USE OF THESES

This copy is supplied for purposes of private study and research only. Passages from the thesis may not be copied or closely paraphrased without the written consent of the author.
An investigation of a problem solving situation as a paradigm of the double bind.

A. F. Hamilton.

This thesis was submitted in fulfilment of the requirements for the degree of Master of Arts at the Australian National University, November, 1969.
This statement is to certify that the experiments described in this thesis were my own original work.

A. F. Hamilton.
Table of Contents

Acknowledgements v
Abstract vi
List of tables viii
List of figures x
Ch. 1 The Problem 1
   Hypotheses 37
Ch. 2 Method: Apparatus 42
   Pilot study 1. 43
   Pilot study 2. 45
   The experiment, apparatus 50
   procedure 51
   subjects 61
   collection and treatment of data. 68
Ch. 3 Results: Total number correct 72
   Total number correct + 1/2 ? responses. 82
   Mean response times 90
   Total number of fixations 107
   Total number of times the ? button was pressed 118
Total number of subjects forming correct hypotheses 120
M.A.S. results 125
Material obtained from the "level of aspiration" questionnaires. 128
Material obtained from the taped interviews 145

Ch. 4 Summary of results and conclusions 120
Ch. 5 Summary 125
Ch. 6 Appendix 128
Ch. 7 References 145
Acknowledgement

The author wishes to express her appreciation to Associate Professor P. Pentony for his patient guidance of this study, and to her typist, Mrs. N. Blundell.
Abstract.

The present thesis reports on the results of an experiment designed to measure certain aspects of the double bind hypothesis, which was developed by the Bateson group in 1956 to account for the aetiology of schizophrenia. Two ingredients of the total double bind situation were studied, firstly, conflict between levels of communication and the importance of a command keeping the victim of the double bind in the field. These two conditions were seen as important distinguishing points between double bind frustration and the ordinary type of frustration.

The experimenter tested 80 normal subjects in a problem solving situation similar to one used by Maier (1949) in his experiments with rats. In the experiment, subjects were given a number of problems to solve and some were frustrated in the middle of the experiment. The general hypothesis was that double bind subjects would show greater performance deterioration after frustration than subjects who experienced the ordinary frustration situation (i.e. contradiction subjects). Performance deterioration was measured in terms of response latencies, number of correct answers, and the number of "fixated" responses.

The results offered limited support for the hypotheses. In general, double bind subjects and contradiction subjects performed equally badly on the problem, but both did worse than the continually-rewarded control group. Only in two measures did the double bind subjects differ significantly from the frustrated subjects.
These differences were that the former made more "fixated" responses than contradiction subjects (fixations were used as a measure of the abnormality of a subject's response,) and also they pressed an escape button more often than frustrated subjects. Data obtained from questionnaires indicated that double bind subjects became more puzzled and angry during the experiment than frustrated subjects, but these results were of a qualitative nature and no statistical analysis was carried out. An unexpected significant result demonstrated the importance of the feedback of information in the problem-solving situation, suggesting some modification to the present experiment.

As most of the results were insignificant, the experimenter rejected the hypotheses concerning differences between double bind and frustration subjects in the efficiency of problem solving. Results did indicate a trend in the predicted direction and the experimenter concluded that with some refinements to the present experiment, important differences between double bind and frustration subjects could exist, thus disagreeing with an earlier conclusion reached by Ringuette and Kennedy (1966) about the testability of the double bind hypothesis.
List of Tables.

<table>
<thead>
<tr>
<th>Table No.</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No. Ss in the four pilot study groups.</td>
<td>47</td>
</tr>
<tr>
<td>2</td>
<td>t-ratios of the differences between pilot study subjects in ease of problem solving.</td>
<td>49</td>
</tr>
<tr>
<td>3</td>
<td>Summary of experimental design.</td>
<td>59</td>
</tr>
<tr>
<td>4</td>
<td>Total number of correct responses.</td>
<td>72</td>
</tr>
<tr>
<td>5</td>
<td>Variance estimates of the total no. correct answers.</td>
<td>73</td>
</tr>
<tr>
<td>6</td>
<td>Summary table of B.</td>
<td>76</td>
</tr>
<tr>
<td>6a</td>
<td>t-ratios for the main B effect.</td>
<td>76</td>
</tr>
<tr>
<td>7</td>
<td>Total no. correct responses + 1/2 ? responses.</td>
<td>82</td>
</tr>
<tr>
<td>8</td>
<td>Variance estimates of the total no. correct responses + 1/2 ? responses.</td>
<td>83</td>
</tr>
<tr>
<td>9</td>
<td>Summary table of factor C.</td>
<td>85</td>
</tr>
<tr>
<td>9a</td>
<td>t-ratios for the main effect of C.</td>
<td>86</td>
</tr>
<tr>
<td>10</td>
<td>Interaction values of B and C.</td>
<td>87</td>
</tr>
<tr>
<td>11</td>
<td>Mean response times.</td>
<td>90</td>
</tr>
<tr>
<td>12</td>
<td>Variance estimates of mean response times.</td>
<td>91</td>
</tr>
<tr>
<td>13</td>
<td>Main B effects</td>
<td>92</td>
</tr>
<tr>
<td>13a</td>
<td>t-ratios for the main effect of B.</td>
<td>93</td>
</tr>
<tr>
<td>14</td>
<td>Summary of factor C.</td>
<td>95</td>
</tr>
<tr>
<td>14a</td>
<td>t-ratios for the main C effect.</td>
<td>96</td>
</tr>
<tr>
<td>15</td>
<td>Means of the total response latencies.</td>
<td>97</td>
</tr>
<tr>
<td>Table</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>15a</td>
<td>Simple effect of A at a given level of B.</td>
<td>97</td>
</tr>
<tr>
<td>15b</td>
<td>Simple effect of B at a given level of A.</td>
<td>98</td>
</tr>
<tr>
<td>16</td>
<td>Interaction values of B and C.</td>
<td>101</td>
</tr>
<tr>
<td>17</td>
<td>Number of fixations.</td>
<td>107</td>
</tr>
<tr>
<td>18</td>
<td>Variance estimates of the number of fixations.</td>
<td>108</td>
</tr>
<tr>
<td>19</td>
<td>Summary table of B.</td>
<td>110</td>
</tr>
<tr>
<td>19a</td>
<td>t-ratios for the main effect of B.</td>
<td>110</td>
</tr>
<tr>
<td>20</td>
<td>Interaction of A and B factors.</td>
<td>112</td>
</tr>
<tr>
<td>20a</td>
<td>Simple effect of A at a given level of B.</td>
<td>113</td>
</tr>
<tr>
<td>20b</td>
<td>Simple effect of B at a given level of A.</td>
<td>114</td>
</tr>
<tr>
<td>21</td>
<td>Total number of times subjects pressed the ? button.</td>
<td>118</td>
</tr>
<tr>
<td>22</td>
<td>Total number of subjects who formed a correct hypothesis in the first half of each trial.</td>
<td>121</td>
</tr>
<tr>
<td>23</td>
<td>Number of subjects rating the problem hard.</td>
<td>129</td>
</tr>
<tr>
<td>24</td>
<td>Number of subjects who were dissatisfied with their performance.</td>
<td>129</td>
</tr>
<tr>
<td>25</td>
<td>Number of subjects who said they could have performed better.</td>
<td>132</td>
</tr>
<tr>
<td>26</td>
<td>Number of subjects who said they performed worse than most on the problem.</td>
<td>134</td>
</tr>
<tr>
<td>27</td>
<td>Subjects' ratings of the easiest trial.</td>
<td>143</td>
</tr>
</tbody>
</table>
## List of figures.

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>An array of instances comprising combinations of four attributes, each exhibiting three values.</td>
<td>43</td>
</tr>
<tr>
<td>2</td>
<td>Kodak carousel projector, and subjects' response panel.</td>
<td>54</td>
</tr>
<tr>
<td>3</td>
<td>Equipment from the experimenter's view.</td>
<td>55</td>
</tr>
<tr>
<td>4</td>
<td>Equipment from the subject's view.</td>
<td>56</td>
</tr>
<tr>
<td>5</td>
<td>Differences in the total number of correct answers for each of 8 treatment groups.</td>
<td>79</td>
</tr>
<tr>
<td>6</td>
<td>Changes in the total number of correct answers for all groups of subjects over 3 trials.</td>
<td>81</td>
</tr>
<tr>
<td>7</td>
<td>Relative positions of each B group's response times.</td>
<td>94</td>
</tr>
<tr>
<td>8</td>
<td>Different reaction times for each treatment group.</td>
<td>100</td>
</tr>
<tr>
<td>9</td>
<td>Different reaction times over 3 trials.</td>
<td>102</td>
</tr>
<tr>
<td>10</td>
<td>Total number of fixations for each group of subjects.</td>
<td>115</td>
</tr>
<tr>
<td>11</td>
<td>Number of ? responses made in every trial.</td>
<td>119</td>
</tr>
<tr>
<td>12</td>
<td>Number of correct hypotheses obtained in each trial.</td>
<td>122</td>
</tr>
<tr>
<td>13</td>
<td>Number of subjects dissatisfied with their performance.</td>
<td>131</td>
</tr>
</tbody>
</table>
List of figs. (contd.)

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Number of subjects who &quot;could have done better&quot;.</td>
<td>132</td>
</tr>
<tr>
<td>15</td>
<td>Number of subjects who performed worse than others.</td>
<td>135</td>
</tr>
<tr>
<td>16</td>
<td>Number of feelings of anxiety, discouragement and annoyance reported by subjects in each trial.</td>
<td>138</td>
</tr>
<tr>
<td>17</td>
<td>Number of subjects who didn't know why they were correct.</td>
<td>141</td>
</tr>
<tr>
<td>18</td>
<td>Subjects' rating of the &quot;easiest trial&quot;.</td>
<td>144</td>
</tr>
<tr>
<td>19</td>
<td>M.A.S. frequency distribution of subjects in the sample.</td>
<td>xxiiia</td>
</tr>
</tbody>
</table>
THE PROBLEM

The present study is concerned with the investigation of the "double bind" hypothesis. This hypothesis was formulated by Bateson, Haley, Weakland and Jackson (1956) to account for the aetiology of schizophrenia. In order to understand the nature of the "double bind" concept it is necessary to consider briefly the context in which it arose.

Bateson and his colleagues were one of several groups investigating the possibility that schizophrenia originates in the interaction between members of the family of origin of the schizophrenic. Among the early advocates of this position may be listed Fromm-Reichmann. She introduced the concept of the "schizophrenogenic mother", to describe the typical mother of schizophrenic children she had studied. Such a mother was overtly overprotective, but covertly rejecting of her child. The mother-child relationship was considered the crucial element in schizophrenia, while the father was seen as peripheral to the relationship.

Cheek (1964) observed mothers and their schizophrenic children together and rated their behaviour by a group-interaction technique. Their interaction profiles showed qualities of aloofness, coldness and withdrawal plus overprotective attitudes toward the child, in the mothers of both male and female schizophrenics. The general nature of the observations by Cheek
has been confirmed by other clinicians such as Mark (1953), who found that the mothers of male schizophrenics were restrictive in their control of the child. When it came to the warmth of the relationship between mother and child, the mothers exhibited attitudes of both excessive devotion and cool detachment. The findings of other experimenters such as Ross (1955), Tietze (1934) and Lu (1961) add support to the above findings.

However, all of the above studies emphasise that it is not the personality of the mother as such which is the important factor in the aetiology of schizophrenia, but her particular relationship to a particular child. It is this consideration which allows them to account for the presence of both schizophrenic and non-schizophrenic children in the one family.

While Fromm-Reichmann emphasised the importance of the mother in the history of schizophrenia, later theorists emphasised the importance of the whole family. This emphasis developed out of the observations that the father was just as embroiled in the disturbed family situation as the mother, and therefore had just as much to contribute to its pathology. The main advocates of this type of approach are Lidz et al. (1965), Wyne et al. (1958), Jackson, (1960) and Bateson et al. (1956).

The first example mentioned above of a family theory of schizophrenia has been developed by Lidz et al. (1965), based on a large number of clinical observations of disturbed and
normal families. The family is viewed as a shaping force on the offspring's personality through heredity, and constantly adds to it by teaching and by the interaction of its members as a social unit. Within this unit the child is prepared for an existence in relation to other persons and social groups.

In many ways, Lidz et. al.'s theory is a direct extension of the orthodox psychoanalytical concepts of the family triad. There is a central concern with the age-sex structure of the family. A critical etiological factor for schizophrenia lies, for these theorists, in the blurring of age and generation boundaries. Parents behave inappropriately for their age and sex both to each other and to their child. The child, therefore, learns inappropriate behaviour. The consequence is that the identity of the child is distorted, and it is in the distortion of adequate identity development that the theory locates the psychological basis for schizophrenia.

Empirically, two types of schizophrenic families are distinguished. One, organised around a central, dominating, pathological figure, usually the mother, and referred to as "skewed". Marital skew describes a situation where the pathology of one parent dominates the house. In some, the dissatisfaction and unhappiness of one spouse is apparent to the other, and to the children, but the husband and wife manage to complement or support each other sufficiently to permit a degree of harmony. In others, the distorted ideation of one partner is accepted and shared by
the other, creating an atmosphere of folie à deux.

A second pattern of "schism" was isolated, where a relationship is characterised by hostility and mutual withdrawal. More fully, marital schism is characterised by a chronic failure, on the part of the parents, to achieve complementarity of purpose, or role reciprocity. Wives have no confidence in their husbands, and constantly defy them.

The effect of such an environment on children is seen in the following way, "Children who grow up in such homes are aware that something is not right. They may become deeply resentful that the more intact parent takes no action to protect them from the situation. The children are puzzled, but may also learn to mask or ignore the obvious. Their efforts to explain away situations, or to accent or convey the pretense of affection or devotion, which has no resonance or real meaning, distorts their value systems." The patients as children were psychologically "estranged" from their environment.

The major source of evidence cited by Lidz et. al., comes from a series of clinical observations of disturbed and normal families over a period of several years. In their sample, they found that 43% of schizophrenics had parents who were psychotic of chronically neurotic and 41% had unsuitable and unusual raising by their parents.

In another study, they replicated an earlier experiment by
McConaghy (1959) comparing schizophrenics parents' performance on an object sorting test with the performance of control parents. A greater incidence of illogical and inappropriate conceptual thinking was found among the parents of schizophrenic patients than among the parents of non psychotic children. However, the frequency of illogical thinking in Lidz's sample of control parents was higher than for McConaghy's control group.

Most of Lidz's conclusions were based on qualitative data, and a typical example is given below. Concerning the schizophrenic's fathers, Lidz et. al. say, "(They) are frequently insecure in their masculinity and need admiration and undue attention to bolster their masculine self-esteem..." The mothers were described in the following way, "It was apparent that the interaction of many of these women with their children was affected adversely by their efforts to cope with extremely difficult... husbands. All but three were seriously disturbed."

Frazee (1953) observed a large number of families and found that 14 out of 23 parental couples he studied were in severe conflict and none were "normal" or had "only moderate conflict". Thirteen of the control couples were normal or showed only moderate conflict. The criteria used to judge "normal", "moderate conflict" and "severe conflict" were not mentioned.

From the examples cited above, it can be seen that the main body of evidence on which the Lidz group based their conclusions is far from systematic. Their evidence consisted
almost entirely of naturalistic observations of family interaction in therapy (i.e. in a unique and not a common family situation). However, as Lidz et. al. pointed out (1965) the evidence they cite did not necessarily intend to establish a causal link between schizophrenic behaviour and family background. What the work of the Lidz group has done, however, is to indicate the importance of the role of the family unit in an understanding of the present behaviour of the schizophrenic. Their work stimulated a number of questions about the possible causal links between marital skew and marital schism in the family as a whole and schizophrenic behaviour in one of the offspring. This possible causal connection has been tackled more directly by other theorists.

Wynne et. al. (1958) have also developed a set of hypotheses concerning the relation between schizophrenic behaviour and family interaction. Their hypotheses were based on work with schizophrenic families. These investigators are primarily concerned with the quality and structure of role relationships within the family, rather than with the particular content of these relationships. They stress the family unit as a whole, rather than as a number of dyadic or triadic relationships within the family. The rationale of their approach is made explicit in the general hypothesis underlying their work.

"The fragmentation of experience, the identity diffusion, the disturbed modes of perception and communication, and certain other characteristics of acute reactive schizophrenic personality structure, are to a significant extent derived by the process of
internalisation from the characteristics of the family social organisation... also internalised are the ways of thinking and of deriving meaning, the points of anxiety and the irrationality, confusion and ambiguities that are expressed in the shared mechanism of family social organisation."

Thus, for Wynne, the child's behaviour reflects the behaviour of the family unit, so that if the family interaction is disturbed, or inconsistent, then the child's behaviour is inconsistent also. Four main qualities are isolated which distinguish between schizophrenic and non-schizophrenic families.

1. In disturbed patterns of handling attention and meaning,
2. Erratic and inappropriate kinds of distance and closeness,
3. Underlying feelings of meaninglessness,
4. Overall structure of the family in which members have collusively joined together in shared manoeuvres which deny or reinterpret the reality of anxiety-provoking feelings and events. These shared manoeuvres are called "pseudo mutuality" and "pseudo hostility". Wynne et al. define the former in the following terms,

"In pseudo mutuality, emotional investment is directed more toward maintaining the sense of reciprocal fulfilment of expectations than toward accurately perceiving changing expectations." (p. 207).

One example of pseudo mutuality is found in the following quote taken from one of Wynne's case studies;

"We are all peaceful. I like peace even if I have to kill
someone to get it... A more normal happy kid would be hard to find. I was pleased with my child. I was pleased with my husband. I was pleased with my life. I have always been pleased..." (1958, p. 211).

Pseudo hostility is the opposite of pseudo mutuality, and defines a state of chronic conflict and alienation among family members, but this difference is seen as unimportant and superficial.

The important aspect of both states is that they are rigid and "pseudo." Both are viewed as collective defenses, permitting family members to maintain some semblance of life together without having to confront directly the essential and pervasive "meaninglessness" of their life as well as their underlying forms of separation, hostility, tenderness or intimacy.

Wynne argued that according to his hypothesis, pseudo mutuality or pseudo hostility in the family structure is not productive of schizophrenia, but rather it provides a fertile environment for the child to react to other stress situations such as growth, or exposure to more seductive outside relations with an acute schizophrenic breakdown.

Hence the pseudomutuality theory must be considered only as a commentary on the behaviour of families with a schizophrenic member, and not as an all-embracing theory of the aetiology of schizophrenia. Even the validity of Wynne's observations is open to doubt, as the work reported in his 1958 paper was based
on the observations of only four families.

The next major group of theories consider the family as a self-contained homeostatic mechanism. This was the view put forward by Jackson (1960) and elaborated upon by Bateson et al. (1956).

Jackson says, "The concept of family homeostasis arose from the observation that therapeutic efforts with one member of the family might be hindered by the behaviour of other members, or that another member might become disturbed as the member on treatment improved." From these initial observations Jackson formalised the concept of family homeostasis.

He argued that when a relationship is "important" to both parties concerned, and fairly long term (e.g., a familial or marital relationship) formalisation of the relationship is necessary. These relationship agreements, which are called rules, prescribe and limit the individual's behaviour over a wide variety of content areas, organising their interaction into a reasonably stable system. These rules are the homeostatic mechanisms of the family unit.

The best description of homeostasis is given by Jackson (1960). He says,

"An analogy with a household thermostat is useful: When the temperature deviates from a pre-set norm, this deviation is registered and counteracted by the homeostatic mechanism of the thermostat system. Thus, if the norm of the family is that there
be no disagreement, when trouble begins to brew, we might observe a general uneasiness, change of topic, or even symptomatic behaviour on the part of the identified patient who may behave crazily or become physically ill when the family members begin to argue. The family is distracted and brought into Coalition (frequently against the patient) and the norm holds until next time.

Bateson et. al. (1956) elaborated upon the concept of family homeostasis and emphasised the role of verbal and non-verbal communication in maintaining (or destroying) homeostasis. As in all families, members of schizophrenic families govern each other's behaviour by imposing sanctions and other correctives when their rules and prohibitions are violated. The difference for these families, according to Haley, lies in the collective denial that anyone is setting the rules, i.e. that anyone is the metagovernor. In this respect he notes,

"Typically, in these families the mother tends to initiate what happens, while indicating either that she isn't, or that someone else should. The father will invite her to initiate what happens while condemning her when she does. Often they suggest that the child take the lead, and then disqualify his attempts.... The family 'just happens' to take actions in a particular direction with no individual accepting the label as the one responsible for any action.... The family of the schizophrenic would seem to be not only establishing and following a system of rules, as other families do, but also following a prohibition on
any acknowledgement that a family member is setting rules. Each refuses to concede that he is circumscribing the behaviour of the others, and each refuses to concede that any other family member is governing him."

The example just cited by Haley is typical of the pathological mechanisms used to maintain homeostasis in schizophrenic families. The Bateson group concentrates on communication patterns within the family, and how it affects the children's communication patterns, and eventually, their behaviour in general. Their key concept is the "double bind."

The hypothesis of the double bind was first developed by the Bateson group in 1956, to describe the typical communications in families with a schizophrenic member. Their observations led them to postulate that double binds existing in communication produce schizophrenia in the child.

A double bind is essentially a conflict between 2 levels of a given message. Each message has a content level, i.e. the verbal statement made, and a meta-level, a meaning level, or an "implication" of the verbal message. In a double bind communication, what is implied by a message conflicts with the verbal context of the same message.

E.g. if one person says to another, "Disobey me", the other person is faced with an incongruent set of directives, and can neither obey nor disobey. So, the child is caught in a set of paradoxical relationships with all his responses labelled as wrong ones. Thus, the double bind stresses the importance of disturbances in communication systems.
Work on the double bind stems from the original observation by Bateson that the schizophrenic consistently mislabels his communication, which led him to believe that the schizophrenic was raised in a learning situation where he was faced with conflicting levels of message. Basically, the double bind hypothesis was a statement about a two-person interaction, and it has since been extended to areas outside of schizophrenia.

Since the original paper was published, a number of different sets of ingredients of the double bind have been put forward by researchers in the area, but they are all fairly similar. So, for the purposes of the present exposition, the theoretical starting point will be that laid down by Bateson et. al. in their first paper in 1956. As they saw it, the essential conditions for the double bind were:

1. "Two or more persons. Of these, we designate one, for the purposes of our definition, as the victim. We do not assume that the double bind is inflicted by the mother alone, but that it may be done by either the mother alone, or by some combination of mother, father, and/or siblings.

2. Repeated experience. We assume that the double bind is a recurrent theme in the experience of the victim. The important thing about this particular point is that the hypothesis does not invoke the idea of a single traumatic experience, but repeated experiences, such that the double bind structure comes to be an habitual expectation on the part of the victim.
3. A primary negative injunction. This may have either of two forms.
   a. 'Do not do X or I will punish you.' or,
   b. 'If you do not do X, I will punish you.' This punishment Bateson sees as either withdrawal of love, or, more importantly, the kind of abandonment that results from the parents' expression of extreme helplessness.

4. "A secondary injunction, conflicting with the first at a more abstract level, and like the first, enforced by punishments." This secondary injunction is commonly communicated by non-verbal means (such as gestures, facial expressions, etc.) This type of communication has been called meta-communication by other psychologists working in this area (Watzlawick, 1963). These two conflicting messages on two different 'levels' can both be issued by the same person or by 2 different people within the family.

5. "A tertiary negative injunction prohibiting the victim from leaving the field. In a formal sense it is perhaps unnecessary to list this injunction as a separate item since reinforcement at the other 2 levels imposes a threat to survival, and if double binds are imposed during infancy, escape is naturally impossible. However, it seems that in some cases, escape from the field is made impossible by certain devices which are not purely negative, e.g. capricious promises of love.

6. Finally, the complete set of ingredients is no longer necessary when the victim has learned to perceive his universe in double bind patterns. Almost any part of the double bind sequence
may then be sufficient to precipitate panic or rage. The pattern of conflicting injunctions may even be taken over by hallucinatory voices."

The sixth point is important because it stresses the fact that the double bind is not a one-way situation, i.e. not a situation where a "binder" issues conflicting statements to the "bound" i.e. the victim. Although this one-way picture of a binder and victim may be correct to some extent early in the parent-child relationship, the victim soon learns similar or reciprocal patterns of communication, such as giving incongruent messages of his own, or responding to any and all communications he receives as if they were incongruent and binding. This contributes strongly to the maintenance of the overall patterns of communication and interaction found in the families of schizophrenics.

In the same paper, Bateson et al. go on to add a further three qualities to the double bind situation. Whether these are meant to be additional or alternative factors isn’t entirely clear. They are:

"1. When an individual is involved in an intense relationship, i.e. in a relationship in which he feels it is vitally important that he discriminate accurately what sort of message is being communicated, so that he may respond appropriately.

2. And, the individual is caught in a situation in which the other person in the relationship is expressing two orders of message, and one of these denies the other."
3. And the individual is unable to comment on the messages being expressed, to correct his discrimination of what order of message to respond to, i.e. he cannot make a meta-communicative statement."

However, the second and third points really add nothing to the original conditions of the double bind as mentioned earlier. Only the first point above is new, as it brings up the important question of intensity of emotional involvement between communicants.

Bateson maintains that if an individual has spent his life in the kind of double bind relationship described above, his way of relating to people after a psychotic break would have a systematic pattern. "First, he would not share with normal people those signals which accompany messages to indicate what a person means. His metacommunicative system, the communication about communication, would have broken down, and he would not know what kind of message a message was." He would also be concerned with hidden meanings in communications. This process can be seen at work in the paranoid schizophrenic.

Some psychologists have confused the concepts of the double bind, contradiction, and conflict. The double bind is essentially a conflict, but it differs from the ordinary type of conflict situation in that it involves a conflict between levels of communication, i.e. a conflict between what is said, and how it is said. A contradiction, on the other hand, is a conflict between two messages on the same level e.g. "I will do it" and, "I won't do it" later on. Here the conflict between messages is obvious.
Incongruent or double bind statements are of different levels e.g. "I will do it" said in a tone of voice which indicates, "Don't take what I say seriously."

Another important distinction between contradictory and paradoxical (i.e. double bind) injunctions, is that in the face of contradictory injunctions, one chooses and suffers the other alternative. The result is not a happy one, one cannot have one's cake and eat it too, a lesser evil is still an evil. But in the face of a contradictory injunction, choice is logically possible. Paradoxical injunction, on the other hand, bankrupts choice itself, nothing is possible, and a self-perpetuating oscillating series of communication and meaning is set in motion.

