6-1975

The Role of Extraversion and Introversion in an Instrumental Avoidance Task

Steven Finkelstein

Follow this and additional works at: http://digitalcommons.wku.edu/theses

Part of the Psychology Commons

Recommended Citation

http://digitalcommons.wku.edu/theses/2002
THE ROLE OF extraversion AND INTROVERSION
IN AN INSTRUMENTAL AVOIDANCE TASK

A Thesis
Presented to
the Faculty of the Department of Psychology
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Steven I. Finkelstein
June 1975
THE ROLE OF EXTRAVERSION AND INTROVERSION
IN AN INSTRUMENTAL AVOIDANCE TASK

Recommended [Signature]
(Date)

Director of Thesis

[Signature]

Approved [Signature]
(Date)

Dean of the Graduate College
Acknowledgements

My friends have helped me the most in the past two years. Without their presence and their acceptance of me, this paper would have far less meaning to me. The people I have met at this university have created a unique and moving experience. My friendships here will always have an important influence on me. I hope that this means of expressing my love will be accepted as genuine. I have been touched by the warmth of Danny and Diana Brown, Greg Wilmoth, Susan Fisher, Chuck Webb, Elliot Herman, Art Camplone, John Linden, Maureen Murphy, Doug Doyle, Lee Kraus, Ed Turner, and Anne Lee Paxton. I have truly felt loved and appreciated by these people. I wish that our experiences could continue.

A special thanks to Karl Bodtorf, who was able to maintain accuracy during a less than exciting procedure.

I also appreciate the help of chairman Carl Martray, who aided greatly in the creation of this dynamic and monumental requirement.

Thank you, Hans, for your theory.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Tables</td>
<td>v</td>
</tr>
<tr>
<td>Abstract</td>
<td>vi</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>3</td>
</tr>
<tr>
<td>Review of the Literature</td>
<td>5</td>
</tr>
<tr>
<td>Studies in support of Eysenck's theory of conditioning as related to personality</td>
<td>10</td>
</tr>
<tr>
<td>Problems in investigation due to the confounding variable of neuroticism (anxiety)</td>
<td>12</td>
</tr>
<tr>
<td>Studies failing to support Eysenck's theory of personality and conditioning</td>
<td>14</td>
</tr>
<tr>
<td>Summary of research dealing with Eysenck's theory of personality and conditioning</td>
<td>16</td>
</tr>
<tr>
<td>Method</td>
<td>19</td>
</tr>
<tr>
<td>Subjects</td>
<td>19</td>
</tr>
<tr>
<td>Instrument</td>
<td>19</td>
</tr>
<tr>
<td>Apparatus</td>
<td>20</td>
</tr>
<tr>
<td>Design</td>
<td>21</td>
</tr>
<tr>
<td>Procedure</td>
<td>21</td>
</tr>
<tr>
<td>Results and Discussion</td>
<td>23</td>
</tr>
<tr>
<td>References</td>
<td>29</td>
</tr>
</tbody>
</table>
List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Analysis of Variance of Mean Number of Correct Responses for Extraverts, Introverts, and Ambiverts</td>
<td>23</td>
</tr>
</tbody>
</table>
The role of extraversion and introversion in an instrumental avoidance task

Steven L. Finkelstein       June 1975       32 pages
Directed by: Carl Martray, Clint Layne, and Leroy Netze
Department of Psychology    Western Kentucky University

An instrumental avoidance conditioning task was used to test Eysenck's theory of personality and conditioning, which is based upon levels of cortical inhibition and excitation, characteristic of extraverts and introverts. Based upon Eysenck's theoretical stance, it was hypothesized that introverts would condition more effectively than extraverts. Several criteria defined by Eysenck for a proper test of his theory were followed. The Eysenck Personality Inventory was administered to 125 undergraduates at Western Kentucky University for purposes of separating personality types into classification groups of extraverts, introverts, and ambiverts. Thirty-six subjects were presented a series of 48 index cards on which were typed four pronouns and three verbs of neutral impression level. Each subject was asked to say aloud a sentence for each card using any one of the pronouns and any one of the verbs. A noxious buzzer was sounded after every other time a subject used either "they" or "we" in a sentence. These were considered "incorrect" sentences, while sentences using either "I" or "you" were considered "correct," and when used, indicated conditioning had taken place. The results showed no significant
differences in ability to condition between the three groups, thus rejecting the hypothesis under study. Several explanations were offered as to the reasons for introverts not showing greater conditioning than extraverts.
Introduction

