunitiveness alone was not associated with depression.

3) Those who were depressed tended to score higher on External Locus of Control in pregnancy. Separate analyses showed that this was significantly so only for Intropunitive women, and it would appear that depression may be associated in view of the different ways of ascertaining status. By with an external view of control in women who direct hostility inwards, and this may be more extreme if they are primiparous.

4) There were no association between direction of attribution and control and direction of hostility scores. Those who directed attributions of control externally did not appear to for the findings to be regarded with more certainty. This direct blame externally, nor did those who attributed control data may perhaps best be regarded as suggesting other findings, internally appear to direct blame internally.

5) The women who were depressed were significantly younger and it was predominantly the extrapunitive women who accounted for this finding. The finding of younger age did not account for the associations between the questionnaire measures and the depression ratings, as these correlations held up when age was partialled out.

6) High scores on all the sub-scales contributing to the hostility score were associated with post-natal depression and in a suitable instrument in the study of Rubin (1980) ratings. Only high scores on Acting-out hostility were significant for the Intropunitive women, while for the Extrapunitive group, all the hostility sub-scales except Projected Hostility were significantly associated.

7) A few of the post-natally depressed women may have already been unwell in pregnancy, but these few women do not appear to have accounted for the associations between the questionnaire measures and the post-natal depression ratings.
Discussion

For convenience the findings will be considered under sub-headings.

a) The Depression ratings post-partum

It is not altogether appropriate to make direct comparisons of the prevalence of depression found here with those quoted in other studies, such as those of Pitt (1968) in view of the different measures of depressed state. By confining the criterion to the sixth week post-partum, it was not possible to follow up non-responders without extending beyond this point. The response rate here was only 76%, and a response rate nearer to 100% would have been preferable for the findings to be regarded with more certainty. This data may perhaps best be regarded as augmenting other findings.

The SDS has not previously been used to measure post-partum depression, and required amending as previously described to make it more suitable for a parturient sample.

There is no general agreement as to whether self-rating measures should be used at all where depression is concerned (Mowbray (1972) and Carroll et al. (1973) disagreeing with their use, while Biggs et al. (1978) and Blumenthal and Dielman (1975) are in favour of them; nor as to whether the SDS is a suitable instrument in its own right. Zubin (1967) and Blumenthal (1975) consider it to be a suitable screening instrument, while Carroll et al. (1973) disagree.

The depression ratings were not obtained in an interview situation. It might be considered that questionnaire assessments would be more appropriate as a screening procedure than as a final criterion. In fact provision had been made for an extension of the study, comprising interviews offered to
all the women who scored highly on the SDS, at which a subsequent administration of the SDS was given and also, for comparison, the Hamilton Rating Scale. There was no compulsion on the women however to be interviewed in this way; only a few of the depressed women were prepared to be seen, and this data gathered by the psychiatrist is not available here. The term "post-partum depression" will be used without contending whether or not this is of "clinical" severity.

Another aspect of the assessment of depression post-partum relates to whether primarily incidence or prevalence is being evaluated, and this highlights one of the least satisfactory aspects of the study. This is the extent to which the depression observed had in fact occurred post-partum - with the birth or infant-care experience implied as contributing to it - or whether, at least some of the women had been depressed before the birth, or even before the pregnancy.

It would have been necessary - and desirable - to administer the SDS before the birth also, and to observe the pre-partum scores of those who rated as depressed post-partum. This had been considered but the time scale of the study only allowed for one questionnaire administration pre-natally, and it was considered that to include another scale then would lead to the risk of a high refusal rate. In retrospect however this omission was undesirable, and leads to less confidence in the findings.
Some indications of pre-natal state were available however in the form of the depression sub-scale of the DSSI. The majority of the sample scored zero on this measure, and the scores were not amenable to correlational analysis. It was however possible to examine whether many or any of the women who rated as depressed post-natally using the criterion of the SDS, also rated as disturbed pre-natally by the criterion of the DSSI. As there were among the 21 women who rated as mildly depressed post-partum, 2 who rated as disturbed pre-natally on the DSSI and one who rated as disturbed among the 7 most depressed women on the SDS, it is possible that these few women did not have a post-partum response and were already disturbed before the birth. It would seem probable that the remainder - the bulk of the women - were previously well and did experience a post-partum reaction. Nevertheless, it is not possible to assert this with any certainty in the absence of the same measure of depression in pregnancy. This raises an issue which may be pertinent here. Whereas concern is being directed recently to post-partum mental health, it may be that mental health in pregnancy also requires more investigation and concern. Women who are disturbed then may be particularly unlikely to seek treatment, and it may be some of these women who account for part of the apparent rise in incidence of depression post-partum. It might however be found that those depressed pre- and post-natally comprise two differing groups, as the recent findings of Kumar and Robson (1978) seem to suggest. It seems important to investigate whether depression occurring pre-natally normally remits after the birth. If it does, then it
would assist the investigation of post-partum reactions to be able to distinguish any different characteristics of those depressed only pre-natally, only post-natally or in both periods.

b) The Locus of Control Findings

The findings of the association between external locus of control and later depression are encouraging, as they are in the direction of the hypothesis, although the strength of the association is not extremely high. It is interesting, and may be important that it is intropunitive women who before the birth also account for this. The findings here do not appear to support the tentative proposed hypothesis that extremely internal individuals might also be those who succumb to depression, thus not supporting the suggestion of Smith (1970).

It should be mentioned however, that the findings from this study do not altogether refute such a proposition for the reasons:-

1) It may not be possible to generalise the findings beyond the pre-natal population tested here.

2) It is also possible that extreme internals may have been vulnerable, but that the manifestation of this in depression and specifically at six weeks post-partum is not the only or the best criterion.

3) Another possibility is that highly internal women may have been affected by depression, but that this occurred earlier in pregnancy and had the effect of making their attitudes more external before the pre-natal testing - especially perhaps for any women who did not welcome or had tried to avoid the pregnancy. Monitoring of locus of control
and depressive status throughout pregnancy might throw some light on this possibility, although the most extreme impact for some women might be the initial awareness of pregnancy itself. Monitoring locus of control after this would not elicit any changes that had occurred due to the confirmation of pregnancy.

As with all the pre-natal measures, it is not possible to assert that externality and depression ratings would not have been associated with each other both before and after the birth, and that the external women were not more depressed before the birth also. However the exclusion of the few women who rated highly on the DSSI pre-natally from the subsequent analysis gives some confidence that at least this factor alone did not entirely account for the findings.

An associated possibility is that externality is itself an aspect of depression, rather than being a precursor of it or even a currently associated characteristic, (an association which Prociuk et al. (1976) suggest might be mediated by hopelessness).

This possibility can best be approached by examining the scales used to measure both, and here the items in both appear quite discrete. What they may have in common is to reflect an attitude of "hopelessness" or pessimism, as Prociuk et al. suggest. A more general criticism, which could be applied to all the variables used here is that, where questionnaire measures are used for both independent and dependent variable assessment, associations found may be due to response bias. Whereas this possibility cannot be firmly excluded, there are some grounds for believing this not to be the case here, particularly in the construction of the Locus of Control Scale,
where a forced-choice format is used and yea-saying could not easily be practiced.

No predictions were made concerning age in relation to depression, nor of its effect in conjunction with any of the hypothesized variables. There could be reasons for hypothesizing that older women in our society (who may have had fewer, less choices open to them) would tend to be more external. It might also however be supposed that the youngest women would be more external, having a less well-developed awareness of their own effectiveness (as Feather (1967) found in Australia). It must be considered a possibility that either the population sampled was found in either direction between age and locus of control scores. (Nor when the extrapunitives and intropunitives were examined separately.) As (younger) age itself was found to be associated with depression, partialling out the effect of age gives some confidence that the association between SDS and locus of control ratings was not due to this factor, (the correlation remaining significant).

c) The Hostility and Direction of Hostility Findings

Perhaps the most striking finding to emerge from the study is the high association between high pre-natal hostility depression and hostility post-natally over a time-period and post-natal depression ratings. This hypothesized aspect proved to be highly significant, while the tentative hypothesis concerning extremely low hostility and depression was not supported.
It appeared rather that the higher the pre-natal hostility ratings, the higher the post-natal depression ratings. Analysis of the Intropunitive and Extrapunitive groups separately showed that it was the extrapunitive women who accounted for the high associations. The possibility of item overlap or of response bias must again be considered. There is however no evidence of item overlap between the two scales, nor of any probability that individuals who tend to accentuate their positive responses would know how to do this on the HDHQ, the purpose of the scale not being apparent.

Again it must be considered a possibility that either the post-natally depressed women were also depressed in pregnancy, and that their high hostility scores then are a reflection of this and/or that, had hostility also been measured post-natally, it would have been found to be associated with depression then.

When the few women who rated highly on the DSSI pre-natally were omitted, the correlation between the hostility and SDS scores remained significant, which may indicate at least that it was not these most disturbed women in pregnancy who were accounting for the association between the pre- and post-natal measures. To try to overcome the problem of obtaining ratings of hostility pre-existing the pregnancy, it might be feasible in further research to monitor levels of depression and hostility post-natally over a time-period which would hopefully allow a remittance of the depression, and to examine whether hostility remained high, or reduced with decreased depression to presumed "normal" levels. It would also be of considerable interest to monitor hostility levels through pregnancy and post-partum to examine any general
trend in these, as the scale has not been used in a pregnant sample previously.

The mean hostility score found here of 15.61 pre-natally can be compared with those found in normal sample of females: 12.1 and 11.3 (Caine, Foulds and Hope, 1967).

