

SOCIAL FACILITATION THROUGH A ONE - WAY SCREEN

by

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Abstract

The study examines the effects of being observed via a one-way screen on individuals' ability to learn competitive and non-competitive lists of paired associates. A between-groups design was used, with different subjects serving in each of the four experimental groups. The study was initially carried out with male business administration students at the University of Washington and was repeated with student nurses at the University of British Columbia. All subjects were administered the Manifest Anxiety Scale (Taylor, 1953) and the Suspiciousness Scale (Endicott et al., 1969). The results showed that the male subjects were not significantly affected by observation from behind a one-way screen but that the females made significantly more errors on the competitive list when observed as opposed to when not observed. In learning the non-competitive list the females were also not affected by observation, but the overall observation-by-list interaction was significant for the females. No relationships were found between performances on the experimental task and the Manifest Anxiety Scale scores for either males or females. Suspiciousness Scale scores were significantly and negatively related to the number of errors made by the males when the four experimental groups were combined; this relationship approached significance for the females.

Implications for further research are discussed.

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CHAPTER I

REVIEW OF THE LITERATURE

The presence of others affects the behaviour of individuals, and this phenomenon has been called "social facilitation" (Allport, 1924). The concept of social facilitation encompasses two different types of social situations, the audience situation and the coaction situation. In the coaction situation other individuals are present behaving simultaneously and independently of the subject, but are participating in the same activity (Allport, 1924). In the audience situation passive spectators observe the subject (Cottrell, in Simmel, 1968). This study focuses on the audience situation and all further references to social facilitation will refer to the audience situation unless otherwise specified.

Social facilitation within the audience setting has been the focus of psychological research periodically since 1925 when Travis found that an audience improved the subjects' ability to perform a pursuit rotor task. Wapner and Alper (1952) obtained similar results using a choice situation as the task. Contrary to these findings, Pessin (1933) found that an audience impaired the subjects' learning of nonsense syllables, and Husband (1931) obtained similar results with finger maze learning. Conflicting results have also been obtained from co-action studies (e.g., Allport, 1924; Dashiell, 1930).

Zajonc (1965) formulated a hypothesis based on Hull-Spence drive theory to account for the apparently contradictory results. He suggested that the presence of others increases an individual's general drive level, thus enhancing the most dominant responses at the expense of less dominant responses. It follows from this hypothesis that behaviours well-learned and familiar to individuals would be enhanced by the presence of others. When such behaviours are demanded by a given task, the individual's performance would therefore be improved. On the other hand, if new, less familiar behaviours were required for the performance of a given task, facilitated, dominant behaviours would interfere with these and thus hinder the subjects' performance. This hypothesis seemed to account for the existing seemingly contradictory results. Audiences had enhanced individuals' performances in such familiar and/or habitual tasks as lifting a weight (Meumann, in Zajonc, 1968), a pursuit rotor task after extensive training (Travis, 1925), and simple multiplication (Dashiell, 1930). Passive spectators have been found to impair individuals' performances on tasks requiring less familiar behaviours and/or responses such as the learning of nonsense syllables (Pessin, 1933) and the learning of a finger maze (Husband, 1931).

More recently research has specifically focused on testing Zajonc's hypothesis. It was first tested by Zajonc and Sales (1966). They used a pseudo-recognition task in which subjects were instructed to guess at the recognition of a word supposedly flashed by a tachistoscope on a screen. Since on

the critical test trials no word was actually exposed, the subjects' responses were a function of their previous differential training which had been used to establish habits of differing strengths. The results obtained were consistent with Zajonc's hypothesis: "the probability of dominant responses was found to be higher for subjects working in the presence of an audience than for those working alone. The opposite result was observed for subordinate responses" (Zajonc & Sales, 1966, p.160). Cottrell et al. (1967) tested the same hypothesis using a different task which fitted their specifically stated criteria: "the task must have clear-cut accuracy criteria; it must be independently classifiable as either having correct responses in a position of dominance or as eliciting strong, incorrect response tendencies; and it must have been independently validated as a behavioural indicator of variations in general drive level" (Cottrell, et al., 1967, p.426). The task used was the learning of competition and non-competition lists of paired associates that had been developed by Spence et al. (1956). Spence et al. had demonstrated that under high drive levels (as determined by the Manifest Anxiety Scale, hereafter referred to as the MAS) subjects made more errors on the competition lists (where dominant responses were not correct) and fewer errors on the non-competitive list (where dominant responses were correct). Thus the task met all three requirements of Cottrell et al. stated above. Spence et al. had met the criteria by examining the performances of subjects scoring high versus low on the MAS. Those scoring high, indicating a high drive level, performed

better on the non-competitive list and worse on the competitive list than did those subjects scoring low on the MAS. This finding has been replicated by others who used the MAS as a measure of drive level. It has also been replicated using drugs and electric shock to manipulate drive level (Cottrell et al., 1967).

In the Cottrell et al. study the paired associates were presented on a memory drum. The experimenter was always present and the audience was introduced as "some people interested in this (experiment)". They did not obtain the predicted results with all their subjects; but had to split their experimental groups into slow, medium, and fast learners. This decision was based on work by Katahn (1966) indicating that for some present-day college students who are exceptionally good at paired associate learning, the older competitive lists of Spence et al. (1956) are not sufficiently competitive. This division yielded significant results, as predicted, for slow and medium speed learners. Under observed conditions these tended to do better on the non-competitive list and worse on the competitive list than when not observed. Level of performance was determined by the number of errors made in reaching a criterion of two consecutive errorless trials.

Cottrell, Wack, Sekerak, and Rittle (1968) attempted to refine Zajonc's original hypothesis which stated that the "mere presence" of others elevates an individual's drive level and thus induces social facilitation. They incorporated two types of observation conditions using the pseudo-recognition

task originally employed by Zajonc and Sales (1966). Under one audience condition the audience confederates entered as subjects for another experiment and obtained permission to watch the experiment in progress. Under the alternative audience condition the confederate subjects were blindfolded on the pretense of having to adapt to dark conditions for a subsequent color-perception experiment. Again the experimenter was present in all conditions. They found that the mere presence of non-observing individuals did not enhance the emission of dominant responses but that the presence of those who could evaluate the subjects' performances did enhance dominant responses. The results of the mere presence condition were very similar to those of the alone condition.

Cottrell (in Simmel et al., 1968) explains these results in terms of social learning theory and conditioning. "I believe the additional process involved (besides the mere presence of others) is the anticipation of positive or negative outcomes; the presence of others has nondirective energizing effects upon performance only when their presence creates anticipation of positive or negative outcomes" (Cottrell, in Simmel et al., 1968, p.103). He suggests that individuals learn through experience (e.g., in school, with parents, etc.) that those observing one's performance usually express an evaluation of it. He hypothesizes further that this anticipatory reaction to observer evaluation is established through classical conditioning. He supports this suggestion with evidence from animal research which indicates that social

facilitation of eating responses is a learned behaviour (James and Gilbert, 1955; Harlow, 1932; James, 1960; all in Simmel et al., 1968). He also points out that his explanation fits more adequately the findings of Dashiell (1930) that subjects working under coaction conditions but assured of no interpersonal comparisons of performance did not yield the social facilitation effects found when interpersonal competition was emphasized. This learned drive hypothesis appears to be the most parsimonious explanation for the phenomenon of social facilitation at the present time.

Outside this nucleus of basic studies focusing on social facilitation by Zajonc and Cottrell and their colleagues, there are a number of more isolated but interesting relevant studies. Wilson (1968) examined the effects of observation on groups writing human relations stories. It was found that under observation (the observer sitting in the room with the group) there were higher rates of communication and of "task-oriented interaction" than in the non-observed groups, but that actual productivity was higher in the non-observed groups. If it is assumed that task-oriented responses are most dominant in such situations, their facilitation by an observer fits the model suggested by Zajonc (1965) and Cottrell (1968). Chase (1967) studied the effects of direct observation on fourth grade boys' performances on the Information, Arithmetic, and Vocabulary items of the Wechsler Intelligence Scale for Children. No significant differences between observed and non-observed conditions were found. On these tasks there are both

very easy items (non-competitive) and very hard items (competitive) and thus the differential effects of observation could have cancelled each other out. The author does not mention this possibility, but concluded that "the presence or absence of an inactive observer did not affect problem solving behaviour for 'normal' boys in a structured testing situation" (Chase, 1967, p.3322).

In the studies reviewed up to this point, individual differences in personality characteristics and resulting differential effects of being observed have largely been ignored; and the observer(s) has always been physically present to the subjects during the observation. A number of studies have examined the effects of being observed by individuals who are not physically present and the different effects of such observation on individuals with varying scores on personality scales. Ganzer (1968) examined the effects of observation from behind a one-way screen on the serial learning of nonsense syllables by individuals as a function of their Test Anxiety Scale score (hereafter referred to as the TAS; Sarason, 1960). The performances of subjects with high and middle TAS scores were impaired by observation from behind a one-way screen, the subjects with the high TAS scores being impaired the most. The performance of the low TAS scorers was not significantly affected by such observation. (The fact that the low TAS scoring subjects did best in all conditions suggests that Cottrell (1967) may have unknowingly separated out low-anxious individuals when he found that his facilitation results held

only for his slow and medium learners and not for his fast learners). Ganzer (1968) explains his results in terms of a

"... habit interpretation of anxiety (Child, 1954; Sarason, 1960) which states that high and low scorers on anxiety scales differ in the kinds of response tendencies aroused by evaluative or personally threatening situations. High scorers respond to threat with habitual, personalized responses of a self-deprecatory, critical nature. These self-preoccupations are essentially task irrelevant and interfere with efficient learning and performance. On the other hand, low scorers do not respond in this manner and may be expected to react to threat or stress with increased effort and attention".