One of the earliest theoreticians to use the terms extraversion and introversion as personality trait descriptions was Carl Jung in the 1920's (Allport, 1937). These descriptions have been used extensively since that time, and are now common terms among both professionals and laymen. Very briefly, the terms "extraversion" and "introversion" may be equated with "objective mindedness" and "subjective mindedness," respectively (Allport, 1937). According to Jung (cited in Allport, 1937), an extraverted individual may be described as one interested in the outer or objective world, who is spontaneous and real in his emotional expression, with an absence of self-analysis and self-criticism. In contrast, he described an introvert as a person who prefers an imaginary world, one whose expressions are clouded with subjective feelings, and who deals a good bit in self-analysis and self-criticism. A good deal of an extravert's behavior is in response to his environment, while the actions of an introvert are based more on his inner, subjective feelings. Jung felt that extraversion and introversion are characteristics which most people possess, but with few people actually possessing either a dominant extraverted or a dominant introverted tendency.
While Jung's descriptions were of ideal personality types, the tendencies to manifest these characteristics in behavior are possessed by every individual. Jung also expressed the belief that neuroticism (another commonly accepted trait) and extraversion-introversion are totally separate and independent variables (Allport, 1937).

Since the original description of these terms and the numerous follow-ups, there have been many tests and analyses used to measure the variable extraversion-introversion. Guilford's factor analysis helped extend the variable to a description of three variables. These are social extraversion, emotional dependence, and masculinity-femininity (Allport, 1937). The variables social extraversion and emotional dependence could best replace the single extraversion-introversion factor. Eysenck (1962) developed the Maudsley Personality Inventory based on item and factor analyses of Guilford's scales. Another statistician, Cattell (1957), has found two general descriptions of personality: extraversion and neuroticism. These are the main factors included in Cattell's 16 PF test (Cattell, 1949). Eysenck has noted that "Cattell has made it possible to measure neuroticism and extraversion in terms of his second order factor, and that these measures correlate reasonably highly with the neuroticism and extraversion measures of the MPI" (Eysenck, 1960a, p. 203). Thus, it appears that extraversion-introversion is a pervasive
personality dimension and that it has been successfully measured by a variety of tests and analyses.

The dimensions extraversion and introversion have been studied extensively since their conception, and especially so in the past 20 years by Hans Eysenck and his colleagues. A wide variety of tasks and procedures have indicated differing levels of performance and abilities between extraverts and introverts. For example, introverts are expected to produce more responses on the TAT than extraverts, and introverts have a higher level of persistance than do extraverts (Eysenck, 1960b). The work of Franks (1956, 1957) has been used by Eysenck to exemplify the differences between extraverts and introverts in conditioning tasks. Eysenck hypothesized, and Franks has shown, that introverts condition quicker than extraverts. But this issue, and the other tests of differences between the two personality types, remain in doubt. The evidence for many of these differences has received mixed support.

Statement of the problem

The present study will attempt to properly test Eysenck's theory of personality and conditioning. The contradictory results of other studies, and the desire to test a theory according to the demands of that theory, have initiated the present study. The problem to be examined is whether or not introverts condition more readily than extraverts. The study will use an instrumental avoidance
task of verbal conditioning, following certain procedures set forth by Eysenck (1959, 1965), and the conditioning technique used by Otis and Martin (1968). The hypothesis follows directly from Eysenck's theory. The hypothesis states that introverts, as measured by the Eysenck Personality Inventory, will condition more effectively (i.e., stronger and quicker stimulus-response associations) than will extraverts or ambiverts in a verbal conditioning task. These three groups will be compared, with the expectation that introverts will perform better on the conditioning task than the other groups.
Review of the Literature