In brief, the situation which Bateson sees as characteristic of the double bind is one where the victim is the object of two opposing and negative commands, on 2 different levels of communication and he must obey one of the commands on one of the levels. His position is made even more difficult as he is unable to comment on the situation or to avoid making a response. Thus he is "trapped" in the situation, emotionally and/or physically.

The literature on the double bind hypothesis and schizophrenia may be divided into categories of descriptive and controlled investigation. Most of the literature falls within the first category and consists of the presentation of case histories, transcripts of family psychotherapy sessions, clinical descriptions and anecdotes. A discussion of some of the descriptive evidence will be given first.
The main source of information for Haley (a key research worker in the double bind theory) was from therapy sessions with schizophrenic patients and their families. As he indicated in his 1959 paper:

"This paper will attempt to show that schizophrenic behaviour serves a function within a particular kind of family organisation. The emphasis on this description will be on the interactive behaviour of the schizophrenic and his parents, rather than on their ideas, beliefs, attitudes or psychodynamic conflicts. This work is largely based on an examination of a small sample of families participating in therapeutic sessions where parents and a schizophrenic child, as well as siblings, are seen together and recorded. An excerpt from a recording of a family session will be presented and analysed in terms of the observable behaviour of family members, to illustrate the hypothesis that the family of the schizophrenic is a special kind of system which can be differentiated from other family systems."

Haley typically observed and recorded the behaviour of the family in therapy sessions. He placed schizophrenic as well as non-schizophrenic families in a standard interview situation, which included leaving the family alone to talk together, in order to note similarities and differences in responses to the situation. In more recent studies, he has begun to devise explicit experimental settings for the measurement of family behaviour. These attempts to objectify the measurement of family interaction will be discussed together with the "experimental" studies.

One piece of descriptive evidence was obtained by Sluzki et. al. (1967). Their evidence was taken from transcripts of exploratory
conjoint interviews of several families, composed of father, mother, adolescent schizophrenic son, and one sibling. They then rated each person according to the frequency with which certain types of behaviour occurred.

1. Evasions (change of subject.)
2. Sleight of hand (where an evasion was labelled as an answer to the question.)
3. Status disqualification, especially of the victim.
4. Redundant question.

Sluzki et. al. observed the above kind of behaviour in schizophrenic families, giving examples of each, but did not compare the number of times each type of behaviour occurred in schizophrenic families with its incidence in normal families. Such information is clinically interesting and useful as far as it goes, but cannot be taken as decisive evidence for the influence of the double bind in the etiology of schizophrenia.

Weakland and Fry (1962) closely examined a series of letters from a sample of three mothers to their schizophrenic offspring. From the results of their analysis, they concluded, "Detailed examination of these letters has disclosed that, almost no statement is allowed to stand, clearly and unambiguously. Rather, another message disguising it, in any variety of ways, occurs. Further, this alteration and the difference between messages is not itself made clear and explicit."

Weakland and Fry’s conclusions are suggestive of the effects of paradoxical injunctions on the schizophrenic child’s behaviour,
but hardly provide a rigorous test of the double bind hypothesis.

A number of clinicians, realising the short-comings of the case study approach to research in family processes, have tried to subject these processes to experimental study. In the past decade, a number of experiments have been conducted, which claim to measure one or more aspects of the double bind and its effects on communication within schizophrenic families. However, some of these experimenters seem to have misunderstood the concept of the double bind altogether, e.g. Ciotola (1961) who equated the double bind with a simple discrimination situation. Or, other experiments have been conducted so carelessly e.g. Berger (1965) or with so few subjects, (Weakland and Fry, 1962) that the validity of their conclusions is open to doubt.

Berger (1965) subjected the double bind hypothesis to experimental investigation. He administered a “double bind questionnaire” to schizophrenics showing thought disorder and difficulties in verbal communication, other psychiatric patients, ward attendants and college student volunteers. The questionnaire consisted of statements gathered from clinical records and observations of mother-child interaction and judged to be examples of double bind communication by four experienced clinicians. Subjects were asked to rate each statement according to the frequency with which they, or ones like them, were made by their mothers. A score of “double bindingness” was calculated by summing the weighted ratings for all items and Berger reported that schizophrenics obtained higher scores than any other group. However, the unreliability of the
recall method throws the significance of Berger's results into doubt.

Another study was conducted by Ringuette and Kennedy in 1966. Five groups of judges,

1. expert double bind,
2. trained double bind,
3. uninformed clinicians,
4. informed clinicians,
5. naive judges,

were required to judge the degree of "double bindingness" in three sets of letters. One group of letters was written by parents of schizophrenic patients to their child, the second set by parents of non-schizophrenic psychiatric patients, and the third by volunteers with normal children. The results indicated that none of the judges were able to differentiate between letters received by schizophrenic patients and those received by non-schizophrenic patients. On the basis of these results Ringuette and Kennedy question the existence of a double bind phenomenon, and say that even if it did exist, it was not a measurable phenomenon.

There was, however, one basic fault with the design of the experiment, and it was this; Not all groups of judges were asked to make the same decision. For example, group 1 judges were asked to determine the degree of double bindingness of letters. Group 2 and 4 were asked to distinguish between schizophrenics, non-schizophrenic patients and volunteers; group 3 was asked to
distinguish between schizophrenic and non-schizophrenic patients, while group 5 was asked to rate the letters on a scale according to how much they personally liked the letters.

The irregularity with which the experiment was conducted questions the validity of Ringuette's and Kennedy's criticisms of the double bind phenomenon.

The most important recent study of family communication was conducted by Haley (1962). It will be discussed in some detail as it is felt that it is one of the few studies which directly tackle the problem of measurement of communication patterns within the family in a reasonably objective manner.

In Haley's experiment, groups of three family members were seated at a table, separated from each other's sight and required to "co-operate" with each other by pressing "signal" or "coalition" buttons. When two people co-operated, they got a certain joint score, and the higher the scores for the group as a whole, the more "co-operative" behaviour they were manifesting.

Thirty normal and 30 schizophrenic families were subjects for the experiment, which consisted of three rounds of the "game" described above. Haley obtained the following interesting and important results.

1. The schizophrenic group had a higher percentage of time when no member of the family was in coalition with any other member (difference significant at the .01 level).

2. The schizophrenic group had longer continuous periods of
time when no two family members were in coalition (difference significant at the .001 level).

3. No differences in the average lengths of time each group of subjects was in coalition.

4. Haley also predicted that the members of a schizophrenic's family would be less consistent than normals in responding to button pressing. "Consistent" in terms of following a signal with a press of the coalition button and less frequent responses by the person signalled. He found that, the two groups only differed in the consistency of family members in the case of the schizophrenic child. The schizophrenic child followed a signal with a coalition less often than did the normal child. (difference significant at the .05 level). But there was no significant difference between the parents of a normal child and parents of a schizophrenic child in this measurement.

Haley's experiment represented an important step towards the objective measurement of communication patterns, as it demonstrated that schizophrenic families differ significantly from normal families in the amount of "co-operation" between individual family members. Although the results were suggestive of the importance of disturbed communication patterns no causal relationship between these disturbed communications (presumably of the double bind type) and schizophrenic behaviour has been established.

The experiments described above claiming to measure the effects of the double bind have really only demonstrated the existence of
disturbed communication patterns in schizophrenic families and not in "normal" families. However, the precise causal relationship between the double bind and schizophrenia, as laid down in the 1956 paper, has not been demonstrated. Most of the investigators have argued for the "logical" causal link between schizophrenia and the double bind. Their reasoning follows the pattern that, "the mother issued double bind statements to the schizophrenic child significantly more often than she did to her non-schizophrenic offspring" or, according to Lu (1962) the mother made more contradictory demands in terms of behaviour and achievement on the pre-schizophrenic child than the non-schizophrenic sibling. These researchers then presume that, since the schizophrenic child was subjected more often to these conflicting demands, these demands lead to the development of a schizophrenic psychosis. Such a conclusion does not necessarily follow. What has been demonstrated is a correlation between the incidence of schizophrenia in children and the amount of "double binding" communications, they have not demonstrated a cause-effect relationship.

Hence, there is a need for more objective experimental evidence of the effects of double bind communications on subjects' behaviour if the double bind hypothesis is to be regarded as a viable theory of the aetiology of schizophrenia.

Short of subjecting groups of newly-born babies to computerised "double binding" communications all their lives, there are only two methods by which its role in the aetiology of
schizophrenia can be established. One method is by means of a longitudinal study, where it is shown that double bind interaction precedes the development of psychopathology. Another less time-consuming approach is to try to produce schizophrenic-like behaviour in normal subjects in a similar situation. The rationale behind this is, if double bind communication patterns in the family actually cause schizophrenia, then the act of placing normal subjects in a similar situation should produce schizophrenic-like behaviour in them. Of course the effects of a short-term double bind situation on normal subjects would not be nearly so pathogenic as the continued exposure to double binds suffered by schizophrenics, but if similarities between normal subjects' behaviour under double bind conditions and the usual schizophrenic behaviour could be demonstrated, one would be in a better position to argue that exposure to double bind communications leads to schizophrenic types of responses in the recipient.

The experimenter decided to use the latter approach, in an attempt to see what effect the double bind, or parts of it, had on normal subjects' behaviour, especially in the way they solved conceptual-type problems. If, as Bateson et. al. maintain, double bind communication patterns in the family environment lead to schizophrenia in the child, then double bind communications produced artificially, should lead to "schizophrenic like" behaviour in normal subjects subjected to the same
condition. Types of "schizophrenic like" behaviour that would be expected to occur would depend on the nature of the experimental situation but one would expect a general deterioration in efficiency of performance in problem solving situations.

Because of the extreme complexity of the double bind situation (which covers six essential ingredients) and in view of the difficulties such as Berger, Ciotola, Ringwetie and Kennedy have had in trying to subject the global concept of the double bind to objective measurement, it was decided that only three of the ingredients would be varied in the present experiment, to measure their effects on subjects' behaviour. These conditions were: "A primary negative injunction," and "a secondary injunction, conflicting with the first at a more abstract level, and like the first, enforced by punishments" (points 3 and 4). These conditions stress the importance of two "levels" of communication. By them Bateson meant that within a single communication, what is said on one level, the verbal level, is opposed to what is "said" or implied on a more abstract level of communication. This second level of communication is called "meta" communication, (meta - above) and is essentially non-verbal, and can be communicated by gesture, facial expression, or tone of voice. A double bind message may occur in a simple statement, e.g. if one person says to another, "Disobey me", the other person is faced with an incongruent set of directives and can neither obey nor
disobey. If he obeys, he is disobeying, and if he disobeys, he is obeying.

The second important factor which the experiment was designed to test was the importance of being "trapped" in this impossible choice situation (point no. 5). Bateson would maintain that the victim's inability to escape from the unpleasant situation is an important factor in leading to the pathological behaviour eventually manifested by the schizophrenic offspring, who is continually subjected to double binding communications, and is unable to leave the family situation because of his emotional and/or dependency needs.

The experimenter chose to measure the effects of these conditions on subjects' behaviour for two reasons. Firstly, it was by the variation of these three conditions that Maier (1949) was able to produce fixated or "schizophrenic like" behaviour in rats and hence his experiments seemed to provide a ready-made framework within which to test the effect of these conditions on human subjects' behaviour. Secondly, examination of the relevant data suggested that these conditions were the most important qualities of the double bind, qualities which distinguish it from an ordinary frustration or ambivalence situation. This was pointed out by Cornelison (1959) who said that the quality which prevented the double bind concept from being a "warmed over version of ambivalence" was the idea of a conflict between "levels" of communication.
Maier's experiments in 1949 were used as a model to measure the effects of the double bind on human behaviour. Using a Lashley jumping apparatus, Maier taught rats to jump to a particular symbol, which was associated with 100% reinforcement, i.e. it was always correct. The situation was then changed so that the previously correct response was now reinforced randomly, i.e. it was not always correct. The situation was then changed so that the previously correct response was now reinforced randomly, i.e. partial reinforcement, so that no matter what response was made, whether it was to the previously rewarded symbol or to another one, it was rewarded half the time and punished half the time, this strategy of reward and punishment not bearing any relation to the response the rat made. Hence, the situation the rat was placed in was not merely a frustration situation, where the rat's initially learned response was wrong, but the situation was more similar to a double bind situation described by Bateson, in that the rat was responding to the cards on the assumption that it was still a discrimination situation when in fact the context had been switched and discrimination between the two symbols became an irrelevant issue. Hence the conflict was not between two particular responses, but between what response to make and the context in which the rat was to make the response. This is like a double bind situation in which the situational message, "This is a choice situation, there is one correct and one incorrect response" conflicts with the meta-message, "This is a random situation, you can't make a correct
choice," which is conveyed to the rat by the number of punishments he receives. Thus, the situation described above represents a conflict between two levels of communication, the verbal or, in this case, the stimulus level, and the meta or meaning level.

Maier observed again and again the following striking patterns of rat behaviour. The rat usually refused to jump after short experience of the insoluble situation. When this happened, Maier forced the rat to jump by directing an air blast at it, or by tapping its tail. If the rat was unable to make abortive responses, (e.g. jumping right over the cards or directly into the net) it was compelled to respond to the cards. When the rats did respond to the cards, they made stereotyped (repetitive) responses either to the same side (position stereotype) or to the same slide (symbol stereotype). Maier found that the rat would make the same response over hundreds of trials, and when the problem was made soluble again, 75% of the stereotyped rats were unable to change their responses, and continued to make the old stereotyped response for well over 200 trials. When a stereotyped response continued in a soluble problem situation, it was called a fixation and was regarded as "abnormal" as it was no longer applicable to the situation.

Maier's experimental framework was used to test the double bind hypothesis because there are some elements common to the theoretical positions of both Maier and Bateson. These conditions (and the ones subjected to measurement in the present experiment) are, a. Conflict between levels of message (discussed earlier) and, b. Inability to
leave the field. This formed an important part of Maier’s experiment. Rats exhibited stereotyped and later, fixated behaviour when escape from the situation was blocked, i.e. abortive responses were prevented. Maier states, "When escape or the choosing of substitute goals is prevented, the situation becomes more stressful and frustration may be made a more likely condition. The animal’s methods of avoiding the unpleasant effects of barriers may be further prevented by forcing the animal towards the barrier. Thus, any pressure exerted towards the barrier hastens the transition from a state of motivation to a state of frustration."

Bateson himself saw the equivalence between these two conditions of the double bind and the variables manipulated by Maier in his experiments. He says, in reference to the Pavlovian experiments with dogs, "In the well-known experiments in which an animal subject is reduced to psychotic behaviour by first training them to discriminate, for example between an ellipse and a circle and then making the discrimination impossible, the 'trauma' is not as is commonly stated, the 'breakdown of discrimination' but is the breakdown of that pattern of complex contingencies which the experimenter had previously taught to the animal. As I see it, what happens at the climax of the experiment is that the animal is penalised for following a deeply unconscious and abstract pattern which the psychologist had previously rewarded. It is not that the animal cannot discriminate, it is that the animal is put in error.
when he thinks that this is a context for discrimination."

Furthermore, Maier's experiment provides a useful guideline by which to measure frustration. His frustrated rats manifested delayed reaction times and response stereotypes, later changing to fixations. It was thought that these indices could also provide information on the amount of frustration felt by each human subject, such that the more fixated responses a subject made, presumably the more frustrated he was.

A number of experimenters have used a similar technique to the one employed by Maier to study the effects of frustration on human subjects. Patrick (1934) demonstrated that college students became less rational and more random and stereotyped in their behaviour during emotional excitement and Jones (1954) reported similar findings.

Marquart (1948) designed an experiment similar to Maier's. She was primarily interested in measuring the effect of different concentrations of arbitrary punishment on the subsequent efficiency of human subjects' problem-solving behaviour. She predicted that with an increase in the amount of arbitrary punishment, she would get an increase in frustrated behaviour, which would manifest itself in a significant increase in the number of abnormal fixations and also in increased resistance to making a decision in the last part of the problem.

"Abnormal fixations" she defined operationally as the continued adherence to an erroneous principle of choice.
Marquart also examined the relationship between subjects' performance on the last learning problem (she called it "frustration susceptibility") and scores on the Bernreuter Personality Inventory.

In the experiment, Marquart approached as closely as possible, the procedure used by Maier in his experiments with rats. Marquart's subjects sat in front of a board containing two stimulus doors with two windows, each of which contained a stimulus card. The board also contained a one-way screen. The stimulus doors had handles for subjects to turn when selecting one of the two stimulus cards displayed in the windows. Handles were made of metal so that subjects would receive electric shocks of 10 milliamps. from them, whenever they chose the wrong door. The task of 147 subjects (university undergraduates) was firstly to acquire a complex discrimination habit (choosing between the two stimulus cards.) By the time the subjects had learned the discrimination to a satisfactory level of efficiency, they had done about 100 trials.

For the second trial, subjects were split up into four groups for different schedules of arbitrary punishment. Group A had 50 trials, 75% of their responses were punished arbitrarily. Group B made 150 discriminations, 25% of which were punished arbitrarily, group C had 50 trials, 25% of their responses were punished arbitrarily. Group D made 50 discriminations, all of which were rewarded (0% punishment).

At the conclusion of the no-solution period, and with no warning to the subject, the door on the left of the panel was made
always correct so that the subject could avoid punishment by establishing a simple position response. The subject received punishment whenever he chose the door on the right. The third part of the experiment was continued until each subject obtained 15 consecutively correct choices.

Marquart found that only some of the subjects had a significantly larger number of "fixated" responses. These subjects were what she called "slow learners" comprising about half the number of subjects in group A. The other half of the group weren't significantly different, in terms of frustration levels, from groups B and C, which weren't significantly different from control group D.

Thus, only in group A did she get a bi-modal distribution of the ease of learning scores, similar to the distribution obtained by Maier with his rats. She explained this result by saying that the "slow learners", those who required a large number of trials to acquire a position response in the third part, learned sufficiently slowly for the arbitrary punishment to act as a frustrator, while for the "normal learners" arbitrary punishment acted as a negative reinforcement, indicating to them which response was not correct, still enabling them to learn the concept.

Marquart also attempted a correlation between subjects' behaviour on the learning task with their answers on the Bernreuter Personality Inventory, but found no significant differences between the personality characteristics of frustrated and non-frustrated sub-groups of group A subjects.
The conclusion that Marquart reached was that, although fixation occurred too rarely to allow comparisons between groups of subjects, there was some suggestion of bi-modality in the results of group A subjects. The results seemed to indicate that the concentration of punishment alone had an important effect on certain types of subjects, i.e. "slow learners", producing a larger number of fixated responses.

Peters (1953) conducted an experiment with schizophrenic subjects, in an experiment similar in design to Marquart's. He compared performance of chronic and acute schizophrenics on a series of multiple choice learning problems of graded difficulty. Chronic patients took more trials to learn to the criterion, and unlike acute patients, tended to adopt stereotyped responses repeated trial after trial, despite verbal guidance by the experimenter. When discussing his results, Peters says, "A similar behaviour has been described by Maier in rats when the problem becomes insoluble. He stresses the point that this behaviour is non-adaptive and different in kind from motivation produced reactions. He considers such behaviour to be governed by laws of its own and to be a product of frustration. Findings of similar reactions in chronic schizophrenics supports the hypothesis that behaviour peculiar to their disorder is similarly produced and should be dealt with as different in kind from motivated behaviour." In this statement, Peters drew a parallel between the type of behaviour exhibited by schizophrenics in an ordinary problem-solving situation, and how Maier's "previously normal" rats behaved in an insoluble situation.
The feasibility of using a Maier-type of experimental framework for studying the effects of the double bind type of frustration has been demonstrated by the experiments of Marquart and Jones. Marquart was more concerned with the effect of different concentrations of punishment and Jones with the effect of different subjects' motivational levels on their problem-solving efficiency. However, the method they used can be profitably employed in the present study, which had a different approach to the effect of the double bind type of frustration. The present study is concerned with a comparison of different types of frustration (double bind and standard frustrations) and also with the effect of a change from solubility to insolubility on subjects' behaviour. It is worth restating Bateson's point on the importance of this change. He says, "In the well known experiments in which animal subjects are reduced to psychotic behaviour by first training them to discriminate, e.g. between an ellipse and a circle and then making the discrimination impossible, the 'trauma' is not as is commonly stated, the 'breakdown of discrimination' but is the breakdown of that pattern of complex contingencies which E had previously taught to the animal. As I see it, what happens at the climax of the experiment is that the animal is penalised for following a deeply unconscious and abstract pattern which the psychologist had previously rewarded. It is not that the animal cannot discriminate, it is that the animal is put in error when he thinks that this is a context for discrimination."

The relevance of this type of frustrating situation to
schizophrenia, apart from Bateson’s suggestion, has been demonstrated by Peters’ experiment. Thus, it was felt that a Maier-type experiment would be the most suitable method of measuring the effect of the double bind type of frustration on the behaviour of normal human subjects, envisaged in the present experiment.

Based on the type of behaviour Marquart and Peters reported in their subjects, the type of behaviour predicted in the present study consists of the following:

1. Increased latencies of response. Maier’s frustrated rats took much longer to choose between each pair of cards in the initial stages of frustration. Thus it was assumed that the more frustrated subjects (i.e. double bind subjects) would have greater response latencies.

2. Fewer correct answers. In Marquart’s study, frustrated subjects made fewer correct responses, and it was predicted that the most frustrated subjects (the subjects subjected to the double bind conditions) would have a smaller number of correct answers.

3. Fixated responses. These were the most striking behaviour patterns exhibited by Maier’s rats, and, to a lesser extent, by Marquart’s human subjects. It was predicted that the double bind subjects would make the greatest number of fixated responses. A fixated response was operationally defined as the continued adherence to an erroneous principle of choice.

4. Abortive responses. In Maier’s experiment this occurred when the rat jumped directly into the net, or over the stimulus
cards, and was a measure of the subject's tendency to escape from an unpleasant situation. In the present situation, subjects' desire to leave the field was measured by the number of times they refused to make a choice between the two stimuli, and pressed an "escape button" i.e. a button labelled "?". It was predicted that the double bind subjects, being the most frustrated, would make the most abortive responses, i.e. would press the "?" button most often.

5. More frustrated and angry answers to the questionnaire items. Each subject was required to fill out several questionnaires asking them for their subjective opinion of the experiment and of their performance. It was predicted that the frustrated subjects would make more aggressive or discouraged comments.

6. The experimenter was also interested in the relation between anxiety levels and response to frustration. A review by Mednick (1957) suggested that schizophrenics are highly anxious people, and that mounting anxiety would have an important link with the aetiology of schizophrenia. Each subject's anxiety level was estimated by the M.A.S. and related to his performance during the experiment. It was predicted that highly anxious subjects would perform worse throughout the experiment than the mildly anxious subjects.

On the basis of these predictions the following hypotheses were formulated for testing.
HYPOTHESES

1. The total number of correct answers made by the double bind subjects will fall significantly in the second trial and remain at the same low level in the third trial.
2. The total number of correct answers by the contradiction subjects will also fall significantly in the second trial and remain at the same low level in the third trial, but their results will not decline as much as for the double bind subjects.

It was predicted that the number of correct responses for both double bind and contradiction subjects would decrease in the second trial and remain low in the third trial as a result of the frustration experienced in the second trial. The double bind subjects, being more frustrated, would show a greater deterioration than the contradiction subjects because, as hypothesised by Bateson, the double bind type of frustration is more severe in its effects on behaviour than the usual type of frustration (see p.10). The continually rewarded subjects were expected to have a large number of correct responses over the whole experiment, and the continually punished subjects expected to have a small number of correct responses over the whole experiment, the low level of correct responses being arbitrarily established at a low level by the experimenter. There should be no significant difference between the subjects with a ? button and those without, in the number of correct responses.

3. Response latencies of the double bind subjects will increase significantly in the second trial and remain at the same high level
4. Response latencies of the contradiction subjects will also increase significantly in the second trial and remain at the same level in the third trial, but their latencies will not increase as much as those of the double bind subjects.

The experimenter predicted a significant increase in the response latencies with the second trial, the increase being greater for the double bind subjects than for the contradiction subjects, because of the severer type of frustration experienced by the former. It was also expected that increased latencies would continue in the third trial, as a residual effect of the frustration experienced in the second trial, but not at such a high level. The rewarded subjects would have low response latencies because for them the problem was soluble and they would build up to an efficient level of performance. Punished subjects' latencies would be large to start with, but after continued experience of being wrong, they would become used to being punished and their response latencies would gradually decrease over the experiment.

5. Subjects with an escape button (i.e. ? Ss) would have smaller response latencies throughout the experiment than subjects without an escape button (non ? Ss).

Subjects without a ? button to press would be forced to make a decision and would vacillate more in deciding, before making a response, and this vacillation would increase their response latencies.
6. The number of fixated responses made by the double bind subjects would increase significantly in the second trial and remain at a high level in the third trial.

7. The number of fixated responses made by the contradiction subjects would also increase significantly in the second trial, (not as much as the double bind subjects) and would remain at a high level in the third trial (but not at as high a level as for the double bind subjects.)

According to Maier and Marquart (see pp. 18, 31) fixated responses are abnormal, and reflect the degree of frustration felt by a subject. As the double bind subjects were the most frustrated, they were expected to be more fixated in the third trial after the problem became soluble. Contradiction subjects would also be expected to show a certain amount of fixated behaviour, but not to the same extent as the double bind subjects. Rewarded subjects should of course show no signs of fixation, nor should the continually punished subjects who, by the third trial, will have adapted themselves to the punishment situation.

Subjects with a ? button and those without should not differ significantly in the number of fixated responses they make because a stereotyped response to the ? button will also be counted as a fixation (similar to the abortive stereotypes exhibited by Maier's rats (pp. 28 - 29).

8. Double bind subjects will press the ? button more often than any other group of subjects.
9. Contradiction subjects will press the ? button more often than any other group apart from the double bind group. These predictions concern only half the total number of subjects, as not all had a ? button to press. As a result of the frustration suffered in the second trial, double bind and contradiction subjects will start to press the ? button in an attempt to escape the unpleasant situation. The double bind subjects will press the ? button more often than the contradiction subjects, because the double bind type of frustration is the more severe of the two.

10. There is a negative correlation between a subject's efficiency of performance and anxiety level. A subject's general efficiency level will be determined by the above criteria i.e. by the number of correct answers, the response latencies and the number of fixations. Highly anxious subjects would be expected to perform badly on all three indexes, i.e. they would have longer response latencies, make more fixated responses and have fewer correct answers than the low anxious subjects.

11. Double bind subjects would report most feelings of dissatisfaction and annoyance with their performance during the experiment.