(pp.197-198). This hypothesis complements Cottrell's hypothesis in terms of anticipation or threat of evaluation and social facilitation. A further interesting result of this study was that the effects of observation were not found when subjects relearned the same material on a second day. Whether this was due to adaptation to the experimental situation or to the fact that the task was significantly easier on the second day (the required responses being more dominant) is not known. However, Ganzer suggests the adaptation interpretation. These two possibilities could be complementary if adaptation was due to the change in dominant responses. Robe (1967) also attempted to examine the relationship between test anxiety and the effects of being observed but obtained no significant results.

Moos (1968) studied the effects of observation via a wireless radio transmitter on inpatients' behaviour in a hospital ward setting. He found very minor effects but there was a tendency toward more purposeful and less purposeless behaviour when being so observed. Also the results suggested that observation had the greatest effect on individuals scoring

lower on the Correction (K) scale and higher on the Psychopathic Deviate (Pd), Paranoia (Pa), Schizophrenia (Sc), and Hypomania (Ma) scales of the Minnesota Multiphasic Personality Inventory (Hathaway and McKinley, 1942). Again this illustrates evidence of individual differences in reactions to being observed.

Wapner and Alper (1952) compared the effects of direct observation (i.e. subjects could see observers) with those of observation from behind a one-way screen. Three conditions were employed with the experimenter present at all times. Under the non-observation conditions the screen was covered by curtains; under direct observation, observers could be seen behind the mirror since the observation room was illuminated; under the unseen audience condition the observation room was dark so that the observers behind the screen could not be seen by the subjects. The instructions to the subjects were either task-oriented, emphasizing that the task itself was the focus of the study rather than the subject himself; or ego-oriented, emphasizing that the subject's personality was being assessed. Both males and females participated. The task consisted of choosing one of two alternative words to complete a given phrase. The phrases varied in both difficulty (easy and difficult discriminations) and orientation (personality oriented and impersonal discriminations). Decision time and adaptation to observation (early versus late trials) were examined. Decision time was found to be longest when the observers were not visible and shortest with no audience, with the results for the visible audience being intermediate between these two groups. These results held only for the first half of the experimental session, indicating

adaption to the observation and/or that the initially unfamiliar task had become more habitual. There were no significant interaction effects between the type of audience and the other variables. These results do not obviously fit the Cottrell social facilitation hypothesis. However, if it is assumed that a dominant response for college students is to stop and think about decisions, then these results do fit the hypothesis.

Apart from the experiments mentioned above, a few studies have been carried out in psychiatric settings which have examined the effects of being observed through recordings and films (Haggard et al., 1965; Lamb and Mahl, 1956; Redlich et al., 1950; Sternberg et al., 1958). An unpublished summary of these findings (Criddle, 1968) revealed that patients are less disturbed than are therapists by the recording devices. As well as being more disturbed themselves, therapists tend to exaggerate the patients' anxiety, but there is no evidence that the devices directly hinder patient-therapist interaction. There is some evidence that both patients and therapists adapt quite quickly to such devices. However, most of the above mentioned studies fall short of strict experimental criteria. Haggard et al. (1965) used only four subjects (three experimental, one control) and four different therapists. Redlich et al. (1950) and Lamb and Mahl (1956) presented no quantitative data, but only subjective impressions of their subjects. Sternberg et al. (1958) did not actually record or observe their subjects, but questioned them about the hypothetical situation of being observed. Only one study (Haggard et al., 1965) used the two

conditions of being observed and not being observed for comparison. Thus those who advocate or oppose the use of specific types of recording techniques in psychiatric settings are basing their bias on assumptions which almost completely lack any well controlled experimental data for support.

This concludes a review of the literature on the effects of being observed and social facilitation. Although it may have to be interpreted rather liberally in some instances, Zajonc's Hull-Spence drive hypothesis, further refined by Cottrell with his anticipated evaluation hypothesis, accounts for most of the experimental results reasonably well.

CHAPTER II

RATIONALE AND HYPOTHESES OF THE PRESENT STUDY

The primary purpose of the present study is to examine the effects on dominant responses of being observed through a one-way screen. Wapner and Alper (1952) illustrated that decision time may be longer when subjects are observed from behind a one-way screen than when they are directly observed, but no accuracy data were available from their study nor was any attempt made to study dominant versus non-dominant responses. Thus integration of the results with social facilitation theory was not readily possible. Ganzer (1968) obtained accuracy data, but did not explicitly examine the effect of one-way screen observation in light of Zajonc's and Cottrell's hypotheses. The present study does both. Thus one secondary purpose of the study is to determine whether or not the social facilitation effect holds when the audience is not physically present but is capable of observing the subject's performance. Another secondary purpose is to begin to explore empirically the validity of one assumption behind the use of one-way screens: that their use does not significantly change the behaviour of the individuals observed by this means.

The experimental design of the present study is very similar to that of the Cottrell et al. study (1967) where the effects of being directly observed on the learning of the competition and non-competition lists were examined. The same task is used in this study because it meets the three requirements proposed by Cottrell (see page 3). In addition,

the task requires no initial training to establish dominant and non-dominant responses, and is relatively easy to self-administer. The combination of two types of tasks plus the two observation conditions, alone and observed through a one-way screen, resulted in four separate experimental groups: non-observed - competition, observed - competition, non-observed - non-competition, and observed - non-competition. A basic change in procedure from most previous social facilitation studies is that in the present study the non-observed subjects perform completely alone with no experimenter present. It is felt that this procedure will yield data less contaminated by the observation done by the experimenter himself. Of course, this situation is not completely free from "observation" since the recording of the performance is a kind of observation. For practical purposes, however, some recording of individuals' performances when alone had to be obtained and the task had to be carried out in the absence of the experimenter. Such requirements could best be met by using tape recorders.

Previous studies were usually carried out with subjects of only one sex. Most of these involved males, including the studies by Cottrell et al. (1967, 1968) and Zajonc and Sales (1966). In our society there are specific expectations based on sex role which would be predicted to operate in social facilitation studies (Mischel, 1968; Kagan in Hoffman and Hoffman, 1964). Rosenthal (1966) and Lindzey and Aronson (1968) have presented reviews of empirical evidence suggesting that females are more susceptible to social

influence than are males. It was originally planned to use comparable groups of both males and females in the present study to test the generality of these findings to the one-way screen situation. Due to practical considerations, discussed later, comparable groups of males and females were not obtained and although sex differences were explored, the comparisons were less rigorous than originally anticipated.

Individual differences have also been ignored in most previous studies, especially in those focusing directly on social facilitation. However, it could be hypothesized that suspicious individuals or individuals with paranoid tendencies would be more affected by unseen observers than those not having such tendencies. Moos (1968, see page 8) found that observation affected the behaviour of patients who tended to have high Paranoia Scale scores on the Minnesota Multiphasic Personality Inventory. To examine the relationship between such a personality variable and social facilitation, a recently developed Suspiciousness Scale (Endicott et al., 1969) was administered to all subjects and the relationship between their scores on this scale and the degree of social facilitation was examined.

Ganzer (1968) and Robe (1967) have examined the effects of being observed on subjects scoring high, average, and low on test anxiety, but obtained no clear relationship between social facilitation and anxiety (see pages 7 and 8). Subjects in the present study were administered the MAS (Taylor, 1953) to explore further the anxiety - social

facilitation relationship.

The hypotheses of the present study are based on the empirical findings reviewed in Chapter I and on the considerations discussed above. Three major hypotheses were formulated:

1. Subjects' dominant responses will be facilitated, at the expense of less dominant responses, under observed conditions compared to non-observed conditions. This results in two sub-hypotheses:
 - (a) Where dominant responses are correct, on the non-competitional list, subjects' performances will be facilitated by observation.
 - (b) Where dominant responses are not correct, on the competitional list, the subjects' performances will be impaired by observation.
2. Females will be influenced by observation more than males in the learning of lists.
3. Subjects' scores on the Suspiciousness Scale and the MAS will be directly related to the degree to which their performances are affected by observation.

C H A P T E R III

METHOD

Subjects¹

The subjects were 40 male and 63 female undergraduates. All but two of the males were business administration majors at the University of Washington, and all but two of these received as an incentive to participate in the experiment an elevation of their lowest weekly quiz score in a personnel class to 100%. These males were solicited by the professor of their class. Two of the business administration students were volunteers with no stated incentive and two other participants were from introductory psychology classes where participation in psychological research was mandatory. They ranged in age from 19 to 37 (mean = 23.2; SD = 3.82) and were all third or fourth year students except for the two non-business administration students who were second year students. The females were all volunteers from the School of Nursing at the University of British Columbia, all but one - a second year student - being first or third year students. They ranged in age from 18 to 25 (mean = 19.8; SD = 1.84). The females were solicited by the experimenter who asked for volunteers both in classes and on psychiatric wards where the student nurses were trained. They were told that they would receive a summary of the

¹The author would like to thank all the subjects who participated as well as Miss Mary L. Richmond, Director of Nursing, University of British Columbia, and Drs. Kent Collings and Lance K. Canon, both of the University of Washington, who made the necessary arrangements in making the subjects available.

results and that it was hoped the results would have some relevance to procedures used in the hospital.