Hans Eysenck has used factor analytic techniques in order to discover several of the principal dimensions of personality (Brody, 1972). Three of Eysenck's dimensions which have been studied extensively by other experimenters are extraversion, introversion, and neuroticism. Eysenck has described extraversion and introversion as they are measured by the Eysenck Personality Inventory (EPI) (Eysenck & Eysenck, 1968). The EPI manual states, in part, that high extraversion scores indicate that a person is outgoing, sociable, carefree, optimistic, not always reliable, and does not like to read or study by himself. The typical introverted person is quiet, introspective, reserved, reliable, likes a well ordered mode of life, and places great value on ethical standards. Eysenck (1957) has hypothesized that extraversion and introversion signify phenotypic sets of behaviors which are related to genotypic differences in the relative ease of cortical inhibition and excitation arousal. He has attempted to show that a major source of difference between these two personality types is the excitatory and inhibitory potential of the central nervous system. Excitation refers to the neural processes upon which the development of stimulus-response associations
depends. According to Eysenck's theory of personality and conditioning, individuals with strong excitatory potential would be more able to form stimulus-response connections than individuals with weak excitatory potential. Inhibition, in turn, is a change in cortical neurons which is responsible for unlearning and extinction. Inhibition makes the connection between a stimulus and a response more difficult (Eysenck, 1957). Eysenck has used the work of Hull and Pavlov in combination to form his description of inhibition (Brody, 1972).

Eysenck (1957) has formed two postulates relating to personality differences. The first postulate states that differences in physical structure is involved in creating stimulus-response associations. Individuals produce cortical excitation and inhibition in different amounts. Postulate II, referred to as the Typological Postulate, describes Eysenck's basic hypothesis:

Individuals in whom excitatory potential is generated slowly and in whom excitatory potential so generated are relatively weak, are thereby predisposed to develop extraverted patterns of behavior and to develop hysterical-psychopathic disorders in cases of neurotic breakdown; individuals in whom excitatory potential is generated quickly and in whom excitatory potentials so generated are strong, are thereby predisposed to
develop introverted patterns of behavior and to develop dysthyemic disorders in case of neurotic breakdown. Similarly, individuals in whom reactive inhibition is developed quickly, in whom strong reactive inhibitions are generated, and in whom reactive inhibition is dissipated slowly, are thereby predisposed to develop extraverted patterns of behavior and to develop hysterical-psychopathic disorders in case of neurotic breakdown; conversely, individuals in whom reactive inhibition is developed slowly, in whom weak reactive inhibitions are generated, and in whom reactive inhibition is dissipated quickly, are thereby predisposed to develop introverted patterns of behavior and to develop dysthyemic disorders in case of neurotic breakdown (p. 114).

This postulate expounds Eysenck's belief that introverts condition, or generate excitatory potential, more quickly than do extraverts.

Eysenck (1967) later described excitation and inhibition as hypothetical constructs which refer to certain observable phenomena, but are not themselves observable. Excitation is a cortical process of an unknown character which facilitates learning, conditioning, memory, and perception, while inhibition has the opposite effect of reducing the efficiency of the cortex. A build-up of
inhibition will result in an involuntary cessation of responding and a decrease in performance of a particular task.

Claridge (1960) has investigated the relationship between personality and conditioning, using a variety of experimental measures of perception, attention, and learning. He found, with few exceptions, evidence which confirmed Eysenck's hypothesis that dysthymics (introverted neurotics) would condition more effectively than hysterics (extraverted neurotics). Claridge suggested that dysthymics would behave in a manner suggesting low levels of inhibition.

Eysenck's assumptions concerning excitation and inhibition follow from Pavlov's theory and experiments (Pavlov, 1927). Pavlov studied the behavior of dogs and the excitation, irradiation, and inhibition of brain stimulation. While Pavlov's theory explaining the operation of the cortex is apparently useful and relevant, it has been criticized for several reasons. The strongest criticism is that concepts concerning cortical physiology should be based on more direct observation of the cortex instead of observing and measuring overt movements or the amount of saliva secreted (Kimble, 1961). In describing "sanguine" and "melancholic" types of dogs, Pavlov described behaviors which are similar to Eysenck's "extraverted" and "introverted" people, respectively. Eysenck (1957) has noted that there are contradictions in Pavlov's theory, and
that it is not a proper theory of personality. Pavlov simply points out certain analogies and possible methods of research in the fields of normal and abnormal personality. Instead of making rigorous deductions, Eysenck used Pavlov's conditioning experiments as analogies to studies of humans. It should be pointed out that the criticisms of Pavlov's procedures may in some cases also pertain to Eysenck's research. In any case, as will be reported, Eysenck has devised a theory of personality based on his observations of different types of people in a variety of situations.