12. Some contradiction subjects will report feelings of dissatisfaction - but not as many as in the double bind group.

Subjects' feelings of annoyance, dissatisfaction, etc. will be obtained from questionnaires and from tape recordings of the experimental sessions. Rewarded subjects were expected to be most satisfied with their performance because they would have the largest number of correct
responses and a small amount of electric shock.
Continually punished subjects would not be quite as satisfied, but, as a result of continual punishment, they would tend to think that the problems were insoluble, and that they were doing their best under the circumstances. Double bind and contradiction subjects would feel dissatisfied as a result of punishment for being wrong when they were expecting to be correct.

Note

To have used the word "stage" would have implied a continuing relationship between each of the three problems. In fact each consisted of ten "choices" to be made by the subject.

Hence the word "trial" was used throughout.
METHOD

The Experimental Situation:

Briefly, the experimental situation required each subject to view a number of pairs of coloured slides and to choose which one of each pair of slides was the correct one, "correct" according to some principle which was common to each correct slide in the series.

Description of Slides:

The experimenter developed a set of 256 coloured slides, each of which had 6 different attributes. The attributes present in each slide in a different combination for each slide, were as follows:

- type of figure; cross, circle, square.
- number of figures; 1, 2, or 3.
- colour of figures; red, green, or black.
- colour of background; white or green.
- number of borders around the edge; 1, 2, or 3.
- colour of borders around the edge; red, green, or black.

Some of the possible combinations are represented in fig. 1 below.

Each instance in the array exhibits one value of each of the six attributes. One may speak of a "category" of instances or a "concept" in terms of the defining properties of some subset of the instances. e.g. "All slides with one red figure" is a concept embracing nine instances. So too, "All slides with green borders", this particular concept is "broader" than the first, because it embraces 27 instances, while the first includes only nine.

The pilot studies were designed to test the subjects' ability to form different types of concepts using the slides just described.
Figure 1. An array of instances comprising combinations of four attributes, each exhibiting three values. Plain figures are in green, striped figures in red, solid figures in black.
The first Pilot Study:

This was conducted to obtain some indication of the level of difficulty of different types of concepts.

Ten subjects each observed five separate series of 20 pairs of cards (exactly the same as the slides) presented successively. Their task was to discover the concept underlying all correct cards in a particular series. Only one card out of each pair was "correct", i.e. was a positive example of a concept.

Some examples of the types of concepts E required S to form were; "All cards with green background are correct, and all with a plain background are incorrect." The concept of green background. "All cards with three figures on them are correct". The concept of three figures. "All cards with a green background and three borders are correct". The concept of green background and three borders.

The experimenter found that subjects generally took a shorter time to discriminate efficiently between plain and shaded backgrounds and took a longer time to acquire the correct concept when the discrimination involved borders.

Based on trial and error in the presentation of the cards, the reactions of the subjects to the cards, and the times taken by the subjects to solve the various concept-formation problems, E chose two concepts which she thought were equivalent in difficulty, i.e. in terms of the number of attributes involved in the concept, the times taken by the subjects to solve the problems, and how many subjects
found the correct concept. The two concepts E chose were:

1. All slides with three and/or red borders are correct.
2. All slides with two and/or green figures are correct.

The concepts were similar, firstly in the number of attributes involved (two) and the fact that both are disjunctive concepts. i.e. they are "and/or" concepts.

A **D**isjunctive Concept consists of that class of slides that possesses, e.g. three red borders, or any constituent thereof. i.e. three borders only, red borders only, or three red borders. One difficulty with disjunctive concepts is their arbitrariness i.e. the lack of any apparent relation between those two attributes which can substitute for one another. Hence it is possible for subjects in the experiment to get about half of their choices right by following only half the correct concept.

Second Pilot Study: Equipment and Procedure.

In order to determine whether the two concepts mentioned above were really equivalent in difficulty level, E presented both to a second group of 20 pilot subjects.

By this time, the cards had been made into slides, which each subject saw projected in pairs onto a screen in front of him. The procedure was as follows:

Before the pilot study, the experimenter said to the subject,

"In this study I am investigating your ability to discriminate between two different slides. Each of these slides has a certain number of characteristics."
The experimenter then showed the subject six randomly selected slides as an example of the types of slides he would later be looking at.

E. continued:

"I will show you two slides at once. One of the slides in each pair is correct, and the other slide in the pair is incorrect. There is a definite rule that makes one correct and the other incorrect. By that I mean that one of the two slides has one quality, or a number of qualities, which are the same for all correct slides in a particular series, and all incorrect slides in the series do not have this particular quality or qualities.

This is what I mean when I say that there is a definite rule that makes one slide correct and the other slide incorrect. I want you, while you are looking at a series of pairs of slides, to see if you can discover this rule. Each pair of slides will be projected onto the screen for an indefinite length of time (for 2 secs.) until you decide which of the two slides represents the concept I have in mind. (You can have as much time as you like to decide after the slides have been taken off the screen).

I want you to tell me which slide you think is the correct one, and I will tell you whether your choice is right or wrong. This will happen for each pair of slides you see. For the first few pairs of slides you'll be guessing, but after a while you will see some patterns emerging in the correct slides, and you will begin to have some sort of hypothesis as to what you think the correct concept is. As soon as you have an hypothesis, I want you to tell me what it is. This is just so that I can keep track of the type of things you are looking at in the slides."

Each subject saw two sets of slides, one involving the concept, "All slides with three and/or red borders are correct."

---

1. Half the subjects viewed the slides for 2 seconds only. The instructions in brackets represent the alternative instructions for S's who had only 2 seconds in which to view the slides, but had an unlimited length of time in which to choose which slide they thought correct.
and "All slides with two and/or green figures are correct".

Pilot subjects were divided into four groups, according to, firstly, whether they were allowed an unlimited amount of time to look at the slides, or whether they had only 2 seconds and secondly, according to whether they saw three red borders problem first, or the two green figures concept first. (To counterbalance practice effects.) A diagrammatic representation of the testing scheme is presented below.

Table 1.

<table>
<thead>
<tr>
<th></th>
<th>2 secs.</th>
<th>unlimited time (U.T.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 red borders</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>concept first</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 green figures</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>first</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 20

The subjects were divided in this way because E wanted to see whether the presentation time altered the difficulty of the concept, and if there were any differences inherent in the two concepts, which affected the quality of subjects' performances differently.

Difficulty levels for both concepts were determined by two factors,

1. The mean times taken by subjects to make discriminations
and "All slides with two and/or green figures are correct".

Pilot subjects were divided into four groups, according to, firstly, whether they were allowed an unlimited amount of time to look at the slides, or whether they had only 2 seconds and secondly, according to whether they saw three red borders problem first, or the two green figures concept first. (To counterbalance practice effects.) A diagrammatic representation of the testing scheme is presented below.

Table 1.

Number of Subjects in each of the four experimental groups.

<table>
<thead>
<tr>
<th></th>
<th>2 secs.</th>
<th>unlimited time (U.T.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 red borders</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>concept first</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 green figures</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>first</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N = 20

The subjects were divided in this way because E wanted to see whether the presentation time altered the difficulty of the concept, and if there were any differences inherent in the two concepts, which affected the quality of subjects' performance differently.

Difficulty levels for both concepts were determined by two factors:

1. The mean times taken by subjects to make discriminations
between pairs of slides (i.e. the longer the response times, the more difficult the problem).

2. The total number of correct responses (the fewer correct responses, the more difficult the problem).

The results of the pilot study were collected and t-ratios computed. As mentioned earlier, E was interested in comparing the difficulty levels of the two concepts. Indications of difficulty levels were obtained by comparing the total number correct for each of the two concepts and the mean times taken by subjects to choose between pairs of slides. The experimenter was also interested in discovering whether the length of time the slides were viewed by the subject influenced these two measures of difficulty levels.

Eight t-ratios were computed between sets of results obtained.

1. Mean times for 3 red borders concept Vs 2 green figures concept within the unlimited time span. (t-ratios for correlated pairs of means).

2. Mean times for three red borders concept Vs two green figures concept within 2 secs. time span. (t-ratios for correlated pairs of means).

3. Total number right for the three red borders Vs two green figures concepts, within the unlimited time span. (correlated pairs of means).

4. Total number right for the three red borders concept Vs the two green figures concept within the 2 secs. time span. (t-ratios for correlated pairs of means).

5. Mean times between the unlimited time and the 2 secs. groups of
subjects for the three red borders concept alone. (t-ratio for uncorrelated means).

6. Mean time differences between the unlimited time and the 2 secs. subjects for the two green figures concept alone. (t-ratio between uncorrelated means.)

7. Total number right between the unlimited time and 2 secs. subjects for the three red borders concept alone. (uncorrelated means).

8. Total number right between the unlimited time subjects and the 2 secs. subjects for the 2 green figures concept alone. (uncorrelated means) t-tests were used because of the small size of the sample. N = 20.

Table 2

<table>
<thead>
<tr>
<th>t-ratios</th>
<th>Value</th>
<th>Significance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. times 3 R Bord./2 gr. frgs. (U.T.)</td>
<td>0.15</td>
<td>n.s.</td>
</tr>
<tr>
<td>M. times 3 R Bord./2 gr. frgs. (2 secs.)</td>
<td>0.27</td>
<td>n.s.</td>
</tr>
<tr>
<td>T. no. right 3 R Bord./2 gr. frgs. (U.T.)</td>
<td>0.09</td>
<td>n.s.</td>
</tr>
<tr>
<td>T. no. right 3 R Bord./2 gr. frgs. (2 secs.)</td>
<td>1.06</td>
<td>n.s.</td>
</tr>
<tr>
<td>M. times U.T./2 secs. (3 R Bords.)</td>
<td>4.58</td>
<td>.01</td>
</tr>
<tr>
<td>M. times U.T./2 secs. (2 gr. frgs.)</td>
<td>1.65</td>
<td>n.s.</td>
</tr>
<tr>
<td>T. no. right U.T./2 secs. (3 R Bords.)</td>
<td>0.59</td>
<td>n.s.</td>
</tr>
<tr>
<td>T. no. right U.T./2 secs. (2 gr. frgs.)</td>
<td>1.02</td>
<td>n.s.</td>
</tr>
</tbody>
</table>
Conclusions based on the above table:

1. There appears to be no significant difference in the difficulty levels of the two problems (three borders and two green figures) in terms of the total number correct or in the mean times taken by the subjects to make their choices, as the first four t-ratios were insignificant.

2. Except for one significant t-ratio (that for mean times between the unlimited time subjects and the 2 sec. subjects in the three red borders concept, where $t = 4.59$) all other t values for the differences between the unlimited time and the 2 sec. exposure times were insignificant.

There seemed to be no reason why this single t-ratio should be significant, and as all other t values were insignificant, E felt justified in concluding that for the results taken as a whole, there appeared to be no significantly different effects on the quality of performance (as judged by the mean times and the total number right) by the two different exposure times.

Hence, E decided to use the two concepts, three red borders and two green figures as problems in the experiment proper. It was also decided that all subjects in the experiment could have an unlimited amount of time in which to view each pair of slides, as the length of time subjects viewed the slides seemed to have little effect on the difficulty level of the two problems (except for that one significant t value for the three red borders concept only).

The Experiment: A. Apparatus and Procedure.

The same slides were used as in the pilot study with a small
number of modifications in their presentation.

E continued to use the two concepts, three red borders and two green figures. The number of pairs of slides each subject viewed was reduced from 65 to 50. Another series of 50 pairs of slides similar to those of the first trial (i.e., involving the three borders concept) were added. The extra series was introduced for procedural purposes and will be described later.

Eighty subjects each saw three series of 50 pairs of slides (total of 150 pairs) projected two at a time onto a screen in front of where they sat.

Pairs of slides were projected onto the screen by means of two Kodak carousel projectors. E controlled the lengths of the exposures and rates of change-over from one pair to the next by means of a remote control button. Each pair of slides was projected and changed simultaneously.

Each subject viewed the slides from a distance of 5 ft. away from the screen and his task was to choose one of the two slides according to a common principle or a concept, which was defined to him earlier.

The subject was to indicate which of two slides he was choosing by pressing one of three (or two) buttons on a metal panel, 2" X 3" X 7", which he held in his lap. The metal buttons were labelled in the following way, L (left), R (right), and for half the subjects, a third button, labelled ? (don't know). If a subject thought the correct slide was on the right side of the screen, he pressed the R button. If he thought it was on the left side of the screen, he pressed the L
button, and half the subjects who had the third button, if they couldn't decide between the two slides, they could press the ? button.

The subject's metal panel was wired to a corresponding panel near to where E sat. E's metal panel, 31/2" X 41/2" X 7" contained three buttons, labelled L, R, and ? and 3 lights labelled in the same way. The two panels were connected so that whenever the subject pressed the R button, the R light in E's panel flashed. If the subject's choice of the R button was incorrect, E could then press her R button, and deliver an electric shock to the subject, while his finger was still on his R button. The same procedure applied to the other two buttons.

If the subject's choice was incorrect, he received a mild electric shock of 1 milliamp. through the button he had just pressed. If his choice was correct, E said, "Correct". If the subject pressed the ? button, nothing happened, and E went onto the next pair of slides. E only moved onto the next pair of slides after the subject had made a response of some kind to the previous pairs of slides.

Each subject saw three series of 50 pairs of slides involving three problems. The first problem was the three red borders concept, and the third problem, the two green figures concept. The second problem changed according to the particular experimental group of each subject. Each subject could take as long as he liked over the task, but E kept a record of his decision times. The decision time was measured from when a new pair of slides came onto the screen, to when the subject chose one of the pair. E also recorded each response.

---

2. Half the subjects could "escape from" the frustrating problem-solving situation by pressing the escape button, i.e. the ? button. A fuller exposition of this condition is given in The Problem.
made by the subject, and whether it was correct or incorrect, and a tape-
recorder kept a record of any comments the subject made during the 
experimental session.

At the beginning of the experiment, E gave the following stand-
ardised instructions to each subject;

"In this experiment I am investigating your ability to 
discriminate between two different slides. Each of 
these slides has a certain number of characteristics".

E showed the subject four randomly-selected slides.

"These are some examples of the types of slides you will 
be seeing throughout the experiment.

I will show you two slides at once. One of the slides in 
each pair is correct, and the other slide in the pair is 
incorrect. There is a definite rule that makes one 
correct and the other incorrect. By that I mean that one 
of the two slides has one quality, or a number of qualities, 
which are the same for all correct slides in one particular 
series, and all incorrect slides in the series do not have 
this particular quality or qualities. This is what I mean 
when I say that there is a definite rule that makes one 
slide correct and the other slide incorrect. I want you, 
while you are looking at a series of 50 pairs of slides, 
to see if you can discover what this rule is.

In other words, over the series of 50 pairs of slides, all 
correct slides in each pair have something in common, and 
it is your job to find out what is common to the correct 
slides.

Each pair of slides will be projected onto the screen for 
an indefinite length of time, and I want you to decide 
which one of the two slides you think represents the con-
cept I have in mind. You will have as much time as you 
like to decide which one of the two slides you think is 
correct, but I will time you to see how long it does take 
you to decide.

When you have decided which slide you think is correct, I 
want you to tell me which slide you are selecting and I 
will indicate to you whether your choice is correct or 
incorrect.
Kodak carousel projector, and subjects' response panel.
Equipment from the experimenter's view.
Equipment from the subject's view.
Now, for the first few pairs of slides you will probably be guessing, but after a while, you will see some kind of pattern emerging from the slides, especially in the correct ones, and you will no longer be guessing, but you will be following some sort of plan in choosing your slides. As soon as you start following a plan, or an hypothesis, I want you to tell me what it is. This will be taken down on the tape recorder. I will not tell you whether your hypothesis is correct or incorrect, but I will tell you whether each choice you make is correct or incorrect.

Now, when you have decided which slide you think is correct, you must press one of the three (or two) buttons in this panel which you can hold in your lap."

E showed the subject the small metal panel described earlier, and allowed the subject to manipulate the buttons.

"If you think that the correct slide is on the left side of the screen, press the button labelled L. If you think that the correct slide is on the right, press the button labelled R. You must press one of the two buttons."

I will indicate to you whether your choice is correct or incorrect in the following way.

If you press the correct button, I will say correct, if you press the incorrect button, you will receive a mild electric shock through the button you have just pressed".

For those subjects who have a choice of three buttons (including the ? button) the alternative instructions were as follows.

"If you think that the correct slide is on the left of the screen, press the button labelled L. If you think the correct slide is on the right of the screen, press the button labelled R. If you can't make up your mind, you can press the ? button to indicate that you don't know."

"If you press the ? button, nothing will happen. I will neither say which slide is the correct one, nor will I give you an electric shock."

Each subject was allowed to test the shock, and given an opportunity to leave if he thought the shock was too severe. No-one did so.
E continued:

"Now, remember, you will have to guess at first, perhaps for the first few pairs of slides, before you will be able to tell for certain which of the two slides is the correct one. Try to find out the rule for the correct slides.

Any questions?"

E answered the subject's questions, if any, and then proceeded with the experiment.

A total of 80 subjects were assigned to one of four groups, representing four experimental treatments.

A summary table of the experimental procedure is given below.
<table>
<thead>
<tr>
<th></th>
<th>Rewarded Group $B_1$</th>
<th>Punished Group $B_2$</th>
<th>Double Bind Group $B_3$</th>
<th>Frustrated Group $B_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PART I</strong></td>
<td>Problem I 3 red borders</td>
<td>Problem I 3 red borders</td>
<td>Problem I 3 red borders</td>
<td>Problem I 3 red borders</td>
</tr>
<tr>
<td><strong>Schedule of Reinforcement</strong></td>
<td>100% positive for correct response</td>
<td>100% positive for correct response</td>
<td>50% positive for correct response</td>
<td>50% positive for correct response</td>
</tr>
<tr>
<td><strong>Schedule of Reinforcement</strong></td>
<td>100% positive for correct response</td>
<td>100% positive for correct response</td>
<td>50% positive for correct response</td>
<td>50% positive for correct response</td>
</tr>
<tr>
<td><strong>PART III</strong></td>
<td>Problem III 2 green figures</td>
<td>Problem III</td>
<td>Problem III</td>
<td>Problem III</td>
</tr>
<tr>
<td><strong>Schedule of Reinforcement</strong></td>
<td>100% positive for new correct response</td>
<td>100% positive for new correct response</td>
<td>50% positive for new correct response</td>
<td>100% positive for new correct response</td>
</tr>
</tbody>
</table>
The Experimental Groups

Group B₁

These subjects were given a schedule of 100% reward for all of their correct responses, i.e. each correct response was rewarded by E throughout the three parts of the experiment. Reward was defined operationally, i.e. E said "Right" whenever the subject's choice was correct. All incorrect choices by the subject were punished, i.e. E gave the subject a mild electric shock.

The effects of reward and punishment in the present experiment were considerably milder than the rewards and punishments with which the schizophrenic child is threatened. e.g. in the schizophrenic family, the child is threatened with the withdrawal of the mother's love and support if he does not obey her commands. Reward and punishment as used in the present study were, more or less, "token" reward and punishment.

Group B₂

These subjects were rewarded randomly throughout the experiment. Although the experimental task was the same as for the group B₁ subjects, there was, for these subjects, no "correct" answer, as they were rewarded only 50% of the time they made an objectively correct response. i.e. whenever a group B₂ subject made a wrong choice, he was given an electric shock, and also, half the time when this subject was objectively correct, he was given a shock. Thus, for these subjects, the problem was an insoluble one, as there was no consistently correct response.
Group B₃

In this group there was 100% positive reinforcement for the correct response in the first part of the experiment. Thus, in the first trial, group B₃ subjects were in a soluble problem situation (the same as the group B₁ subjects). In part 2 of the experiment, these subjects received 50% random reinforcement for the same, previously correct response. i.e. in the second trial, the same concept, "three red borders" existed in the series of slides, but now, the previously correct response was no longer consistently rewarded by E. This group of subjects is called the Double Bind Group, because the nature of the experimental situation has changed. i.e. instead of a soluble problem situation, where there was one correct and one incorrect answer, the subjects were faced with a situation in which there was no correct response, and whether a particular response on the subject's part was rewarded or not, was entirely due to chance. Thus, in this part of the experiment, the subject's second order premise, that "this is a soluble problem situation", was disconfirmed, and the whole nature of the experimental situation was changed for these subjects because the problem was now insoluble. In the third trial, group B₃ subjects revert to the soluble problem situation, similar to the one in the first trial.

Group B₄

In the first part of the experiment, they were given 100% positive reinforcement for the correct choice. In the second part, the particular concept which was correct was changed, without

---

3. See "The Problem" section for a description of the double-bind as used in the present experiment.
telling the subjects, so that instead of all slides with three red borders being correct, all slides on the right side of the screen, regardless of content, were correct. This group of subjects were described as "frustrated" group of subjects. They were "frustrated" in that the particular choice they had to make was changed, but the problem was still soluble, i.e. there was still a definite correct answer which was consistently rewarded, but the nature of the correct answer had changed. This group of subjects had their first-order premise (i.e. that all slides with three red borders are correct) disconfirmed, as compared with the disconfirmation of the second order premise "that this is a soluble problem" experienced by the group B$_3$ subjects. In the present experiment, a comparison between the performances of group B$_3$ and B$_4$ was most important, as it represented the comparison between the effects of the "double bind" and of frustration, which the experimenter maintains are quite separate.

In part 3 of the experiment, group B$_4$ subjects reverted to the original type of discrimination problem, and were consistently rewarded whenever they made a correct choice.

The experiment was divided into three parts, representing three treatments.

Part 1

Groups B$_1$, B$_3$ and B$_4$ received 100% positive reinforcement for the correct response, all of the time they made a correct choice. Whenever they were correct, E said "correct", and whenever they were wrong, they received an electric shock.
Group B₂ subjects were rewarded randomly. Whenever a group B₂ subject made a wrong response, he received an electric shock. Half the time he made an objectively correct response, he also received an electric shock. Hence, the B₂ subjects were in an insoluble problem situation. There was a short break of approximately 10 mins. between the first and second trials. Before the start of the second trial, E said to each S:

"We will now start the second trial. You will still be working on the same conceptual problem as you were on the first trial", but now I want to see how efficient you are in practising what you have already learned. The procedure is exactly the same as that of the first trial. Any questions?"

Part 2

Groups B₁ and B₂ continued as before, on the same concept, "All slides with three red borders are correct", and with the same reinforcement schedules. Group B₃ subjects now received random reinforcement for the same previously correct response, i.e. all slides with three red borders were correct, but they were not consistently rewarded when they responded to it. Thus the problem situation had changed from a soluble to an insoluble one.

Group B₄ subjects; for them a new correct concept. Instead of the concept "All slides with three borders" being correct, all slides

4. Group B₄ subjects were also told that they would be continuing with the same problem to keep their procedure as close as possible to the procedure of Ss in the other three groups. However, most group B₄ subjects realised very quickly that the problem in the second trial was not the same as the one in the first trial.
on the right side of the screen were consistently rewarded by E. These subjects were still in a soluble problem situation as a correct response was still rewarded all the time, but the nature of the correct concept had changed, from a discrimination problem to a position problem.

There was a short break.

Before the start of the third trial, E said to each S;

"We will now start the third trial, where you will have to learn a new problem. The procedure is exactly the same as for the first two trials, except that you have to solve a new problem."

Part 3

All subjects moved to a new concept, "All slides with 2 green figures are correct."

Groups B₁ and B₂ continue to receive the same amount of reinforcement i.e. group B₁ were consistently rewarded whenever they made a correct choice, and group B₂ subjects were punished half the time they made an objectively correct response.

Group B₃ subjects reverted to their original reinforcement schedule, i.e. they now received 100% reinforcement for the new correct response (the same as the group B₁ subjects.)

Group B₄ subjects also reverted to the original schedule of reward and punishment, so that whenever they made a correct response to the new correct slide, they were rewarded all of the time. (100% reinforcement) and they are punished whenever they are wrong.

Each of the experimental groups of subjects were further divided into two groups. Half the subjects were able to "escape
from the double bind experimental situation by pressing the ? button. That is, if they couldn't decide whether the correct slide was on the left or right side of the screen, they could choose a way out by pressing this button. The other half of the subjects had this button covered, and so had to make a discrimination between the two slides, i.e. they weren't able to escape from this frustrating situation.

The added dimension of whether or not a subject could make an "abortive" response (i.e. press a ? button) was introduced because, in Maier's experiments, the abnormally fixated behaviour of the rats was only exhibited when they were forced to jump and furthermore, from the literature on the double bind, the inability to escape seems to be the really pernicious aspect of the double bind situation, making it different to an ordinary frustration situation.

The experimenter was also interested in the amount of correlation (if any) between the subject's anxiety level and his performance in the experiment.

Thus, before the experiment began, each subject was required to fill out the short form of the M.A.S. (50 items)\(^5\).

The M.A.S. was used because it was regarded as one of the most suitable questionnaire methods of measuring a person's level of anxiety, and it has a large body of experimental and normative data backing it. Its face validity is high, and its test-retest reliability

---

5. See the appendix for copies of M.A.S. and other questionnaires used in the present study.
over four weeks' time span for 179 Ss is $r = .88$. The 150 "buffer" questions were removed, leaving the shortened version of 50 "Anxiety" questions to be answered by the subject. This was done because the buffer items don't add anything to the validity or reliability of the M.A.S. as a measure of anxiety.

In the first break (between trials 1 and 2) E administered to each S a "level of aspiration" questionnaire. E devised three such questionnaires, composed of a number of multiple-choice questions, such as,

"Did you become annoyed when you were punished for a wrong response?"

"Do you think you will perform better on the next trial?"

"On which of the three trials do you think you performed best?" and so on. By asking subjects to answer such questions E hoped to obtain a subjective report of how each subject felt he was performing, and how satisfied he was with his performance, and through this, to get some indication of a subject's feelings of frustration.

E administered two similar questionnaires to the subjects after the second and third trials also. Each subject's answers to the second and third questionnaires were compared with his answers to the first questionnaire (as a number of questions remained the same throughout), as an index of the subject's changing attitude to the problem. Each subject could have as long as he wanted to fill out the Questionnaire.
Subjects were tested individually, and each session generally took about 90 mins.

The Subjects

80 Psychology I students were used, 10 for each of the subgroups. Age range: 17 - 42 years.

Mean age: 21.4 years, 38 males 42 females.

The sample was assumed to be fairly homogeneous in education levels and intelligence. As the subjects were university students, they were not really representative of the general population, but this was not an important factor in this experiment.
Collection and Treatment of Data

A variety of results were obtained from each subject. These included,

1. Total number of correct responses made by each subject (over three trials).

2. Total number of correct responses for each subject plus half the total number of ? responses made by one half of the subjects (over three trials).

3. Mean response times for each subject (over three trials).

4. Total number of "fixations". Fixations were defined operationally as more than two successive responses to the same side, regardless of the content of the two slides.