Four male and three female subjects were discarded for various reasons. Two males and one female were discarded because they did not meet the minimum requirement of one correct response on the practice list of paired associates. One male was eliminated due to a complete lack of motivation (he made very few attempts to respond and admitted his lack of motivation) and one was randomly eliminated for statistical purposes (i.e. to obtain an equal number of subjects in each group). One female was discarded because a jack-hammer next to the experimental room made such excessive noise during the experimental session that she often could not hear the tape; another was discarded because, rather than listening on the first presentation of the list, she guessed wildly and thus had to listen on the second trial, automatically giving her twelve more errors than all other subjects. Since no other subject responded in this manner it was felt that her performance was not validly comparable to the other subjects' performances.

Originally it was hoped that comparable samples of males and females could be used in the study in order to examine sex differences since the majority of the studies in the past have used only males or females. Because of unavoidable practical limitations set by subject availability, this was not possible. Essentially the study was run with males and then repeated with a non-comparable sample of females.

Apparatus and Experimental Setting

The initial part of the study (using male subjects) was conducted in a small experimental room in the building housing the Psychology Department at the University of Washington. The one-way screen covered most of one wall and when not in use was covered with a piece of fiberboard. The second part of the study (using nurses) was carried out in a large room in the University of British Columbia Faculty of Medicine Hospital, a room often used for psychological testing. The one-way screen again covered most of a wall but in this room was covered with curtains when not in use. For both groups two easily operated portable tape recorders were used in the learning of the paired associates, one to present them and one to record the responses of the subjects. The lists of paired associates, including the practice list, were those developed by Spence et al., (1956) described earlier² (page 3). The personality scales were the Manifest Anxiety Scale (Taylor, 1953) and the Suspiciousness Scale (Endicott et al., 1969).³

Post-experimental questionnaires were administered to all subjects.⁴ These had three purposes. Primarily they were

²See Appendix A for copy of paired associate lists.

³See Appendix D for copy of personality inventory.

⁴See Appendix C for copy of post-experimental questionnaires.

an attempt to determine whether or not subjects (both observed and non-observed) felt they were actually being observed, since this was the crucial independent variable. Secondly, they were an attempt to obtain the subjects' subjective opinion on how nervous they felt, how they felt their performance had been (or would have been) affected by both observation and the taking of the personality questionnaire. Lastly, the questionnaires gave the subjects an opportunity to state what they thought the purpose of the study was, which at least suggests the extent to which this knowledge could have affected the performances of the subjects.

Procedure

Subjects were assigned to experimental groups in sequential order such that each male group had 9 subjects and each female group had 15 subjects.

Each subject was met at the door of the experimental room by the experimenter and the experimenter obviously glanced around the hall explaining that he was expecting some fellow graduate students who had made arrangements to observe his study that day. He explained that they might as well get started even though the observers had not arrived yet. The subject was taken into the room and told that the study involved an examination of the relationship between certain aspects of verbal learning and personality and was then instructed to fill out the personality inventory. The one-way screen was covered

at this point in all conditions. Subjects were assured of anonymity. While the subjects worked on the personality inventory the experimenter got up and looked out into the hall, again pretending to look for the mentioned observers. After finishing the personality inventory, the subjects were shown how to work the two recorders and told the nature of the learning task. Each subject completed the first task of five trials on the practice list while the experimenter scored their responses and made sure the subject worked the recorders properly.

At this point there was a brief rest period during which the experimenter looked out into the hall again claiming to be looking for the expected observers. In the observed conditions he looked back into the room stating that the observers had arrived and that he would return in a minute. The experimenter then went behind the screen and made various noises (moving chairs in the case of the male subjects, or pulling a sliding blackboard up and down over the opposite side of the screen for the female subjects) and switched the lights on and off quickly to indicate the presence of observers behind the screen. The experimenter then returned and told the subject that for the next learning task he would be left alone and to proceed the same as he had before with the practice list except to record his responses this time. A second microphone was placed on the desk with the explanation that it was there so the observers could hear. Each subject was then left alone and the experimenter went behind the screen to observe and returned after the subject had finished the task.

All male subjects were given twenty trials on the lists of paired associates regardless of their performance. Because this was found to be an extremely boring task for the subjects and since most had learned the lists by the fifteenth trial, the number of trials for all females was cut to fifteen.

When the experimenter returned to the experimental room after the subject had completed the task, he asked each subject to fill out a brief questionnaire focusing on how he had felt about being observed and attempting to tap his belief that someone was actually watching from behind the screen. When this was completed each subject was thanked and told he would receive a summary of the results of the study. The females were asked two or three additional questions (two if not observed; three if observed): 1) what, if any, specialty of nursing they planned to go into, 2) if they really believed that they were being observed from behind the screen (only asked of observed subjects), and 3) if talking into the recorder bothered them.

The procedure for the subjects in the non-observed groups was identical except that the experimenter returned after his second exit from the room saying that the students were not around and would have to observe some other time. The post-experimental questionnaire for these subjects was slightly different, aimed at tapping how the subjects thought they would have felt if they had been observed and if they thought that they were actually being observed in some way.⁵

⁵A text of instructions appears in Appendix A.

A summary of the sequence of steps appears in Figure 1 below.

- Step 1: The subject is met at the door of the experimental room and informed that some graduate students are expected by the experimenter to observe the study.
- Step 2: The subject is seated and fills out personality questionnaire (MAS and Suspiciousness Scale) during which the experimenter looks in hall once for observers.
- Step 3: Experimental task is explained and practice list is run through.
- Step 4: The experimenter looks again for observers and informs the subject whether or not he or she will be observed; if observed, the experimenter goes behind screen and makes noises indicating observers getting settled; if not observed, the experimenter merely returns stating no observers have arrived.
- Step 5: The experimenter explains experimental task which the subject completes after the experimenter leaves the room.
- Step 6: The experimenter re-enters and administers final post-experimental questionnaire, thanks subject and asks him or her not to tell other prospective subjects about the study.

Figure 1: Sequence of steps in the experimental situation

C H A P T E R I V

RESULTS

Performance on Learning Task

A two by two factorial design analysis of variance was used. The differential effects of observation on the learning of the two types of lists of paired associates was tested as was performance on the practice list in order to check for any initial differences between groups in ability to learn paired associates. The measure of performance level used in these analyses was the mean number of errors made on the given task. For the practice list, those errors made on the final two trials were used since a number of subjects asked questions during the first three of the five trials indicating that they did not exactly understand what was expected of them. However, all subjects understood the task by the beginning of the third trial. This procedure does not make all subjects' performances on the last two trials strictly comparable since some were totally confused for the initial trials while others were performing as expected and hopefully learning. However, this factor would only lead to greater differences between groups and thus if no significant differences were found in initial ability measured in this way it would strengthen rather than weaken an assumption of equal initial ability. Also it is assumed that variations in understanding what was expected were randomly distributed among the experimental groups. Table I shows the mean number of errors for each group on the last two trials of the practice list. Table II summarizes the analyses of

TABLE I (a & b)

Mean number of errors on last two practice trials

<u>a - Males</u>			<u>b - Females</u>		
	Observed	Not observed		Observed	Not observed
Competit- ional	18.3	16.6	Competit- ional	21.5	19.1
Non-comp- etitional	20.8	19.6	Non-comp- etitional	17.7	18.0

TABLE II (a & b)

Summary of analyses of variance on practice list errors

<u>a - Males</u>					
Source	ss	df	ms	F	p
Total	637.6	35	-	-	-
List	66.7	1	66.7	3.88	ns
Observation	20.2	1	20.2	1.17	ns
L x Ob.	0.69	1	0.69	0.04	ns
Error	550.0	32	17.2	-	-

<u>b - Females</u>					
Source	ss	df	ms	F	p
Total	997.4	59	-	-	-
List	91.26	1	91.26	5.93	0.025
Observation	17.06	1	17.06	1.11	ns
L x Ob.	26.68	1	26.68	1.73	ns
Error	862.4	56	15.4	-	-

variance indicating that there were no significant differences between observed and non-observed groups on a given type of list ($F_{\text{male}} = 1.17$, $df = 1/32$; $F_{\text{female}} = 1.11$, $df = 1/56$; both ns). Significant differences in initial ability did exist between the competition and non-competition groups of females ($F = 5.93$, $df = 1/56$, $p < .025$), a difference that can only be explained by chance groupings since up to the time of the practice list all subjects had undergone identical experimental treatment. However, these differences do not interfere with the testing of the main hypotheses as would a significant difference in initial ability between those in the observed versus non-observed conditions.

Tables III and IV summarize the means and analysis of variance for the test trials of the males. Observation had no significant effect on the male subjects learning either type of list of paired associates ($F = .14$, $df = 1/32$, ns).

TABLE III

Mean number of errors on experimental task by males.