Eysenck (1957) proposed to test his personality theory by examining the conditionability of individuals. A provision of the theory is that the optimal degree of excitation has not yet been reached in the cortex. However, as he has pointed out, this requirement is not likely to be met in normal, rested subjects, so emphasis is placed on the inhibitory phenomena (Eysenck, 1965). The expectation is that differences between extraverts and introverts will emerge only when conditions for maximal inhibition have been arranged. These conditions are as follows: Partial as opposed to continuous reinforcement; weak as opposed to strong stimuli; and discrimination as opposed to single stimulus conditions (Eysenck, 1965). When these conditions for the accumulation of inhibitory potential are met, then a significant difference between the conditioning of extraverts and introverts will emerge. In summary, Eysenck (1957)
stated that "inhibitory potential is expected to be generated during the unreinforced trials interspersed with the reinforced trials" (p. 125).

The present paper will review the literature and present a study relating to Eysenck's theory of personality. Studies showing both confirmation and denial of the veracity of the theory will be examined, as well as the procedures necessary to properly test Eysenck's theory as he has stated these procedures and criteria.

Studies in support of Eysenck's theory of conditioning as related to personality

Eysenck (1959) has used verbal conditioning experimentation to test his theory of personality and conditioning. The MPI was administered to 137 male and female neurotics, and an extraverted and introverted group was formed. By using extreme extraverts and extreme introverts, Eysenck expected to deal with only these variables instead of the neuroticism variable. After the selection procedure the subjects were presented a series of 100 index cards on which the pronoun "they" and three verbs were typed. One of the verbs referred to muscular activity, such as "run" or "swim." Subjects were then asked to say a sentence for each card using the word "they" and a verb of their choice from the three listed. The verb which referred to a muscular activity was the one which the examiner wanted the subject to select. If a subject did use one of these verb
types in a sentence he was reinforced by the examiner saying "hm-mm." An analysis of the difference between the two groups indicated that introverts conditioned more readily than extraverts. This supported Eysenck's earlier theory of a positive relationship between introversion and conditionability.

Earlier studies by Franks (e.g., 1956, 1957) produced results which helped form Eysenck's later writings. Franks used eyeblink conditioning (as did Eysenck in many later studies) with 20 dysthyms (introverted neurotics), 20 hysterics (extraverted neurotics), and 20 normal subjects. Dysthyms showed quicker conditioning than the other groups, the hysterics slower conditioning. According to Eysenck (1957), if it can be assumed that the relevant dimension involved when comparing dysthyms with hysterics is extraversion-introversion (rather than neuroticism), then these results support Eysenck's theory. The second study by Franks showed a difference between normal, not neurotic subjects.

A later study also found results favorable to Eysenck's theory. Hekmat (1971) examined the influence of extraversion-introversion on conditioning the verbalization of self-disclosures. Based on the Eysenck Personality Inventory, the following groups were formed: Neurotic extraverts; stable extraverts; neurotic introverts; and stable introverts. A control group was also used. All subjects were
involved in a task in which they had an opportunity to express a feeling they were experiencing. The procedure was for the examiner to say "good" when a subject began a sentence with the words "I feel" and expressed a feeling. The control group received no reinforcement. Using a factorial design, Hekmat found that introverted subjects showed significantly stronger conditioning effects than did extraverts. Introversion was also found to facilitate conditioning more than did neuroticism. Hekmat related these findings to therapy situations, in that teaching a patient to go from negative to positive self-disclosures would be easier for an introvert, based on his relative ease of conditionability.