5. Total number of times Ss pressed the ? button (this is obtained from half the total number of subjects, the half which had the choice of three buttons to press, L, R, and ?).

6. Total number of Ss who verbally stated, as a working hypothesis, at least half of the correct concept (remember, for the two problems, the concepts had two attributes) in the first half of each trial. Presumably, the earlier a subject formed a partly-correct hypothesis, the more efficient he was. A subject's verbal statement of the correct hypothesis was taken as the most consistent index of when he had, in fact, formed a correct hypothesis. There were several reasons why hypothesis-formation was only considered in the first half of each trial. Firstly, it was found that several subjects never did verbally state
any hypothesis at all until the end of each trial, and it was impossible to tell when they were successfully testing an hypothesis just by looking at their result sheets. Secondly, a consideration of the first half of each trial gave a sharper separation between successful and unsuccessful subjects. If this measure was to be used as an index of efficiency, then the consideration of the first half of each trial only would give a clearer distinction between the efficient and the not-so-efficient subjects.

7. M.A.S. scores.
8. Written responses to the 3 "level of aspiration" questionnaires.
9. Verbal comments made by the subjects during the experimental session, tape-recorded and transcribed by E.

The last two sets of results were intended to help in the interpretation of the other more quantitative results.

The analysis of Variance technique was the most applicable method of analysing the results, as E wanted to examine the separate and interacting effects of the three factors varied in the experiment. The three factors were, the type of experimental group each subject belonged to (see procedure), each S's width of choice (i.e. two or three response buttons) and also individual subject differences over the three consecutive trials. Four separate analyses of Variance were calculated, using the method recommended by Lindquist (pp. 261-264), one separate analysis each for the total number of correct responses, total number of correct responses plus 1/2 the ?
responses, mean response times, and the total number of fixations.

The significant F values were then subjected to further analysis by t-ratios.

A summary table only is given of the total number of times the ? button was pressed by Ss and the number of hypotheses formed by Ss as the figures were not large enough to warrant statistical analysis.
The following classification of the variables was used throughout all results sections.

**Factor A.** Width of choice. (See procedure). There were 2 groups of subjects, half had three response buttons to choose from (L, R, and ?) the other half had only two response buttons to choose from (L and R). This group of subjects are referred to as the non-? subjects.

**Factor B.** The experimental group each subject was in. The subjects were divided into four according to this factor.
- **B1** 100% reward.
- **B2** 100% punishment.
- **B3** double bind subjects.
- **B4** contradiction subjects.

**Factor C.** The number of the trial the subject was doing at the time of analysis. Subjects were divided into three according to this factor.
- **Trial 1** 01
- **Trial 2** 02
- **Trial 3** 03
Table 4

Total No. of correct responses

(Summed and averaged over 10 Subjects per cell)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Group A₁</th>
<th>Group A₂</th>
<th>Group B₁</th>
<th>Group B₂</th>
<th>Group B₃</th>
<th>Group B₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial No</td>
<td>1 2 3</td>
<td>1 2 3</td>
<td>1 2 3</td>
<td>1 2 3</td>
<td>1 2 3</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Totals</td>
<td>320 376 296</td>
<td>258 293 277</td>
<td>343 346 309</td>
<td>351 308 299</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Means</td>
<td>32.0 37.6 29.6</td>
<td>25.8 29.5 27.7</td>
<td>34.3 34.6 30.9</td>
<td>35.1 30.8 29.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-? Subjects</td>
<td>362 419 356</td>
<td>292 321 254</td>
<td>342 349 316</td>
<td>394 317 346</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>36.2 41.9 35.6</td>
<td>29.2 32.1 25.4</td>
<td>34.2 34.9 31.9</td>
<td>39.4 31.7 34.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Means</td>
<td>36.2 41.9 35.6</td>
<td>29.2 32.1 25.4</td>
<td>34.2 34.9 31.9</td>
<td>39.4 31.7 34.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td>682 735 652</td>
<td>550 614 531</td>
<td>685 695 627</td>
<td>745 625 645</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6 Total no. of correct responses include the objectively correct responses made by each subject, but which E said were incorrect. E. did this because she wanted to know if, being told "wrong" the subjects made more genuine mistakes - or if they continued at the same level of efficiency, regardless of the fact that E had said "wrong".
Table 5
VARIANCE ESTIMATES OF THE TOTAL NO. CORRECT ANSWERS

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error (b) [Between subjects]</td>
<td>72</td>
<td>1460.33</td>
<td>20.28</td>
</tr>
<tr>
<td>A</td>
<td>1</td>
<td>360.1503</td>
<td>360.1503</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>1733.5133</td>
<td>577.8378</td>
</tr>
<tr>
<td>AB (interaction)</td>
<td>3</td>
<td>180.9867</td>
<td>60.3289</td>
</tr>
<tr>
<td>Error (w) [Within subjects]</td>
<td>144</td>
<td>7979.87</td>
<td>55.42</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>510.0583</td>
<td>255.0297</td>
</tr>
<tr>
<td>AC</td>
<td>2</td>
<td>8.1247</td>
<td>4.0624</td>
</tr>
<tr>
<td>BC</td>
<td>6</td>
<td>755.8617</td>
<td>132.6436</td>
</tr>
<tr>
<td>ABC</td>
<td>6</td>
<td>146.2883</td>
<td>24.3814</td>
</tr>
<tr>
<td>Total</td>
<td>239</td>
<td>13175.1833</td>
<td></td>
</tr>
</tbody>
</table>

$F_a = 17.76$ (Significant at .01 level).

$F_b = 28.49$ (Significant at .01 level).

$F_c = 4.50$ (Significant at .05 level, n.s. at .01 level).

$F_{ab} = 2.97$ n.s.

$F_{ac} = 0.07$ n.s.

$F_{bc} = 2.39$ (Significant at .05 level, n.s. at .01 level).

$F_{abc} = 0.44$ n.s.
A value of 17.76 indicated a reliable tendency for the two 
A groups of subjects to differ in terms of the number of correct 
responses made. As there were only two groups of subjects under 
the A classification, no t-test was needed to further examine 
the results. By looking at the totals for A1 and A2, in the 
summary table (table 4) there can be seen a consistent tendency 
for the A2 subjects to have a significantly greater number of 
correct answers. This difference was significant at the .01 
level, i.e. one would expect the A2 subjects to score signifi-
cantly higher than the A1 subjects by chance only once in 100 
times.

There are two possible explanations of this result. The 
first is that the ? subjects got fewer correct because they were 
uncertain of the concept, and pressed the ? button, whereas the 
other subjects were forced to choose one of the two, and 
apparently chose the correct one quite often, even when they 
were uncertain about their choice.

Another possible reason lies in the importance of a negative 
instance i.e. a wrong choice, as a source of positive information 
about the solution to the problem. i.e. in the experimental 
situation, the problems subjects were required to solve involved 
concept formation, where some slides were correct (in that they 
were positive exemplars of a concept) and some were wrong 
(negative exemplars, i.e. examples of what the concept was not.) 
Subjects who didn't have the ? button, and pressed the wrong
button, still obtained some information about the correct concept from being wrong, whereas subjects who pressed the ? button obtained no information about the correct answer, and so were no closer to a solution than they were before. This seems to be the most likely explanation of why non-? subjects got significantly more correct than the ? subjects. This explanation is confirmed by the next set of results.  

F value of 28.49 indicated even more clearly, reliable differences between each of the B conditions, i.e. the experimental treatment received by a particular group of subjects had a definite influence on the number of correct responses made by those subjects.

From the summary table it appeared that group B2 subjects had the smallest number of correct responses, but to discover if this apparent trend was statistically significant, a number of t-ratios were calculated between each pair of B means.

Another possible explanation is that, by chance alone, non-? subjects would be expected to get more correct than the ? subjects as the latter's probability of obtaining a correct response was 1 in 3 (33%) while for non-? subjects, it was 1 in 2 (50%). This possibility was allowed for in the next statistical treatment where half the number of ? responses made by the ? subjects were counted as correct responses (on the basis of chance probability) and were added to those subjects' total number of correct responses.
Table 6
Summary Table of B
Summed over all A & B

<table>
<thead>
<tr>
<th></th>
<th>B₁</th>
<th>B₂</th>
<th>B₃</th>
<th>B₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>320</td>
<td>258</td>
<td>343</td>
<td></td>
<td>351</td>
</tr>
<tr>
<td>376</td>
<td>293</td>
<td>346</td>
<td></td>
<td>308</td>
</tr>
<tr>
<td>296</td>
<td>277</td>
<td>309</td>
<td></td>
<td>299</td>
</tr>
<tr>
<td>362</td>
<td>292</td>
<td>342</td>
<td></td>
<td>394</td>
</tr>
<tr>
<td>419</td>
<td>321</td>
<td>340</td>
<td></td>
<td>317</td>
</tr>
<tr>
<td>356</td>
<td>254</td>
<td>318</td>
<td></td>
<td>346</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>B₂</th>
<th>B₃</th>
<th>B₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>2119</td>
<td>1695</td>
<td>2007</td>
<td>2015</td>
</tr>
<tr>
<td>353.17</td>
<td>282.50</td>
<td>334.50</td>
<td>335.83</td>
</tr>
</tbody>
</table>

Table 6a

<table>
<thead>
<tr>
<th>t-ratios for the main effect of B</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-ratios</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>B₁ - B₂</td>
</tr>
<tr>
<td>B₁ - B₃</td>
</tr>
<tr>
<td>B₁ - B₄</td>
</tr>
<tr>
<td>B₂ - B₂</td>
</tr>
<tr>
<td>B₄ - B₂</td>
</tr>
<tr>
<td>B₄ - B₃</td>
</tr>
</tbody>
</table>
From the above table of t-ratios it can be seen that all but one of the main B categories differ significantly in terms of the total number of correct answers. The only exception is the difference between B3 and B4 (i.e. between the double bind and the frustration groups) where the difference is 1.62. Thus the double bind and frustration groups appear to be similar in terms of the number of correct responses they make. This is supported by a glance at the means in the summary table above (6a).

From table 6a one can also see that B1 subjects (i.e. the 100% rewarded group) had significantly more correct responses than any other group of subjects. (The reliability of the differences are supported by the significant t-ratios between B1 and B2, B1 and B3, B1 and B4). The B3 and B4 groups come next in terms of the number of correct answers. Each differed significantly from B1 and from B2, but not from each other. The B2 group of subjects had the lowest number of correct responses, being significantly lower than all of the other three groups. The B2 subjects were the ones who were punished all the way through the experiment.

More intensive interpretation of these results will be made in a later section of the report, but it seems, at present, that the amount of punishment received by the B2 subjects adversely affected the number of correct responses they made, even when the correct responses included the "objectively"
correct responses (i.e., those which were objectively correct) but to which E said "wrong". One could argue that punishment increased the number of mistakes over all, and that the subjects weren't just continuing at a given level of efficiency regardless of the number of times that E said "correct".

F_t = 4.60. There was a slight tendency for the number of correct answers obtained by each subject to change with each trial. This trend was significant at the .05 level, but not at the .01 level. As the significance level throughout the experiment was established at .01, the above F value was taken to be non-significant and no further statistical analysis was done on the differences between C means. Thus, it can be concluded that none of the subjects differed significantly over the three trials in terms of the total number of correct responses they made.

F_{bc} = 2.39 and was significant at the .05 level, but not at the .01 level, which indicated a tendency for the correct responses for each subject to vary according to a special combination of the trial number and the treatment group. This tendency was fairly unreliable, as it did not reach the pre-set significance level.
Summary of results for the total number of correct answers.

The large F value for the difference between the two A conditions indicated a reliable tendency for A1 subjects (those who could press the ? button) to make significantly fewer correct responses over the three trials, than subjects without a ? button. Two tentative conclusions were arrived at, firstly, that subjects with a ? button became confused by this extra alternative, and as a result, were less successful in choosing the correct slide. The other was that subjects without a ? button obtained valuable information about the solution to the problem by being wrong (the importance of feedback).

The F value of 28.49 indicated significant differences between the four treatment groups in the number of correct responses made.

Fig. 5. Differences in the total number of correct answers for each of 6 treatment groups.
The graph shows that the B1 subjects had the greatest number of correct responses, and B2 the least. The latter result was expected because of the arbitrarily high level of wrong responses E decided that the B2 subject should receive. B3 and B4 were roughly equivalent, and lay between B1 and B2.

B3 and B4 didn't differ significantly from each other, suggesting that the double bind and contradiction conditions weren't different enough in terms of the amount of frustration they produced in subjects, with the result that the total number of correct answers given by each subject was roughly equivalent.

Fe was not significant. There was a slight tendency for subjects to get more correct in the second trial, but the trend was not marked.

None of the interaction values were significant. There was a suggestion of an interaction effect between B and C (Fbc significant at the .05 level). The following graph shows some interesting trends.
Fig. 6  Changes in the total number of correct answers for all groups of subjects over 3 trials.

The graph shows that all three groups except B4, had the greatest number of correct answers in the second trial, and that the B1 group was significantly higher than the other three, and B2 the lowest. B3 and B4 were not significantly different from each other in the number of correct responses. B4 subjects' performances fell off in the second trial and rose again in the third, while the opposite trend took place for the other three groups of subjects.

However, the above represents a trend in the results, as the F value for the interaction was statistically insignificant.
Table 7

TOTAL NO. OF CORRECT RESPONSES + 1/2 ? RESPONSES

<table>
<thead>
<tr>
<th>? Subjects</th>
<th>Group B₁</th>
<th>Group B₂</th>
<th>Group B₃</th>
<th>Group B₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial no.</td>
<td>1  2  3</td>
<td>1  2  3</td>
<td>1  2  3</td>
<td>1  2  3</td>
</tr>
<tr>
<td>Totals</td>
<td>322 376 297</td>
<td>262 295 279</td>
<td>350 352 310</td>
<td>357 311 300</td>
</tr>
<tr>
<td>Means</td>
<td>32.2 37.6 29.7</td>
<td>26.2 29.5 27.9</td>
<td>35.0 35.2 31.0</td>
<td>35.7 31.1 30.0</td>
</tr>
<tr>
<td>non ? Subjects Totals</td>
<td>362 419 356</td>
<td>292 321 254</td>
<td>342 349 318</td>
<td>394 317 346</td>
</tr>
<tr>
<td>Means</td>
<td>36.2 41.9 35.6</td>
<td>29.2 32.1 25.4</td>
<td>34.2 34.9 31.8</td>
<td>39.4 31.7 34.6</td>
</tr>
<tr>
<td>Grand Total</td>
<td>684 795 653</td>
<td>554 616 533</td>
<td>692 701 628</td>
<td>751 628 646</td>
</tr>
</tbody>
</table>
Table 8

VARIANCE ESTIMATES OF THE TOTAL NO. CORRECT RESPONSES + 1/2 ? RESPONSES

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error (b)</td>
<td>72</td>
<td>1497.60</td>
<td>20.80</td>
</tr>
<tr>
<td>A</td>
<td>1</td>
<td>271.17</td>
<td>271.17</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>1719.31</td>
<td>573.13</td>
</tr>
<tr>
<td>AB (interaction)</td>
<td>3</td>
<td>213.08</td>
<td>71.03</td>
</tr>
<tr>
<td>Error (w)</td>
<td>144</td>
<td>4163.70</td>
<td>29.05</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>544.68</td>
<td>272.34</td>
</tr>
<tr>
<td>AC</td>
<td>2</td>
<td>12.99</td>
<td>6.49</td>
</tr>
<tr>
<td>BC</td>
<td>6</td>
<td>798.72</td>
<td>133.12</td>
</tr>
<tr>
<td>ABC</td>
<td>6</td>
<td>161.21</td>
<td>26.87</td>
</tr>
<tr>
<td>TOTAL</td>
<td>239</td>
<td>13402.46</td>
<td></td>
</tr>
</tbody>
</table>

Fa = 13.04 Significant at the .01 level
Fb = 27.55 Significant at the .01 level
Fc = 9.37 Significant at the .01 level
Fab= 3.41 Significant at the .05 level, n.s. at the .01 level
Fac= 0.22 Not significant
Fbc= 4.58 Significant at the .05 level, n.s. at the .01 level
Fabc= 0.92 Not significant
2. Total number of correct responses + 1/2 ? responses.

As might be expected, the trend of these results followed closely the previous set of results. There was, however, a number of important divergences from the first set.

F\text{a} value of 13.04, although not as large as the first F\text{a} value, still indicated a reliable difference between the two A groups in the total number of correct responses, with the addition of half the ? scores. Thus, when the higher probability of being correct for the non-? subjects was taken into account, they still differed significantly from the ? subjects in the number of correct responses they made. This result confirms the importance of a negative instance as a provider of positive information about the solution.

F\text{t} = 27.55 which again indicated significant differences between each of the four experimental conditions in the number of correct responses they made. As in the first set of results, B2 subjects obtained the least correct, with B3 and B4 subjects together having more correct, but having significantly fewer correct than the B1 subjects.

F\text{c} = 9.37, significant at the .01 level. Thus, the number of correct answers including the ? answers differed significantly over the three trials in the experiment. This result may be contrasted with the corresponding F\text{c} value for the first set of results. The original F\text{c} value of 4.60 did not quite reach
statistical significance. The present Po value of 9.37 appears to represent a magnification of a trend which was present in the first set of results, but wasn't reliable enough to reach statistical significance.

The following summary table gives a better indication of the trend of results.

Table 9
Summary table of factor C
(Summed over all A and B)

<table>
<thead>
<tr>
<th></th>
<th>01</th>
<th>02</th>
<th>03</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>322</td>
<td>376</td>
<td>297</td>
</tr>
<tr>
<td>C2</td>
<td>362</td>
<td>419</td>
<td>356</td>
</tr>
<tr>
<td>C3</td>
<td>262</td>
<td>295</td>
<td>279</td>
</tr>
<tr>
<td>C4</td>
<td>292</td>
<td>321</td>
<td>254</td>
</tr>
<tr>
<td>C5</td>
<td>350</td>
<td>352</td>
<td>310</td>
</tr>
<tr>
<td>C6</td>
<td>342</td>
<td>349</td>
<td>318</td>
</tr>
<tr>
<td>C7</td>
<td>359</td>
<td>311</td>
<td>300</td>
</tr>
<tr>
<td>C8</td>
<td>394</td>
<td>317</td>
<td>346</td>
</tr>
<tr>
<td>T</td>
<td>2681</td>
<td>2740</td>
<td>2460</td>
</tr>
<tr>
<td>M</td>
<td>335.13</td>
<td>342.50</td>
<td>307.50</td>
</tr>
</tbody>
</table>
According to the above table, the second trial yielded the greatest number of correct responses. This was probably due to the practice and familiarity with the same concept in the second trial for the B1 and B2 subjects, sufficiently large to override the decline in performance expected for the B1 and B4 subjects. Whether this is true or not will be determined by an examination of the BC interaction effects.

Table 9a

<table>
<thead>
<tr>
<th>t-ratios</th>
<th>value</th>
<th>significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2 - C1</td>
<td>23.38</td>
<td>.01</td>
</tr>
<tr>
<td>C1 - C3</td>
<td>32.51</td>
<td>.01</td>
</tr>
<tr>
<td>C2 - C3</td>
<td>55.88</td>
<td>.01</td>
</tr>
</tbody>
</table>

All three trials differed significantly from one another in the number of correct responses. The second trial was accompanied by the greatest number of correct responses, significantly greater than the first and third trials. The first trial had significantly more correct responses than the third.

Fab = 3.41, and was not quite significant at the .01 level. It indicated that there was a rather unreliable tendency for the number of correct answers obtained by each subject to vary for the ? subjects and the non ? subjects according to the experimental group they belonged to. But this trend was not great enough to
warrant further investigation.

Similarly, the Fbc value of 4.58 didn't quite reach the required level of significance. But in view of the comments relating to table 9, I thought it worthwhile to examine the results more closely.

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>684</td>
<td>554</td>
<td>692</td>
<td>751</td>
<td>2681</td>
</tr>
<tr>
<td>C2</td>
<td>795</td>
<td>616</td>
<td>701</td>
<td>628</td>
<td>2740</td>
</tr>
<tr>
<td>C3</td>
<td>653</td>
<td>533</td>
<td>628</td>
<td>646</td>
<td>2460</td>
</tr>
<tr>
<td>T</td>
<td>2132</td>
<td>1703</td>
<td>2021</td>
<td>2025</td>
<td>7881</td>
</tr>
</tbody>
</table>

A glance at the above table shows that B1, B2 and B3 groups scored more correct in the second trial than any other trial. However, B4 subjects scored most correct in the first trial, and their performance was worst in the second trial.

None of the other interaction effects were significant, and were not subjected to further statistical analysis.

Summary (2) of the total number of correct responses + 1/2 ? responses

Examination of this and the first set of results revealed that subjects with the ? button made fewer correct responses than subjects
without this button, even when the different chance probabilities of being correct for the two groups were taken into account.

There were also significant differences between the four experimental groups, the continually punished subjects having fewer correct responses (even when their objectively correct answers were added to their scores). B3 and B4 subjects made an equal number of errors, but fewer than the punished group, and both made more errors than the rewarded subjects.

When half the ? responses were added to subjects' scores, the trial number exerted an important influence on each group's number of correct responses, such that the second trial was accompanied by the greatest number of correct responses for B1, B2 and B3 subjects, but not for the B4 subjects. It was concluded from this that familiarity with the original problem in the second trial led to improved performance in the B1 and B2 subjects, and also in the B3 subjects, where this familiarity was apparently strong enough to override the effect of a change in the problem from soluble to insoluble in the second trial. On the other hand, B4 subjects made more errors in the second trial when they were given a new problem to solve. Apparently, a change from one specific problem to another was more frustrating in its effects on subjects' performance than the change which occurred when a single problem changed from being soluble to becoming insoluble.

All obtained F values related to main effects of the three
variables, i.e. width of choice had similar effects on each subject, regardless of the experimental group he belonged to, or regardless of the trial number. This conclusion was based on the lack of any significant interaction effects.
**TABLE 11**

MEAN RESPONSE TIMES

(Summed and averaged over 10 subjects per cell)

<table>
<thead>
<tr>
<th>? Subjects</th>
<th>Group B₁</th>
<th>Group B₂</th>
<th>Group B₃</th>
<th>Group B₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial No.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Totals</td>
<td>89.15</td>
<td>63.83</td>
<td>72.50</td>
<td>267.71</td>
</tr>
<tr>
<td>Means</td>
<td>8.92</td>
<td>6.38</td>
<td>7.25</td>
<td>26.77</td>
</tr>
<tr>
<td>Non- ? Subjects</td>
<td>116.93</td>
<td>54.98</td>
<td>80.20</td>
<td>126.29</td>
</tr>
<tr>
<td>Totals</td>
<td>11.69</td>
<td>5.50</td>
<td>8.02</td>
<td>12.63</td>
</tr>
<tr>
<td>Grand Total</td>
<td>206.08</td>
<td>118.81</td>
<td>152.70</td>
<td>394.00</td>
</tr>
</tbody>
</table>
3. Mean Response Times.

The following results were obtained.

Table 12

Variance estimates of the Mean Response Times.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error (b)</td>
<td>72</td>
<td>1743.89</td>
<td>24.22</td>
</tr>
<tr>
<td>A</td>
<td>1</td>
<td>1160.37</td>
<td>1160.37</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>1892.44</td>
<td>630.81</td>
</tr>
<tr>
<td>AB (interaction)</td>
<td>3</td>
<td>887.59</td>
<td>295.87</td>
</tr>
<tr>
<td>Error (e)</td>
<td>144</td>
<td>6295.55</td>
<td>43.72</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>779.41</td>
<td>389.71</td>
</tr>
<tr>
<td>AC</td>
<td>2</td>
<td>51.51</td>
<td>25.75</td>
</tr>
<tr>
<td>BC</td>
<td>6</td>
<td>696.60</td>
<td>116.43</td>
</tr>
<tr>
<td>ABC</td>
<td>6</td>
<td>214.26</td>
<td>35.71</td>
</tr>
<tr>
<td>Total</td>
<td>239</td>
<td>13723.53</td>
<td></td>
</tr>
</tbody>
</table>

$F_a = 47.91$ Significant at .01 level.
$F_b = 26.05$ Significant at .01 level.
$F_c = 8.91$ Significant at .01 level.
$F_{ab} = 12.22$ Significant at .01 level.
$F_{bc} = 2.66$ Significant at .05 level, n.s. at .01 level.
$F_{ac} = 0.59$ n.s.
$F_{abc} = 0.82$ n.s.
Fa = 47.91 significant at the .01 level. It indicated that there was a reliable tendency for all ? subjects to differ reliably from the non-? subjects in their response times. The totals for A1 and A2 in the summary table above show that subjects who had three response buttons to choose from took longer to make a response (both correct and incorrect) than the non-? subjects, who had only two alternatives.

Fb value of 26.05, significant at the .01 level, indicates that the B factor (experimental treatment) e.g. double bind or frustration received by each subject had an important influence on the time he took to make a response.

To obtain a clearer picture of the way factor B operated on each subject's response times, the B values were subjected to further analysis by t-tests.

The following summary tables provide a clearer picture of the trend of results.

Table 13
Main B effects.
(Summed over all A and C).

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>89.15</td>
<td>267.71</td>
<td>110.85</td>
<td>111.48</td>
</tr>
<tr>
<td>A2</td>
<td>116.93</td>
<td>126.29</td>
<td>78.95</td>
<td>51.82</td>
</tr>
<tr>
<td>A3</td>
<td>63.83</td>
<td>190.11</td>
<td>112.23</td>
<td>99.13</td>
</tr>
<tr>
<td>A4</td>
<td>54.98</td>
<td>95.45</td>
<td>75.08</td>
<td>40.94</td>
</tr>
<tr>
<td>A5</td>
<td>72.50</td>
<td>117.97</td>
<td>70.51</td>
<td>102.94</td>
</tr>
<tr>
<td>A6</td>
<td>80.20</td>
<td>65.35</td>
<td>48.62</td>
<td>46.13</td>
</tr>
<tr>
<td>T</td>
<td>477.59</td>
<td>862.88</td>
<td>496.24</td>
<td>452.49</td>
</tr>
</tbody>
</table>

| M | 79.59 | 143.81 | 82.77 | 75.42 |
Table 13a

t-ratios for the main effect of E.