	Observed	Not observed
Competitional	92.0	89.3
Non-competit- ional	28.3	21.9

TABLE IV

Summary of analysis of variance on errors made
by males on experimental task

Source	ss	df	ms	F	p
Total	72791.6	35	-	-	-
List	38677.8	1	38677.8	28.2	<.001
Observation	186.8	1	186.8	0.14	ns
L x Ob.	32.1	1	32.1	0.02	ns
Error	33894.9	32	1371.7	-	-

TABLE V

Mean number of errors on experimental task by females

	Observed	Not observed
Competitional	95.2	65.1
Non-competit- ional	21.9	16.9

TABLE VI

Summary of analysis of variance of errors made
by females on experimental task

Source	ss	df	ms	F	p
Total	89,658.18	59	-	-	-
List	55,388.81	1	55,388.81	113.63	<.001
Observation	4,628.81	1	4,628.81	9.50	<.005
L x Ob.	2,343.76	1	2,343.76	4.81	<.05
Error	27,296.8	56	487.44	-	-

Tables V and VI and Figure 2 summarize the effects of observation on the performances of the females. Both main effects are significant ($F = 113$, $df = 1/56$, $p < .001$, $F = 9.5$, $df = 1/56$, $p < .005$) as well as the interaction of observation and list type ($F = 4.81$, $df = 1/56$, $p < .05$). These results indicate that overall observation hindered the performance of females, doing so on both types of lists, impairing their performance more on the competitive list than on the non-competitive list. A Duncan Multiple Range Test (Brunning and Kintz, 1968) was applied to these results to clarify more exactly the intergroup relationships. Table VII summarizes the results of this test. They indicated that observation significantly impaired the performance of the females on the competitive list ($p < .01$) but did not do so on the non-competitive list (p is ns).

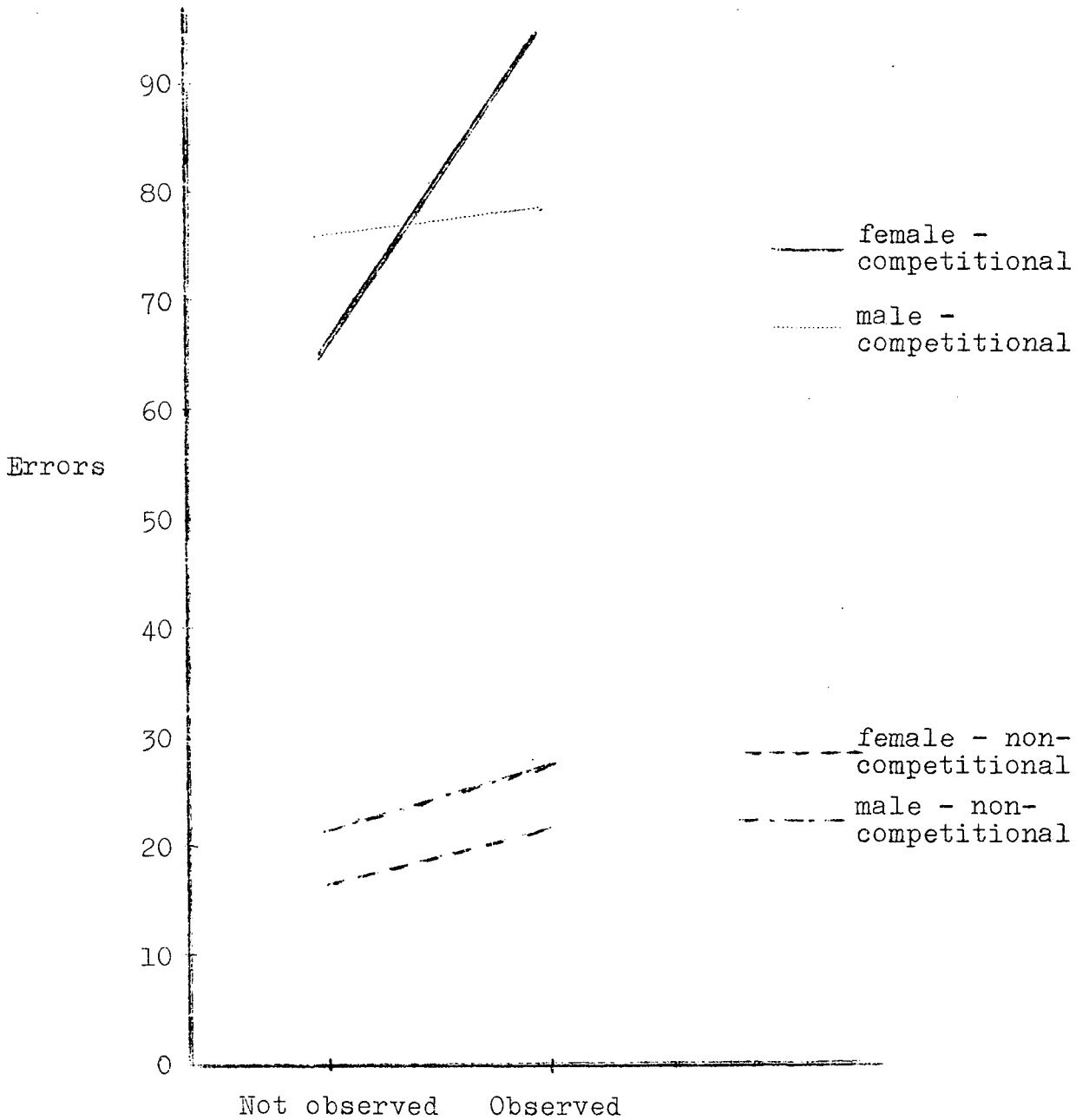


Figure 2: Female Experimental Results and Male versus Female Results on the Number of Errors Made on Initial 15 Trials.

TABLE VII
Summary of Duncan Multiple-Range Test
on female experimental task data

Comparison	$\bar{x}_1 - \bar{x}_2$	p
*Observed-Competitional vs Non-observed-Competitional	30.1	<.01
Observed-Competitional vs Non-observed-Non-competit.	78.3	<.001
Observed-Competitional vs Observed-Non-competitional	73.3	<.001
Non-observed-Competit. vs Observed-Non-competitional	43.2	<.001
Non-observed-Competit. vs Non-observed-Non-competit.	48.2	<.001
*Non-observed-Non-competit. vs Observed Non-competit.	5.0	ns

*Critical comparisons for hypotheses of study.

To help clarify more exactly how the females differed from the males the mean number of errors made by the males on the first fifteen trials was calculated. A graph of the male-female comparison is presented in Figure 2 (see page 28) which indicates that the males in general made more errors than the females in all conditions except that of observed-competitional where the males made fewer errors. None of these differences are significant however (t 's = .45, .34, .88, .88; $df = 22$ for all).

Personality Scales

On the MAS the females scored significantly higher than did the males (female mean = 16.9, male mean = 11.9, $t = 3.38$, $df = 95$, $p < .001$). However no significant relation-

ship was found between an individual's score on the MAS and the number of errors made; this result held for both males ($r = -.31$, $z = -1.83$, ns) and females ($r = -.18$, $z = -1.38$, ns) and for the individual experimental groups (see Table VIII).

TABLE VIII
Correlations between MAS scores
and Total Errors made

Group	r	t or z	df	p
Male:				
Observed-Competitional	$r = -.18$	$t = 0.48$	7	ns
Observed-Non-competitional	$r = -.18$	$t = 0.48$	7	ns
Non-observed-Competitional	$r = -.12$	$t = 0.32$	7	ns
Non-observed-Non-competitional	$r = +.10$	$t = 0.27$	7	ns
Overall	$r = -.31$	$z = -1.83$	-	ns
Female:				
Observed-Competitional	$r = +.006$	$t = .02$	13	ns
Observed-Non-competitional	$r = +.14$	$t = .51$	13	ns
Non-observed-Competitional	$r = -.34$	$t = -1.3$	13	ns
Non-observed-Non-competitional	$r = +.28$	$t = +1.05$	13	ns
Overall	$r = -.18$	$z = -1.38$	-	ns

The females also scored significantly higher on the Suspiciousness Scale than did the males (female mean = 2.5, male mean = 1.3, $t = 3.33$, $df = 94$, $p < .01$). A significant inverse relationship was found between scores on the Suspiciousness Scale and the total number of errors made for the males ($r = 0.41$, $\rho = -.37$, $z = 2.19$, $p < .03$). This relationship approached significance for the females ($r = -.30$,

$\rho = -.23$, $z = 1.77$, $p < .08$). The Spearman Rank Order Correlation (ρ) was used here for significance tests because of the very limited distribution of the Suspiciousness scores (Hayes, 1963). Again no significant relationship was found between Suspiciousness Scale scores and error scores within the experimental groups, as is shown in Table IX.

TABLE IX

Correlations (r & ρ) between Suspiciousness Scale scores and total errors made

Group	ρ	t or z	df	p	r
Male:					
Observed-Competitional	-.21	t = 0.57	7	ns	r = -.58
Observed-Non-competitional	-.49	t = 1.49	7	ns	r = -.61
Non-observed-Competitional	+.19	t = 0.51	7	ns	r = -.34
Non-observed-Non-competit.	+.11	t = 0.29	7	ns	r = -.02
Overall	-.37	$z = 2.19$	-	<.03	r = -.41
Female:					
Observed-Competitional	-.08	t = 0.29	13	ns	r = -.31
Observed-Non-competitional	+.13	t = 0.33	13	ns	r = -.02
Non-observed-Competitional	-.09	t = 0.46	13	ns	r = -.25
Non-observed-Non-competit.	+.24	t = 0.92	13	ns	r = -.004
Overall	-.23	$z = 1.77$	-	<.08	r = -.30

Post-experimental Questionnaire

All scores and means in the following discussion are based on a numbering system which designates the initial space of the rating scales used⁶ as having a value of 0, the second space a value of 1, ... up to 6. The only exception is question three on the non-observed questionnaire on which the range is from 0 to 7 rather than 6.