Problems in investigation due to the confounding variable of neuroticism (anxiety)

Several studies have investigated the neuroticism (anxiety) dimension along with extraversion-introversion. Spence and Taylor (1953) proposed that there is a positive relationship between eyeshift conditioning and anxiety. This theory, like Eysenck's, uses concepts derived from Hull (1943). Eysenck has criticized Spence and Taylor's work because the scale they use (the Taylor Manifest Anxiety Scale) measures introversion as well as neuroticism (Eysenck, 1957). Eysenck stated that the greater conditioning might reflect the conditionability of introverts, not necessarily neurotics. He also stated that Spence and
Taylor do not contribute to a theory of personality because they do not differentiate between the variables neuroticism and introversion. Relating to this item, and to the present paper, Eysenck (1967) pointed out a precaution in dealing with tests of his theory. The dimensions extraversion-introversion and neuroticism must be kept apart. Comparing dysthymic neurotics with normals, or anxious subjects with nonanxious ones makes it impossible to attribute differences to either neuroticism or introversion. An example of a violation of this precaution was a study by Otis and Martin (1968). They used a factorial design to study the interaction between extraverts and neurotics on an avoidance task. The results showed a significant interaction between the two variables. However, as far as Eysenck's theory of personality is concerned, the interaction makes it impossible to attribute the difference between the groups to either extraversion or neuroticism.

Costello (1967) tested both Eysenck's position and that of Spence and Taylor, but anxiety and extraversion did not interact as in the previously mentioned study. Costello investigated the variables extraversion, introversion, and neuroticism using what Costello referred to as the classical conditioning of connotative meaning. The MPI was administered to 180 students prior to the conditioning session. From this group, 40 subjects were chosen to take part in the study on the basis of their scores on the neuroticism and
extraversion scales of the MPI. Four groups were formed: ten subjects with high extraversion scores; ten subjects with low extraversion scores; ten subjects with high neuroticism scores; and ten subjects with low neuroticism scores. The conditioning procedure consisted of pairing words of a variety of connotative meanings (i.e., positive, negative, passive and active words) with, respectively, the words wet, thick, wide, and long. These four words were used as conditioned stimuli; and when paired with the UCS words (positive, negative, etc.), the experimenter determined how often the CS words acquired the connotative meanings of the UCS words for each subject. The results of the task suggested that Eysenck's theory would better predict individual differences in conditioning than would Spence's theory. The differences in scores for the high and low neurotic subjects was not significant, providing no support for the theory of Spence and Taylor.

Studies failing to support Eysenck's theory of personality and conditioning

Although research seems to support Eysenck's theory of a positive relationship between introversion and conditioning, studies have not provided evidence of this relationship. McDowell and Inglis (1962) studied Eysenck's theory of a correlation between extraversion, introversion, and conditioning. The experiment dealt with verbal operant conditioning using 60 undergraduate students. The MPI was
administered to all subjects and the extraversion scale was used to divide the subjects into high and low extraversion groups. Subjects were then asked to form sentences using verbs which were typed on stimulus cards. The experimenter reinforced sentences beginning with the words "I" or "we" by saying "good." The results did not support the hypothesis that this form of operant conditioning is related to extraversion-introversion in either the acquisition or the extinction trials.

Gelfand and Winder (1961) also failed to find support for differences in ability to condition. Dealing with neurotic introverts and neurotic extraverts, the study examined the possibility of a relationship between conditioning of verbal behavior and type of neurosis. The hypothesis followed that of Eysenck (1957) which stated that dysthymic neurotics should condition more readily and stably than hysterical neurotics, in this case using an acquisition and counter-conditioning task. Ten female dysthymsics and 16 female hysterics were the subjects. Guilford's R scale was used as a measure of extraversion. One hundred sixty commonly used verbs were randomly selected for the study, along with these six pronouns: I, we, he, they, she, and you. Subjects were asked to form a sentence with a specific verb and any pronoun on the list. After an operant level of responding was reached on the first 20 trials, 60 acquisition trials followed. The experimenter reinforced the subjects by
saying "good" following sentences that began with the words "I" or "we." The findings did not support those of Franks (1956, 1957) or Eysenck (e.g., 1959, 1960b) which reported a relationship between extraversion-introversion and conditioning. Gelfand & Winder (1961) felt that it was possible to choose groups which differed in their ability to condition, but it was not yet possible to define the relevant psychological variables upon which the groups differed.

Knowles (1963) tested the hypothesis that the degree of conditioning is inversely related to the personality variables of rigidity and extraversion, based on the theories of Cattell and Eysenck, respectively. The study used a verbal conditioning task, as described previously (see Gelfand & Winder, 1961). Following the experiment, all subjects (36 psychoneurotic patients) were given the Wesley Rigidity Inventory and the MPI. The results showed performance in the predicted direction for both personality types, but there was no significance. Thus, those subjects low in rigidity did not perform significantly better than subjects high in rigidity, and those subjects low in extraversion did not perform significantly better than subjects high in extraversion.