<table>
<thead>
<tr>
<th>t-ratios</th>
<th>value</th>
<th>significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2 - B1</td>
<td>71.36</td>
<td>.01</td>
</tr>
<tr>
<td>B3 - B1</td>
<td>3.53</td>
<td>.05*</td>
</tr>
<tr>
<td>B1 - B4</td>
<td>4.52</td>
<td>.05*</td>
</tr>
<tr>
<td>B2 - B3</td>
<td>67.82</td>
<td>.01</td>
</tr>
<tr>
<td>B2 - B4</td>
<td>75.99</td>
<td>.01</td>
</tr>
<tr>
<td>B3 - B4</td>
<td>8.17</td>
<td>.01</td>
</tr>
</tbody>
</table>

* The level of significance throughout the experiment was .01. Therefore these two values were regarded as being not significant.

The above table of t-ratios indicated that the B1 and B3 subjects did not differ significantly in their response latencies, nor did the B1 and B4 subjects. This conclusion is supported by a glance at the means for each of the four B groups in the above table.

The B2 subjects (the continually punished group) had the longest response times. Their times were significantly greater than any of the other four groups. The B3 group (double bind) came next. These subjects' times were significantly shorter than those of the B2 subjects (t = 67, 82) but the double bind subjects also had significantly greater latencies than the B4 group (the frustration group). Their times were significantly different from those of the B1 subjects.
The B1 subjects had the next longest response times, they differed significantly from the B2 subjects but not from the B3 and B4 groups. The B4 subjects (frustration group) had the shortest response latencies of the four groups, significantly shorter than the B2 and B3 subjects, but not significantly different from the B1 subjects.

The obtained results can perhaps be more easily understood by an examination of the following figure, which indicates the relative positions of each of the four experimental groups.

![Fig. 7 Relative positions of each B group's response times.](image)
$F_c = 8.91$, significant at the .01 level, suggesting that the mean response times of each subject varied together with variations in the experimental treatment from trial to trial. To discover the direction in which these changes occurred, the mean times were subjected to further analysis by t-tests. The results are set out below.

Table 14

Summary of factor C
Summed over all A and B

<table>
<thead>
<tr>
<th></th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>89.15</td>
<td>63.83</td>
<td>72.50</td>
</tr>
<tr>
<td>2</td>
<td>116.93</td>
<td>54.98</td>
<td>80.20</td>
</tr>
<tr>
<td>3</td>
<td>267.71</td>
<td>190.11</td>
<td>117.97</td>
</tr>
<tr>
<td>4</td>
<td>126.29</td>
<td>95.45</td>
<td>65.35</td>
</tr>
<tr>
<td>5</td>
<td>110.85</td>
<td>112.23</td>
<td>70.51</td>
</tr>
<tr>
<td>6</td>
<td>78.95</td>
<td>75.08</td>
<td>48.62</td>
</tr>
<tr>
<td>7</td>
<td>111.48</td>
<td>99.18</td>
<td>102.94</td>
</tr>
<tr>
<td>8</td>
<td>51.82</td>
<td>40.94</td>
<td>48.13</td>
</tr>
<tr>
<td>T</td>
<td>953.18</td>
<td>131.80</td>
<td>604.22</td>
</tr>
<tr>
<td>M</td>
<td>119.15</td>
<td>91.45</td>
<td>75.53</td>
</tr>
</tbody>
</table>

The t-ratios for the differences between each pair of C means were significant at the .01 level. The magnitude of the differences indicates reliable differences between the means,
differences that could not be explained by chance.

Table 14a

t-ratios for the main effect of C

t-ratios       value     significance level
C1 - C2        26.63     .01
C1 - C3        41.94     .01
C2 - C3        15.31     .01

From table 12, it can be seen that the response latencies follow a steady downward path. The first trial yields the longest response latencies, significantly longer than the latencies of the second and third trials. The second trial is accompanied by significantly greater latencies than the third trial.

From the summary table, there is a smaller difference between the latencies of the second and third trials than there is between the first and second trials.

The interaction of the width of choice factor (A1 and A2) and the experimental group, (B1, B2, B3 and B4) was associated with significant changes in the response latencies. (F_{AB} = 12.22) and was significant at the .01 level. The significant interaction effect indicated that some combinations of the A and B factors might have been accompanied by increased latencies, while other combinations might not. In other words, the width of choice a particular group of subjects had may have affected them differently to the way it may have affected another group.
of subjects.

For this purpose, a set of t-ratios was computed for the differences between pairs of AB means.

Table 15
Means of the total response latencies
(Summed across the 3 C conditions)

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>75.16</td>
<td>191.93</td>
<td>197.86</td>
<td>104.53</td>
</tr>
<tr>
<td>A2</td>
<td>87.37</td>
<td>95.70</td>
<td>67.55</td>
<td>46.30</td>
</tr>
</tbody>
</table>

Taking the table as a whole, the double bind ? subjects had the longest response times of all groups, followed by the punished ? subjects, then the frustrated ? subjects. Next in the response times were, the punished non-? subjects, then the rewarded non-? subjects, followed by the double bind non-? subjects.

Table 15a
Simple effect of A at a given level of B.

<table>
<thead>
<tr>
<th>t-ratios</th>
<th>value</th>
<th>significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2B1 - A1B1</td>
<td>12.21</td>
<td>.01</td>
</tr>
<tr>
<td>A1B2 - A2B2</td>
<td>96.23</td>
<td>.01</td>
</tr>
<tr>
<td>A1B3 - A2B3</td>
<td>130.31</td>
<td>.01</td>
</tr>
<tr>
<td>A1B4 - A2B4</td>
<td>58.23</td>
<td>.01</td>
</tr>
</tbody>
</table>
Thus, within any given B level, each pair of A means differ significantly from one another. However, there was a reversal in the direction of this difference in the B1 group of subjects. That is, the subjects who could press the ? button had significantly shorter response times than the non-? subjects. For all other treatment groups the non-? subjects had shorter latencies than the ? subjects; which is consistent with the "confusion" hypothesis put forward earlier.

Table 15b

<table>
<thead>
<tr>
<th>t-ratios</th>
<th>Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2A1 - B1A1</td>
<td>116.77</td>
<td>.01</td>
</tr>
<tr>
<td>B3A1 - B1A1</td>
<td>122.70</td>
<td>.01</td>
</tr>
<tr>
<td>B4A1 - B1A1</td>
<td>29.37</td>
<td>.01</td>
</tr>
<tr>
<td>B3A1 - B2A1</td>
<td>5.93</td>
<td>.01</td>
</tr>
<tr>
<td>B2A1 - B4A1</td>
<td>97.40</td>
<td>.01</td>
</tr>
<tr>
<td>B3A1 - B4A1</td>
<td>93.33</td>
<td>.01</td>
</tr>
<tr>
<td>B2A2 - B1A2</td>
<td>8.33</td>
<td>.01</td>
</tr>
<tr>
<td>B2A2 - B3A2</td>
<td>19.82</td>
<td>.01</td>
</tr>
<tr>
<td>B1A2 - B4A2</td>
<td>41.07</td>
<td>.01</td>
</tr>
<tr>
<td>B2A2 - B3A2</td>
<td>28.15</td>
<td>.01</td>
</tr>
<tr>
<td>B2A2 - B4A2</td>
<td>49.40</td>
<td>.01</td>
</tr>
<tr>
<td>B3A2 - B4A2</td>
<td>21.25</td>
<td>.01</td>
</tr>
</tbody>
</table>
All of the t-ratios were significant, indicating that the total AB interaction variance was made up of equally important differences between each of the AB cells.

Within the A1 level (for the ? subjects only) the double bind subjects had the longest response latencies, significantly greater than the punished subjects B2, which in turn had significantly greater response latencies than the frustrated subjects (B4). The rewarded subjects had the lowest response latencies.

However, for the non-? subjects the pattern is quite different. Here the punished subjects had the longest times, significantly longer than the rewarded subjects, which were significantly longer than the double bind subjects, which were in turn significantly longer than the frustrated subjects'. All non-? subjects' response times are much shorter than the ? subjects'. This could be because the non-? subjects had only two buttons to choose from, whereas the ? subjects had three, and the extra times could have been taken up by their considering the possibility of pressing the ? button, while the other subjects didn't have to consider this possibility.

The trends just outlined are represented diagrammatically below.
Fig. 8 Different reaction times for each of the treatment groups.

All differences between A1 and A2 are significant.

All differences between B1, B2, B3 and B4 are significant.

The t-ratios for the main effect of C suggested that all subjects' response times decreased over the three trials, suggesting a practice effect. The t-ratios for the main effect of B revealed greater latencies for the punished subjects while the double bind and rewarded groups did not differ significantly from each other. To clarify these separate results, the experimenter decided to examine the BC interaction, even
though the obtained $F$ value did not reach the required level of significance ($F = 2.66$).

Table 16

<table>
<thead>
<tr>
<th>Interaction values of B and C</th>
<th>(Summed over both A conditions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>B2</td>
</tr>
<tr>
<td>C1</td>
<td>206.00</td>
</tr>
<tr>
<td>C2</td>
<td>118.81</td>
</tr>
<tr>
<td>C3</td>
<td>152.70</td>
</tr>
<tr>
<td></td>
<td>477.59</td>
</tr>
</tbody>
</table>

The above table gives a clearer picture of the trend of results for each BC sub-group (I did not test the significance of the differences between the sub-groups as the original $F_{bc}$ value was insignificant).

Looking along the C rows, the highest values were consistently obtained by the B2 subjects. Thus, the punished group of subjects had the greatest response times in all three trials.

Looking down the columns, all subjects had their longest latencies in the first trial, and while the B2 and B3 subjects' times decreased over the three trials, the B1 and B4 subjects' times decreased from trial 1 to 2, and then increased again in the third trial.
These differing trends come out more clearly in the following figures.

![Figure 9: Different reaction times over 3 trials.](image)

It can be seen that the punished subjects had the longest response times, and that these times decreased steadily from the first to the third trial. This suggests that these subjects could have become "accustomed" to being wrong practically all the time, and made their responses more quickly with each succeeding trial.

For the other three groups, there was an irregular downward trend in their response times. That is, the mean times on trial 3 were lower than on the first trial, but the B1 and B4 subjects
(rewarded and frustrated groups) had lower times in the second trial than they did in the third. This is quite understandable for the B1 subjects, as the second trial was a continuation of the first, and as most of them had found a solution to the first problem, the second trial was almost a re-run of their first trial.

In the third trial the B1 subjects' times increased a little, as they had to learn a new response, equal in difficulty to the first problem, but the very fact that it was a new problem meant that their response times increased slightly.

The drop in latencies for the B4 subjects can be explained in the following way. In the second trial, they learned a new concept (to respond to the Right button) and E predicted that their response latencies would increase somewhat, as it was a new problem. However, the new problem in the second trial was very simple, and once the subjects had acquired the correct response, they responded very quickly. The response to the right hand slide was fairly automatic, not requiring too much thought by the subjects, in contrast to responses to a particular type of slide, which meant that the subject had to at least look at the two slides, to see which one had the quality he was looking for. Indeed, some subjects in this group anticipated the slides, and pressed the right button before a particular pair of slides came onto the screen.

In the third trial, the B4 subjects' latencies increased
because they had to learn a new response, a discrimination response, which meant that they had to attend to both slides, with the result that their response times increased slightly.

The B3 subjects' times also decreased over the three trials. However, the difference between the first and second trials appears, from the graph, to be rather insignificant (from a mean time of 189.80 to 187.31). This result does not support hypothesis no. 3 which predicted that, as a result of making the first problem insoluble, the double bind subjects would feel frustrated, and become uncertain about their responses, and this would be reflected in the longer response times in the second trial. Indeed, there was little change in the response times, suggesting that their familiarity with the first concept to some extent overpowered any frustration they may have felt when it was no longer correct every time. (as they were still rewarded half the time they made an objectively correct response.) Perhaps if they had been punished every time they responded to an originally correct slide, there may have been an increase in their response times. When these subjects were given a new, soluble problem in the third trial, their response times decreased markedly (from an av. time of 187.31 to 119.13).

Other interaction effects, i.e. between trial number and width of choice, and the triple interaction were insignificant. (See table 12).
Summary 3 of the Mean Response Times.

Non-? subjects had significantly shorter response times than the ? subjects ($F = 47.91$) suggesting that the latter group were "confused" by the choice of three buttons, and they spent a longer time considering a response before actually making a response. The ? subjects also made fewer correct answers, which demonstrates the importance of the feedback provided by a wrong response.

The continually punished subjects had significantly greater response times than any other group of subjects, probably due to almost continually being wrong. Double bind and continually rewarded subjects were about equal in their response latencies, the former being significantly longer than the contradiction subjects. A fuller interpretation of results will be made in a later section of the report, but suffice it to say at present that the double bind condition apparently was not distinct enough from the 100% reward condition to be associated with significantly longer response latencies.

A significant AB interaction meant that the width of choice had different effects on different groups of subjects. Generally, the elimination of the ? button decreased all subjects’ response latencies because they had fewer response alternatives to choose from, which reduced the uncertainty of their responses. Reduction of uncertainty apparently was greater for the double bind subjects (shown by the sharp decline in the B3 curve in fig. 5).
The obtained t-ratios for the main effect of C (trial number) showed that all subjects' response times decreased from trial 1 to trial 2 and 3, however, examination of the BC interaction showed that this trend wasn't completely uniform. All subjects' times decreased from trial 1 to 3, B2 and B3 subjects' times decreased from trial 1 to 2 and 3, while B1 and B4 subjects' times decreased from trial 1 to 2, but increased from trial 2 to 3. This was related to the type of experimental treatment each group received in each of the three trials.

Some interpretations of these results have been made, but a more meaningful discussion will have to wait until all results are reported.
Table 17.
Number of fixations
(Summed and averaged over 10 Subjects per cell)

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Group B₁</th>
<th>Group B₂</th>
<th>Group B₃</th>
<th>Group B₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial no.</td>
<td>1, 3</td>
<td>1, 3</td>
<td>1, 3</td>
<td>1, 3</td>
</tr>
<tr>
<td>Totals</td>
<td>120, 112</td>
<td>147, 118</td>
<td>111, 106</td>
<td>114, 95</td>
</tr>
<tr>
<td>Means</td>
<td>12.0, 11.2</td>
<td>14.7, 11.8</td>
<td>11.1, 10.6</td>
<td>11.4, 9.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Subjects</th>
<th>Group B₁</th>
<th>Group B₂</th>
<th>Group B₃</th>
<th>Group B₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals</td>
<td>116, 108</td>
<td>139, 135</td>
<td>115, 130</td>
<td>100, 103</td>
</tr>
<tr>
<td>Means</td>
<td>11.6, 10.8</td>
<td>13.9, 13.5</td>
<td>11.5, 13.0</td>
<td>10.0, 10.3</td>
</tr>
<tr>
<td>Grand total</td>
<td>236, 220</td>
<td>286, 253</td>
<td>226, 236</td>
<td>214, 198</td>
</tr>
</tbody>
</table>
Table 18
Variance estimates of the number of fixations

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error (b)</td>
<td>72</td>
<td>80.25</td>
<td>1.11</td>
</tr>
<tr>
<td>A</td>
<td>1</td>
<td>3.31</td>
<td>3.31</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>208.92</td>
<td>69.64</td>
</tr>
<tr>
<td>AB interaction</td>
<td>3</td>
<td>20.76</td>
<td>6.92</td>
</tr>
<tr>
<td>Error (w)</td>
<td>72</td>
<td>1995.25</td>
<td>27.71</td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>18.91</td>
<td>18.91</td>
</tr>
<tr>
<td>AC</td>
<td>1</td>
<td>28.05</td>
<td>28.05</td>
</tr>
<tr>
<td>BC</td>
<td>3</td>
<td>23.56</td>
<td>7.85</td>
</tr>
<tr>
<td>ABC</td>
<td>3</td>
<td>9.73</td>
<td>3.24</td>
</tr>
<tr>
<td>Total</td>
<td>159</td>
<td>2388.74</td>
<td></td>
</tr>
</tbody>
</table>

Fa = 2.98 n.s.
Fb = 62.74 significant at .01 level.
Fc = 0.68 n.s.
Fab = 6.23 significant at .01 level.
Fbc = 1.01 n.s.
Bbe = 0.28 n.s.
Fabc = 0.12 n.s.
4. Total number of fixations.

Fixated responses were operationally defined as more than two successive responses to the same side, left or right, regardless of the content of the slides. If a subject chose the left or right slide continually, without attention to the content of the slides, then his behaviour was obviously not being determined by the content of the slides, and, in a sense, his response was "abnormal". Fixated responses were taken as a measure of the unadaptability of the subject's responses.

In the 3-way analysis of variance of results, factor C (number of trials) was reduced to 2. The second trial was eliminated from consideration because the B4 subjects were, in the second trial, being rewarded for stereotypy in that they were rewarded whenever they pressed the right hand button. \( F_a = 2.98 \) and was not significant. There was no significant difference between the ? and non-? subjects in their numbers of fixated responses. Thus the width of choice did not affect the number of fixated responses made by the subjects. \( F_b = 69.64 \). Significant at the .01 level, indicating that the experimental treatment factor had an important effect on the number of fixated responses made by the subjects. To obtain an indication of which of the B conditions was associated with the greatest number of fixations, individual B means were compared by a series of t-ratios.
The following table shows how the number of fixations in the B conditions varied, and the table of t-ratios tells how significant these variations are.

Table 19
Summary Table of B
Summed over all A and C.

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>120</td>
<td>147</td>
<td>111</td>
<td>114</td>
</tr>
<tr>
<td></td>
<td>116</td>
<td>139</td>
<td>115</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>112</td>
<td>118</td>
<td>106</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>108</td>
<td>135</td>
<td>130</td>
<td>103</td>
</tr>
<tr>
<td>M</td>
<td>456</td>
<td>539</td>
<td>462</td>
<td>412</td>
</tr>
<tr>
<td></td>
<td>114</td>
<td>134.75</td>
<td>113</td>
<td>103</td>
</tr>
</tbody>
</table>

Table 19a

<table>
<thead>
<tr>
<th>t-ratios for the main effect of B.</th>
<th>t-ratios</th>
<th>values</th>
<th>significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2 - B1</td>
<td></td>
<td>84.38</td>
<td>.01</td>
</tr>
<tr>
<td>B1 - B3</td>
<td></td>
<td>4.17</td>
<td>.05*</td>
</tr>
<tr>
<td>B1 - B4</td>
<td></td>
<td>45.83</td>
<td>.01</td>
</tr>
<tr>
<td>B2 - B3</td>
<td></td>
<td>88.54</td>
<td>.01</td>
</tr>
<tr>
<td>B2 - B4</td>
<td></td>
<td>132.29</td>
<td>.01</td>
</tr>
<tr>
<td>B3 - B4</td>
<td></td>
<td>41.67</td>
<td>.01</td>
</tr>
</tbody>
</table>

* not significant
Tables 21 and 21a reveal that the punished subjects had the greatest number of fixated responses, being significantly greater than all other groups of subjects. The double bind and rewarded groups, according to Table 21a, are not significantly different in the number of fixated responses they made. The frustrated subjects had the lowest number of fixations. These results suggest that the method B2 subjects used to deal with continual frustration was to choose the same button time after time, even though they knew it would be wrong.

That the B3 subjects had the same number of fixated responses as the B1 subjects is perhaps not surprising when one considers that in the first and third trials (the only two trials considered) they were working on the soluble problem, and hence a fixated response had no value for them in this situation. According to hypothesis no. 6 the double bind subjects would be expected to have the greatest number of fixations in the third trial. An examination of the main effects of C and of the BC interaction will indicate whether or not hypothesis no. 6 holds up. The present t-ratios for the main effect of B indicated that of all groups of subjects, taken over the experiment as a whole, the B2 subjects made the greatest number of fixated responses. $F_B = 0.68$ which is not significant, indicating that there were no significant differences between the first and third trials in the number of fixations made by all subjects. The total number of fixated responses for the first trial = 962, while for the third trial it
was 902. Thus, all subjects made an equal number of fixated responses in the first and third trials. The Fbc interaction also was not significant. Table 19 shows a slight increase in the number of fixations from trial 1 to 3, but this was very small. This, together with the insignificant Fe value, does not support hypothesis no. 6 which predicted that the double bind subjects would have the greatest number of fixations of all subjects in the third trial. The third trial was not accompanied by any significant increase in the number of fixations, and the double bind subjects did not differ significantly from the rewarded subjects in the number of fixations. Hence, hypothesis no. 6 must be rejected.

$F_{bc} = 6.23$, significant at the .01 level, indicating that the width of choice (factor A) affected differently the different experimental groups of subjects. To discover the direction of these specific effects, the AB means were subjected to analysis by t-tests.

Table 20
Interaction of A and B factors
(Summed over both S conditions)

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>116</td>
<td>132.5</td>
<td>108.5</td>
<td>104.5</td>
</tr>
<tr>
<td>A2</td>
<td>112</td>
<td>137</td>
<td>122.5</td>
<td>101.5</td>
</tr>
</tbody>
</table>
From the above table it can be seen that the punished subjects had the greatest number of fixations (some of these fixations included the continual choosing of the ? button). The next greatest number of fixations occurred for the same treatment group in the non-? condition. The next highest number of fixations occurred in the double-bind non-? group, while the double-bind ? subjects had a fairly low level of fixated responses.

Such a difference is rather hard to explain. It appears that these subjects did not feel frustrated enough by the experimental treatment to stop trying to find the correct answer, i.e. by pressing the same button without considering the content of the slides.

Table 20 a

<table>
<thead>
<tr>
<th>t-ratios</th>
<th>value</th>
<th>significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1B1 - A2B1</td>
<td>4.0</td>
<td>.01</td>
</tr>
<tr>
<td>A2B2 - A1B2</td>
<td>4.5</td>
<td>.01</td>
</tr>
<tr>
<td>A2B3 - A1B3</td>
<td>14.0</td>
<td>.01</td>
</tr>
<tr>
<td>A1B4 - A2B4</td>
<td>3.0</td>
<td>.01</td>
</tr>
</tbody>
</table>

Thus each pair of ? and non-? means differ significantly within each of the experimental conditions, in spite of the fact that the Fa value was not significant. This means that the width of choice by itself did not have any significant relation with the number of fixations, but, when associated with certain
experimental groups, (especially B3) it did start to have an
important influence on the number of fixations.

Table 20

Simple effect of B at a given level of A.

<table>
<thead>
<tr>
<th>t-ratio</th>
<th>value</th>
<th>significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A1B2 - A2B1 )</td>
<td>16.5</td>
<td>.01</td>
</tr>
<tr>
<td>( A1B1 - A1B3 )</td>
<td>5.5</td>
<td>.01</td>
</tr>
<tr>
<td>( A1B1 - A1B4 )</td>
<td>11.5</td>
<td>.01</td>
</tr>
<tr>
<td>( A1B2 - A1B3 )</td>
<td>24.00</td>
<td>.01</td>
</tr>
<tr>
<td>( A1B2 - A1B4 )</td>
<td>28.00</td>
<td>.01</td>
</tr>
<tr>
<td>( A1B3 - A1B4 )</td>
<td>4.00</td>
<td>.01</td>
</tr>
<tr>
<td>( A2B2 - A2B1 )</td>
<td>15.00</td>
<td>.01</td>
</tr>
<tr>
<td>( A2B3 - A2B1 )</td>
<td>10.5</td>
<td>.01</td>
</tr>
<tr>
<td>( A2B1 - A2B4 )</td>
<td>10.5</td>
<td>.01</td>
</tr>
<tr>
<td>( A2B2 - A2B3 )</td>
<td>14.5</td>
<td>.01</td>
</tr>
<tr>
<td>( A2B2 - A2B4 )</td>
<td>35.5</td>
<td>.01</td>
</tr>
<tr>
<td>( A2B3 - A2B4 )</td>
<td>21.00</td>
<td>.01</td>
</tr>
</tbody>
</table>

The above table shows that all treatment means differ
significantly within each of the two A levels.

The trends described above are represented in the
following graph.
At A1, the level of fixated responses was highest for the B2 subjects, with B4 subjects having the lowest number. (All of these differences were significant.) At the A2 point (i.e., non-? subjects) the B2 subjects still had the highest incidence of fixated responses, significantly more than any other experimental group. However, the number of fixated responses made by the B3 subjects increased significantly ($t = 14.50$) but this figure was still significantly smaller than the number of fixations of the B2 subjects ($t = 14.50$).

An interesting trend brought out by the above figure is that the number of fixations increased for the B2 and B3 subjects.
from A1 to A2, whereas the number of fixations for B1 and B4 subjects decreased (from 116 to 112 and from 104.5 to 101.5 respectively.) One could speculate, on the basis of these results, that the subjects who experience some kind of frustration (the double bind or punished groups) will have fewer fixated responses if they have three choices open to them (L, R, or ?). Because, if they are doubtful about a response, they would press the ? button. But when the ? button is not available, these subjects' frustration would manifest itself in an increase in the number of fixated responses.

The opposite effect occurred for the B1 and B4 subjects. Apparently, their fixated responses were greater when they had a choice of three buttons. (This may have "confused" the B1 and B4 subjects, leading to an increase in stereotypy).

But, when their choice was reduced from three to two, the number of fixations dropped significantly. B1 and B4 subjects had an easy problem to solve and performed quite efficiently, so when the ? button was eliminated, their performance improved.

Neither the Fac, Fbc, nor the Fabc values were significant.

Summary 4. for the total number of fixations.

A table of the number of fixations for each subject was devised as a measure of the "abnormality" of the subjects' results. It was hoped that there would be some link between the number of fixations and the amount of frustration each subject experienced (according to the experimental treatment
The ? subjects and the non-? subjects did not differ significantly in the number of fixated responses they made.

The punished subjects had the largest number of fixations, significantly different from all other subjects and it was suggested that this was their method of dealing with the unpleasant choice situation, where they were forced to try to solve an insoluble problem. The double bind subjects did not differ significantly from the rewarded subjects in the number of fixations they had. \( Fe = 0.68 \), indicating that the trial number had no significant relation to the number of fixations.

The interaction between the trial number and the experimental group was insignificant also, causing \( E \) to discard hypothesis no. 6, and it was suggested that the "frustration" experienced by the B3 subjects in the second trial apparently was not frustrating enough to produce an increase in the number of fixations in the third trial.

There was a significant \( \Delta B \) interaction, which meant that the width of choice (i.e. three or two response buttons) had a significant relationship with each of the four experimental groups (B1, B2, B3, B4). This occurred in spite of the fact that the main effect of \( \Delta \) was not significant. This means that width of choice alone did not have any significant effect on the number of fixations but, when associated with certain experimental groups (especially B3) it did start to have an important influence on subjects' fixation levels.
5. Total number of ? responses.

The experimenter counted the number of times that half the subjects pressed the ? button. (As only half had a ? button.) Through this, E hoped to get a measure of each subject's indecisiveness in making a choice between two slides. However, the ? button was pressed only 58 times, so the results weren't analysed statistically.