11.17 (Mayo, 1969)

The mean hostility score found here of 15.61 pre-natally can be compared with those found in normal sample of females: 12.1 and 11.3 (Caine, Foulds and Hope, 1967).

11.17 (Mayo, 1969)

normals of both sexes:

15.17 (Philip, 1970)

in normal females but with neurotic symptoms:

18.60 (Mayo, 1969)

in depressive in-patient sample, (both sexes):

17.92 (Mayo, 1967)

in a neurotic female patient sample:

17.90 (Mayo, 1969)

in a group of female patients (recently attempted suicides):

25.08 (Philip, 1970)

in Mayo's (1967) sample of depressed patients after improvement (both sexes): 12.67.

It was not feasible to compare the pregnant sample's means with any "control" group of other women, for obvious reasons, so the findings may serve rather to extend normative data on the HDHQ with specific groups, as Lyketsos et al. (1978) have done cross-culturally. The mean here appears to be slightly higher than those reported for normal female samples and this might be partly a function of pregnancy or it might be that there is a slight general increase in depressed mood pre-natally which is reflected in these scores. Yet again, it might simply be that the mean reflects slightly higher levels of hostility which are culturally characteristic of women in this decade.
The association found between hostility and younger age might support such a view. Whether further investigation suggests that hostility and depression ratings may rise successively or concurrently, this investigation may have proved useful in indicating that high hostility levels measured pre-natally may be a warning-sign of poor mental state for some parturient women. The use of such a scale as a screening-device might be more acceptable initially than a direct measure of depression, and might be useful in highlighting some of the women who might be at risk.

It is evident though, from the distribution of the scores shown (and to be expected) that this dimension alone would not be adequate in picking up every case of post-partum depression.

Whereas the scatter of the scores indicates that there is an overall tendency for high pre-natal hostility to be associated with post-natal depression, there are a few outlying scores which do not fit into this trend. This is perhaps not so surprising, unless one were asserting that depression has a single precursor or precipitator. It is assumed here that high hostility (and high locus of control in intropunitive women) are but two possible precursors.

Both these aspects comprise individual differences in personal attitudinal or coping styles, but it is accepted that depression may have many provoking agents apart from these.

One of the most unexpected findings was that intropunitiveness alone was not associated with later depression, although such an expectation was based mainly on the general observation that the two are frequently associated during depression (e.g. Priest and Netter, 1975) and it is also implicit in psychodynamic theory that introjected hostility
is a causative factor of the latter. As direction of hostility and depression were not monitored concurrently, the possibility remains that intropunitiveness as well as overall hostility might have been found to be high when the depression was assessed post-natally. The question that cannot be answered here is whether the women in this sample who became depressed, and who were largely extrapunitive pre-natally, become predominantly intropunitive as depression ensued. Philip (1971) suggested that extrapunitiveness remained fairly stable, whereas only intropunitiveness shifted with illness. Extrapunitiveness is thus seen as a "trait" characteristic, and intropunitiveness as a state measure.

Previous studies have not however been concerned with the precursors of depression, and thus it is still not impossible that extrapunitiveness changes prior to depression, (i.e. rises), and that it assumes normal levels both during and after a depressive episode although this possibility may seem less likely. To assume that extrapunitiveness is a relatively consistent trait, and that the most extrapunitive - (at least extrapunitive females in the post-partum situation here) - are the most vulnerable for depression, implies that such women may be particularly at risk in this situation.

Studies such as that of Mayo (1967) indicate that, as intropunitiveness fell to levels similar to those of normals after recovery, the Dir H levels of such patients may have originally been close to normal. (This does not however help to predict which individuals will show a rise in intropunitiveness and experience depression). It is possible that such individuals tend always to operate intropunitively, even if only to a slight degree, and that this tendency may make the individual more vulnerable.
The findings of the current study do not appear to be closely related to other findings, with the possible exception of those of Weissman and Paykel (1974), who concluded that outwardly-directed hostility was related to depression, although their data were not psychometric and cross-cultural applications may be limited. In addition, the difficulty of assessing the whole gamut of hostility has been referred to by Pilowski (1975). It has been suggested that the HDHQ may measure either "conscious" or "unconscious" hostility, and may reflect either an awareness of hostile feelings or the willingness to report them (Hafner, 1977). It seems probable that high hostility represents a general difficulty in handling inter-personal relationships in those who see the world as threatening.

As the approach here is an empirical one, speculative interpretations are not offered, but the "meaning" of the hostility scores must be sought in the scale itself, and particularly in its composition of the five sub-scales. When examining these for any aspects of the hostility that were most predictive of depression, analysis showed that, although some of the sub-scales were more strongly associated than others, each one was correlated with the depression ratings.

For the whole sample, the most strongly correlated component of hostility was that of AH (Acting-out Hostility). When the sample was divided into Intropunitive and Extrapunitive groups, this component was significantly correlated with depression for both groups, and was the only one that was significant for the intropunitives. It may seem strange that it is an aspect of extrapunitive behavior that appears to be important in this intropunitive group.
A possible interpretation is that high scores on this variable may represent a vulnerability factor whether a woman is extrapunitive or intropunitive. To seek for a meaning of this within the questions contributing to the sub-scale, individuals who score highly on this would appear to be hot-tempered, cynical and potentially destructive, including being self-destructive. When the scores of the Extrapunitive group are examined, as well as this component, the factors most strongly associated with depression were CO (Criticism of others) and SC (Self-Criticism), followed by G (Guilt). Again, it is interesting that in this extrapunitive group, it is two components of intropunitive itself, as well as two of extrapunitive that are related to depression. Guilt and Self-Criticism are more highly associated with depression in this group than for the intropunitives. The CO (Criticism of others) sub-scale seems to indicate a low opinion of others and an obstructive attitude, which was only related to depression in this extrapunitive group (whereas Acting-out Hostility characteristics were significant for both groups).

These findings can be compared with those of Priest and Natter (1975) who had found that depressed patients who improved most (after anti-depressant treatment) were those who were initially lower on the Self-Criticism, Criticism of Others and Projected Hostility sub-scales. As the scale was used by them on patients during depression, it may be that high scores on those three subscales indicated greater risk if measured specifically during depression and in relation to poorer recovery.
Mayo (1969) had found that depressed patients (compared with normal subjects with neurotic symptoms) were significantly higher on Self-Criticism, while the normals with symptoms were higher on Criticism of Others, i.e. the patients were higher on an intropunitive measure and the less severely ill on an extrapunitive one.

Philip (1971) had found similarly that high self-criticism scores characterized patients who did not recover, but the other sub-scale which indicated non-recovery was that of Guilt. Thus these were both intropunitive scores, and whereas these scores fell slightly over treatment, they did not fall as much as for those who recovered. Extrapunitiveness also distinguished poor recoverers while ill, although to a lesser degree, and only at the first testing. These scores remained fairly stable after that for both groups. It was this which led Philip to suggest that the extra- and intropunitive sub-scales were tapping different aspects, the former aspects behaving more like a trait, and the latter more like a state measure. With the HDHQ administered only once in the current study, this possibility cannot be examined, although it would be interesting to know if high scores here on the extrapunitive scales indicated the "chronically" at risk woman, while high intropunitive ones might have represented signs of encroaching illness. Mayo (1967) had also found that the Self-Criticism and Guilt sub-scales appeared to be the most important, in that they were the two that reduced significantly as patients improved. He considered however, that the overall hostility score (which also fell significantly) was an extremely sensitive indicator of the severity of (current) depression.
Such a view might indicate that the high hostility subjects in the current study, and particularly those high on Self-Criticism and Guilt might already be experiencing depression before the birth. As previous studies have not however made assessments on normal subjects prior to depression, it is still possible that hostility rises prior to depression, or that the chronically high H subject may be at risk in the face of significant life events.

If the former possibility is considered, it would be interesting to know whether characteristically extrapunitive women, who might previously be high on the extrapunitive sub-scale measures, might have shown a rise in the intropunitive scales also shortly before experiencing depression. This would be in line with Philip's suggestion that extrapunitive measures behave more like traits, and intropunitive ones like state measures. It might also underlie other findings that it is the intropunitive measures which reduce on recovery. In other words, previous findings which stress the importance of intropunitiveness may not in fact be dealing with characteristically intropunitive women but may be observing rises in Self-Criticism and Guilt in women who were already (or previously) high on other and outer-directed aspects of hostility.

Whereas Mayo referred to punitiveness increasing in depression, he also suggested that "the depressive's tendency to withdraw from interaction with other people ... could be one outcome of increased general punitiveness".

There is implied a rise in hostility that might precede depression, as well as accompany it, and any tendency to withdraw might be augmented by the often socially isolated,
nature of the early post-partum period. He assumed punitive-
ness as a channel through which available energy is utilised,
with less energy available for other areas of life, which
might be relevant for physically demanding infant care.
Blackburn (1974) was also only able to speculate on whether
there was a causal relationship between mood states and
hostility and on the direction of this. Possibilities she
considered were that depressed mood might cause a person to
construe themself or their environment as hostile - or that
such hostile construing might lead to abnormal mood states.
Although no direct evidence is available from the current
study, the author leads towards the latter explanation.

As youth was so strongly associated with subsequent
depression, it raised the question as to whether it was not
this factor that was more important than any of the predicted
variables.

When age was examined in relation to hostility, the two
were found to be associated, although the correlation was
a low one (R = -.17). This association between hostility
and younger age held for both the extrapunitive and intro-
punitive groups also, although it remained low, and was not
significant for either group. Although the more hostile
women tended to be younger, age alone did not appear to
account for the findings, as the partial correlation, removing
the effect of age showed that hostility and SDS score were
still significantly related. This applied also for the
extrapunitive group, whose scores had been those largely
accounting for the correlation between depression and younger
age.
It might be possible to interpret the higher hostility and younger age relative to depression in socio-cultural terms. In the current social climate, where expectations for self-fulfillment for women are now higher and where work or social life may provide more opportunities for this, the younger women may experience most resentment at the lack of reinforcements in the more isolated role of infant caretaker.