**Summary of research dealing with Eysenck's theory of personality and conditioning**

The results of studies dealing with Eysenck's theory of personality and conditioning have been contradictory
(especially studies other than Eysenck's own). Those studies which have not supported his theory have been questioned by Eysenck for a variety of reasons. As he has pointed out, in order to test his theory in a suitable manner, conditions in an experiment must favor the development of inhibition (Eysenck, 1965). When these procedures are carried out, then introverts should be shown to condition more readily than extraverts. Eysenck has incorporated these procedures into his experiments (Eysenck, 1960b) and has found better conditioning of introverts. A good example of a study which did not properly follow Eysenck's directions was one done by Sweetbaum (1963). This study indicated no significant differences in ability to condition between introverts and extraverts. An eyeblink conditioning task was used, but the experimenter failed to use partial reinforcement, a condition necessary to test Eysenck's theory. Sweetbaum (1963) reinforced 90 percent of the trials, hardly "partial" reinforcement. Several other studies quoted in the present paper have not provided enough information to determine their procedure in detail (e.g., McDowell & Inglis, 1962). Also questioned by Eysenck has been the use of personality tests other than the EPI or MPI, which are highly correlated (Eysenck & Eysenck, 1968). Using other scales could result in groups of subjects which are not extraverted or introverted according to Eysenck's descriptions. Finally, as has been pointed out, an
examination of the interaction between extraversion-introversion and neuroticism creates a situation in which it is difficult to determine which variable was responsible for differences in conditioning.

Eysenck has found support for his theory as a result of his own research (1957, 1959, 1960a, 1960b, 1967), the research of Franks (1956, 1957), and of others (see Eysenck, 1965). The present paper has reviewed studies both favorable and unfavorable to Eysenck's hypotheses in verbal and eye-blink conditioning tasks. Eysenck has related his positive findings dealing with conditioning and personality to socialization processes. For example, the introvert is likely to be governed by ethical and religious ideals, and to avoid behavior that might incur social disapproval more so than the extravert (Brody, 1972). This is based on his greater conditioning potential. Since moral training and socialization depend largely on the acquisition of instrumental avoidance and conditioned fear responses, the relative ease with which the introvert conditions will make him properly socialized, perhaps oversocialized (Berlyne, 1968). The literature, however, is lacking in studies of extraversion-introversion and avoidance conditioning.
Method

Subjects

The subjects were 36 students (both male and female) enrolled in undergraduate psychology courses at Western Kentucky University. Subjects were selected from a group of approximately 125 students who volunteered to take a personality inventory. Those students selected were chosen on the basis of their scores on the Eysenck Personality Inventory. All students were administered the EPI, and those chosen to take part in the study were told that it was because of their scores on the test. Those not chosen were given the same explanation (i.e., their scores failed to meet the criterion for selection.

Instrument

The instrument used was the Eysenck Personality Inventory (EPI), form A. The EPI is a revision of the Maudsley Personality Inventory. The two tests are highly correlated (Eysenck & Eysenck, 1968). The EPI assesses an individual's personality in terms of two scales: extraversion-introversion and neuroticism-stability. Also, there is a lie scale to detect false responding. The instrument is a forced-choice questionnaire, with 24 items pertaining to the extraversion scale, 24 items on the
neuroticism scale, and nine items on the lie scale. The entire questionnaire was administered to the initial 125 subjects, although only the extraversion-introversion scale was used for this study. This scale yields a score indicating high or low extraversion (or extraversion and introversion for purposes of this study).

The EPI manual (Eysenck & Eysenck, 1968) provides test-retest reliability of "normal" English people. The correlations range from +.80 to +.97. Platt, Pomeranz and Eisenman (1971) validated the EPI against the Minnesota Multiphasic Personality Inventory (MMPI) and the Internal-External Control Scale. Eleven hundred seventy-seven freshman college students were administered the three tests. The EPI's extraversion scale was correlated with the MMPI's social introversion scale for both males ($r = -.58$, $p < .005$), and females ($r = -.63$, $p < .005$). Additional correlations supported the construct validity of the EPI.