The following summary table and graph do, however, show some interesting trends in the results with the changes in the trials.

Table 21

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>4</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>11</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

(Totalled over 10 subjects per cell.)

The greatest number of ? responses were made by the double bind subjects in the first trial. The frustrated subjects also made a large number of these responses, but for all subjects except the double bind subjects, the number of ? responses was quite low in the second trial. This is clarified by the following graph.
Although the figures weren't large enough to warrant statistical analysis, a few interpretive comments at this point may be useful.

From the graph it can be seen that, generally, the B3 subjects pressed the ? button most often, and the B1 subjects least of all. All groups were least certain of their responses in the first trial, but the degree of uncertainty was relatively greater for the B3 and B4 subjects. In the second trial the number of ? responses dropped sharply for the B4 subjects and decreased again in the third trial. The B1 and B2 subjects, however, slightly decreased their number of ? responses in the second trial. In the third trial the number of ? responses then increased again for the B1.
subjects (as they were given a new problem to solve) but decreased slightly for the B2 subjects (although the problem was a new one, it was still insoluble, like the problem in the first and second trial.)

The B3 subjects' number of ? responses remained about the same for the first two trials. This can be attributed to the fact that the same problem was made insoluble in the second trial, and the subjects became less certain of the correctness of the original response, and this uncertainty was reflected in the high level of ? responses.

From the data presented above it appears that the double bind subjects were the least sure of their responses and that this uncertainty remained at a fairly high level for the first two trials, whereas for the other groups of subjects the number of ? responses either dropped from a high to a low level in the second trial (e.g. B4) or stayed at a low level (B1 and B2).

Results with the number of ? responses become more intelligible when they are considered in conjunction with the next set of results, i.e. with the total number of subjects who formed and tested a correct hypothesis.

6. Total number of subjects who verbally stated half the correct hypothesis in the first half of the trial.

These figures were collected to give a rough estimate of each
subject's efficiency in solving each problem. The rationale was that the more efficient subjects would find the correct solution quicker than the less efficient ones, hence, only the first half of each trial was considered. Again, the figures weren't large enough to warrant statistical analysis, and so a summary table was drawn up, together with a graph, which has some interesting features, if compared with fig. 11.

Table 22.
Total number of subjects who formed a correct hypothesis in the first half of the trial.

<table>
<thead>
<tr>
<th></th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>T</td>
<td>8</td>
<td>4</td>
<td>9</td>
<td>7</td>
<td>28</td>
</tr>
</tbody>
</table>

Looking along the rows, it seems that in the first trial more subjects formed a partly correct hypothesis. Looking across the columns, more group B3 subjects seemed to have formed a correct hypothesis although their number of correct hypothesis wasn't significantly different from the totals of B1 and B4 subjects.

From these figures, the following graph was obtained.
Fig. 12  Number of correct hypotheses obtained in each trial.

The graph shows that the number of correct hypotheses formed by the B1 and B2 subjects rose during the second trial and dropped in the third. The opposite trend occurred with B3 and B4 curves.

Although there was no specific hypothesis relating to the number of subjects forming correct hypotheses, the general prediction was that these subjects would exhibit a decline in the overall efficiency of performance in the second trial, and that in the third trial their efficiency would remain about the same or increase only slightly. This general prediction was to some extent supported by the results of B3 and B4 subjects as
shown by fig. 12. In the second trial, fewer subjects in both
groups formed fewer correct hypotheses. In the third trial,
the number of correct hypotheses formed by B4 subjects stayed
at the same low level, while this number increased for B3 subjects.
However, this increase was small, from two to three subjects.

As fewer B4 than B3 subjects formed correct hypotheses in the
second and third trials, it seems that a change from one soluble
problem to another, even a simple one (in the case of B4 subjects)
proved slightly more difficult and frustrating than a change
from a solution-present situation to a no-solution situation
in the same problem (for B3 subjects.)

The B1 and B2 subjects produced their greatest number of
correct hypotheses in the second trial, presumably because for
both subjects, the second trial was a continuation of the first.
For the B1 subjects, the problem was still soluble in the
second trial, and these subjects reached a high level of
efficiency then. For the B2 subjects, the problem remained
insoluble, but they worked out some kind of pattern in the
series of slides, a pattern which operated at least part of
the time, hence their efficiency level increased in the second
trial. Note that the B2 curve is always lower than the B1 curve.

Summary 5. Total number of times the ? button was pressed
plus the total number of subjects forming a correct
hypothesis.

A general index of each group of subjects' efficiency of
problem solving was obtained by examination of two complementary measures.

a. The total number of times the button was pressed (the more often it was pressed, the more indecisive the subject and hence, the less efficient he was.)

b. The number of subjects forming a correct hypothesis in the first half of each trial. (These subjects were considered the more efficient subjects.)

Examination of figs. 11 and 12 revealed that the B1 and B2 subjects manifested greater uncertainty in the first and third trials, when they were given new problems to solve, while the B3 and B4 subjects were least efficient in the second trial. It was suggested that this resulted from the disconfirmation or frustration experienced by these subjects in the second trial, whereas B1 and B2 subjects continued with the same problem in the second trial, and became more familiar with it, and hence, more efficient and sure of their performance.

Each subject was required to fill in a 50 item M.A.S. questionnaire. Taylor's scoring procedure was followed, with the assignment of a score of 1 to each "anxiety" item answered "yes" by each subject. Each subject's scores were added to obtain an anxiety total score, and these anxiety scores were correlated with three different indices of efficiency of performance.

These three scores were: total number of correct answers, mean response times and total number of fixated responses, summed and averaged for each subject over his three trials.

Hypotheses no. 20, 21, 22, predicted a negative correlation between each subject's anxiety score on the M.A.S. and his general efficiency of performance in the problem solving situation. More specific predictions concerning the particular measures of efficiency of performance are discussed individually.

1. The first prediction was that H.A. subjects (determined by high M.A.S. scores) would make fewer correct responses. It was predicted that the high anxiety of some subjects would be detrimental to their performance, and would be reflected in a greater number of errors.

Pearson r. for the correlation between the total number of

---
9 The method used is described in Guilford. 1956, p. 139.
10 A definition of fixated responses has been given earlier in the report.
correct responses and anxiety score = -.0986 which was not significant.\footnote{To be significant at the .01 level, all correlation coefficients had to exceed ±0.112. For an explanation of the derivation of this significance level, see Guilford. 1956, p. 180.} Thus, there was an almost negligible tendency for the H.A. subjects to make fewer correct responses than the L.A. subjects. This led to the rejection of hypothesis no. 20.

2. The second prediction was that there would be a positive correlation between a subject's M.A.S. scores and his mean response times. It was predicted that the high anxiety of some subjects would lead to an increased latency of responding because of their uncertainty in choosing one out of each pair of slides. However, the obtained correlation of +.072, while in the predicted direction, was not significant. This led to the rejection of hypothesis no. 21.

3. The third prediction was that the M.A.S. scores and the fixation scores would be significantly positively related. That is, the combination of a large amount of anxiety and the uncertainty of the choice situation would be associated with a large amount of maladaptive responses in the form of fixations. (i.e. more than two successive responses to the same button.) However, the obtained correlation coefficient of +.046 was not significant. The relationship between the number of fixations and the M.A.S. was in the predicted direction, but the relationship was not strong enough to lead to the acceptance of hypothesis no. 22.
Summary of the M.A.S. results.

It was predicted that highly anxious subjects (whose high anxiety level would be reflected in high M.A.S. scores) would perform less well in the experiment as a whole because their anxiety level would disrupt their performance. Three specific scores were combined to give an indication of the general level. These were, total number of correct responses, mean response times, and the total number of fixations. A negative correlation between M.A.S. scores and the total number of correct responses was predicted, but the obtained correlation coefficient, although in the predicted direction, was not significant. A positive correlation between the mean response times and the M.A.S. scores and between total number of fixations and M.A.S. scores was predicted, and again, although the obtained correlations were in the predicted direction, the values were not statistically significant.

In view of the insignificant correlations obtained, it must be concluded that, for the present sample of subjects, there was no significant relation between anxiety level (as measured by the M.A.S.) and efficiency of performance.
8. Results obtained from the three "Level of Aspiration" questionnaires.

All subjects were required to answer three "level of aspiration" questionnaires designed to obtain qualitative data on subjects' attitudes toward the problems, their feelings when they were punished, and how these feelings changed from trial to trial.

Most questions appeared in two or more of the three questionnaires, and others which appeared in the last questionnaire only, referred back to the previous trials e.g. "Which was the easiest of the three trials?" In this way it was hoped to measure different groups of subjects' changing appraisal of their performance and their changing feelings of discouragement or annoyance over the three trials.12

The types of questions asked in the questionnaires related to three broad areas. The first was concerned with each subject's feelings of satisfaction with his performance.

One of these questions asked whether subjects thought the problem was hard. From the following table it can be seen that the majority of subjects agreed. Subjects did not seem to distinguish between each of the three trials in difficulty level.

12 Complete copies of each questionnaire are given in the appendix. Attempts were made, wherever possible, to quantify the results. ? subjects' and non-? subjects' results were combined after a chi-square showed that these two classes of subjects did not differ in their responses to questionnaires.
Table 23.

Number of subjects rating the problem hard

<table>
<thead>
<tr>
<th>Trial</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13</td>
<td>20</td>
<td>12</td>
<td>13</td>
<td>58</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>20</td>
<td>19</td>
<td>12</td>
<td>62</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
<td>20</td>
<td>19</td>
<td>17</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>60</td>
<td>50</td>
<td>42</td>
<td>194</td>
</tr>
</tbody>
</table>

The chi-square value for the departure of the obtained values from a chance distribution = 1.71 and was not significant.

Hence, none of the groups differed from one another in subjective rating of the difficulty of the problems. Also, their rating did not change from trial to trial. All subjects thought the three problems were difficult. This result probably reflects more on the objective difficulty of the problem as such, rather than subjects' subjective rating of the difficulty.

Another question asked subjects whether they were dissatisfied with their performance during each of the three trials.

Table 24

Number of subjects (out of 20) who were dissatisfied with their performance.

<table>
<thead>
<tr>
<th>Trial</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>19</td>
<td>9</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>18</td>
<td>20</td>
<td>14</td>
<td>57</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>18</td>
<td>7</td>
<td>9</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>55</td>
<td>26</td>
<td>22</td>
<td>143</td>
</tr>
</tbody>
</table>
The above table reveals that expressed dissatisfaction with performance increased for B3 and B4 subjects in the second trial, most markedly for B3 subjects. This can be related to the frustration experienced in the second trial, when, for the B3 subjects, the first problem became insoluble, and the B4 subjects were given a new, but soluble problem. This result supports, to some extent, hypotheses concerning quantitative results which predicted that B3 and B4 subjects' performance would fall in the second trial, with a corresponding increase in feelings of frustration and dissatisfaction. The fact that an increase in dissatisfied feelings was greater when the problem became insoluble than when a new, soluble problem was introduced supports the hypothesis that the special type of frustration that occurred with the double bind was more extreme in its effects on subjects' behaviour than the usual type of frustration experienced by the B4 subjects.

Changes in feelings of dissatisfaction come out more clearly in the following figure.
Subjects were asked two questions aimed at measuring possible changes in their satisfaction with their performance from trial to trial. One of the questions asked was, "How well do you think you will perform on the next trial?" If subjects said they would perform better next time, it was taken to indicate some kind of dissatisfaction with their present performance and a desire to improve. It was found that 50% of subjects said that they would perform better, while the remainder said their performance would remain the same in the next trial. There were no differences between any group of subjects in this respect.
The next question asked, "Do you think you could have done better than you did?" The following table and graph illustrate differences in the way different groups of subjects answered this question.

Table 25

Number of subjects (out of 20) who said they could have performed better

<table>
<thead>
<tr>
<th>Trial</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
<td>6</td>
<td>10</td>
<td>11</td>
<td>41</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>7</td>
<td>13</td>
<td>16</td>
<td>47</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>6</td>
<td>10</td>
<td>12</td>
<td>43</td>
</tr>
<tr>
<td>T</td>
<td>40</td>
<td>19</td>
<td>33</td>
<td>39</td>
<td>131</td>
</tr>
</tbody>
</table>

Fig. 14 Number of subjects who "could have done better".
The graph shows that in the second trial, more B2, B3 and B4 subjects thought they could have performed better than they did. For B3 and B4 subjects this change was larger, and was most likely to be due to a change in problem in the second trial, causing a drop in their efficiency and accompanied by increased dissatisfaction with their performance (see fig. 13).

For B2 subjects there was a slight increase in the number of subjects thinking that they should have done better, but this increase was not as large as for B3 and B4 subjects. Also, number of subjects answering "yes" was much smaller overall. When asked why they felt they couldn't do much better, group B2 subjects tended to think that they were either "too dumb" or that the problem was too difficult for them, and some doubted that there was a solution to the problem. It seems that, as a result of continuous frustration, B2 subjects lost confidence in their ability to perform well on the problem. In the second trial B3 subjects felt that after the experience gained in the first trial they should have performed well in the second, and were dissatisfied when their performance deteriorated. B4 subjects' felt dissatisfied mainly because they were too slow to discover the new concept in the second trial.

The answers of the B1 subjects went in the opposite direction. After the second trial fewer said they could have performed any better, because in the second trial, many were getting nearly perfect scores, and felt that they couldn't do any better.
However, these changes in subjects' satisfaction with their performance did not prove to be significant when analysed by the chi-square method.

Another question asked subjects to give an estimate of how they performed relative to other subjects. The aim was to see if subjects felt their performance was inferior to that of other subjects, and if these feelings of inferiority changed as a result of the frustration experienced in different trials.

The question asked was, "Although you haven't been able to compare your results with those of other subjects, how do you think your performance on the previous trial might compare with theirs?" Subjects could respond: "the same, better, or worse than" other subjects.

The following table shows that different groups of subjects did answer this question differently, and that there was a large change in the perceived efficiency of performance by the double bind subjects in the second trial.

<table>
<thead>
<tr>
<th>Trial</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>11</td>
<td>5</td>
<td>4</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>8</td>
<td>14</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>11</td>
<td>5</td>
<td>6</td>
<td>35</td>
</tr>
<tr>
<td>T</td>
<td>8</td>
<td>30</td>
<td>24</td>
<td>16</td>
<td>79</td>
</tr>
</tbody>
</table>
The values in the present table reveal a slight increase in unfavourable self-ratings for the double bind subjects in the second trial, and a decrease in these unfavourable ratings on the part of the punished group (See fig. 15). However, the chi-square value of 7.03 with 6 df. was not significant at .01 probability level, thus there was no significant association between trial number and group type in the number of unsatisfactory self-ratings subjects made.

Fig. 15  Number of subjects who performed worse than others.
The graph reveals some interesting trends, in that the peak of unfavourable self-ratings for both B3 and B4 subjects occurred in the second trial, whereas for the B1 and B2 subjects it represented the trial where the lowest number of unfavourable self-ratings were made.

The graph and table represent the number of times subjects said they performed worse than other subjects on the same problem. Fig. 15 shows that double bind subjects' self-rating declined sharply in the second trial, when the problem they were working on was made insoluble. In the third trial, when they were given a new, soluble, problem, their self rating improved considerably. A similar trend occurred with the contradiction subjects, whose self rating declined a little in the second trial, when they were given a new problem to solve, and it remained at the same level after the third trial also.

B2 and B1 subjects' self rating improved in the second trial, as both were continuing with the first problem. Note, however, that the self rating of B1 subjects is considerably better than that of the B2 subjects, as a result of the greater amount of punishment the latter received, ostensibly for making a wrong response.

Looking at subjects' general satisfaction with their performance during each trial, double bind subjects seem to have changed most from trial to trial. Figs. 13 and 14 show that they were reasonably satisfied with their performance in the first trial, became much less
satisfied after the second trial, and then more satisfied again in the third trial. Contradiction subjects' results followed the same pattern, but the changes weren't as marked for them. B1 and B2 subjects changed their self ratings in the opposite direction. They seemed to become slightly more satisfied with their performance in the second trial, because of their familiarity with the problem, which was continued from the first trial. This is true even of the B2 subjects who, although still receiving large amounts of punishment for being "wrong", somehow managed to perform a little better in the second trial, without becoming too discouraged. Their self rating was, however, significantly lower than the self ratings of B1 subjects.

Another group of questions appearing in two or three of the questionnaires were designed to tap subjects' feelings of discouragement, annoyance etc. in response to the treatment received during each of the three trials. Specific questions asked: "Did you become [ ] uneasy

Discouraged when punished for a wrong response?

[ ] anxious

46% of all subjects reported feeling "mildly" anxious when wrong, 59% felt discouraged and 51% uneasy. There was a tendency for reported feelings of discouragement, anxiety and annoyance to increase from the first to second trial for the B2 and B3 subjects, and for these ratings to remain the same or to decline slightly
for the B1 and B4 subjects. These trends are shown in the following figure.

Fig. 16 Number of feelings of anxiety, discouragement and annoyance reported by subjects in each trial.
However, none of the chi-square values for these self ratings were statistically significant.

The lack of differentiation between groups of subjects and between the two trials in responses to these three questions could have been due partly to the wording of the questions. They asked, "Did you become annoyed... etc. when punished for a wrong response?" When subjects answered this question they probably remembered the occasions on which they were punished, and hence the frequency of punishment would have had relatively little influence on the answer to these questions.

When it came to giving reasons for their anxiety or annoyance, all subjects said that they became annoyed because they were wrong, rather than as a result of the shock. Very few subjects found the shock painful, and this did not influence their reactions to the problem solving situation. Also, when subjects were asked if they felt like giving up after being wrong, very few answered positively. Practically all subjects reported that the experience of being wrong made them try harder. Subjects found being wrong a challenge, making them concentrate more on the problem, trying to remember previous slides better, e.g. one subject wrote, "Enjoyed the first sequence, became more frustrated in the second but took more care over answers, and enjoyed the third trial, while still taking more care." Another subject said after the second trial, "I became rather puzzled as to what the correct features were, and rather curious, also I
became rather frustrated." These two answers indicate the general tone of subjects' changing feelings during the experiment. Whenever they were wrong, they felt somewhat frustrated and dissatisfied and these feelings spurred them into wanting to try harder to find out the correct concept, for the satisfaction of being correct, rather than to avoid shock.

The third major grouping of questions was concerned with subjects' feelings of indecisiveness during the experiment.

All subjects were asked if they followed a plan in choosing their slides throughout the three trials. The majority of subjects replied yes, but there were some slight, but interesting differences between the four groups in the way they responded. 7% of the B1 subjects (out of a total of 20) did not follow a definite hypothesis, nor did 25% of the B3 subjects. 50% of B2 subjects and 14% of the B4 subjects did not have a definite plan. Most B2 subjects were wrong so often that they resorted to guessing early in the experiment. A number of these subjects complained that even their guesses were unsuccessful.

A similar pattern emerged from subjects' responses to the question asking, "Did you get the correct answer without knowing why?" 70% of the B2 subjects agreed, while only 35% of the B1 subjects and 42% of both B3 and B4 subjects answered in the same way. The following graph illustrates the important differences between each group and shows a large increase in uncertainty on the part of the B3 subjects in the second trial, most probably
as a direct result of the change from a soluble to an insoluble problem.

Fig. 17  Number of subjects who didn't know why they were correct.

When subjects were asked if they were aware of a change in the nature of the problem, B3 and B4 subjects replied "yes" most often, (50% and 65% respectively). Just under half the B1 subjects replied yes, while only 20% of the B2 subjects reported being aware of a change. Thus, even when the B2 subjects had a new problem to solve in the third trial, the large amount of punishment they had received in the past and again in the third trial apparently prevented them from detecting any differences.
among them.

In conjunction with the previous question, all groups reported changing their method of tackling the problem during each trial. Even in the B2 group, over 50% of the subjects changed their approach, in spite of the fact that many of them did not think the problem changed. This indicates that they tried a number of different approaches to the problem, in an effort to find a correct answer, and because they were unsuccessful, the problem remained insoluble, thus accounting for the large number who reported changing their approach, even though the problem itself did not change. 88% of the B4 subjects changed their method. This is quite understandable in view of the dramatic change in the problem from trial to trial. 68% of the B3 subjects changed their approach, and these subjects indicated that much of this change occurred during the second trial, when the original problem became insoluble.

From this general evidence on subjects' feelings of indecisiveness and confidence in the problem solving situation, it appears that the punished subjects saw themselves as rather unintelligent in not being able to get many correct answers, but as trying many different plans to solve a problem which remained essentially the same, and when they were correct, they didn't really know why. B3 and B4 subjects fluctuated in confidence in their performance. They felt least confident during the second trial, when the problem became insoluble.
This was accompanied by increased feelings of discouragement, as reported earlier. B4 subjects' results showed similar trends, but changes weren't as marked as for the B3 subjects. B2 subjects appeared least confident of all groups about their performance as a result of the large amount of punishment they received.

Each subject was asked to indicate which one of the three trials was the easiest and in which one of the three trials he performed best. There was very little difference between the way both questions were answered, i.e. subjects saw their "best" performance occurring on the "easiest" trial, so only one set of results will be discussed.

<table>
<thead>
<tr>
<th>Trial</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>14</td>
<td>11</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>9</td>
<td>0</td>
<td>7</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>16</td>
<td>9</td>
<td>6</td>
<td>36</td>
</tr>
<tr>
<td>T</td>
<td>19</td>
<td>39</td>
<td>20</td>
<td>21</td>
<td>99</td>
</tr>
</tbody>
</table>

Chi square = 23.37  6 df, prob. < .01.

This test revealed a significant association between group type and trial number in subjective ratings of the "easiest trial".

From the table two different trends can be seen to occur, B2 and B3 subjects marked the second trial least often, in fact, no B3 subjects at all said that the second trial was the easiest.
The B2 curve is higher than any other because most subjects said that the three trials were equally hard, hence each response was scored three times, once in each category. There was a small decline in the number of B2 subjects checking the second trial, indicating that they found the first and third trials a little less difficult and frustrating.

The results went in the opposite direction for the B1 and B4 subjects. B1 rated the second trial the easiest as it was a continuation of the first problem, and by the second trial they were becoming quite efficient and achieving nearly perfect scores. The B4 subjects checked the first trial most often, although the differences between the number of subjects favouring each trial were slight. The present results add support to the figures reporting on subjects' dissatisfaction with their performance (figs. 13 - 17).

Fig. 18 Subjects' rating of the "easiest trial".
Summary of subjects' responses to the three questionnaires.

Some consistent patterns emerged from subjects' responses to the three questionnaires. Generally, B2 subjects were least satisfied with their performance throughout the whole experiment, and B1 subjects were most satisfied, as they obtained a large number of correct answers. The attitude of B3 and B4 subjects toward the problem changed quite markedly throughout. For instance, they were quite satisfied with their performance in the first and third trials, but during the frustration they experienced in the second trial, both groups reported feeling more dissatisfied with their performance, accompanied by a desire to improve in the next trial. They also became less sure of the quality of their performance in the second trial, as was shown in fig. 15. B1 subjects, who were rewarded whenever they were correct, reported feelings of confidence and satisfaction throughout their whole performance and many rated the second trial as the easiest of the three.

There were no differences between subjects in how anxious or discouraged they felt when punished. This is probably because most of the subjects had fairly low anxiety levels (as measured by the M.A.S.) and also, the question stressed the point, "How anxious, etc. did you feel when punished for a wrong response?" which ignored the amount of punishment received by each subject.

During each experimental session subjects' spontaneous comments
were recorded on tape to provide insight into subjects' feelings about the problems they were required to solve.

Examination of the transcripts revealed that most of the spontaneous comments made by subjects were neutral in content, concerned with the problem itself and with the hypotheses subjects were testing, e.g. "I think it's the one with the greatest number of objects in the middle," or, "Actually, I can't see the difference between this concept and the last one, are they different? Actually I thought it changed in the second one, too."

Some subjects didn't make any comments at all, until asked by the experimenter. Many subjects in the B2, B3 and B4 groups made what could be called "frustration-type comments" but most of these were made jokingly, accompanied by laughter e.g. a B2 subject in the second trial said, "Every time I start an hypothesis, I get smashed out. (laughs) I am supposed to be pressing what's right, aren't I?"

Another B2 subject, after a consistent number of wrong responses said, in the third trial, "Come on pattern emerge! (when she was wrong she said) Well, at least I'm consistent." (laughs)

Some B2 subjects did express anger when wrong, but this seemed to depend on the individual, as only a small number made angry comments all the way through whereas many subjects never did. For example, one B2 subject, after many shocks, started to mutter to himself, "Doing well, aren't I? (wrong) Blast!....Oh! you
would, spoils things, eh!" and "That's not fair!"

B2 subjects were wrong most of the time, which meant they were getting large amounts of shock. Some subjects said the usual things like, "Ouch!" after shock, and some just laughed. Others made comments like, "Got it that time!" No subject thought the shock was too severe, and practically all said that they became annoyed at themselves for being wrong, rather than at the shock.

Some B2 subjects, instead of becoming annoyed, started to express feelings of inferiority. e.g. "I'm at the give up stage! (Laugha) Mm, I'm tired of myself, I've got to the stage now where I've... mm, I can't think of anything I haven't tried." Or else, "I must be dim or something, I can't see a pattern yet".

Another B2 subject, asked whether she was testing an hypothesis said, "No, I think I'm a dismal failure." This type of comment occurred quite frequently in this group of subjects, especially in the second trial when they had been working on the same problem for 2 trials without any signs of improvement.

Another type of reaction to being wrong consisted of the subject's doubting whether there was, in fact, any solution to be obtained. Not many subjects felt this, and all who did were in the B2 group. e.g. one subject said, "Oh, I haven't got two right so far out of a fifty-fifty chance, I'm beginning to wonder about this hypothesis. If I get two rights in a row, I'll change that ideal" Later he said, "Who's testing who, you or me?" When
this skeptical subject was asked about his hypothesis at the end of the experiment he laughed and said, "I've got a hypothesis, that you're shocking me to see if I respond in any particular fashion to not being successful."

Groups B3 and B4 subjects on the whole made fewer of these frustration-instigated comments, except in the second trial, when for the B3 group, the original problem became insoluble, and B4 subjects had a new problem to solve. However, the types of comments made by these subjects in the second trial expressed puzzlement more than anger or depression.

When a B3 subject was asked whether she was following an hypothesis at the end of the second trial said, "No, I'm not any more. I'm not following anything at the moment...I'm still trying to work out another one...I've scrapped the other one (laughs) I didn't really have a hypothesis there! Everything I thought of (laughs) every time another slide came along, it turned out to be something different! (laughs) not any idea, really."

Or, "I was ending up there feeling brainwashed or something, one would just seem correct, I don't know."