TABLE X

Summary of mean responses to questions
on post-experimental questionnaire⁷

Question	Sex	Mean rating	t	df	p
Observed:					
1	male	2.4	2.2	46	≤.05
	female	3.5			
2	male	3.8	.27	46	ns
	female	3.7			
3	male	2.4	2.45	46	≤.02
	female	3.7			
4	male	2.3	.34	46	ns
	female	2.1			
Non-observed:					
1	male	3.7	3.17	46	≤.01
	female	5.0			
2	male	3.2	2.11	46	≤.05
	female	4.4			
3	male	5.9	.78	46	ns
	female	5.4			

⁶See Appendix C for questionnaires.

⁷Male and female responses to the last two questions on both questionnaires were almost identical: 6.3 versus 6.2 and 4.0 versus 4.1 for males versus females respectively.

Observed Subjects' Questionnaire

As the tabled summary of questionnaire results indicates, the males differed significantly from the females in their answers to two of the six questions. The females rated themselves as significantly more nervous due to the observation than did the males ($t = 2.20$, $df = 46$, $p < .05$). The females also rated themselves as being significantly more aware of the observers than did the males ($t = 2.45$, $df = 46$, $p < .02$). Comparisons were also made between male and female questionnaire responses within the observed-competition groups alone since it was in these groups that the pattern of results of the two sexes appeared to deviate on the results of the learning task (see Figure 2). Comparing only the observed-competition groups, the means of the males were significantly different from those of the females on questions 1, 2 and 3 indicating again that the males rated themselves as being less nervous ($t = 2.60$, $df = 22$, $p < .02$), less hindered in their performance by the observation ($t = 2.50$, $df = 22$, $p < .02$) and again less aware of the observers than the females ($t = 2.31$, $df = 22$, $p < .05$). Males and females did not differ in how they perceived their performances as affected by observation and by taking the personality questionnaires. Neither did they differ on the extent to which they could detect the presence of observers, nor in their rating of the extent to which they were annoyed by the content of the personality questionnaire.

In addition, females who rated themselves higher in nervousness due to observation (4 to 6 on the scale) made more errors than those who rated themselves lower in nervousness

(0 to 3 on the scale); this finding approached significance for the non-competitive group ($t = 2.12$, $df = 13$, $p < .06$) but was not significant for the competitive group. Also those females in the competitive group rated their performances as being hindered by observation (mean = 2.8) whereas those in the non-competitive group rated their performance as being relatively unchanged (mean = 4.5, $t = 4.15$, $df = 28$, $p < .001$).

Non-Observed Subjects' Questionnaire

On the non-observed post-experimental questionnaire the males differed significantly from the females in their self-ratings on questions 1 and 2. On question 1 the males felt that they would be less hindered by observation than did the females (female mean = 5.0, male mean = 3.7, $t = 3.17$, $df = 46$, $p < .01$). The sexes also differed in their estimate of how nervous such observation would make them, the males rating themselves as being less so than the females (female mean = 3.2, male mean = 4.4, $t = 2.11$, $df = 46$, $p < .05$). The males and females did not differ in their self ratings concerning being annoyed by the personality inventory nor in how it affected their performance; they were minimal for both sexes.

Since actual observation did affect the performance of the females on the competitive list and since some non-observed females did indicate that they felt they were being observed, a comparison was made of the mean number of errors

made by those who felt that they might have been observed (0 to 3 scale ratings) with those who were more sure that they were not being observed (scale ratings of 4 to 7). No significant differences were found for either the competitive or the non-competitive groups (competitive: $t = .13$, $df = 13$, ns; non-competitive: $t = 1.23$, $df = 13$, ns).

The final question of both questionnaires concerned what the subject felt was the purpose of the study. Ten males and seventeen females indicated that they felt the purpose was to study the effects of observation on one's performance. This finding is not surprising since the nature of the previous questions on the questionnaire strongly suggest this fact. Five males and four females mentioned the effects of stress in general as a possible focus of the experiment. Nineteen males and thirty females gave some other unrelated explanation and seven males and nine females either stated they did not know the purpose of the study or left the question blank (two females).

As mentioned in the procedure section, all female subjects were asked either two or three questions at the end of the study. All females were asked what specialty of nursing they were planning to enter and if talking into the recorder bothered them at all. Observed female subjects were asked if they ever doubted the existence of actual observers behind the screen. Most of the nurses replied to the first question that they had made no definite decision on a nursing specialty. Concerning the recorder, fifty-five said it did not bother them at all, three said it did a little, and two stated that it bothered them considerably. Most of the observed females

stated that they believed someone was actually behind the screen: twenty-four reported no doubts, five reported that a doubt had at least passed through their mind, and one doubted it very much.

C H A P T E R V

DISCUSSION

Theoretical Discussion

The major hypothesis (Hypothesis 1, page 15) was supported partially by the female sample but not at all by the male sample. The performance of the females on the more difficult competitive task was considerably impaired by observation from behind a one-way screen whereas their performance on the easy, non-competitive task was neither improved nor impaired by the observation. The performance of the males was not significantly affected on either task. The results of the female sample on the competitive list fit the predictions from social facilitation theory. The lack of social facilitation on the easy, non-competitive task and its presence on the competitive task suggest first, that the physical presence of the audience may be necessary in some situations to produce social facilitation but not in other situations and secondly, that one dependent variable functioning is the nature of the task being performed. This suggestion which focuses on the importance of the physical presence of the observers is not in accord with Cottrell's hypothesis which considers the ability of the audience to evaluate the subject's performance to be the crucial factor in the production of social facilitation. But it is obvious that an implicit criterion for social facilitation in any situation is that the subjects or performers be aware of the observers. In Cottrell's hypothesis, the subject's awareness of the observer's ability to be potentially evaluative is the crucial

factor. This awareness factor is the crucial variable manipulated by the one-way screen since it is obvious that on a purely objective level the potential degree of sensory awareness is reduced by the screen to a lack of actual visual awareness of observers. Since this reduction in awareness was equal for the competitive and non-competitive list groups, and social facilitation still occurred, some other factor must have been operating to eliminate social facilitation in the non-competitive situation.

If the social learning and conditioning basis for Cottrell's hypothesis is accepted, the explanation for the obtained results may lie in a difference between how individuals learn to perceive potential negative evaluation of a poor performance versus positive evaluation of a good performance. A suggestion by this author focuses on what might be called the amount of "ego involvement" of the task, "ego involvement" being defined as the amount of self esteem the subject attaches to his ability to perform or not perform well on a given task. It seems reasonable that college students would consider the learning of paired associates as a rather mundane, simple minded task that they should be able to handle quite readily; therefore it would be very embarrassing, upsetting, or self esteem reducing not to be able to do reasonably well on such a task. On the other hand a very superior performance would not be considered as a great, self esteem building achievement. (One could also argue that they would tend to be consistent and thus attach little importance to not being able to do well on a simple minded task; however this is an empirical question to be clarified in later research.) Based on these assumptions, it

can be hypothesized that college students would react to an evaluation of their performance much more intensely (general drive level increased to a greater extent) when making many errors on the competitive list than when making few errors on the non-competitive list. This suggestion is supported by Cottrell et al.'s (1967) findings, since the effects of social facilitation were considerably more potent in the competitive compared to the non-competitive list performances. A direct test of this hypothesis is possible via direct manipulation of the types of tasks used on a continuum of "ego involvement". So far this hypothesis suggests a possible reason why only those females learning the competitive list fulfilled the social facilitation hypotheses; however it may have some relevance to why the males were essentially unaffected by observation.

The finding that the males were essentially unaffected by observation was not expected. Cottrell et al. (1967), Zajonc and Sales (1966) and others have obtained social facilitation using male subjects, and similar results were expected in this study. The hypothesized sex difference was only in terms of the degree of social facilitation, more being expected in the females than in the males, and this was based on previous research on sex roles and sex differences (eg. Lindzey and Aronson, 1968; Rosenthal, 1966). Since social facilitation has been demonstrated consistently in males, it appears that some additional factors were functioning in the present study to yield results indicating a complete lack of facilitation in males yet considerable facilitation in females.

There were many differences between the male and the female portions of the study. Initially it is of value to examine exactly how the males differed from the females on the dependent variable, the number of errors made on the first fifteen trials of the learning task. It is obvious from Figure 2 that the major difference is most probably in the relative performances of the observed-competitional groups, with the females of this group making considerably more errors than all other competitional groups. Also the observed and non - observed competitional males differed to about the same extent as did the observed and non-observed non-competitional males (both being nonsignificant). Of course the opposite assumption could be made: that the competitive list males differed from the females in the relative performances of the two non-observed groups. However, the prior hypothesis gains support from the fact that on the non-competitive list, in both the observed and non-observed conditions, the males made more errors than did the females and this is also the case in the relative number of errors of the two non-observed competitional groups (i.e. male and female), but not in the case of the male-observed-competitional versus the female-observed-competitional groups. Based on the above considerations the differences between the male and female observed competitional groups on the post-experimental questionnaire were examined specifically along with the overall differences between the male and female samples taken as a whole on these measures.