**Apparatus**

The apparatus for the present study was 48 index cards on which were typed four pronouns (They, I, We, You) and three verbs. The same pronouns were on each card (at the top) with a variety of different verbs typed on the bottom of each card. A study by Dixon and Dixon (1964) dealing with verb impression level was used as an aid in the selection of verbs. Dixon and Dixon found that the verbs they studied tended to be classified by college students as either "good,"
"bad," or "neutral." The present study selected from among those verbs found to be "neutral," or which had neither good nor bad connotations. The use of these verbs was expected to eliminate the verb type on the cards as an important variable. Also used for the study was a buzzer which was connected to a 12 volt battery.

Design

A one-way analysis of variance was used to analyze the differences in the mean number of "correct" responses for introverts, extraverts, and ambiverts. The independent variable was the group each subject was in. The dependent variable was the responses of the subjects on the conditioning task.

Procedure

The 125 subjects were initially administered the EPI and 36 subjects were selected to take part in the experiment on the basis of their scores. The criterion for selection as a subject were the scores on the extraversion-introversion scale of the EPI. Twelve introverted, 12 extraverted, and 12 ambiverted subjects were selected. Introverts were considered those subjects whose extraversion score was nine or below, extraverts were those subjects whose extraversion score was 18 or above, and ambiverts were considered those subjects who obtained a score of either 13 or 14 on the extraversion scale. The mean for the scale is 13.1 for American college students, with a standard deviation of 4.1.
Following the selection procedure, each subject began the conditioning phase. For each of the 48 index cards, subjects were asked to say aloud a sentence using any one of the pronouns and any one of the verbs. They were told that they would hear a loud buzzer following certain sentences and would not hear the buzzer after certain other sentences. At this point, the experimenter rang the buzzer for one second to illustrate his explanation. The buzzer was placed on the table near the subject, and most subjects reported that it was quite aversive.

Every other sentence which included the words "we" or "they" caused the buzzer to sound, while sentences which included the pronouns "I" or "you" did not cause the buzzer to sound. The verbs that the subjects used had no bearing on whether or not the buzzer sounded. Sentences using the pronouns "we" or "they" were considered "incorrect," and sentences which included the pronouns "I" or "you" were considered "correct." The sounding of the buzzer was on a fixed ratio schedule of 2:1 (see Eysenck, 1965). The buzzer duration was approximately one second. The first eight trials were used to obtain an operant level of responding with the conditioning procedure taking place after the eighth trial. Following the 40 trials the experimenter counted the number of sentences which used the pronouns "I" or "you" for each subject.
Results and Discussion

The mean number of responses for each group were compared using a one-way analysis of variance. The results of the analysis are shown in Table 1.

Table 1

Analysis of Variance of Mean Number of Correct Responses for Extraverts, Introverts, and Ambiverts

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>1.865</td>
<td>0.0537</td>
</tr>
<tr>
<td>Within Groups</td>
<td>33</td>
<td>34.732</td>
<td></td>
</tr>
</tbody>
</table>

The results do not show a significant difference in performance for the three groups, \( F(2, 33) = 0.0537, p > .05 \). The mean number of correct responses for the extraverted, ambiverted, and introverted groups were 23.5, 24.1, and 24.3, respectively. This suggests that the overall performance on the task was virtually the same for the three groups. The means refer to the number of times each subject used either "I" or "you" in a sentence. When these pronouns were used more often than the other two pronouns, it was considered an indication that conditioning had taken place.
The hypothesis under study was thereby rejected. That is, introverts did not condition more effectively than either ambiverts or extraverts on an instrumental avoidance task. Eysenck's hypothesis (1965) of a difference in abilities to condition between extraverts and introverts was not confirmed in this study. There may be several explanations for these findings, based on this experiment's methodology and Eysenck's theory.

First, the sample used for the present study may have been quite a bit different from the subjects used by Eysenck or other experimenters. Eysenck's studies (e.g., 1959, 1967) were carried out in English schools and universities. The present study used subjects from a university in the southern United States. These students may differ greatly in social background from the English students. These and other variables probably affect personality styles and performance on conditioning tasks.