B4 subjects also exhibited this puzzlement during the second trial, although some eventually realised that they were being rewarded whenever the right button was pressed. e.g. "Seems silly, but they all seem to be on the right hand side...I expect that to come to a sticky end too!"
This brief discussion of each group of subjects' protocols revealed some interesting differences between them. Most of the spontaneous and elicited comments were simply concerned with the task e.g. stating hypotheses, asking for confirmation of whether their choice was correct or incorrect, and so on. However, many of the comments made by the B2 subjects could be said to be frustration-instigated, as they revealed feelings of inferiority, anger or skepticism about the problem. B3 and B4 subjects on the whole made fewer of these types of comments and the comments they did make seemed to express bewilderment in the second trial, when the correct concept changed without warning.

The illustrative comments cited above add support to the interpretations made concerning the questionnaire data. The conclusion reached there was that B1 and B2 subjects didn't change much in their opinion of the problem and of their performance, the B1 subjects being quite satisfied with their performance over all three trials, and B2 subjects reporting extreme dissatisfaction with their performance. B2 subjects' dissatisfaction with their performance is obvious in some examples of annoyed or sarcastic comments they made, especially during the second trial.

Questionnaire data suggested that B3 and B4 subjects' opinion of the problem changed quite markedly from trial to trial. In the first and third trials, they felt that although the problem
was difficult, they performed quite well and were reasonably satisfied with their performance. However, in the second trial, when the problem changed and they made a greater number of errors, they became increasingly dissatisfied with their performance, and this was manifested in the puzzled types of comments they made. This tendency was most marked in the B3 subjects, as indicated by figs. 13 - 18.

These two sets of data support the prediction that double bind subjects will feel more frustrated in the second trial than the contradiction subjects. This evidence adds support to the hypothesis that the double bind type of frustration is more frustrating than the ordinary type experienced by the contradiction subjects.
Summary of results and conclusions

In the previous chapter, individual sets of results were discussed separately and some conclusions were reached concerning their significance. Now, the obtained results will be applied to the specific hypotheses that the present experiment was designed to test, and finally, all relevant evidence will be drawn together and discussed in relation to Bateson's double bind hypothesis.

The first two hypotheses were concerned with the effects of different intensities of frustration on the number of correct answers subjects obtained, and predicted that double bind and contradiction subjects would show a significant increase in the number of errors in the second trial, as a result of the frustration experienced then, and that these errors would remain at a high level in the third trial. The double bind subjects were expected to have a greater number wrong than the contradiction subjects, as frustration was expected to be more severe for them (see p. 24).

These hypotheses essentially involved a test of the BC interaction effect (i.e. the interaction between group type and trial number.) Indirect evidence relevant to these hypotheses was also provided by the Fb and Fc values.

The Fb value of 27.55 indicated significant differences between each treatment group in terms of the total number correct,
but when the variance was split up and its components examined, it was found that, as expected, the continually punished subjects obtained significantly fewer correct responses than any other group and that the double bind and contradiction subjects (who were equivalent in number correct), had significantly more correct than the B2 subjects, and the B1 subjects had the highest number of correct responses.

F value for the effect of trial number on the number of errors was also significant (Fe = 9.37), and the t-ratios indicated that the smallest number of errors for all subjects occurred in the second trial, which was in the opposite direction to the predictions made by hypotheses 1 and 2.

These two significant F values, when viewed separately, suggest that the punished subjects, out of all subjects, obtained fewest correct over the whole experiment and that all subjects got most correct in the second trial. However, the most direct test of the first two hypotheses was provided by the Fbc interaction values which estimated the combined effect of trial number and subject group on the number of correct answers. However, the Fbc values for the total correct and for the total number correct plus half the ? responses did not quite reach the required significance level. There was a tendency for the number of correct answers obtained by each group of subjects to vary from trial to trial, and because these results were important for the hypotheses, E decided to examine it more closely. These
results are represented in fig. 6.

If hypotheses 1 and 2 are to be supported, B3 and B4 curves would have to fall from trial 1 to 2, and rise again to trial 3, while the curves for the B1 and B2 subjects would go in the opposite direction. The graph reveals that this trend does occur for the B4 subjects, but not for the B3 subjects. There was no significant change in the total number correct for the double bind subjects from the first to the second trials, and a fall in the total number correct in the third trial. B1 and B2 subjects' correct answers rose in the second trial, most probably as a result of practice and familiarity with the problem. Only B4 subjects' performance declined in the second trial, and this change did not appear to be significant.

From these results, the conclusion was reached that a change from one soluble problem to a new soluble problem seemed to result in subjects making more errors than the change from a soluble situation to an insoluble situation in the same problem. However, the above comments must remain speculative, as the Fbc value for both total correct and for the total number correct + half the ? answers was not significant.

In summary, the data revealed that non-? subjects obtained significantly more correct answers than the ? subjects, and it was suggested that this could be due either to confusion of the ? subjects when confronted with a ? button or to the importance of
feedback provided by a negative instance, in the eventual attainment of a concept by the non-? subjects, or both.

The significant Fb value showed that the continually punished subjects got significantly fewer correct than both the contradiction and double bind subjects. Significant Fc values, plus the insignificant Fbc value led E to reject hypotheses 1 and 2. Although there was a tendency for contradiction subjects to do worse in the second trial (i.e. fewer correct answers) this tendency was not significant, and so the null hypothesis of no change in the number of correct answers from trial to trial by the double bind and contradiction subjects must be maintained.

The third and fourth hypotheses were concerned with the effect of different types of frustration on subjects' response latencies. These hypotheses together predicted that double bind and contradiction subjects' response times would increase significantly, and that their response latencies would remain large in the third trial as an after-effect of the frustration experienced in the second trial. Double bind subjects were expected, in terms of the Bateson hypothesis, to have longer response latencies than contradiction subjects.

Examination of the F values for subjects' mean response times gives only limited support to these two hypotheses.

Fb value of 26.05 showed that groups of subjects differed significantly in response latencies over the whole experiment.
When total variance was analysed by a number of t-tests, it was found that continually punished subjects had the greatest response latencies throughout the experiment, and that contradiction and rewarded subjects together had the lowest response latencies. Double bind subjects fell between the two groups suggesting that the treatment they received was causing some uncertainty which was reflected in their large response latencies, as fig. 1 shows.

Main trial effect also had an important influence on all subjects' response latencies ($F=8.91$). However, when individual t-ratios were examined, it was found that the greatest response latencies occurred for subjects as a whole, in the first trial, and least in the third. From this it must be concluded that familiarity with the problem solving situation had a powerful effect on all subjects, causing them to respond, on the whole, more quickly with each succeeding trial, in spite of the change of problem or treatment for the B4 and B3 subjects respectively.

Significant AB interaction when further analysed by means of t-ratios, indicated that in general, all groups of subjects without the ? button had smaller response latencies, the difference was greatest for the double bind subjects (fig. 6). This seemed to support the hypothesis advanced earlier about the role of feedback in the speed of subjects' (especially double bind subjects') performance.
However, the most direct test of the third and fourth hypotheses was provided by the significance of the BC interaction. Fbc for mean response times = 2.66 which didn't quite reach the required significance level. As fig. 9 illustrates, contradiction subjects' response times remained fairly stable over the three trials, thus leading to the rejection of hypothesis no. 4.

Double bind subjects' response latencies remained the same for the first and second trials and then declined in the third, and it was suggested earlier that perhaps the double bind subjects' familiarity with the problem to some extent counteracted the effect of the problem becoming insoluble in the second trial.

Hypothesis no. 5 predicted that subjects with an escape button (i.e. ? subjects) would have smaller response latencies throughout the experiment than subjects without an escape button (non-? subjects.) This prediction was derived from Bateson's fifth point, which stresses the importance of the inability of the victim of the double bind to escape from an unpleasant situation. Maier's rats also, only exhibited abnormally fixated behaviour when forced to respond to the stimulus. Thus, in the present experiment it was predicted that frustrated subjects who were unable to escape from an unpleasant choice situation would manifest their psychological discomfort by vacillating in their decision making and by taking longer to respond.
Fa value of 47.91 indicated a reliable difference between ? and non-? subjects, but in the opposite direction to that predicted by the hypothesis. As subjects with only two response buttons to press had significantly shorter response latencies, it appears that the ? button has failed in its function as an "escape mechanism" enabling subjects to escape from an unpleasant choice situation.

When the AB interaction was examined, it was found that for all subjects, the addition of a ? button had a disrupting effect on the speed of their performance. For those subjects who experienced some kind of frustration during the experiment (B2, B3 and B4 subjects) those with a ? button had longer response latencies overall. The most likely explanation seems to lie in the value of a wrong response as a source of information (negative information) about the correct concept (see earlier discussion of results). It could also be argued that for subjects without any experience of frustration (the continually rewarded subjects) negative instances had little intrinsic value, as they were correct so often during the experiment.

Thus, in view of the reliable tendency for subjects without a ? button to have shorter response latencies, hypothesis no. 5 must be rejected.

The results that were obtained raise two important questions. The first is aimed at a basic theoretical point the experiment was designed to test, i.e. the importance of the victim's inability to escape from the unpleasant choice situation in the development of psychopathology.
Maier, in his experiments with rats, found that they didn't manifest disturbed behaviour until forced to respond, and on this basis E predicted that subjects who were forced to respond (i.e. non-\textit{?} subjects) would perform worse in terms of number correct and longer response latencies. However, all significant \textit{P}a values have shown that subjects \textit{with} an escape mechanism (\textit{?} subjects) had longer response times, and it was hypothesised that this was due to the importance of a wrong response in providing information to the subject about the problem, and thus in speeding up the problem solving process.

It appears that the present experiment, involving a fairly complex conceptual problem solving task was an unsuitable way of testing the importance of escape from frustration. That is, in the present situation, being wrong did not have purely negative value for subjects (the shock did not worry them) and it appeared that subjects were intellectually challenged by a wrong response, and got some positive value from it (in the form of negative feedback.)

In view of the negative results described above, it seems that if an experimenter is interested in determining the effect of escape mechanisms in frustrated subjects' responses, then \textit{the escape mechanism must offer an attractive alternative response} and that both the punishment experienced when wrong, and the inability to escape, must be entirely negative in their effects, otherwise it would be unlikely that really strong fixations like those exhibited by Maier's rats exhibited, will be forthcoming.
According to hypotheses no. 6 and 7, double bind and contradiction subjects would be expected to have a significant increase in their number of fixations in the third trial, after the frustration experienced in the second trial. However, an examination of the main B effect (subject group) and C effect (trial number) and the BC interaction did not support either hypothesis.

Fb value of 69.64 was significant and indicated that the four groups of subjects varied systematically from one another in the number of fixated response they made, but when the variance was further analysed by t-tests, it emerged that most of the significance was contributed by the large differences between the B2 subjects and all other groups. Double bind subjects made significantly fewer fixated responses, and did not differ from the rewarded subjects in this respect.

Subjects generally made the same number of fixated responses in the first and third trials (F<1, n.s.) and there was no significant interaction between trial number and group type.

This evidence then leads to the rejection of both hypotheses 6 and 7, as neither the contradiction nor the double bind subjects had a significant increase in the number of fixations in the third trial. The index of fixation was used to give E some measure of the "abnormality" of a response. For the purposes of the present experiment it was defined as more than two successive responses to the same side of the screen and could only be regarded as "abnormal" if
it occurred in a soluble problem situation. That is why all results from the second trial were eliminated, because the contradiction subjects, by having to respond to the right-hand slide, were in fact being rewarded for stereotypy.

The continually punished subjects made a large number of fixated responses, but their fixations could not be called abnormal in that it was the only "rational" solution to an insoluble problem. As Yates (1962) says, "A stereotype, therefore, does not indicate frustration, it may be a normal response to an insoluble situation.... A stereotype is a sign of frustration only if it is shown to be fixated when the animal has an opportunity to change it." As the B2 subjects had no opportunity to change their fixated responses, their behaviour could not really be called abnormal.

Failure to produce a significant number of fixations in subjects after frustration leads to two important questions. The first raises doubts about the sensitivity of the index of "fixation" as an adequate measure of human subjects' level of frustration. This proved a valuable indicator for Maier in his experiments with rats where their choice was between two distinct alternatives.

In the present situation the difference between two alternatives was not so obvious, with the result that subjects kept trying to find the correct answer and didn't exhibit obviously maladjusted behaviour such as fixations. The second more basic question asks whether the experimental treatment in the second trial was really frustrating. Subjects' answers to the questionnaires suggest that they found being wrong frustrating, so it seems that what is needed is a more sensitive
way of measuring the "abnormality" of human subjects' responses to an insoluble situation. The method of counting the number of "fixated responses" seemed to work for Maier, who was using rats as subjects, but the present evidence suggests that another measure of the amount of frustration other than the number of fixated responses should be developed.

Hypotheses 8 and 9 predicted that double bind and contradiction subjects would press the ? button more often than any other group of subjects, especially in the second and third trials. By this index E hoped to get a measure of subjects' indecisiveness in decision making, and their desire to leave the field.

Although the number of subjects pressing the ? button was small, some support was given to the two hypotheses. As fig. 11 showed, in the first trial, B3 and B4 subjects' ? responses were high, while B2 and B1 subjects' ? responses were at a fairly low level, and in the second and third trials, ? responses of these subjects remained about the same. In the second trial, the number of ? responses for B4 subjects dropped sharply from its peak in trial 1, and then dropped again in the third trial. Although this sudden drop from trial 1 to 2 wasn't predicted by the hypothesis, B4 subjects still had a greater number of ? responses than B1 and B2 subjects.

The results of the B3 subjects do give limited support for hypothesis no. 8, because in the second trial (when the problem became insoluble) the number of ? responses were not much lower than
in the first trial, and in the third trial, when they were given a new soluble problem, the number of ? responses declined sharply.

Although some of the results did give limited support for hypothesis no. 8, and 9, in view of the small size of the sample, one cannot say the hypothesis was supported, but the results do suggest that subjects who were frustrated after initially being correct, tended to become uncertain of their efficiency and felt the need to escape from the unpleasant situation by pressing the ? button.

After examination of subjects' results, E found that the data provided another measure of subjects' efficiency in the problem solving situation. This new index noted the time in each trial when the subjects spontaneously stated a partly correct hypothesis about what the correct concept was. In the experiment it was quite possible for subjects to be partly correct and still get some wrong answers, because of the nature of the concept used (i.e. a "disjunctive" concept was used, see p. 45).

Although the results obtained weren't large enough to warrant statistical analysis, some interesting trends came out, and are shown in fig. 12. This figure shows that for both contradiction and double bind subjects, the number of hypotheses fell away in the second trial, and for the latter, rose again in the third. Results for punished and rewarded groups went in the opposite direction, i.e. there was an increase in the number of hypotheses
they formed in the second trial.

On the basis of these results it was suggested that the B3 and B4 subjects' frustration in the second trial was shown by a drop in the number of successful hypotheses, whereas for the other two groups, continuation of the same problem resulted in increased efficiency. These results were taken as providing indirect support to hypotheses 8 and 9, where it was predicted that double bind and contradiction subjects' performance would become less confident in the second trial as a result of frustration experienced then.

Hypothesis no. 10 predicted that H.A. subjects would have a lower general efficiency level than L.A. subjects. This was predicted after a review by Mednick (1957) suggested that schizophrenic thought disorder might be related to high anxiety levels within the individual. In the present study, an abbreviated WASH was used to measure anxiety and it was predicted that H.A. subjects would have a greater number of fixated responses, longer response latencies and fewer correct responses.

The obtained correlation coefficients were in the hypothesized direction, but were not significant, hence hypothesis no. 10 was not supported. It was suggested that the lack of correlation could have been due to the restricted sample of subjects used in the experiment, i.e. they were all university students, and their anxiety scores were all fairly low (see p. xxiii appendix).
Hypotheses 11 and 12 were concerned with subjects' subjective feelings of anger, dissatisfaction, frustration, confidence, etc., in relation to the three trials of the experiment. These hypotheses predicted that double bind and contradiction subjects would both report feelings of dissatisfaction, discouragement, etc., especially after the second trial, and that such reports would be more frequent for the double bind subjects.

Material bearing on these hypotheses was taken from subjects' written responses to three questionnaires. Generally, B2 subjects reported feelings of dissatisfaction with their performance throughout the whole experiment, while B1 subjects were most satisfied throughout. Attitudes of the B3 and B4 subjects changed quite markedly from trial to trial, and generally speaking, they appeared much less satisfied with their performance in the second trial than in either the first or third trials. The trend appeared more marked for the B3 subjects, and can be seen in figs. 11, 13 and 14.

Subjects did not differ in their reports of how anxious or discouraged they felt when wrong. However, as explained earlier, the lack of a difference could have been the result of the unsatisfactory wording of the question.

Considering the data obtained from the questionnaires and bearing in mind the fairly qualitative nature of the data, the experimenter tentatively concluded that the 11th and 12th
hypotheses seemed to be supported.

The present experiment was designed to test two main aspects of the double bind situation in an attempt to discover their significance in the production of "schizophrenic like" thinking disturbances. The dependent variable could be called "subjects' problem solving efficiency" and was measured by the number of correct answers, response times, number of fixations and so on. Factors which E varied, to measure their effect on subjects' behaviour were, the conflict between levels of communication (the B factor, representing different types of conflict and frustration) and the importance of being forced to remain in an unpleasant situation. The general aim of the study was to show that double bind subjects' performance was poorer, in terms of the number correct etc., than subjects who experienced the ordinary frustration situation.

A fuller interpretation of the results was made earlier, and there it was found that few of the hypotheses were supported.

In general, subjects who were continually punished throughout the experiment performed worst. This was to be expected because of the high level of wrong responses arbitrarily set by the experimenter.

In only two measures did the double bind subjects do worse than the contradiction subjects. Double bind subjects made more fixated responses and pressed the ? button more often, suggesting
that the double bind type of frustration had more confusing effects than the ordinary type of frustration. However, in all other measures, double bind and contradiction subjects did not differ significantly from each other, although both differed significantly from the rewarded subjects. Hence, the evidence obtained provided only limited support for hypotheses 1 - 4, and 6 - 9, and was supported to some extent by the BC interaction values. These values represented the significance of the combined effect of trial number and subject class. The Fbc results did suggest some interaction effects, but as these values did not quite reach statistical significance, most of these hypotheses were rejected.

The other condition the experiment was designed to measure was the importance of the ? button as a safety valve, allowing some subjects to escape from the unpleasant choice situation. Hypothesis 5 predicted that subjects with a ? button would have shorter response latencies than subjects without, because, if in doubt about a particular pair of slides, they could press the ? button and avoid making a decision, whereas the former would be forced to spend a longer time vacillating between response alternatives. However, the results went in a direction opposite to the one predicted, and it was concluded that being wrong did not have strong enough negative effects on subjects' behaviour. Subjects apparently didn't mind being wrong as it gave them some information about the correct concept, probably as much
information as being correct did, resulting in faster responses and a quicker solution of the problem. This conclusion was supported by the number of correct responses.

Failure of the data to confirm the hypotheses and practical difficulties which occurred during the experiment suggest a number of points which would be worthwhile following up in future experiments.

The first suggestion concerns the severity of punishment for a wrong response. In the present experiment electric shock of 1 milliamp. was used to punish subjects for a wrong response. Few subjects found this obnoxious and so it didn't seem particularly effective as an aversive stimulus. However, E wanted the experience of being wrong itself to be intrinsically punishing, as this appeared to be closer to the definition of the double bind. Subjects themselves said that when they became annoyed, they were more annoyed with themselves for being wrong than with the shock. However, the experience of being wrong was probably of little importance to the subjects, as the situation was far removed from their everyday life. If subjects were told that results on this test would have an important bearing on yearly grades they may have become more emotionally involved in the experiment. As all subjects were first year Psychology students, they were required to be subjects for experiments in order to get their full quota of marks, and so it would be quite possible
to introduce an element of emotion or prestige into the situation in this manner.

Also, the type of problem subjects had to work on could be changed to decrease the positive value of being wrong (the importance of feedback as mentioned earlier.) Thus, the first important alteration to the experiment would involve a sharpening of the positive value of success and making it more relevant to subjects' daily life, and of the negative value of being wrong (preferably not by increasing an extrinsic punishment such as shock) but by increasing the intrinsic punishment, and this would be bound up with the value of making a correct response.

The next major difficulty involved the fact that the experiment was, to some extent, removed from a real-life situation and so it was impossible to produce, in an experimental situation, similar behaviour to that observed by clinicians in a real life situation. In the introduction it was said that the present situation could only approximate behaviour in the real family environment. The fact that the results did suggest some differences between the double bind type of frustration and ordinary frustration does support the hope that the double bind is qualitatively distinct from the ordinary type of frustration and also supports the hope that the double bind, although a clinical phenomenon, is amenable to objective measurement.
SUMMARY

The present experiment was designed to examine some of the features of the double bind hypothesis developed by Bateson et al., in 1956 to account for the aetiology of schizophrenia. Most of the evidence in the field consisted of the subjective interpretation of data obtained from clinical interviews.

Some experimenters, such as Berger (1965), Cicola (1961), Ringuette and Kennedy (1966) attempted to subject the global concept of the double bind to experimental investigation, but seemed to miss the essential point of the double bind, i.e. the conflict between levels of communication. The present experiment therefore, was designed to investigate the effects of conflict between levels of communication on subjects' behaviour and also one other condition; the importance of some sort of escape mechanism in determining a subject's response to a frustrating double bind situation.

The experiment itself was based on the procedure Maier (1949) used in his study of frustration in rats. He found that a type of frustration quite similar to the double bind type of frustration as defined by Bateson et al., produced disturbed behaviour in the rats. Other experimenters, such as Marquart (1948), and Jones (1954) working with normal human subjects and Peters (1953) with schizophrenics used a similar experimental design to Maier's and the present study represents an attempt to continue work
along this line.

It was predicted that subjects who experienced the double bind type of frustration would exhibit more of these schizophrenic-like behaviours than subjects who were subjected to the ordinary frustrating situation simply involving punishment when wrong.

The results indicated that double bind subjects did in some ways differ from frustrated subjects e.g. they pressed the escape button more often and made more fixated responses, but overall, these differences were not statistically significant, and the hypotheses were rejected.

Examination of the results did suggest the possibility that the concept of the double bind is amenable to experimental investigation. The Experimenter must disagree with the opinion expressed by Ringuette and Kennedy (1966, p. 141) that the double bind isn't an objectively-measurable phenomenon. The present results, although not statistically significant, do indicate that the concept of the double bind can be objectively measured, but only if the relation between the concepts of double bind and frustration and the amount, severity and type of punishment is thoroughly worked out by theoreticians and by experimenters working in this area.
APPENDIX
TABLE 1
TOTAL NUMBER OF CORRECT ANSWERS
(Including objectively-correct responses)

<table>
<thead>
<tr>
<th>Group B, S's</th>
<th>Group B, S's</th>
<th>Group B, S's</th>
<th>Group B, S's</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trial 1</td>
<td>Trial 2</td>
<td>Trial 3</td>
<td>Trial 1</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>43</td>
<td>36</td>
</tr>
<tr>
<td>2</td>
<td>27</td>
<td>34</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>34</td>
<td>46</td>
<td>39</td>
</tr>
<tr>
<td>4</td>
<td>36</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>36</td>
<td>37</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>43</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td>7</td>
<td>31</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>8</td>
<td>31</td>
<td>37</td>
<td>30</td>
</tr>
<tr>
<td>9</td>
<td>32</td>
<td>29</td>
<td>26</td>
</tr>
<tr>
<td>10</td>
<td>33</td>
<td>43</td>
<td>22</td>
</tr>
</tbody>
</table>

Total: 320, 376, 296, 258, 293, 277, 343, 346, 309, 351, 308, 299
<table>
<thead>
<tr>
<th></th>
<th>Group B, S's</th>
<th>Group B, S's</th>
<th>Group B, S's</th>
<th>Group B, S's</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trial 1</td>
<td>Trial 2</td>
<td>Trial 3</td>
<td>Trial 1</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>43</td>
<td>36</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>27</td>
<td>34</td>
<td>29</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>34</td>
<td>46</td>
<td>39</td>
<td>26</td>
</tr>
<tr>
<td>4</td>
<td>36</td>
<td>35</td>
<td>25</td>
<td>28</td>
</tr>
<tr>
<td>5</td>
<td>36</td>
<td>37</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td>6</td>
<td>43</td>
<td>50</td>
<td>38</td>
<td>29</td>
</tr>
<tr>
<td>7</td>
<td>31</td>
<td>26</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td>8</td>
<td>31</td>
<td>43</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>9</td>
<td>32</td>
<td>29</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>10</td>
<td>33</td>
<td>33</td>
<td>22</td>
<td>29</td>
</tr>
<tr>
<td>A1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>320</td>
<td>376</td>
<td>296</td>
<td>258</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B, S's</td>
<td>Group B, S's</td>
<td>Group B, S's</td>
<td>Group B, S's</td>
</tr>
<tr>
<td>1</td>
<td>26</td>
<td>40</td>
<td>35</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>31</td>
<td>27</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>47</td>
<td>34</td>
<td>23</td>
</tr>
<tr>
<td>4</td>
<td>44</td>
<td>50</td>
<td>44</td>
<td>22</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td>33</td>
<td>23</td>
<td>29</td>
</tr>
<tr>
<td>6</td>
<td>29</td>
<td>33</td>
<td>26</td>
<td>37</td>
</tr>
<tr>
<td>7</td>
<td>35</td>
<td>43</td>
<td>42</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>41</td>
<td>48</td>
<td>45</td>
<td>35</td>
</tr>
<tr>
<td>9</td>
<td>48</td>
<td>48</td>
<td>42</td>
<td>33</td>
</tr>
<tr>
<td>10</td>
<td>46</td>
<td>30</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>A2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>362</td>
<td>419</td>
<td>356</td>
<td>292</td>
</tr>
</tbody>
</table>
## TABLE 2

### TOTAL NUMBER OF CORRECT ANSWERS PLUS 1/2 ? RESPONSES

<table>
<thead>
<tr>
<th>Group $A_1$ S's</th>
<th>Group $A_2$ S's</th>
<th>Group $A_3$ S's</th>
<th>Group $A_4$ S's</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trial 1</strong></td>
<td><strong>Trial 2</strong></td>
<td><strong>Trial 3</strong></td>
<td><strong>Trial 1</strong></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>322</td>
<td>376</td>
<td>297</td>
<td>262</td>
</tr>
<tr>
<td>262</td>
<td>295</td>
<td>279</td>
<td>350</td>
</tr>
<tr>
<td>350</td>
<td>352</td>
<td>310</td>
<td>357</td>
</tr>
<tr>
<td>311</td>
<td>300</td>
<td>292</td>
<td>321</td>
</tr>
<tr>
<td>356</td>
<td>292</td>
<td>254</td>
<td>342</td>
</tr>
<tr>
<td>349</td>
<td>318</td>
<td>394</td>
<td>317</td>
</tr>
<tr>
<td>346</td>
<td>28</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>
## TABLE 3
### MEAN RESPONSE TIMES