The two samples differed in many ways. The sexes differed in their mean scores on both the anxiety and suspiciousness scales, the females being significantly more

anxious and suspicious than the males (p 's $<.001$ and $<.01$ respectively). On the post-experimental questionnaire the observed females rated themselves as being significantly more nervous and more aware of the observers than did the males; these differences held for the observed-competition groups taken alone as well as for the observed samples taken as a whole. In addition the male and female observed-competition groups also differed significantly in that the females felt that their performance was more hindered by the observation than did the males. If one assumes that the two samples are using close to identical internal, subjective criteria in their self-ratings, these differences help explain why the females were more affected by observation than were the males. However, this assumption is probably not a completely valid one since females in general may have a tendency to rate themselves differently than do males, a phenomenon found in many psychological studies (Tyler, 1964). This factor must be taken into consideration when weighing the significance of the sex differences found in the self-rating measures.

The more explicit differences in the two samples and the two experimental settings may offer a more potentially valid, but admittedly intuitive and post hoc, explanation of the observed sex differences. The males were considerably older than the females (means of 23.2 versus 19.8) and also were generally from a more advanced college class, the nurses being mainly first and third year students and the males mainly fourth with some third year students. Thus the males may have had more experience in similar evaluative and/or experimental

situations and therefore possibly were more relaxed and less anxious (having a lower general drive level) in response to the study than were the females.

The samples differed completely in college major. This difference is of considerable importance when one considers the different settings in which the male versus female parts of the study were conducted. The male portion of the study was carried out in a small experimental cubicle in the Psychology Department at the University of Washington among many other ongoing psychology experiments. The female section was carried out in a hospital setting, in the psychology department, in a large room usually used for psychological testing and interviewing, a fact most student nurses are well aware of since they often accompany patients to such interviews and testing sessions, patients who are often anxious about the testing or interview. Thus the physical setting of the study was probably much more personally threatening for the females than for the males.

The means of solicitation of subjects also differed in an important way for the males and females. The nurses were solicited by the author visiting classes and nursing stations (on the psychiatric ward) asking for volunteers; no incentive was offered other than feedback of experimental results. The males were solicited by their professor who offered them the incentive of having their lowest weekly quiz grade of the quarter raised to 100% if they participated in the study (the study was carried out one and two weeks prior to final examination periods at the end of the academic year). The females, being purely volunteers, were probably more personally

involved and motivated than were the males who were essentially bribed for their participation. These assumptions would be predicted from dissonance theory (Festinger, 1957) and are supported by the fact that the males generally made more errors than the females on the experimental task. If such suggestions are valid, the presence of observers would have been much more threatening to the nurses, especially if they were doing poorly on the task, than to the males.

These subjective impressions of the experimenter and ratings of the subjects may or may not be the explanatory factors involved in the sex differences found in the results. A third independent factor could have been the cause of the sex difference found in both the major experimental results and in the explanatory factors mentioned. Both sets of sex differences could have been the result of a third factor such as the social role expectations of males versus females.

An important theoretical implication of this study, mentioned briefly in the previous discussion, concerns the physical presence of the observer(s) and its relevance to social facilitation. It is obvious from the results that social facilitation can occur through a one-way screen, without the audience being either visually or physically present. But it is also obvious that social facilitation may not occur under such conditions, depending on at least two other factors which seem to be relevant: the nature of the task involved and the nature of the sample and/or setting.

The fact that social facilitation did occur using observers behind a screen supported Cottrell (1968) in his refinement of Zajonc's (1966) original hypothesis focusing on the mere presence of observers. Cottrell et al.'s study (1968) illustrated that the physical presence of the audience plus the ability of the audience to evaluate the subject's performance yielded social facilitation, thus refining Zajonc's mere presence hypothesis. The results of the present study illustrate that the physical presence of the audience can be eliminated completely and social facilitation can still occur. This phenomenon had previously been illustrated in co-action situations (Dashiehl, 1935), but not in audience situations. However the critical factor hypothesized by Cottrell was present: the audience could evaluate the subjects' performances and the subjects realized it.

The attempt to find relationships between individuals' scores on the MAS and Suspiciousness Scale and the number of errors made on the learning task was only partially successful. No relationship was found between individual's scores on the MAS and the number of errors made, either for the individual experimental groups or for the samples taken as a whole. This does not corroborate the findings of Ganzer (1968; see page 8), although he pre-selected his sample based on their test anxiety scores which definitely aids one in establishing such a relationship. Individuals' scores on the Suspiciousness Scale were significantly related to the number of errors made for the males ($r = -.41$, $\rho = -.37$, $p < .03$) and approached significance for the females ($r = -.30$, $\rho = -.23$, $p < .08$).

These relationships did not hold in the individual experimental groups. For the groups taken as a whole (still divided by sex), the more suspicious one rated himself the fewer errors he tended to make on the learning task. If suspiciousness implies an elevated drive level, these results contradict the Spence-Hull Drive level explanation for social facilitation which would predict no overall relationship but a direct relationship for the competitive list subjects and an inverse relationship for the non-competitive list as found by Spence et al. (1954) using the MAS.

Individuals with paranoid tendencies, one of which is suspiciousness, have some characteristic abilities that may suggest an explanation for the above findings. Paranoid individuals generally have higher than average intelligence quotients (Rappaport et al., 1968). They do especially well on tasks requiring little emotional involvement and little common sense, (eg., Digit Span and Picture Completion tasks of the Wechsler Adult Intelligence Scale (Rappaport et al., 1968)) both of which are aspects of the paired associate task of this study. Schafer (1949, p.94) states as typical of the paranoid condition "a precision of recall is emphasized" as a characteristic of their learning efficiency. They are generally over-alert and pay attention to details (Schafer, 1949). Endicott et al. (1969) compare their typical suspicious individual to one who has paranoid tendencies, but not to the extreme degree of a true paranoid individual. However, they developed their scale with mental patients. All the above abilities which are characteristic of the paranoid person, and to a lesser degree of

the suspicious person, would lead one to expect that they would do especially well on tasks such as paired associate learning.

Practical, Clinical Implications

One-way viewing screens are used frequently in teaching hospitals, schools and clinics and this practice is based on at least two assumptions:

1. The observation affects the behaviour of those being observed minimally; at least less than direct observation.
2. Any loss of validity as a result of such minimal behaviour change is out-weighed by the value of the screen as a teaching aid.

Very little good experimental data has been collected to verify these assumptions.¹

As stated earlier (see page 12) one purpose of this study was to begin to explore empirically the validity of the first assumption stated above. In general, the overall results indicate that the assumption does not hold in all cases since the observed females made over 46% more errors on the competition list than did those not observed. This magnitude of difference in performance on most psychological tests would greatly affect the final results and perhaps the future of the individual tested. But there are many differences, as well as similarities, between the experimental situation and an actual clinical setting.

¹See Chapter I for review of relevant literature.

The female portion of the study approximated the typical clinical setting more so than did the male portion. As individuals they were more anxious and more suspicious. The room used for the females was an actual testing and interviewing room in the psychology department, a fact known to the nurses. It was also a hospital setting and the experimenter was introduced as a graduate student in clinical psychology. In contrast, the male study was carried out in a strictly research setting and no mention was made of clinical psychology. These factors suggest that the female results probably approximate more closely those that would be found in a true clinical situation.

The observation-by-task interaction also has some clinical implications. It suggests that observation would be more likely to impair one's performance on psychological tests and other tasks which require unfamiliar skills. One might expect that a very verbal individual would be impaired on performance oriented tasks or on numerical tasks requiring more quantitative abilities. An introvert might be considerably more impaired in an interview by observation than an individual who was used to discussing himself with others. Such tests as the Raven Matrices and Rorschach require non-dominant, unfamiliar responses for most individuals and thus might be more affected by observation. Also, based on the dominant response theory of social facilitation, one would predict that as one became more accustomed to the task at hand the expected, correct responses would become more and more dominant and observation would therefore have less negative effect. This expectation is supported by Ganzer's (1968) findings that on

the second day of nonsense syllable learning highly anxious individuals were no longer affected by observation.

In one very important aspect the present experimental situation differed from the standard clinical setting: the subjects were completely alone while performing the task whereas in most clinical settings the psychologist is present. Schachter (1959) and Wrightsman (1960, in Simmel et al., 1968) present data suggesting that the presence of others going through a similar anxiety arousing situation can serve to reduce anxiety by providing comfort and support. In clinical settings the psychologist being observed is often a student or a model for students, who explains to the patient that he is also under observation, usually by a superior, and is therefore the prime focus of the observation. He thus puts himself in the threatening situation with the patient, if not in the place of the patient to a certain extent. Also psychologists in such situations usually discuss the patient's feelings about the observation, especially if the patient is anxious about it, and therefore in a sense the patient is desensitized. Through these techniques the psychologist attempts to reduce the patient's drive level (anxiety) and thus minimize the effects of observation. This element of comfort was replaced in the present study with a potentially anxiety producing machine, the tape recorder, making a permanent record of the subjects' performances. Even though the females generally stated that they were not bothered by the recorder, this factor must be taken into consideration when generalizing from the present experimental results to the clinical setting.