Related to this, it is also possible that the aversive stimulus was not aversive enough to affect responding. The buzzer used was attached to a 12 volt battery, while Otis and Martin (1968) used a six volt motorcycle horn operated on 24 volts. The majority of the subjects reported that the buzzer in the present study was aversive, although many did say that they became accustomed to the noise after a short time.
Another explanation for the results of the present study pertains to the number of cards used, which was 48. This number was in comparison to the 100 cards used by Eysenck (1959), and the 80 used by Gelfand and Winder (1961), although these studies dealt with positive reinforcement. The first eight index cards were used to gain an optimal level of responding, and no reinforcement occurred at that time. Perhaps 48 was not a sufficient number of trials for conditioning to take place. But, ideally, the differences between extraverts and introverts should be shown with a small number of cards, and with subjects from a variety of backgrounds. The experimental conditions and selection procedures proposed by Eysenck (1965) were followed so that one would expect differences to be shown in abilities to condition.

The final two possible explanations are apparently the most crucial and merit the most debate, both here and in future studies. The only previous reference to aversive conditioning dealing with Eysenck's theory was a study by Otis and Martin (1968). The present study was carried out in a similar fashion, with a few modifications. Otis and Martin found a significant interaction between neuroticism and extraversion—introversion, using a noxious stimulus which was louder than that used here. This provided Otis and Martin the opportunity to examine the interaction between anxiety and extraversion—introversion. Their procedure and the
decibel level of the sound they used appeared to elicit enough anxiety so as to deal with the neuroticism (anxiety) variable. On the other hand, the buzzer used in this study was expected to effect each group equally. It was used as a source of information which the subjects could use in learning the task. Thus, differences in reaction to the noxious stimulus, it was felt, would not be apparent and would not differentially effect subject's abilities to condition. It was merely a technique with which to create conditioning, based solely on the personality dimension extraversion-introversion, and not neuroticism.

This leads to the matter of using different types of conditioning in testing Eysenck's theory. Those studies examining the differences in abilities to condition among personality types have mostly used eyeblink and verbal conditioning. The experimenters include Franks (1956), Eysenck (1959), and Costello (1967), among many others. The variety of conditioning tasks under study have yielded results both favorable of and rejecting Eysenck's original research and its implications. Eysenck's 1965 article thoroughly dealt with eyeblink and GSR conditioning studies in terms of his criteria for properly examining his theory. He described the suitable experimental conditions to follow in order to test his theory. Eysenck noted that a general statement about personality could not as yet be made covering different conditioning techniques (1965). However,
he does use general terms to explain that when conditions in an experiment are manipulated so as to produce inhibition, introverts will be shown to condition better than extraverts (Eysenck, 1967). In this and other writings, Eysenck includes verbal conditioning as a test of his theory (see Eysenck, 1959). The present examination of Eysenck's theory attempted to further the evidence for or against the theory using a technique rarely used. The verbal conditioning procedure has been extensively studied, though not with an aversive technique. The present study was an attempt to generalize to a greater extent the available evidence of tests of Eysenck's theory. Also, it studied an important area mentioned by Eysenck but not experimentally tested by him. That is, the belief that introverts acquire both instrumental avoidance and conditioned fear responses easier than do extraverts (Berlyne, 1968). Most studies have dealt strictly with positive reinforcement and conditioning with the exception of Otis and Martin (1968) and the present investigation.

The final area of discussion deals directly with the accuracy and validity of Eysenck's theory. Eysenck (1965) stated explicitly that procedures as he has described them and as followed in his earlier studies must be followed in order to study his theory. The present study attempted to do this and found negative results. Eysenck also stated that changing the variables may be an important way to test
his or any other theory, but he does not seem convinced of this or interested in research other than replications of his own. Eysenck remains convinced that following his procedures exactly will ultimately confirm the results his theory is based on, even though the evidence is still contradictory. Several explanations have been proposed for the present study's failure to show better conditioning of introverts. None of these suggestions can adequately explain why the results were as they were. One can only say that using a sample of American college students from a southern university, introverts were not determined to be able to condition more effectively than either extraverts or ambiverts. Perhaps the implications should include the fact that these results may occur very frequently, and that Eysenck's theory is inaccurate. At this time, the results of studies dealing with Eysenck's theory lead one to lose confidence in the accuracy and usefulness of his personality theory as it relates to conditioning. The present study adds to the confusion and leads to the conclusion that the likelihood of the theory being invalid is as great as the likelihood of it being valid for American students.
References