She may also be likely to have been employed more recently, and to find the transition from a work context to the home harder, (although no specific data is available on this).

The non-hypothesized effect of age was overall not associated with direction of hostility although the association between extrapunitive and younger age in the extrapunitive group almost reached significance. From the hostility findings, the picture that emerges of the possibly vulnerable woman is that of a younger woman, rating highly on all aspects of the hostility measured, and having a general tendency to direct hostility outwards.

It should also be mentioned here that there was an overall association between high hostility and external locus of control. This relationship had not been hypothesized and no precise explanation can be offered here except that the extremes of these scales measure attitudes proposed as maladaptive, and the association may reflect this general "maladaptivity" which was also found for the extrapunitive and intropunitive groups separately. Direction of hostility will be further discussed shortly in conjunction with the locus of control findings.
d) The Age Findings

In view of the level of significance of the association between younger age and depression, it might be considered that the greatest risk factor for post-natal depression is to be young. This unhypothesized factor may appear to make the other predicted factors less important, if prediction could be achieved so well by this one factor. It would appear however that the finding did not invalidate the use of the other measures, in view of the significance levels that remained after the age effect had been partialled out. The finding should however be treated as important in its own right.

Kumar and Robson (1978) have recently found first-time mothers to be more vulnerable, if older - (i.e. over 30). As they studied only primiparous women one would have expected their sample to be slightly younger, but their mean age (28) and age range (19 to 40) was very similar to the current study. Parity did not appear to be a factor in the current study, as both primiparous and multiparous women being almost equally affected by depression, (not measured by the author), and the younger age finding here did not reflect first births.

Pitt (1968) had not found age to be a factor, so there appears to be no coherent pattern to the age findings, and no clear interpretation can be offered here.

Associations between the Attributions of Blame and Control

A related aspect of the research was the interest expressed in the interaction of these two dimensions, as well as their possible predictive power alone. The present sample did not however provide an adequate test of the
tentative hypotheses regarding depressive outcome, as sufficient high scorers on both dimensions were not available. For an adequate test of the hypothesis, it would have been necessary to pre-select the women on the basis of extreme scores on both dimensions, and compare them with those with scores around the mean.

A problem with testing the hypothesis on any pre-natal sample is that the expectation would be for only approximately 10% of subjects to develop depression. A sample of approximately 100 subjects therefore yields relatively few cases of depression for study. If subjects in such a sample were already pre-selected on the basis of extreme questionnaire scores, it would necessitate the testing of very large numbers.

The findings were encouraging however in that they provided some support for the hypothesis that the attributions of control and of blame (hostility) appeared to be unrelated and therefore presumably "inconsistent" in the sample as a whole. It has not been hypothesized as to why this should be, and it might comprise the focus of future work to examine other differences in "style" of those whose attributions were "consistent" in either direction with those who have inconsistent attributions. Insofar as it was possible to infer from the small number of high scorers, there appear to be some indications that those women who were intro-punitive and high on external control might indeed be more vulnerable. Whereas extrapunitive alone was associated with later depression, it did not appear to be so in conjunction with external or internal attributions of control.

It might have been expected that the impact of the birth on the women with these orientations might have been most extreme on those having their first babies. Pursuing this
possibility, of the depressed women, five of them had extreme scores on the two dimensions. Of these one held an extrapunitive and external locus of control orientation and it was her third child. Of the other four who scored as intropunitive and externally oriented, three were primiparous, and records on the fourth were missing. It must remain in the area of speculation, but this "inconsistent" attitude may possibly reflect an ambivalence to motherhood.

If there was ambivalence or a definite unwantedness of the pregnancy, an attitude of attributing control externally but also blame internally might seem understandable. This would however imply that the pregnancy itself was largely causative of the attitudes, whereas the study here aimed to examine the influence of the attitudes in a stress situation. However, speculations here have not extended to the genesis of such attitudes and a particular situation seen as largely "uncontrollable" might lead to the development e.g. of external attitudes.

While this study proposed that "inconsistent" attitudes would be found, and that these might characterize one type of individual vulnerability to stress, no speculations were made as to how or why the inconsistent attitudes might have developed.

Although hostility in extrapunitive women in the current study yielded the highest correlation with the depression measure, it was also striking that of the 28 depressed women, almost half of these held an intropunitive and external locus of control attitude. It is not possible to say whether this attitude evolved over pregnancy, or whether it is one which might characterize pregnant women compared with those who are non-parturient.
Attributions of the causation of events and of blame for them would both seem to imply that the concept of "responsibility" is involved, and it is difficult therefore to envisage how the intro punitive/external individual attributes "responsibility".

Abramson and Sackeim (1977) have also recently noted the illogicality of self-blame and externality which they accept co-exist in depressed patients, although they could be considered that it still needed to be demonstrated in normal individuals. One possible interpretation they suggest is that, for some individuals, outcomes could not have been otherwise because of personal deficits, but self-blame might still follow. As they point out, this might make the paradox less perplexing, but not remove the logical incompatibilities, nor fully account for them being associated with depression. Among the possible resolutions of the paradox that they suggest are the possibility that self-blame and external of control are attributed to distinct and different outcomes, which they discount.

(When examining the two scales used here, the HDHQ appears to measure mostly generalised attitudes of an interpersonal and infrapersonal nature, while the Locus of Control scale taps these and also more specific factors, such as educational, political and occupational ones). Abramson and Sackeim suggest that alternatively, one or other aspect might be a primary feature aetiologically or symptomatically - e.g. externality, where upon the depressive blames him or herself for being in uncontrollable situations, or possibly finds self-blame positively reinforcing when holding external views. Similarly, self-blame might be primary and re
externality might provide secondary gain, although they find no evidence for these views. Their most interesting proposal points to the dichotomy as being one of beliefs in impotence and omnipotence. Externality is said to reflect a belief in impotence, while self-blame implies that outcomes are under control, even when they could not be, and this signifies a belief in omnipotence. They do not consider it surprising that contradictory beliefs should be found in psychopathological cases, and point to the "neurotic paradox" of fears persisting in the face of repeated disconfirmations.

In a recent paper which may be relevant here, Seligman and his colleagues have pointed out that the learned helplessness hypothesis was formulated before experiments were performed with human subjects, and that early studies with humans mainly attempted to replicate the animal findings in humans. They confess that they, as well as other groups of investigators have become increasingly disenchanted with the ability of the original theoretical concepts to account for understanding helplessness in humans (Abramson, Seligman and Teasdale, 1978).

They suggest that the lowered affect and self-esteem which come about as a result of a belief in non-contingency (of a personal, not a universal nature), are increased with the importance of the events the person is concerned about, (i.e. that they are highly desired or highly aversive). Also that if the attributions are global, (as opposed to specific), and stable (as opposed to transient), then there will be expectations of helplessness in the distant future, both across time and across areas of life. Thus, "the future
will look black", and this expectation will increase the low affect and self-esteem.

They emphasize however that expectations of non-contingency are sufficient but not necessary conditions for depression, and they consider that other factors such as physiological states (or post-partum conditions) could produce depression, "helplessness depressions" being one subset of depression.

Their reformulation does not pretend to articulate the association between blame or guilt and helplessness, but they consider it clears up apparent contradictions between causing events and being helpless. The depressed person who believes in his or her personal helplessness will attribute failure internally, while those who believe that they are universally helpless, (i.e. that events are independent of everyone's responses as well as his own) make external attributions for failure. They admit that their model may appear to make depression follow too "rationally", and allow for "irrationality implicit in depression as a form of psychopathology". They suggest that the attributions that depressed people choose for failure are probably irrationally distorted towards global, stable and universal factors, (and for success possibly towards specific, unstable and external factors); the distortion possibly residing in "readiness to perceive helplessness" rather than in attributional style. They allow for probable individual differences in attributional style, one which tends to attribute failure to global, stable and internal factors producing depression proneness, and perhaps the depressive personality.
In relation to the present sample, a very important question would appear to be whether the extreme external/intropunitive women were already depressed pre-natally or were chronically at risk - (perhaps because of "neurotic" personalities, or perhaps relatively "normal" but merely more vulnerable, and likely to succumb more easily in the face of life-stress). The only information on pre-natal mental state lay in the DSSI scores and one of these four women scored as personally ill on this measure post-natally. As Paykel (1975) and Priest (1979) have noted, the very ill pre-natally, showed that Locus of Control and depression scores were still significantly associated in the intro­

It might be reasonable to infer that External Locus of Control attitudes combined with Intropunitiveness might tend to make a woman more vulnerable to depression post-

Paykel comments that such high prevalence indicates interest to know whether intropuniveness, externality or hostility rose prior to or concurrently with, depressed status; also whether there was a high association between depression and these measures in pregnancy, or whether such associations only emerge post-natally.
Conclusions

Given the overall findings, how can we as Roessler would say "get it all together". As far as the incidence of depression found here is concerned, no firm assertions concerning actual incidence can be made, not only because of the absence of a pre-natal depression rating, but also because of the problems of consensus on the choice of measure and what level of severity to take into account. As Paykel (1979) and Priest (1977) have noted, the very word depression covers the spectrum from severe clinical illness to a normal and universal mood.