Suggestions for Further Research

Throughout the previous discussion questions have arisen which only further research can settle. One of the most basic questions concerns the method of observation used, especially since new elaborate methods are becoming more available such as closed circuit television and videotape. A useful comparison would be between direct observation (i.e. with observer(s) physically present in the same room) with observation via a one-way screen or some other mechanical means where the observers are not physically present. Wapner and Alper (1953) are the only ones to directly compare two such methods of observation; their study could be made more relevant to social facilitation theory or to actual clinical settings by changing the task either to one meeting Cottrell's (1967) criteria or to one used in psychological assessment. Another potentially valuable comparison would be between means of observation that yield a permanent and very complete record of one's performance (eg. camera, recorder, videotape) and means where one's performance is left only in the observers' memories (eg. direct observation, TV) or is only partially recorded (eg. notes or scores recorded). Many patients, psychologists and psychiatrists in this author's experience have indicated that they would rather be observed directly than indirectly so that they could see who was observing them and/or observe the audience's reactions to their behaviour.

Another area not yet examined empirically is the effect on the patient or performer of the presence of the experimenter or psychologist in the observed situation. This

factor could be easily manipulated experimentally using the same apparatus as in the present study and adding further experimental groups. The utility of this information in the typical clinical setting would be minimal since almost always a staff member of some sort is present when patients are observed, and patients are rarely observed alone through a screen. However, techniques are being developed where individuals are observed alone such as to establish base rates of specific behaviour or to observe child-parent interactions (Wahler et al., 1965). Such information about the effects of being observed alone versus being observed with an additional individual present would be valuable. Theoretically such studies might also clarify the contradictory hypotheses mentioned earlier (p.37) of Zajonc and Cottrell versus Schachter and Wrightsman, and yield information clarifying whether or not, or under what conditions, the presence of others is drive inducing or drive reducing.

The area of individual differences and the effects of observation has barely been touched by research. Studies more directly focused on individual differences could use subjects pre-selected on the basis of high and low scores on specific personality scales (as Ganzer, 1968). From a clinical standpoint it would be very useful to select patients as subjects according to some specific criteria such as diagnostic category. Here it would be most useful to use clinically relevant tasks such as subtests of the Wechsler Adult Intelligence Scale or a self disclosure task of some sort which is relevant to what is required in psychiatric interviews.

Another important area that has not been examined is that of the identification of the observers. One would expect intuitively that there would be definite interactions between

the nature of or identification of the observer and those observed. If an individual's professor, competitor or doctor were observing, it would probably be a more anxiety inducing situation than if complete strangers were observing. This factor would probably also interact with the nature of the task. For instance, if the observer(s) was not familiar with the task and therefore could not evaluate the performance, the effect of his observation would be expected to be minimal (according to Cottrell's evaluative theory). Thus the degree to which the observers are capable of evaluating the task could be examined by manipulating the information given the performers about the audience.

Another factor, mentioned earlier, is the amount of ego involvement the task elicits from the performer. Two studies (Wilson, 1968 and Wapner and Alper, 1952 - reviewed earlier) have attempted to manipulate the ego-involvement of the task used. In the Wilson (1968) study the manipulation was not successful. In the Wapner and Alper (1952) study two related manipulations yielded conflicting results: ego-oriented instructions yielded shorter latencies to response than did task oriented instructions, but items related to the subjects' personality yielded longer latencies than did neutral items (the task was multiple choice phrase completion). Pilot studies would probably have to be carried out to determine some sort of criterion for the ego-involvement in a given set of tasks. One might have college students rate different tasks and skills on a scale of personal importance to them. This variable can also be manipulated by varying the stated consequences and/or

purposes of individuals' performances on tasks as Wapner and Alper attempted to do.

Although research in the area of social facilitation has been in progress periodically since 1925, there are many questions left unanswered. New research has continually opened new problems for study so that there are many more unanswered questions today than in 1925. This is in spite of the fact that it is a common, everyday phenomenon admitted to and experienced by almost all individuals. Knowledge of this phenomenon has potential practical application in areas other than the education of psychologists and psychiatrists, for example, in education, entertainment and personnel work. It is hoped that more work in this area of almost universal human experience will be carried out in the future.

B I B L I O G R A P H Y

- Allport, F.H. Social Psychology. Boston: Houghton Mifflin, 1924.
- Bruning, J.L. and Kuntz, B.L. Computational Handbook of Statistics. Palo Alto: Scott, Foresman & Co., 1968.
- Cottrell, N.B., Rittle, R.H., and Wack, D.L. The presence of an audience and list type (competitional or non-competitional) as joint determinants of performance in paired-associate learning. Journal of Personality, 1967, 35, 425-433.
- Cottrell, N.B., Wack, D.L., Sekerak, G.J., and Rittle, R.H. Social facilitation of dominant responses by the presence of an audience and the mere presence of others. Journal of Personality and Social Psychology, 1968, 9, 245-250.
- Criddle, W.D. The effects of one-way screen observation on patients' responses and anxiety level. Unpublished study.
- Dashiell, J.F. An experimental analysis of some group effects. Journal of Abnormal and Social Psychology, 1930, 25, 190-199.
- Dashiell, J.F. Experimental studies of the influence of social situations on the behavior of individual human adults. In Murchison, C. (Ed.), A Handbook of Social Psychology. Worcester, Mass.: Clark U. Press, 1935. (In Zajonc, 1968).
- Endicott, N.A., Jortner, S., and Abramoff, E. Objective measures of suspiciousness. Journal of Abnormal Psychology, 1969, 74, 26-32.
- Ganzer, V.J. Effects of audience presence and test anxiety on learning and retention in a serial learning situation. Journal of Personality and Social Psychology, 1968, 8, 194-199.

- Haggard, E.A., Hiken, J.R., and Isaacs, K.S. Some effects of recording and filming of the psychotherapeutic process. Psychiatry, 1965, 28, 169-191.
- Hathaway, S.R., and McKinley, J.C. Minnesota Multiphasic Personality Inventory. Minneapolis: University of Minnesota Press, 1942.
- Hayes, W.L. Statistics for Psychologists. New York: Holt, Rinehart and Winston, 1963.
- Hoffman, M.L. and Hoffman, L.W. Review of Child Development Research. New York: Russell Sage Foundation, 1964.
- Katahn, M. Interaction of anxiety and ability in complex learning situations. Journal of Personality and Social Psychology, 1966, 3, 475-479.
- Kiesler, S.B. Stress, affiliation and performance. Journal of Experimental Research in Personality, 1966, 1, 227-235.
- Lamb, R. and Mahl, G.F. Manifest reactions of patients and interviewers to the use of sound recording in the psychiatric interview. American Journal of Psychiatry, 1956, 112, 731-737.
- Lindzey, G. and Aronson, E. The Handbook of Social Psychology. London: Addison-Wesley Publishing Co., 1968.
- Mischel, W. Personality and Assessment. New York: John Wiley Sons, Inc., 1968.
- Moos, R.H. Behavioral effects of being observed: reactions to a wireless radio transmitter. Journal of Consulting and Clinical Psychology, 1968, 32, 383-388.
- Pessin, J. The comparative effects of social and mechanical stimulation on memorizing. American Journal of Psychology, 1933, 45, 263-270.
- Rapport, D., Gill, M.M. and Schafer, R. Diagnostic Psychological Testing. New York: International U. Press, 1968.

- Redlich, Dollard and Newman High fidelity recording of psychotherapeutic interviews. American Journal of Psychiatry, 1950, 107, 42-48.
- Robe, H.R. Effects of the presence of an observer upon problem-solving behavior for boys who vary in test anxiety. Dissertation Abstracts, 1967, 27, 3322.
- Rosenthal, R. Experimenter Effects in Behavioral Research. New York: Meredith Publishing Co., 1966.
- Sarason, I.G. Empirical findings and theoretical problems in the use of anxiety scales. Psychological Bulletin, 1960, 57, 403-415.
- Schafer, R. The Clinical Application of Psychological Tests. New York: International U. Press, 1950.
- Simmel, E.C., Hoppe, R.A., and Milton, G.A. Social Facilitation and Imitative Behavior. Boston: Allyn and Bacon, Inc., 1968.
- Spence, K.W. Behavior theory and conditioning. New Haven: Yale University Press, 1956.
- Spence, K.W., Farber, I.E., and McFann, H.H. The relation of anxiety (drive) level to performance in competition and noncompetition paired-associates learning. Journal of Experimental Psychology, 1956, 52, 296-305.
- Spence, K.W., Taylor, J., and Ketchel, R. Anxiety (drive) level and degree of competition in paired-associates learning. Journal of Experimental Psychology, 1956, 52, 306-310.
- Sternberg, R.S., Chapman, J., and Shakow, D. Psychotherapy research and the problem of intrusion on privacy. Psychiatry, 1958, 21, 195-203.
- Taylor, J.A. A personality scale of manifest anxiety. Journal of Abnormal Psychology, 1953, 48, 285-290.

Travis, L.E. The effect of a small audience upon eye-hand coordination. Journal of Abnormal and Social Psychology, 1925, 20, 142-146.

Wahler, R.G., Wirkel, G.H., Peterson, R.F. and Morrison, D.C. Mothers as behaviour therapists for their own children. Behaviour Research and Therapy, 1965, 3, 113-124.

Wapner, S., and Alper, T.G. The effect of an audience on behavior in a choice situation. Journal of Abnormal and Social Psychology, 1952, 47, 222-229.

Tyler, L.E. Tests and Measurements. New Jersey: Prentice-Hall, Inc., 1964.

Zajonc, R.B. Social facilitation. Science, 1965, 149, 269-274.