<table>
<thead>
<tr>
<th>Trial</th>
<th>Group A S's</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Group B S's</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Group A S's</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
<th>Group B S's</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10.72</td>
<td>6.63</td>
<td>7.37</td>
<td>9.00</td>
<td>4.49</td>
<td>9.52</td>
<td>6.59</td>
<td>11.16</td>
<td>18.09</td>
<td>5.16</td>
<td>5.01</td>
<td>8.35</td>
<td>5.91</td>
<td>6.06</td>
<td>5.71</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3.42</td>
<td>2.70</td>
<td>2.90</td>
<td>10.04</td>
<td>8.11</td>
<td>6.34</td>
<td>4.99</td>
<td>5.84</td>
<td>4.00</td>
<td>8.55</td>
<td>4.49</td>
<td>3.81</td>
<td>10.16</td>
<td>4.49</td>
<td>3.81</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3.15</td>
<td>3.13</td>
<td>4.37</td>
<td>19.13</td>
<td>19.42</td>
<td>18.77</td>
<td>24.32</td>
<td>31.00</td>
<td>10.55</td>
<td>40.29</td>
<td>44.01</td>
<td>27.30</td>
<td>15.33</td>
<td>7.49</td>
<td>7.39</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>12.29</td>
<td>3.59</td>
<td>7.82</td>
<td>7.08</td>
<td>8.50</td>
<td>7.73</td>
<td>2.59</td>
<td>3.59</td>
<td>2.69</td>
<td>5.31</td>
<td>3.34</td>
<td>3.97</td>
<td>12.17</td>
<td>7.49</td>
<td>6.42</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8.94</td>
<td>4.37</td>
<td>8.26</td>
<td>30.46</td>
<td>51.95</td>
<td>14.72</td>
<td>20.43</td>
<td>22.21</td>
<td>6.28</td>
<td>8.50</td>
<td>2.71</td>
<td>15.33</td>
<td>12.17</td>
<td>7.49</td>
<td>7.39</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Group A S's</th>
<th></th>
<th></th>
<th></th>
<th>Group B S's</th>
<th></th>
<th></th>
<th></th>
<th>Group A S's</th>
<th></th>
<th></th>
<th></th>
<th>Group B S's</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group A S's</td>
<td></td>
<td></td>
<td></td>
<td>Group B S's</td>
<td></td>
<td></td>
<td></td>
<td>Group A S's</td>
<td></td>
<td></td>
<td></td>
<td>Group B S's</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>69.15</td>
<td>53.83</td>
<td>72.50</td>
<td>267.71</td>
<td>190.11</td>
<td>117.97</td>
<td>110.85</td>
<td>112.23</td>
<td>79.51</td>
<td>111.49</td>
<td>95.18</td>
<td>102.94</td>
<td>116.93</td>
<td>54.98</td>
<td>60.20</td>
</tr>
<tr>
<td>2</td>
<td>8.36</td>
<td>2.84</td>
<td>3.40</td>
<td>4.49</td>
<td>4.40</td>
<td>6.48</td>
<td>5.61</td>
<td>5.71</td>
<td>5.78</td>
<td>5.30</td>
<td>2.83</td>
<td>5.77</td>
<td>5.78</td>
<td>5.30</td>
<td>2.83</td>
</tr>
<tr>
<td>3</td>
<td>19.60</td>
<td>20.04</td>
<td>13.01</td>
<td>7.22</td>
<td>6.36</td>
<td>6.17</td>
<td>9.94</td>
<td>17.66</td>
<td>4.07</td>
<td>5.95</td>
<td>2.45</td>
<td>5.77</td>
<td>5.95</td>
<td>2.45</td>
<td>5.77</td>
</tr>
<tr>
<td>4</td>
<td>4.91</td>
<td>2.94</td>
<td>4.92</td>
<td>27.68</td>
<td>20.39</td>
<td>10.40</td>
<td>12.02</td>
<td>12.56</td>
<td>6.83</td>
<td>2.26</td>
<td>4.28</td>
<td>3.72</td>
<td>2.26</td>
<td>4.28</td>
<td>3.72</td>
</tr>
<tr>
<td>5</td>
<td>9.94</td>
<td>3.13</td>
<td>1.92</td>
<td>3.97</td>
<td>3.49</td>
<td>5.12</td>
<td>9.63</td>
<td>2.01</td>
<td>1.87</td>
<td>5.92</td>
<td>1.56</td>
<td>3.41</td>
<td>5.92</td>
<td>1.56</td>
<td>3.41</td>
</tr>
<tr>
<td>6</td>
<td>10.49</td>
<td>4.59</td>
<td>5.65</td>
<td>13.89</td>
<td>10.87</td>
<td>6.30</td>
<td>6.64</td>
<td>6.13</td>
<td>5.24</td>
<td>6.20</td>
<td>3.55</td>
<td>5.48</td>
<td>6.20</td>
<td>3.55</td>
<td>5.48</td>
</tr>
<tr>
<td>7</td>
<td>5.46</td>
<td>9.41</td>
<td>7.85</td>
<td>4.73</td>
<td>3.93</td>
<td>4.06</td>
<td>4.35</td>
<td>3.87</td>
<td>2.40</td>
<td>4.45</td>
<td>3.89</td>
<td>4.58</td>
<td>4.45</td>
<td>3.89</td>
<td>4.58</td>
</tr>
<tr>
<td>8</td>
<td>3.02</td>
<td>2.10</td>
<td>2.40</td>
<td>8.84</td>
<td>6.05</td>
<td>6.16</td>
<td>4.68</td>
<td>3.57</td>
<td>4.97</td>
<td>2.15</td>
<td>4.15</td>
<td>5.20</td>
<td>2.15</td>
<td>4.15</td>
<td>5.20</td>
</tr>
<tr>
<td>9</td>
<td>51.70</td>
<td>6.99</td>
<td>24.50</td>
<td>13.19</td>
<td>9.00</td>
<td>5.08</td>
<td>4.64</td>
<td>4.47</td>
<td>4.26</td>
<td>8.42</td>
<td>6.00</td>
<td>7.26</td>
<td>8.42</td>
<td>6.00</td>
<td>7.26</td>
</tr>
<tr>
<td>10</td>
<td>4.65</td>
<td>2.68</td>
<td>5.71</td>
<td>9.46</td>
<td>5.65</td>
<td>5.32</td>
<td>15.82</td>
<td>10.63</td>
<td>6.43</td>
<td>6.24</td>
<td>6.25</td>
<td>4.64</td>
<td>6.24</td>
<td>6.25</td>
<td>4.64</td>
</tr>
<tr>
<td></td>
<td>116.93</td>
<td>54.98</td>
<td>60.20</td>
<td>126.23</td>
<td>95.45</td>
<td>65.35</td>
<td>78.95</td>
<td>75.06</td>
<td>48.62</td>
<td>51.82</td>
<td>40.94</td>
<td>46.13</td>
<td>51.82</td>
<td>40.94</td>
<td>46.13</td>
</tr>
<tr>
<td>-------</td>
<td>---------------</td>
<td>---</td>
<td>---------------</td>
<td>---</td>
<td>---------------</td>
<td>---</td>
<td>---------------</td>
<td>---</td>
<td>---------------</td>
<td>---</td>
<td>---------------</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>22</td>
<td></td>
<td>17</td>
<td></td>
<td>12</td>
<td></td>
<td>13</td>
<td></td>
<td>9</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>16</td>
<td></td>
<td>13</td>
<td></td>
<td>7</td>
<td></td>
<td>10</td>
<td></td>
<td>12</td>
<td></td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td></td>
<td>12</td>
<td></td>
<td>13</td>
<td></td>
<td>8</td>
<td></td>
<td>5</td>
<td></td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td></td>
<td>12</td>
<td></td>
<td>12</td>
<td></td>
<td>9</td>
<td></td>
<td>4</td>
<td></td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td></td>
<td>16</td>
<td></td>
<td>9</td>
<td></td>
<td>10</td>
<td></td>
<td>14</td>
<td></td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td></td>
<td>11</td>
<td></td>
<td>12</td>
<td></td>
<td>8</td>
<td></td>
<td>11</td>
<td></td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>17</td>
<td></td>
<td>15</td>
<td></td>
<td>6</td>
<td></td>
<td>12</td>
<td></td>
<td>13</td>
<td></td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>10</td>
<td></td>
<td>14</td>
<td></td>
<td>11</td>
<td></td>
<td>10</td>
<td></td>
<td>13</td>
<td></td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td></td>
<td>16</td>
<td></td>
<td>22</td>
<td></td>
<td>13</td>
<td></td>
<td>9</td>
<td></td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>14</td>
<td></td>
<td>19</td>
<td></td>
<td>14</td>
<td></td>
<td>18</td>
<td></td>
<td>14</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>A1</th>
<th></th>
<th>A2</th>
<th></th>
<th>A1</th>
<th></th>
<th>A2</th>
<th></th>
<th>A1</th>
<th></th>
<th>A2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>112</td>
<td></td>
<td>147</td>
<td></td>
<td>118</td>
<td></td>
<td>111</td>
<td></td>
<td>106</td>
<td></td>
<td>114</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17</td>
<td></td>
<td>14</td>
<td></td>
<td>9</td>
<td></td>
<td>15</td>
<td></td>
<td>11</td>
<td></td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td></td>
<td>13</td>
<td></td>
<td>11</td>
<td></td>
<td>12</td>
<td></td>
<td>11</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td></td>
<td>12</td>
<td></td>
<td>14</td>
<td></td>
<td>14</td>
<td></td>
<td>21</td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td></td>
<td>17</td>
<td></td>
<td>13</td>
<td></td>
<td>5</td>
<td></td>
<td>14</td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td></td>
<td>15</td>
<td></td>
<td>20</td>
<td></td>
<td>14</td>
<td></td>
<td>12</td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td></td>
<td>16</td>
<td></td>
<td>13</td>
<td></td>
<td>13</td>
<td></td>
<td>8</td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td></td>
<td>17</td>
<td></td>
<td>25</td>
<td></td>
<td>9</td>
<td></td>
<td>13</td>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td></td>
<td>14</td>
<td></td>
<td>14</td>
<td></td>
<td>17</td>
<td></td>
<td>9</td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>7</td>
<td></td>
<td>12</td>
<td></td>
<td>2</td>
<td></td>
<td>14</td>
<td></td>
<td>14</td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td></td>
<td>16</td>
<td></td>
<td>19</td>
<td></td>
<td>7</td>
<td></td>
<td>13</td>
<td></td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>A1</th>
<th></th>
<th>A2</th>
<th></th>
<th>A1</th>
<th></th>
<th>A2</th>
<th></th>
<th>A1</th>
<th></th>
<th>A2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>116</td>
<td>108</td>
<td></td>
<td>139</td>
<td></td>
<td>135</td>
<td></td>
<td>115</td>
<td></td>
<td>130</td>
<td></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**Table 4:**

**Total Number of Fixations**
Abbreviated form of the M.A.S. administered to each subject before the experiment.

A Biographical Inventory
(for teaching purposes only).

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>I do not tire quickly.</td>
</tr>
<tr>
<td>5.</td>
<td>I am often sick in my stomach.</td>
</tr>
<tr>
<td>7.</td>
<td>I am about as nervous as other people.</td>
</tr>
<tr>
<td>11.</td>
<td>I have very few headaches.</td>
</tr>
<tr>
<td>13.</td>
<td>I work under a great deal of strain.</td>
</tr>
<tr>
<td>14.</td>
<td>I cannot keep my mind on one thing.</td>
</tr>
<tr>
<td>16.</td>
<td>I worry over money and business.</td>
</tr>
<tr>
<td>18.</td>
<td>I frequently notice my hands shake when I try to do something.</td>
</tr>
<tr>
<td>24.</td>
<td>I blush as often as others do.</td>
</tr>
<tr>
<td>25.</td>
<td>I have diarrhoea once a month or more.</td>
</tr>
<tr>
<td>26.</td>
<td>I worry quite a bit over possible troubles.</td>
</tr>
<tr>
<td>27.</td>
<td>I practically never blush.</td>
</tr>
<tr>
<td>33.</td>
<td>I am often afraid that I am going to blush.</td>
</tr>
<tr>
<td>35.</td>
<td>I have nightmares every few nights.</td>
</tr>
<tr>
<td>36.</td>
<td>My hands and feet are usually warm enough.</td>
</tr>
<tr>
<td>37.</td>
<td>I sweat very easily even on cool days.</td>
</tr>
<tr>
<td>38.</td>
<td>When embarrassed I often break out in a sweat, which is very annoying.</td>
</tr>
<tr>
<td>41.</td>
<td>I do not often notice my heart pounding and I am seldom short of breath.</td>
</tr>
<tr>
<td>43.</td>
<td>I feel hungry almost all the time.</td>
</tr>
<tr>
<td>44.</td>
<td>Often my bowels don't move for several days at a time.</td>
</tr>
</tbody>
</table>
48. I have a great deal of stomach trouble. TRUE FALSE
51. At times I lose sleep over worry. TRUE FALSE
54. My sleep is restless and disturbed. TRUE FALSE
56. I often dream about things I don't like to tell other people. TRUE FALSE
66. I am easily embarrassed. TRUE FALSE
67. My feelings are hurt easier than most people's. TRUE FALSE
77. I often find myself worrying about something. TRUE FALSE
82. I wish I could be as happy as others. TRUE FALSE
83. I am usually calm and not easily upset. TRUE FALSE
86. I cry easily. TRUE FALSE
87. I feel anxious about someone or something almost all the time. TRUE FALSE
94. I like to study and read about things I am working at. TRUE FALSE
99. It makes me nervous to have to wait. TRUE FALSE
100. I commonly hear voices without knowing where they come from. TRUE FALSE
103. Sometimes I become so excited that I find it hard to get to sleep. TRUE FALSE
107. I have sometimes felt that difficulties were piling up so high that I could not overcome them. TRUE FALSE
112. At times I have been worried beyond reason about something that did not matter. TRUE FALSE
117. I do not have as many fears as my friends. TRUE FALSE
123. I have been afraid of things or people that I know could not hurt me. TRUE FALSE
136. I certainly feel useless at times. TRUE FALSE
138. I find it hard to keep my mind on a task or a job. TRUE FALSE

145. I am more self-conscious than most people. TRUE FALSE

152. I am the kind of person who takes things hard. TRUE FALSE

153. I am a very nervous person. TRUE FALSE

163. Life is often a strain for me. TRUE FALSE

164. At times I think I am no good at all. TRUE FALSE

168. I am not at all confident of myself. TRUE FALSE

183. At times I feel that I am going to crack up. TRUE FALSE

187. I don't like to face a difficulty or make an important decision. TRUE FALSE

190. I am very confident of myself. TRUE FALSE
The first "Level of Aspiration" questionnaire administered to each subject between the first and second trial.

**QUESTIONNAIRE 1.**

NAME: __________________________________________ AGE: ______
SEX: ___________________ DATE: ___________________

This questionnaire is designed to discover your reactions to the problem on which you are working and I would like you to answer the following brief questions.

For each question, a number of alternatives are provided; please tick the answer that comes closest to how you feel AT THE PRESENT MOMENT.

Do not omit any questions.

There are no right or wrong answers, I am only interested in finding out your INDIVIDUAL views of the problem at this moment.

You will have all the time you need to answer all the questions, but work as fast as you can.

If you have any queries about the meaning of a particular question, please ask the examiner.

YOU MAY NOW TURN THE PAGE AND BEGIN.
The first "Level of Aspiration" questionnaire administered to each subject between the first and second trial.

QUESTIONNAIRE 1.

NAME: ________________________________________ AGE: ______

SEX: ______________________ DATE: ______________________

This questionnaire is designed to discover your reactions to the problem on which you are working and I would like you to answer the following brief questions.

For each question, a number of alternatives are provided; please tick the answer that comes closest to how you feel AT THE PRESENT MOMENT.

Do not omit any questions.

There are no right or wrong answers, I am only interested in finding out your INDIVIDUAL views of the problem at this moment.

You will have all the time you need to answer all the questions, but work as fast as you can.

If you have any queries about the meaning of a particular question, please ask the examiner.

YOU MAY NOW TURN THE PAGE AND BEGIN.
1. Do you think that the problem you have been working on is:
   a. very hard.
   b. moderately hard.
   c. moderately easy.
   d. very easy.

2. Are you satisfied with your performance on the previous trial of the experiment?
   a. very satisfied.
   b. moderately satisfied.
   c. moderately dissatisfied.
   d. very dissatisfied.
   Give reasons for your answer above.

   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

3. On the next trial, do you think you will perform
   a. better than.
   b. about the same.
   c. worse than you did on the previous trial?
4. Although you haven't been able to compare your results with those of other subjects, how do you think your performance on the previous trial might compare with theirs?
   a. better than.
   b. same as.
   c. worse than theirs.

5. Did you become ANNOYED when you were punished for a wrong response?
   a. very annoyed.
   b. mildly annoyed.
   c. not annoyed at all.

6. If you were annoyed, which annoyed you most?
   a. shock.
   b. being wrong.
   c. both.
   d. anything else (Please specify)

7. Did you feel DISCOURAGED when you were punished for a wrong response?
   a. very discouraged.
   b. mildly discouraged.
   c. not at all discouraged.
8. If you did feel discouraged, which discouraged you most?
   a. shock.
   b. being wrong.
   c. both.
   d. anything else (Please specify).

9. What effect did this discouragement/annoyance have on your attitude to the problem?
   a. made you want to try harder.
   b. no change in attitude toward the problem.
   c. made you feel like giving up.
   d. anything else (Please specify).

10. Do you think you could have done better than you did? YES/NO
    If so, how much better?
       a. a little better.
       b. a lot better.

11. Give reasons for your answer to (10) above.
12. Did you feel ANXIOUS when you were punished for a wrong response?
   a. very anxious.
   b. mildly anxious.
   c. not anxious at all.

13. If you did feel anxious, what led to this anxiety?
   a. shock.
   b. being wrong.
   c. both.
   d. anything else (Please specify)

-------------------------------------------------------------------------

14. Did you feel that you were getting the right answer without really knowing why? YES/NO

15. Did you follow a definite plan in making your choice?
    Please specify.
    YES/NO
The Second "level of aspiration" questionnaire administered to each subject between the second and third trials.

1. Do you think that the problem you have just been working on is;
   a. very hard.
   b. moderately hard.
   c. moderately easy.
   d. very easy.

2. Are you satisfied with your performance on the previous trial? (i.e. on the second trial).
   a. very satisfied.
   b. fairly satisfied.
   c. rather dissatisfied.
   d. very dissatisfied.

Give reasons for your answer above.

________________________________________________________
________________________________________________________
________________________________________________________
________________________________________________________
________________________________________________________

3. On the next trial, do you think you will perform
   a. better than.
   b. about the same.
   c. worse than you did on the previous trial?
4. Although you haven't been able to compare your results with those of other subjects, how do you think your performance on the second trial might compare with theirs on the same trial? 
   a. better than.
   b. same as.
   c. worse than theirs.

5. Did you become ANNOYED when you were punished for a wrong response?
   a. very annoyed.
   b. mildly annoyed.
   c. not annoyed at all.

6. If so, which annoyed you most?
   a. shock.
   b. being wrong.
   c. both.
   d. anything else (Please specify)

7. Did you feel DISCOURAGED when you were punished for a wrong response?
   a. very discouraged.
   b. mildly discouraged.
   c. not at all discouraged.
8. If you did feel that way, which discouraged you most?
   a. shock.
   b. being wrong.
   c. both.
   d. anything else (Please specify)

9. What effect did the discouragement/annoyance have on your attitude to the problems?
   a. made you want to try harder.
   b. no change in your attitude toward the problem.
   c. made you feel like giving up.
   d. anything else (Please specify)

10. Do you think you could have done better than you did? YES/NO
    If so, how much better?
    a. a little.
    b. a lot.

11. Give reasons for your answer to (10) above.
    ____________________________________________
    ____________________________________________
    ____________________________________________
    ____________________________________________
12. Did you feel that you were getting the right answers without really knowing why?  YES/NO

13. Did you feel ANXIOUS when you were punished for a wrong response?
   a. very anxious.
   b. mildly anxious.
   c. not anxious at all.

14. If you did feel anxious, what do you think led to this feeling?
   a. shock.
   b. being wrong.
   c. both.
   d. anything else (Please specify)

15. Did you follow a definite plan in making your decisions?  YES/NO
   Please explain further.
16. Did you change your method of solving the problem? YES/NO
   If so,  a. when?
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   b. why?
   ____________________________
   ____________________________
   ____________________________
   ____________________________

17. Did the problem itself seem to change in any way? YES/NO
   If so,  a. when?
   ____________________________
   ____________________________
   ____________________________
   ____________________________
   b. how?
   ____________________________
   ____________________________
   ____________________________
   ____________________________
The third "level of aspiration" questionnaire, administered to each subject after the third trial.

1. How interesting did you find the problem?
   a. very interesting.
   b. moderately interesting.
   c. rather boring.
   d. extremely boring.

2. Do you think that the problem as a whole was
   a. very hard.
   b. moderately hard.
   c. moderately easy.
   d. very easy.

3. Were you satisfied with your performance AS A WHOLE?
   a. very satisfied.
   b. moderately satisfied.
   c. moderately dissatisfied.
   d. very dissatisfied.

Give reasons for your answer above.

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
4. Although you haven't been able to compare your performance with that of other subjects, how do you think your overall performance might compare with theirs?
   a. better than.
   b. the same as.
   c. worse than theirs.

5. Did your attitude toward the problem change at all during the experiment?  YES/NO
   5a. If so, in what way?

6. Do you think you could have done better than you did?
   a. much better.
   b. a little better.
   c. no better.
   d. worse than you did.

7. Give reasons for your answer to (6) above.
8. Did you feel you were getting the right answer without really knowing why?  
   YES/NO

9. Did you change your method of solving the problem?  
   YES/NO
   If so, approximately how often? ____________________________
   when?
   ____________________________
   ____________________________
   ____________________________
   why?
   ____________________________
   ____________________________
   ____________________________

10. Did you feel you were getting punished for no good reason?  
    Reasons for your answer.  
    YES/NO
    ____________________________
    ____________________________
    ____________________________
    ____________________________
    ____________________________
    ____________________________
    ____________________________
    ____________________________

11. Do you think that you attained a final solution to the problem?  
    What is it?  
    YES/NO
    ____________________________
    ____________________________
    ____________________________
a. What are your reasons for thinking that you have achieved a solution?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

12. Are you satisfied with your final answer? YES/NO

13. Do you think that there was a solution to be obtained from the problem? YES/NO

Why?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

14. What do you consider the purpose of the experiment to be?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

15. Did the problem itself seem to change in any way? YES/NO

If so, a. when?

________________________________________________________________________

________________________________________________________________________
16. On which of the three trials do you think you performed best?
   a. the first.
   b. the second.
   c. the third.

17. Do you think that there was more than one solution to the problem? YES/NO
   Why?

18. Which was the easiest of the three trials?
   a. the first.
   b. the second.
   c. the third.
   d. all the same.
   e. reasons for your choice above.
Fig. 19. Frequency distribution of M.A.S. scores of subjects in the sample.
Fig. 19. Frequency distribution of M.A.S. scores of subjects in the sample.
REFERENCES


Beier, E. G. Effect of induced anxiety on flexibility of intellectual functioning. Psychol. Monogr., 1951, 65(9), whole no. 326.


Burnham, D. L. Identity definition and role demand in the hospital careers of schizophrenic patients. Psychiatry, 1961, 24, (Suppl. to no. 2) 96-122.


Ciotola, P. V. The effect of two contradictory levels of reward and censure on schizophrenics. (Doctoral dissertation, University of Missouri) Ann Arbor, University Microfilms, 1961, No. 61-2278.


Duffy, Elizabeth. The psychological significance of the concept of "arousal" or "activation". Psychol. Rev., 1957, 64, 265-275.


Friedmann, A. S. Family therapy as conducted in the home. Fam. Proc., 1962, 1, 132-140.


Gordon, W. H., & Berlyne, D. E. Drive-level and flexibility in
 paired-associate nonsense-syllable learning. Quart. J.
 Exp. Psychol., 1954, 6, 181-185.

Green, E. J. Concept-formation: a problem in human operant

Guilford, J. P. Fundamental statistics in psychology and

Haley, J. An interactional description of schizophrenia.

Haley, J. The family of the schizophrenic: a model system.

Haley, J. Observations of the families of schizophrenics.

Haley, J. Control in psychotherapy with schizophrenics.

Haley, J. Family experiments: A new type of experimentation.

Haley, J. Whither family therapy? Fam. Proc., 1962 (a), 1,
 69-100.

Haley, J. Strategies of psychotherapy. New York: Grune & Stratton,
 1963.

Haley, J. Research on family patterns. An instrument measurement.

 1951, 97, 725-737.

Hallenbeck, P. N. An analysis of the power dynamics in marriage.
 J. Marr. & Fam., 1966, 28(2), 200-203.

Harlow, H. F. The formation of learning sets. Psychol. Rev.,
 1949, 56, 51-65.

Hassol, L. Margaret Ann & Cameron, W. The production of
 language disorganisation through personalised distraction.


Kempler, W., Iverson, R., & Beisser, A. The adult schizophrenic and his siblings. Fam. Proc., 1962, 1, 224-235.


Klee, J. B. Relation of frustration and motivation to the production of abnormal fixations in the rat. Psychol. Monogr., 1944, 56, whole no. 4.


Limentani, D.  Symbiotic identification in schizophrenia. Psychiatry, 1956, 19, 231-236.


Lyketsos, G.  On the formation of mother-daughter symbiotic relationship patterns in schizophrenia. Psychiatry, 1959, 22(2), 161-166.


Mental research institute for Palo Alto research foundation. Project - Family project in research, training and therapy. Annual Report for 1962.


Ricoh, D. Mck. The sense and the noise. Psychiatry, 1961, 24, (Suppl. to no. 2) 7-18.


Siegel, S. Level of aspiration and decision-making. Psychol. Rev., 1957, 64, 253-262.


Stierlin, H. The adaptation to the "stronger" person's reality: Some aspects of the symbiotic relationship of the schizophrenic. Psychiatry, 1959, 22(2), 143-152.


Addenda.

Frazee, H. E. Children who later become schizophrenic. Smith College Student Social Work, 1953, 123, 125-149.