It is possible for example that the incidence found in the current study might have been no higher than that found in a cross-section of women in the population at large, as Brown and Harris (1978) have reported 17% of "psychiatric disorder" (mostly depression) in their community survey of women with an 8% onset within a year. Paykel comments that such high prevalence indicates that such conditions must be "sub-clinical". However, it is possible that many cases of "clinical" severity in the population do not reach psychiatrists, and that some cases are found by community screening which would not otherwise be revealed. Such screening may fulfill a valuable role in indicating those who may need help, even if screening is only used as an initial measure to be followed up by psychiatric assessment.

If it should be claimed that the number of depressed women found in this study may be similar to that which would be found in the female population at large, this would appear to be a matter for concern rather than complacency. Such
studies may be of value in drawing attention to the mental health and well-being of women generally, and particularly those with babies or young children.

If future research aims are directed at predicting which women may be at risk for post-partum depression, a question which can be asked is whether the focus of such research should be on the individual woman and her characteristics - or whether the areas of crucial importance are situational, and attention should therefore be given to early parental relationships, previous life-events, socio-economic factors and marital relationships.

Brown (1974) has asserted that prediction of post-partum depression can be made without recourse to invoking individual characteristics and that it is only when the birth is directly tied up with a major social problem that depression ensues.

As relationships and socio-economic factors were not investigated in the current study, it is possible that the "loss" factors suggested by Brown might have led to - or interacted with - the attitudes suggested here as indicating vulnerability. In view of the sparse evidence currently available as to which women are at risk for post-partum illness, it may not be appropriate to determine in advance which aspects should be selected.

What is now needed is a study which will look at both intrinsic characteristics and situational factors; only then might a rapprochement of the two aspects be possible, and some idea of their relative importance obtained.

It is not held that the use of psychometric measures is necessarily the best approach to the measurement of
individual differences. The fallibility of such instruments is well known, although other methods such as interview assessments also have their pitfalls.

A broad view of post-partum mental state would be to see the pregnancy, birth, the new baby and its care, and the altered family situation as significant life-stages occurring in fairly rapid succession. Whereas, not in themselves being "negative" life-events, they may act as cumulative or final stressors in a process which may include marital, financial or housing strains, and be a point at which "homeostatic" balance is threatened - one outcome of such a loss of homeostasis possibly being that of depression.

The current findings may have indicated aspects tapped by the psychometric measures which could be further investigated by other means in future studies - for instance the possible genesis and targets of hostility, evaluated by interview data on early and current family relationships and life experiences.

The current findings may indeed seem relevant in the light of Kumar and Robson's (1978) recent findings in a very comprehensive study indicating that women who suffered post-natal depression tended to have difficult parental relationships, whereas this did not characterise women depressed in pregnancy.

A useful extension might be in the direction of formulating a profile - or profiles - of the woman at risk, and this would be feasible in conjunction with more extensive background data.
Although the correlation between hostility in Extra-punitive women (in pregnancy) and scores on depression post-natally is mildly encouraging, it would still seem to allow for a considerable number of false negatives and positives. Indeed it would be unlikely that one or more questionnaire scales would account for most of the variance. The correlation between External Locus of Control in Intropunitive women and later depression may be suggestive of a different and also maladaptive "coping style". The findings appear to rest at the descriptive rather than the explanatory level.

The most useful exercise may be to try to formulate a picture of the two different personal coping styles which it is suggested may be relevant for depression, in view of the Locus of Control and HDHQ findings. To do this requires accepting the findings at face value, and making further speculations on the basis of them.

If we assume for the moment that two different aspects of vulnerability may have been indicated, the processes at work leading to a depressive outcome might be different from each other, and women with these two styles might be sensitive to different pressures - or both might be vulnerable in the face of a sufficient degree of life-stress in any form.

Let us therefore first consider the hostile extra-punitive woman. Such a woman is presumed to experience - perhaps as her normal mode - a fairly high degree of hostility, or the more "negative" and attitudinal aspects of aggression, rather than its briefly aroused and dissipated aspects. She is accustomed to not only experiencing this hostility, but to seeing others as its target, and probably to engage in showing this in practice. The expression of this hostility
however does not lead to its reduction, and the negative cognitive style persists.

If we invoke the work of Mayo (1969) and Hafner (1977), such a woman may cope adequately in the work situation, where outlets for hostility may exist and be acceptable. Similarly, her marriage may be able to contain the hostility and its expression; or the outlet in working life may make the marital interaction containable.

If we envisage such a woman in the immediate post-partum, the probability is that for the majority the work situation no longer pertains. This by definition probably eliminates many of the sources of previous interaction, including the more aggressive ones. Should she not have been working, the marital relationship may have been tolerable, but not capable of coping with the new situation.

If we further envisage the extent of her interactions confined largely to a new infant who make demands on her, but with whom she cannot engage in aggressive interaction a "conflict" situation could be visualised. If others and the outside world are seen as threatening and hostility-provoking, by nature of the woman's own dynamics, the infant may also be seen in this capacity, but the expression of such hostility is inhibited by the baby's helpless status.

Although such suggestions are even more speculative, it may be that characteristics frequently associated with aggression, such as need for achievement and ambition were present in such women who find the work-situation particularly reinforcing of their own needs, then such a woman may be particularly lacking in reinforcers at this time.
It is possible that if job-satisfaction is high, this may forestall the onset of depression while work is continued. It might present too unrealistic a dichotomy to propose distinctly "motherly" or "career-oriented" women, but these characteristics might contribute to a general profile. Another possibility is that the high hostility in these women reflect specific marital tensions, as Hafner (1977) had found that when the most hostile depressed women recovered from depression their husbands tended to display symptoms and to express more self-dissatisfaction. The implication in his study was that the husbands may have been contributing to their wives' illness, or impeding their recovery.

Whereas the conjectures concerning job-satisfaction are purely speculative in the current study, Mayo (1969) had found that extrapunitiveness was associated with poor home adjustment (in "normal" women with neurotic symptoms), and it was also associated with the best occupational adjustment. Mayo suggested that the work situation may have provided an alternative area of satisfaction for those whose extrapunitiveness was associated with poor interpersonal relations at home.

It is of course difficult to be clear about the direction of causation, and it may be that their extrapunitiveness was contributory to their poor home relationships, while it was more "appropriate" in the work situation. Hall-Smith and Ryle (1969) had found imbalanced dominance/submission patterns in women with psychosomatic disorders, as well as less marital affection. It seems possible, as Bullock et al. (1972) suggested, that there may be two distinct groups of women, of which one group has a maladaptively considered.
marital relationship before becoming depressed, seeing their husbands, whether rightly or wrongly, as involved in the cause of their depression. If it were possible to conceptualise the outwardly-hostile woman's frame of mind, perhaps the most appropriate description would be that of resentment.

The other pattern which seems related to post-partum depression is that of intropunitiveness when this is combined with a belief in the external source of control of the individual's life. If we attempt to conceptualise the intropunitive/external locus of control woman, the first point to note is the "inconsistency" inherent in this style. Such a person accepts blame and feels guilt although feeling no control of her situation.

Again there may be some clues in Hall-Smith and Ryle's findings that intropunitive women were shown on a Marital Patterns Test to accept more dominance from their husbands. If one were to characterise - or perhaps caricature - the traditional female role, both dependence on others (lack of personal control) and a submissive attitude lacking in outward aggression could be considered to be at least traditional aspects.

Harris and Harvey (1975) conceive low perceptions of choice as a means of abrogating responsibility and Becker et al (1977) have recently confirmed that internally-directed hostility is found together with externality in depressed patients. The fact that the correlation between guilt and externality in their study fell when depression was partialled out might be an indication that this inconsistent attitude is an aspect of "illness" - whether a precursor or an outcome of it, a possibility that Abramson and Sackeim (1977) have recently considered.
Another possible view is that the combination of these two attitudes is almost bound to result in depression, as the individual is trapped in a position of self blame. Abramson and Sackheim refer to rather tentative evidence suggesting that when the focus of attention is directed predominantly to the self rather than the environment, then outcomes are seen as less controllable, but more responsibility for personal behaviour is assumed (Duval and Wicklund, 1972). There is a possibility that, in a pregnant sample, attention is indeed literally directly increasingly inward and toward the self in general. If this inwardly-directed attention (which perhaps became accentuated), was a factor in the development of depression, then the two discrepant attitudes might be a reflection of this underlying inner-directedness, rather than necessarily aetiological factors of the depression.

Abramson and Secker pointed out that there is evidence of contradictory attitudes in depressed rather than normal subjects, and that it may not be surprising that any psychopathological group should be characterised by holding two such contradictory beliefs.

The implications from this for the post-partum study would appear to be that the women identified by these attitudes may have been already "ill" - and perhaps this might distinguish them from those with an extrapunitive and hostile profile who may have been chronically vulnerable in stress situations, but not yet ill. (If this were so, however, one might have expected more of the women to score as personally ill on the DSSI pre-natally).
With any research undertaken as field work, the need to restrict the investigations to a level acceptable to the subject population is often tantalising by nature of the number of aspects which have to be omitted. However, the exploration of one or two aspects only may be considered acceptable if the findings seem to indicate that these may be worthy of follow-up in greater depth, or in conjunction with other dimensions. One possible extension of the research would be to continue attempts at the prediction of depression.

If further work were to be undertaken in this area, the measures used would require replication before any confidence could be placed in them as useful predictors. As they are not proposed as the only predictive aspects, it might be useful to use them in conjunction with other measures, with the goal of developing a battery or screening instrument composed of the questions that seem most predictive of later breakdown. The use of this in conjunction with assessments of depression throughout pregnancy seems desirable, in order to detect and offer assistance to women who may already be depressed, and to try to distinguish their characteristics from those who suffer a reaction after the birth.