Zajonc, R.B. and Sales, S.M. Social facilitation of dominant and subordinate responses Journal of Experimental Social Psychology, 1966, 2, 160-168.

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A P P E N D I X A
TEXT OF INSTRUCTIONS

This is a study concerning personality characteristics and verbal learning. First I'd like you to fill out this personality questionnaire. Don't put your name or any identification on it since I want everything to be anonymous and am only interested in group results. I want to assure you that I will keep no record of names.

Now I am going to show you how to run these recorders which will be necessary for the following two learning tasks. You start this one by pushing this button; stop it with this one. This one you start and stop with this button on the microphone. When you turn on this recorder you will hear a list of twelve word pairs; all words are separated by two second intervals. Your task is to anticipate the second word of each pair and say it out loud during the interval. The first list will be presented five times; each presentation is separated by a four second interval. On the first presentation you will probably not know any of the pairs. You are to respond as soon as you do think you know a pair. Here is a brief example. You might hear the pairs "box - plane" and "lake - bike". Your task is to respond with the word "plane" after you hear the word "box"; this response should be within the two second interval between the two words. After your response "plane", you would hear the word "plane" on the tape thus enabling you to check your response. Then the word "lake" would be presented, you would respond with "bike", hear the word "bike" on the tape, and go on to the next pair. Do you have any questions? OK, let's give

it a try. On this first task I will score your responses here so you don't have to use that recorder.

OK, that was fine. I'll be back in just a moment; I have to check on the observers that are supposed to show up.

(Not observed) I don't see them anywhere. They will just have to observe someone else at another time.

(Observed) They are here; I have to go and get them settled. I'll be back in just a moment.

The next task will be the same type as the one you just completed except for two changes: instead of five trials you will have 20 (15) trials on this list. Also I will not be in the room; you will be alone and I want you to turn on the recorder and speak into the microphone so your responses will be recorded. Turn on the recorder and start recording right from the start and leave it on constantly; don't turn it on and off as you go. Also be careful not to accidentally turn off the recorder if you hold the microphone in your hand. As long as you speak up it will pick up everything from here on the table, but you can have it where you want it. Any questions? I'll be back when you are done.

That's it except for this short post-experimental questionnaire. Just put a check in the space that best describes your feelings. It's a continuum from one end to the other (pointing).

Thank you very much for participating, I really appreciate it. You will receive a summary of the results of the study and an explanation of all that went on. I would appreciate it if you would not tell others who might participate in it later the nature of the experiment since I want all subjects to enter with equal naivety. Thanks again.

Female questions:

1. Have you decided on any specialty of nursing to go into?
2. Did talking into the recorder bother you at all?
3. At any time did you doubt that anyone was behind the screen?

A P P E N D I X B
 PAIRED ASSOCIATE LISTS

<u>Practice</u>		<u>Non-competitive</u>		<u>Competitive</u>	
alms	fang	adept.	skillfull	petite	yonder
chalk	zoo	barren	fruitless	migrant	agile
flute	barb	complete	thorough	serene	headstrong
glass	yeast	distant	remote	gypsy	opaque
iron	leaf	empty	vacant	tranquil	placid
kink	elm	frigid	arctic	quiet	double
ledge	dime	insane	crazy	barren	fruitless
marsh	quart	little	minute	little	minute
nail	vest	mammoth	oversized	desert	leading
rose	jaw	pious	devout	arid	grouchy
sand	heart	roving	nomad	roving	nomad
tile	palm	stubborn	headstrong	undersized	wholesome
chalk	zoo	barren	fruitless	migrant	agile
glass	yeast	distant	remote	gypsy	opaque
kink	elm	frigid	arctic	quiet	double
marsh	quart	little	minute	little	minute
rose	jaw	pious	devout	arid	grouchy
tile	palm	stubborn	headstrong	undersized	wholesome
alms	fang	adept	skillfull	petite	yonder
flute	barb	complete	thorough	serene	headstrong
iron	leaf	empty	vacant	tranquil	placid
ledge	dime	insane	crazy	barren	fruitless
nail	vest	mammoth	oversized	desert	leading
sand	heart	roving	nomad	roving	nomad
chalk	zoo	barren	fruitless	migrant	agile
kink	elm	frigid	arctic	quiet	double
rose	jaw	pious	devout	arid	grouchy
alms	fang	adept	skillfull	petite	yonder
iron	leaf	empty	vacant	tranquil	placid
nail	vest	mammoth	oversized	desert	leading
glass	yeast	distant	remote	gypsy	opaque
marsh	quart	little	minute	little	minute
tile	palm	stubborn	headstrong	undersized	wholesome
flute	barb	complete	thorough	serene	headstrong
ledge	dime	insane	crazy	barren	fruitless
sand	heart	roving	nomad	roving	nomad

A P P E N D I X C

POST - EXPERIMENTAL QUESTIONNAIRES

Observed Subjects' Questionnaire

1. To what extent did being observed make you nervous?
not at all _____ extremely so
2. To what extent do you feel that your performance was hindered, improved, or unchanged by your being observed?
hindered very much unchanged improved very much

3. To what extent were you personally aware of the observers during your learning task?
not at all aware _____ extremely aware
4. To what extent could you detect the presence of the observers behind the screen?
their presence _____ their presence was
was undetectable _____ obvious
5. To what extent did the questions on the personality questionnaire annoy you?
very much so _____ not at all
6. To what extent do you feel the taking of the personality questionnaire affected your performance on the learning task?
greatly improved did not affect greatly impaired
it it it

7. Briefly state what you think is the purpose of this study.

Non-observed Subjects' Questionnaire

1. If you had been observed through a one-way screen during your second learning task, to what extent do you think your performance would have changed?

greatly improved _____ unchanged _____ greatly impaired

2. To what extent do you think being observed from behind a one-way screen during this experiment would have made you nervous?

not at all _____ very much so

3. Did you feel you were being observed in any way when you were learning the second list of words by yourself?

I was sure I was _____ I was sure
being observed _____ I was not
being observed

or

I never thought about it _____

4. To what extent did the questions on the personality questionnaire annoy you?

very much so _____ not at all

5. To what extent do you feel the taking of the personality questionnaire affected your performance on the learning task?

greatly improved it _____ did not affect it _____ greatly impaired it

6. Briefly state what you think is the purpose of this study.

A P P E N D I X D
PERSONALITY INVENTORY

1. My hands and feet are usually warm enough.
2. I work under a great deal of tension.
3. I have diarrhea once a month or more.
4. I am very seldom troubled by constipation.
5. I am troubled by attacks of nausea and vomiting.
6. Evil spirits possess me at times.
7. I have nightmares every few nights.
8. I find it hard to keep my mind on a task or job.
9. If people had not had it in for me I would have been much more successful.
10. My sleep is fitful and disturbed.
11. I wish I could be as happy as others seem to be.
12. I am certainly lacking in self-confidence.
13. I am happy most of the time.
14. Someone has it in for me.
15. I believe I am being plotted against.
16. I believe I am being followed.
17. I have a great deal of stomach trouble.
18. I commonly wonder what hidden reason another person may have for doing something nice for me.
19. I certainly feel useless at times.
20. Someone has been trying to poison me.
21. I cry easily.
22. I do not tire quickly.
23. I frequently notice my hand shakes when I try to do something.
24. I have very few headaches.
25. Sometimes, when embarrassed, I break out in a sweat which annoys me greatly.

26. There are persons who are trying to steal my thoughts and ideas.
27. I frequently find myself worrying about something.
28. I hardly ever notice my heart pounding and I am seldom short of breath.
29. I have periods of such great restlessness that I cannot sit long in a chair.
30. I dream frequently about things that are best kept to myself.
31. I believe I am no more nervous than most others.
32. I sweat very easily even on cool days.
33. I am entirely self-confident.
34. It is safer to trust nobody.
35. Someone has control over my mind.
36. I have often felt that strangers were looking at me critically.
37. I am sure I am being talked about.
38. I have very few fears compared to my friends.
39. At one or more times in my life I felt that someone was making me do things by hypnotizing me.
40. Someone has been trying to influence my mind.
41. Life is a strain for me much of the time.
42. I am more sensitive than most other people.
43. I am easily embarrassed.
44. I worry over money and business.
45. I cannot keep my mind on one thing.
46. I feel anxiety about something or someone almost all the time.
47. Sometimes I become so excited that I find it hard to get to sleep.
48. I tend to be on my guard with people who are somewhat more friendly than I had expected.
49. I have been afraid of things or people that I knew could not hurt me.

50. I am inclined to take things hard.
51. People say insulting and vulgar things about me.
52. I am not unusually self-conscious.
53. I feel unable to tell anyone all about myself.
54. I have sometimes felt that difficulties were piling up so high that I could not overcome them.
55. I am usually calm and not easily upset.
56. At times I think I am no good at all.
57. I feel hungry almost all the time.
58. I worry quite a bit over possible misfortunes.
59. It makes me nervous to have to wait.
60. I have had periods in which I lost sleep over worry.
61. I am bothered by people outside, on streetcars, in stores, etc., watching me.
62. I must admit that I have at times been worried beyond reason over something that really did not matter.
63. I am a high-strung person.
64. I practically never blush.
65. I blush no more often than others.
66. I am often afraid that I am going to blush.
67. I shrink from facing a crisis or difficulty.
68. I sometimes feel that I am about to go to pieces.