Among the factors apart from individual characteristics that the author would like to see investigated are those of job-satisfaction and the social isolation of the early puerperal period. Both these aspects may be accentuated by current housing characteristics, particularly in urban areas, where working conditions may represent more of an approximation to "community" experience than do residential ones.
A hypothesis proposed for future research is also that of the role of sleep-loss. It is suggested that this factor will be felt much more by some women, and that probably it will be those who normally require the greatest number of hours sleep - and possibly those whose sleeping and activity patterns are more "rigid", and who adjust less easily to new schedules. Loss of sleep at this time might deplete energy resources in some women below a tolerable level.

Aspects of theoretical interest are those of the constancy or change of scores of hostility and its direction and on locus of control throughout pregnancy and post-partum. It would then be possible to ascertain whether hostility and depression ratings co-varied, or whether one preceded the other; whether scores on either hostility, intro- or extravertiveness or externality rose in pregnancy in those who later developed depression, and whether those who were external and intropunitive were already depressed in pregnancy or at greater risk of a post-natal reaction.

Whereas there may be characteristics associated with the depressed individual, these may be 'independent' rather than dependent variables, which do not change when depressive symptoms or affect remits.

It has been suggested that a commonsense approach to the treatment of depression is the aim of symptom-reduction, whilst impact, and here too counselling might be of benefit. Even if intervention during recovery was not appropriate, "characteristics and modes of functioning associated with depressive affect which will not in themselves be recognized as or treated as clinical symptoms" (Lunghi, 1977). Lunghi has suggested that, if these do not change with variation in depression this may be due to their association with some
other causal variable, or to a time-lag in the change in other characteristic variables - or to a third possible reason; that there may be predisposing characteristics which treatment does not aim to, and does not change.

Lunghi mentions a tendency to perceive and evaluate social relationships in atypical ways as one such characteristic. He suggests that whereas depressives may have objectively poor social relations, a generally negative cognitive style of perceiving and evaluating these seem probable, which endures in the absence of depressive mood. As such a style could help to create poor relationships, which might perpetuate the style, Lunghi feels that it may not be useful to debate which occurs first, but considers that such a style might be an important aetiological factor in depressive illness. This represents a broader view, and the use of the Locus of Control and HDHQ scales might be profitable to this end.

Of practical value might be the recognition of poor mental state in some women in pregnancy, and the possibility of intervention before the birth. It could be envisaged that for a number of women, marital problems might be a dominant feature, and provisions could be made for counselling before the family dynamics were extended by the advent of the infant. For other women, early family relationships might reassert their impact, and here too counselling might be of benefit. Even if intervention during pregnancy was not appropriate, the new mother appears to be largely outside the reach of any caring body, and with the exception of the perceptive and empathetic health visitor, her condition may escape the notice and care of all except her immediate family or neighbour.
Some form of continuity of care extending throughout pregnancy and the post-partum period seems desirable for the break between ante-natal "care" and the experience of motherhood not to be too extreme.
General Discussion and Conclusion

This thesis may appear unusual in that it has included both laboratory work and a field study, and to that extent its compass has been wider than is usual. It has raised a number of questions that it was not possible to answer within this framework. In an area concerned particularly with real-life distress this was perhaps inevitable. It may however be helpful to try to assess the extent to which it has provided new insights as well as considering the limitations of the study.

Perhaps one of the most novel and interesting findings has been that of the apparent "inconsistencies" between individuals' attributions of the control of events and of blame. It seems in some ways surprising that this inconsistency has not previously received more attention, particularly in view of intropunitiveness and external control both being cited as factors predisposing to depression, albeit by different schools of thought. It may be partly because these schools have not shared a common dialogue that this apparent paradox has not previously received more attention.

Having provided experimental evidence of these inconsistencies, there are many questions that this thesis has not answered. Foremost amongst these is the query as to whether these "inconsistency" findings would have general applicability. It could be argued that the populations were very specific - young adult male students and expectant mothers - and that the former sample was a very small one.
These arguments would be quite valid, and it is considered that it cannot be argued that the findings are necessarily applicable to other populations. It is however possible to extrapolate from the findings and propose, for further investigation the premise that inconsistency in attributions will be found in other samples, providing a testable hypothesis for future work. It would be of considerable interest in fact if it should be found that certain groups of individuals displayed consistency while other groups did not.

It is implicit in the findings that nothing specific can be said concerning possible sex differences in this inconsistency factor, on account of the disparate size of the samples, and lack of control of factors such as age and class. This is an aspect which remains to be tested, and which might also prove worth investigating.

An aspect of the thesis which may appear surprising is the inclusion of such differing samples and methodologies. The initial laboratory work used a small male sample for specific reasons, viz on account of the problems inherent in measuring psychophysiological parameters in female subjects, whereas the field study used only a female populations for reasons which may be apparent. The use of such different subject populations was not planned originally. Had the final direction of the work been envisaged at the beginning, it might have been preferable to use a female sample initially, either sacrificing the niceties of experimental control, or possibly omitting the psychophysiological assessments. To forego the chance to test the measures on the post-partum sample would have been to neglect a unique opportunity of
testing the proposed vulnerability factors in relation to a real-life stressor. It is hoped that the findings of the research justify this decision. In reporting the findings it is obviously not contended that the minor laboratory stressor is directly comparable with that of child-birth and infant-rearing. What is contended is that the dimensions chosen, either singly or in conjunction, hold promise as general vulnerability factors which might predispose to "stress-response" in a number of situations.

It might also be part of future work to attempt to explore why these attitudes might make for particular vulnerability. The views of Rotter and Seligman concerning the individual's previous learning that his behaviour is not effective in determining events sound feasible in general terms, while those of Hall-Smith, Bullock and others concerning the potentially destructive role of hostility in social relationships also commends itself.

It might be possible in future to elaborate on the cognitions of extreme scorers on these dimensions, and if more extensive interview assessments were to be possible or even therapeutic counselling, to gain insights into a possibly vicious circle of generally negative cognitions that might culminate in depression.

The findings linking depression with inconsistent attitudes of control and blame relate not just to overall mean scores but to certain individuals holding these attitudes. It may be most rewarding if future work also follows up these individuals, as well as examining overall findings. The question as to why the paradoxical attitudes
may exist and how they may have originated has not been part of this investigation. The findings do however provide fruit for further work to try to elucidate the overall "cognitive patterning" of those individuals holding such attitudes, and the antecedents of these attitudes. Such work might yield further insights important for the prediction of depression.

Neither sample used subjects pre-selected for extreme scores on the psychometric measures. To attempt to do so would have presented problems — in the first sample by eliminating a large number of volunteers and in finding sufficient high-scorers who were prepared to give time to psychophysiological investigations, and in the second case, the agreed criteria of the hospital study did not permit this. It could be presumed that pre-selection of high-scoring subjects might have provided even clearer findings, and this remains a possibility for others to attempt a replication using the same measures.

Where the assessment of depression is concerned, there may be different views concerning how this should be made, and each investigation may have a preference, e.g. for observer- or self-ratings, or for a particular measure other than the one used here.

Another aspect of the work which could be refined, and which requires clarification, is whether the proposed maladaptive attitudes were in fact precursors and predictors of later depression — or whether they would have been found to be aspects of the illness already making its appearance. Be drawn or generalisations made concerning the psychometric
It was extremely tantalizing to have to omit the postnatal measure of depression pre-natally. At the moment it is not possible to say whether the maladaptive attitudes preceded depression or were concurrent with it, and whether both extra- and intropunitiveness were relatively stable, or whether intropunitiveness was behaving more like a "state" measure.

The question as to whether the very tentative mood findings of the first study might be replicable and might hold any implications for more severe depression remains unanswered here. Doubts concerning the measurement of mood and its change have already been expressed, as well as those concerning simulated stressors and the deception of subjects.

Little confidence is placed personally in the laboratory of non-normal findings obtained. It is felt that the stressor situation of child-birth was selected, both as an ideal situation for testing the proposed predictions in a before-after situation, and also because the life-event of child-birth was selected, both as an ideal situation for testing the proposed predictions in a before-after situation, and also because the syndrome of post-natal depression deserved study in its own right.

Even given the possible lack of generality of the findings, sufficient confidence remains to make specific predictions for further work, at least concerning the psychometric
dimensions, or regarding depression and stress-responses in general. Any approach however would have had to select a specific stressor and/or control the parameters of a sample population. It cannot be contended, on the basis of these findings, that they would necessarily be applicable to other stressor situations, or other populations. However, the work has generated testable hypotheses to the effect that extreme scores on the psychological dimensions might also be predictive of depression occurring in other contexts, or of other stress-responses, and further, that conjunctions of extreme scores on both dimensions would constitute a vulnerability factor predisposing to maladaptive responses.

It is difficult to envisage how work predicting occurrence of non-puerperal depression might be organised in order to make assessments prior to breakdown. The only exception to this might be a large-scale prospective study whereby the measures used here could be included as part of a screening procedure, but such studies are hard to initiate, not least because of long-term funding.

The findings may not have made a direct contribution concerning the possible chain of causal events culminating in depressive outcome. However, the illness is so widespread and disabling, that a multi-faceted approach to it seems desirable, and the insights gained from a wide body of research may ultimately be capable of integration.

Even given the possible lack of generality of the findings, sufficient confidence in them is felt to make specific predictions for further work, at least concerning...
puerperal women, and these can be postulated:—It is predicted that, in a pre-natal sample, women characterised by both external control and intro-punitiveness will be more at risk for puerperal depression, as will those characterised by overall hostility and extrapunitiveness. Given the present lack of understanding concerning puerperal depression, if these characteristics make it possible to improve prediction of the illness, then a considerable contribution may have been made. Hopefully, this may be true not only at an academic level, but also in practical terms. Although application of the results would present some problems, it is possible to envisage "maternity care" comprising a more holistic approach to women’s health and general well-being. If prevention of depression is possible, it seems particularly important where the responsibility of motherhood is shortly to ensue, where negative mood-state or illness when caring for a new infant may have long-lasting implications for mother, baby and the whole family unit. Whereas this study may not have indicated to a high degree of statistical probability precisely which patients will or will not succumb, attention could be directed towards women with the two profiles depicted who may be particularly at risk. It is conceivable that some form of therapeutic counselling would be acceptable and could be made more readily available to women, who might as a result avert post-partum distress. For a research procedure, if women with extreme scores were selected from a pre-natal population, half of these could be given prophylactic counselling or behavioural therapy with a view to inducing changes in their handling of hostility and attitudes of control. (Such techniques have already
been used in retrospective studies and after the occurrence of depression, and might be even more valuable if they were to be used prospectively). Post-partum outcomes for both groups could then be monitored, and the incidence of post-partum depression also compared with those with normal psychometric scores.

If a long-term prospective study were to be possible, and a large female sample were to be assessed on the psychological dimensions, then a rapprochement between depression occurring in females post-natally and at other times might be possible. If a relatively young age-group were to be selected, a high proportion of these would be likely to become mothers within a limited time-period. This would allow for assessment of the predictors prior to pregnancy (which may make its own psychological impact), and an opportunity to examine possible changes in the variables during or following pregnancy. The "controlled" situation of the pre-natal period, with its defined time-span and its continuous monitoring may still provide an optimal opportunity for the study of depression in women, whether or not this is relevant for depression occurring at other times.

It will be apparent that little reference has been made to depression in the male population. Its occurrence in men appears to be relatively rare, and it may not be possible to make generalizations across the sexes, the occurrence of depression in men possibly requiring a specific study. The emphasis of the current study is not intended to imply that personal characteristics are the only determinants of post-natal depression. External factors such as possibly those of social isolation, loss of job-satisfaction or of loss of...
sleep are also considered to be relevant and requiring investigation.

The psychophysiological variables were not in the forefront of this investigation, and their relevance to the main findings remains to be tested. If longer skin conductance recovery times are indicative of experienced "threat", and if extreme scores on the psychological measures indicate particular vulnerability to life-stressors, it is possible that individuals who appear more "threatened" (in terms of longer skin-conductance recovery times) might also find actual life-events more threatening, and that such individuals might also be identifiable prospectively. The procedures for laboratory work however do not normally sit easily with those of field-work. If laboratory studies were to be pursued separately, then the initial study offers very tentative findings where replication could be attempted, possibly with a larger or pre-selected sample.

Tentative hypotheses have also been proposed concerning other combinations of scores on control and blame and on possible vulnerability to specific illness apart from depression. This appears to be an area of some fascination which other research could develop and extend.


REFERENCES


BROWN, C.W. (1974(b)) Personal communication.


for the study of Interpersonal Processes. Vol.35, 2, May, 139-160.


CANNON, W.B. (1929) Bodily changes in pain, hunger, fear and rage


COCHRANE, N. (1975) Assessing the aggressive component of personality.


HOLME, N. (1973) Life change and illness susceptibility.


JAMES, W.H. (1957) Internal versus external control of reinforcement as a basic variable in learning theory. Unpub. Doct. Diss., Ohio State Univ.


MEFFERD, R.B. & POKORSY, A.D. (1967) Individual variability re-
46, 228-331.

20, 95-108.

MELGES, F.T. & BOWLEY, J. (1969) Types of hopelessness in psycho-

MERRILL, R.M. & HEATHERS, L.B. (1956) The relation of the MMPI to the
Edwards Personal Preference Schedule on a College Counselling Center

MESTCALF, M. (1968) The personality of depressive patients. In:
Coppen, A. & WALK, A. (Eds.), Present developments in affective
disorders. Ashford, Kent: Headley Bros.

MEYERSON, B. (1964) Estrus behaviour in spayed rats. Psychophar-
cologia, 6, 210-218.

and the violation of experimental instructions. Psychol. Record.,
19, 369-380.

 Science, 163, 434-443.

responses to punishment. In: Campbell, B.A. & Church, R.M. (Eds.),

MILLER, W.R. & SELIGMAN, M.E.P. (1973) Depression and the perception


NIINI, Y. (1967) The studies on electrical skin conductance and
galvanic skin reflex by exosomatic methods. Bull. of the Graduate
Division of Literature of Waseda Univ. 13, 1-19.


NOBLE, P.J. & LADER, M.H. (1971) The symptomatic correlates of the
skin conductance changes in depression. J. of Psychiat. Res., 9,
61-69.

NOBLE, R. & LADER, M.H. (1972) A physiological comparison of "endogenous"


NOWLIS, V. (1965) Research with the M.A.C.L In: Homkin, S.S. &
Isard, C.E. (Eds.), Affect, Cognition and Personality. New York:
Springer.

NUCKOLLS, K.B. (1971) Psychosocial assets, life crisis and the prognosis

NUCKOLLS, K.B., CASSEL, J. & KAPLAN, B.H. (1972) Psychosocial assets,
life crisis and the prognosis of pregnancy. Amer. J. of Epidemiology,
95, No.5, 431-441.

OBRIST, P. (1963) Skin resistance levels and galvanic skin response:
unilateral differences. Science. 139, 227-228.

Psychophysiology: some contemporary methods of measurement.
Am. Psychologist. 30 (3) 277-284.

Koessler, R. & Greenfield, N.S. (Eds.), Physiological correlates of psychological disorder. Univ. of Wisconsin Press, Madison.

Lecture to the Royal Medico-Psychological Association.


PITT, B. (1972) Neurotic (or Atypical) Depression following childbirth. 
Psychosom. Med. in Obs. & Gyn., 3rd Int. Cong. London, pp.347-349, 
(Karger, Basel).


Meeting of the Section of Obstetrics and Gynaecology.

Royal Society of Medicine, 68, 223-224.

Springfield, Ill.

POWELL, P.A. & CREEK, T.L. (1969) Interaction of developmental and 
environmental variables in shock-elicited aggression. J. Comp. 
Physiol. Psychol., 69, 219-225.

Depression: The biochemical and physiological role of Ludiomil. 
CIBA publication, Metropolis Press, London.

PRIEST, R.G. & NETTER, P. (1975) Hostility, somatic symptoms and 
recovery with antidepressants. Int. Pharmacopsychiat., 10, 137-141.

PROCIUK, T.J., BRENN, L.J. & LUSSIER, R.J. (1976) Hopelessness, Internal-
External Locus of Control, and Depression. J. Clin. Psychol., 
April, 32, 2, 299-300.


PUGH, T.F., JERATH, B.K., SCHMIDT, W.R. & REED, R.E. (1963) Rates of 
mental disease related to child-bearing. New Engl. J.Med., 268, 
1224-1228.


Locus of control and attitudes towards Women’s Liberation in

RYCKMAN, R.H. & SHERMAN, M.F. (1973) Relationship between self-esteem
and Internal/External control for men and women. Psychol. Rep.,
32, 1106.


endocrine aspects of acute schizophrenic reactions. Psychosom.

classification of obsessional character traits and symptoms.

i, 225-227.


Science, 156, 21-30.

SCHNEIDER, J.M. (1968) Skill versus chance activity preference and

(Eds.), Helping the battered child and his family. J.B. Lippincott

In: Proksaay, W.F. & Raskin, B.G. (Eds.), Electrodermal activity

Practitioner, 175, 166-154.

SELIGMAN, M.E.P. (1973) Fall into helplessness. Psychol. Today, 7,
Pt. 1, 43-48.

SHANNON, J.L. (1946) A survey of mental illness associated with


UDDENBERG, N. & NILSSON, L. (1975) The longitudinal course of para-
VENABLES, P.H. (1975) Progress in Psychophysiology: Some applications
in a Field of Abnormal Psychology. In: Venables, P.H. & Christie,
M.J. (Eds.), Research in Psychophysiology. J. Wiley.
VENABLES, P.H. & CHRISTIE, M.J. (1973) Mechanisms, instrumentation,
recording and quantification. In: Prokasy, W.F. & Raskin, D.C.
(Eds.), Electrodermal Activity in Psychological Research.
state and mood: an exploratory study of Friday/Monday changes.
Biol. Psychol., 1, 201.
In: Venables, P.H. & Martin, I. (Eds.), A manual of psychophysiological
VENABLES, P.H. & SAYER, E. (1963) On the measurement of the level of
In: Wood, C.W. (Ed.), Proceedings of a conference on recent progress
in the endocrinology of reproduction. New York.
Br. J. Psy., 112, 143-150.
WALTON, H.J. (1968) Personality as a determinant of the form of
WAREHIME, R.C. & WOODSON, S. (1971) Locus of Control and immediate
WATSON, D. & BAUMEL, E. (1967) Relationship between locus of control


Remember to answer each statement:

1. Most people make friends because friends are likely to be useful to them. 
   True    False

2. I do not blame a person for taking advantage of someone who has been open to it. 
   True    False

3. I usually expect to succeed in things I do. 
   True    False

4. I have no enemies who really wish to harm me. 
   True    False

5. I wish I could get over worrying about things I have said that may have injured other people's feelings. 
   True    False

6. I think nearly anyone would tell a lie to keep out of trouble. 
   True    False

APPENDIX

7. I don't blame anyone for trying to grab everything he can get in this world. 
   True    False

8. My hardest battles are with myself. 
   True    False

9. I know who, apart from myself, is responsible for most of my troubles. 
   True    False

10. Some people are so happy that I feel like doing the opposite of what they request, even though I know they are right. 
    True    False

11. Some of my family have habits that bother and annoy me very much. 
    True    False

12. I believe my sins are unpardonable. 
    True    False

13. I have very few quarrels with members of my family. 
    True    False

14. I have often lost out on things because I couldn't make up my mind soon enough. 
    True    False

15. I can easily make other people afraid of me, and sometimes do for the fear of it. 
    True    False

16. I believe I am a condemned person. 
    True    False

17. In school I was sometimes sent to the principal for misbehaving. 
    True    False

18. I have at times stood in the way of people who were trying to do something, not because it amounted to much but because of the principle of the thing. 
    True    False

19. Most people are honest chiefly through fear of being caught. 
    True    False

20. Sometimes I enjoy hurting persons I love. 
    True    False

21. I have not lived the right kind of life. 
    True    False

22. Sometimes I feel as if I must injure either myself or someone else. 
    True    False

23. I seem to be about as capable and clever as most others around me. 
    True    False

24. I sometimes tease animals. 
    True    False
Please circle either true or false

Remember to answer each statement.

1. Most people make friends because friends are likely to be useful to them
   True False

2. I do not blame a person for taking advantage of someone who lays himself open to it
   True False

3. I usually expect to succeed in things I do
   True False

4. I have no enemies who really wish to harm me
   True False

5. I wish I could get over worrying about things I have said that may have injured other people's feelings
   True False

6. I think nearly anyone would tell a lie to keep out of trouble
   True False

7. I don't blame anyone for trying to grab everything he can get in this world
   True False

8. My hardest battles are with myself
   True False

9. I know who, apart from myself, is responsible for most of my troubles
   True False

10. Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right
    True False

11. Some of my family have habits that bother and annoy me very much
    True False

12. I believe my sins are unpardonable
    True False

13. I have very few quarrels with members of my family
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14. I have often lost out on things because I couldn't make up my mind soon enough
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21. I have not lived the right kind of life
    True False

22. Sometimes I feel as if I must injure either myself or someone else
    True False

23. I seem to be about as capable and clever as most others around me
    True False

24. I sometimes tease animals
    True False
25. I get angry sometimes ............................................................ True False
26. I am entirely self-confident ................................................. True False
27. Often I can't understand why I have been so cross and grouchy True False
28. I shrink from facing a crisis or difficulty ................................ True False
29. I think most people would lie to get ahead .......................... True False
30. I have sometimes felt that difficulties were piling up so high that I could not True False
     overcome them ........................................................................
31. If people had not had it in for me I would have been much more successful True False
32. I have often found people jealous of my good ideas, just because they had not True False
     thought of them first . . . . . . . . ............................................
33. Much of the time I feel as if I have done something wrong or evil True False
34. I have several times given up doing a thing because I thought too little of my True False
     ability ....................................................................................
35. Someone has it in for me ...................................................... True False
36. When someone does me a wrong I feel I should pay him back if I can, just True False
     for the principle of the thing ..................................................
37. I am sure I get a raw deal from life ....................................... True False
38. I believe I am being followed .............................................. True False
39. At times I have a strong urge to do something harmful or shocking True False
40. I am easily downed in an argument ..................................... True False
41. It is safer to trust nobody ..................................................... True False
42. I easily become impatient with people .................................. True False
43. At times I think I am no good at all ...................................... True False
44. I commonly wonder what hidden reason another person may have for doing True False
     something nice for me ..........................................................
45. I get angry easily and then get over it soon ......................... True False
46. At times I feel like smashing things .................................... True False
47. I believe I am being plotted against ................................... True False
48. I certainly feel useless at times .......................................... True False
49. At times I feel like picking a fist fight with someone ........... True False
50. Someone has been trying to rob me .................................... True False
51. I am certainly lacking in self-confidence ............................. True False

Please check to see that you have given answers for every statement.
### Locus of Control Scale

**Rotter (1966)**

<table>
<thead>
<tr>
<th>Item</th>
<th>15.a. In my case getting what I want has little or nothing to do with luck.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b. Many times we might just as well decide what to do by flipping a coin.</td>
</tr>
<tr>
<td>16.a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.</td>
</tr>
<tr>
<td>17.a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. By taking an active part in political and social affairs the people can control world events.</td>
</tr>
<tr>
<td>18.a. Most people don't realize the extent to which their lives are controlled by accidental happenings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. There really is no such thing as &quot;luck.&quot;</td>
</tr>
<tr>
<td>19.a. One should always be willing to admit mistakes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. It is usually best to cover up one's mistakes.</td>
</tr>
<tr>
<td>20.a. It is hard to know whether or not a person really likes you.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. How many friends you have depends upon how nice a person you are.</td>
</tr>
<tr>
<td>21.a. In the long run the bad things that happen to us are balanced by the good ones.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.</td>
</tr>
<tr>
<td>22.a. With enough effort we can wipe out political corruption.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. It is difficult for people to have much control over the things politicians do in office.</td>
</tr>
<tr>
<td>23.a. Sometimes I can't understand how teachers arrive at the grades they give.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. There is a direct connection between how hard I study and the grades I get.</td>
</tr>
<tr>
<td>24.a. A good leader expects people to decide for themselves what they should do.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. A good leader makes it clear to everybody what their jobs are.</td>
</tr>
<tr>
<td>25.a. Many times I feel that I have little influence over the things that happen to me.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. It is impossible for me to believe that chance or luck plays an important role in my life.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>26.a. People are lonely because they don't try to be friendly.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b. There's not much use in trying too hard to please people, if they like you, they like you.</td>
</tr>
<tr>
<td>27.a. There is too much emphasis on athletics in high school.</td>
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<tr>
<td></td>
<td>b. Team sports are an excellent way to build character.</td>
</tr>
<tr>
<td>28.a. What happens to me is my own doing.</td>
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<tr>
<td></td>
<td>b. Sometimes I feel that I don't have enough control over the direction my life is taking.</td>
</tr>
<tr>
<td>29.a. Most of the time I can't understand why politicians behave the way they do.</td>
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<tr>
<td></td>
<td>b. In the long run the people are responsible for bad government on a national as well as on a local level.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>15.a. In my case getting what I want has little or nothing to do with luck.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b. Many times we might just as well decide what to do by flipping a coin.</td>
</tr>
<tr>
<td>16.a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.</td>
</tr>
<tr>
<td>17.a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. By taking an active part in political and social affairs the people can control world events.</td>
</tr>
<tr>
<td>18.a. Most people don't realize the extent to which their lives are controlled by accidental happenings.</td>
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<td>b. There really is no such thing as &quot;luck.&quot;</td>
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<td>19.a. One should always be willing to admit mistakes.</td>
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<tr>
<td></td>
<td>b. It is usually best to cover up one's mistakes.</td>
</tr>
<tr>
<td>20.a. It is hard to know whether or not a person really likes you.</td>
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<tr>
<td></td>
<td>b. How many friends you have depends upon how nice a person you are.</td>
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<tr>
<td>21.a. In the long run the bad things that happen to us are balanced by the good ones.</td>
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<tr>
<td></td>
<td>b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.</td>
</tr>
<tr>
<td>22.a. With enough effort we can wipe out political corruption.</td>
<td></td>
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<tr>
<td></td>
<td>b. It is difficult for people to have much control over the things politicians do in office.</td>
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<tr>
<td>23.a. Sometimes I can't understand how teachers arrive at the grades they give.</td>
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<tr>
<td></td>
<td>b. There is a direct connection between how hard I study and the grades I get.</td>
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<td>24.a. A good leader expects people to decide for themselves what they should do.</td>
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<td>b. A good leader makes it clear to everybody what their jobs are.</td>
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<tr>
<td>25.a. Many times I feel that I have little influence over the things that happen to me.</td>
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<td></td>
<td>b. It is impossible for me to believe that chance or luck plays an important role in my life.</td>
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<table>
<thead>
<tr>
<th>Item</th>
<th>26.a. People are lonely because they don't try to be friendly.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b. There's not much use in trying too hard to please people, if they like you, they like you.</td>
</tr>
<tr>
<td>27.a. There is too much emphasis on athletics in high school.</td>
<td></td>
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<td></td>
<td>b. Team sports are an excellent way to build character.</td>
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<td>28.a. What happens to me is my own doing.</td>
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<td>b. Sometimes I feel that I don't have enough control over the direction my life is taking.</td>
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<td>29.a. Most of the time I can't understand why politicians behave the way they do.</td>
<td></td>
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<tr>
<td></td>
<td>b. In the long run the people are responsible for bad government on a national as well as on a local level.</td>
</tr>
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</table>
MOOD CHECK LIST

Each of the words in the following list describes feelings or mood. Please use the list to describe your feelings at this moment. Mark each word according to these instructions:

If the word definitely described how you feel at the moment you read it, circle the double cross (xx) to the right of the word. For example, if the word is calm and you are definitely feeling calm at the moment, circle the double cross as follows:

calm (xx) x ? no (This means you definitely feel calm at this moment).

If the word only slightly applies to your feelings at the moment, circle the single cross as follows:

calm xx (x) ? no (This means you feel slightly calm at the moment).

If the word is not clear to you or if you cannot decide whether or not it describes your feelings, circle the question mark as follows:

calm xx x (? no (This means you cannot decide whether you are calm or not).

If you clearly decide that the word does not apply to your feelings at this moment, circle the no as follows:

calm xx x no (This means you are sure you are not calm at this moment).

Work rapidly. Your first reaction is the best. Work down the first column before going to the next. Please mark all the words. This should take only a few minutes.

/ worthless XX X \ / empty XX X no
angry xx x ? no / sad xx x ? no / tired xx x ? no
concentrating xx x ? no / earnest xx x ? no / kindly xx x ? no
drowsy xx x ? no / forgiving xx x ? no / fearful xx x ? no
affectionate xx x ? no / tensed up xx x ? no / regretful xx x ? no
apprehensive xx x ? no / lonely xx x ? no / egotistic xx x ? no
/ blue xx x ? no / cocky xx x ? no / overjoyed xx x ? no
boastful xx x ? no / light-hearted xx x ? no / vigorous xx x ? no
elated xx x ? no / energetic xx x ? no / witty xx x ? no
active xx x ? no / playful xx x ? no / rebellious xx x ? no
nonchalant xx x ? no / suspicious xx x ? no / serious xx x ? no
sceptical xx x ? no / startled xx x ? no / warm-hearted xx x ? no
shocked xx x ? no / defiant xx x ? no / insecure xx x ? no
bold xx x ? no / engaged in thought xx x ? no / self-centred xx x ? no
helpless xx x ? no / hopeless xx x ? no / pleased xx x ? no
\ / / Items scoring on depressed mood / on anxious mood
0-No 1=Not sure 2=slightly 3=definitely
### Table A1

**Questionnaire Scores - Group I**

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\[
\bar{x} = \frac{11.85}{6.92} \quad \text{s.d.} = \frac{4.28}{6.92}
\]

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### Table A2

**Questionnaire Scores - Group II**

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\[ \bar{x} = \begin{bmatrix} 11.63 \\ 15.18 \\ -1.37 \end{bmatrix} \]

\[ \text{s.d.} = \begin{bmatrix} 3.57 \\ 5.59 \\ 6.01 \end{bmatrix} \]
Mood scores at the beginning and end of the relaxation session for Group II.

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\[ \bar{x} = 1.74 \quad .44 \quad -1.29 \]
**Table A4**

*Mood scores at the beginning and end of the relaxation session for Group II.*

**Scores on Depression**

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\[ \bar{x} = 0.66 \quad 0.40 \quad -0.33 \]
## APPENDIX

### Part II

**Laboratory Exploration**

### Table B1

Locus of Control Scores

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<td>19</td>
<td>9</td>
</tr>
<tr>
<td>20</td>
<td>11</td>
</tr>
</tbody>
</table>

Scores are in the direction of Externality.

\[
\bar{x} = 12.35
\]

\[
s.d. = 3.03
\]

Contd/
### Appendix

#### Part II

**Laboratory Exploration**

Table B2: Scores on the HDHQ

<table>
<thead>
<tr>
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<td>-3</td>
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</table>

\[
\bar{x} = 14.55 \quad \text{s.d.} = 5.96
\]

(Dir. H. scores are in the direction of Inward Hostility).
### Appendix

#### Table B3

**The Attribution Ratings**

<table>
<thead>
<tr>
<th>Response No.</th>
<th>Subject 1</th>
<th>2*</th>
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<th>4</th>
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<td>4.5</td>
<td>4.5</td>
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</tr>
</tbody>
</table>

\[
\bar{x} = 6 \quad 4.81 \quad 5.17 \quad 5.35 \quad 4.92 \quad 5.6 \quad 5.5 \quad 5.52 \quad 5.52
\]

Attributions of causation are in the direction of "Other".

* Indicates the "success" responses.
## Table B4

The Mood Ratings

<table>
<thead>
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<th>Subject</th>
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\[
\bar{x} = 0.85 \quad 0.45
\]
## Table B5

Skin-conductance half-recovery times for all the subjects, and for the mean "success" and "failure" responses

<table>
<thead>
<tr>
<th></th>
<th>( \bar{X}_{\frac{1}{2}RT} ) &quot;success&quot;</th>
<th>( \bar{X}_{\frac{1}{2}RT} ) &quot;failure&quot;</th>
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<td>1</td>
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\[ \bar{X} = 4.09 \quad 3.27 \quad 4.15 \]

\[ n = 19 \quad 14 \quad 18 \]

- = missing scores

Mean 1/2 RT scores, and means for the "success" and "failure" conditions for each subject.
### Table B6

#### Mean Subject Attribution Ratings

<table>
<thead>
<tr>
<th>Subject</th>
<th>Mean Attributions</th>
<th>Mean Attributions on the &quot;success&quot; Responses</th>
<th>Mean Attributions on the &quot;failure&quot; Responses</th>
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</table>

$$\bar{x} = 5.36$$

$$\bar{y} = 4.65$$

$$\bar{z} = 5.57$$
Please tick _a_ or _b_ for each question, whichever you agree with more.  
For some questions you may feel you agree with both statements and for some with neither, but please try to decide which is nearest to what you feel, so that you always tick one or the other.

<table>
<thead>
<tr>
<th>Question</th>
<th>Statement A</th>
<th>Statement B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. a.</td>
<td>Children get into trouble because their parents punish them too much.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>The trouble with most children nowadays is that their parents are too easy with them.</td>
<td></td>
</tr>
<tr>
<td>2. a.</td>
<td>Many of the unhappy things in people's lives are partly due to bad luck.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>People's misfortunes result from the mistakes they make.</td>
<td></td>
</tr>
<tr>
<td>3. a.</td>
<td>One of the main reasons we have wars is because people don't take enough interest in politics.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>There will always be wars, no matter how hard people try to prevent them.</td>
<td></td>
</tr>
<tr>
<td>4. a.</td>
<td>In the long run people get the respect they deserve in this world.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>Unfortunately, a person's worth often goes unrecognised no matter how hard he tries.</td>
<td></td>
</tr>
<tr>
<td>5. a.</td>
<td>The idea that teachers are unfair to pupils is nonsense.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>Most pupils don't realize how much their marks are influenced by accidental happenings.</td>
<td></td>
</tr>
<tr>
<td>6. a.</td>
<td>Without the right opportunities no-one can be a good leader.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>Some capable people have not become leaders because they have not made the most of their opportunities.</td>
<td></td>
</tr>
<tr>
<td>7. a.</td>
<td>No matter how hard you try some people just don't like you.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>People who can't get others to like them don't understand how to get along with others.</td>
<td></td>
</tr>
<tr>
<td>8. a.</td>
<td>Heredity plays the main part in deciding what our personality is like.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>It is our experiences in life which determine what we are like.</td>
<td></td>
</tr>
<tr>
<td>9. a.</td>
<td>I have often found that what is going to happen will happen.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>Trusting to fate has never turned out as well for me as deciding to do a particular thing.</td>
<td></td>
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<tr>
<td>10. a.</td>
<td>Becoming a success is a matter of hard work, luck has little or nothing to do with it.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>Getting a good job depends mainly on being in the right place at the right time.</td>
<td></td>
</tr>
<tr>
<td>11. a.</td>
<td>The average person can influence government decisions.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>This world is run by the few people in power, and there is not much the ordinary person can do about it.</td>
<td></td>
</tr>
</tbody>
</table>
12.a. When I make plans, I am almost certain that I can make them work.

b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad luck in any case.

13.a. There are some people who are just no good.

b. There is some good in everybody.

14.a. In my case getting what I want has little or nothing to do with luck.

b. Quite often we might just as well decide what to do by tossing a coin.

15.a. Who becomes the boss often depends on who was lucky enough to be in the right place first.

b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

16.a. As far as world affairs are concerned, most of us are the victims of forces we cannot understand, or control.

b. By taking an active part in political and social affairs people can control world events.

17.a. Most people don't realize the extent to which their lives are controlled by accidental happenings.

b. There really is no such thing as "luck".

18.a. One should always be willing to admit mistakes.

b. It is usually best to cover up one's mistakes.

19.a. It is hard to know whether or not a person really likes you.

b. How many friends you have depends upon how nice a person you are.

20.a. In the long run the bad things that happen to us are balanced by the good ones.

b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

21.a. With enough effort we can wipe out political corruption.

b. It is difficult for people to have much control over the things politicians do in office.

22.a. A good leader expects people to decide for themselves what they should do.

b. A good leader makes it clear to everybody what their jobs are.

23.a. I often feel that I have little influence over the things that happen to me.

b. It is impossible for me to believe that chance or luck plays an important role in my life.

24.a. People are lonely because they don't try to be friendly.

b. There's not much use in trying too hard to please people, if they like you, they like you.

25.a. What happens to me is my own doing.

b. Sometimes I feel that I don't have enough control over the direction my life is taking.
APPENDIX

DSSI/1AD scale

1. Recently I have worried about every little thing.
2. Recently I have been so miserable that I have had difficulty with my sleep.
3. Recently I have been breathless or had a pounding of my heart.
4. Recently I have been so 'worked up' that I couldn't sit still.
5. Recently I have been depressed without knowing why.
6. Recently I have gone to bed not caring if I never woke up.
7. Recently, for no good reason, I have had feelings of panic.
8. Recently I have been so low in spirits that I have sat for ages doing absolutely nothing.
9. Recently I have had a pain or tense feeling in my neck or head.
10. Recently the future has seemed hopeless.
11. Recently worrying has kept me awake at night.
12. Recently I have lost interest in just about everything.
13. Recently I have been so anxious that I couldn't make up my mind about the simplest thing.
14. Recently I have been so depressed that I have thought of doing away with myself.

* Items scoring on depression

0 Not at all
1 A little
2 A lot
3 Unbearably
DEPRESSION—ZUNG

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<td>I have crying spells or feel like it</td>
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<td>I have trouble sleeping at night</td>
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<td>I still enjoy sex</td>
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<td>My heart beats faster than usual</td>
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### Appendix - Part III

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### Appendix - Part III

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## Appendix - Part H I

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Appendix - Part III

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