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The Effects of Loneliness and Attribution
of Causation on Self-Focus, Attention
and Recall

by

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THE EFFECTS OF LONELINESS AND ATTRIBUTION OF
CAUSATION ON SELF-FOCUS, ATTENTION AND RECALL.

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Abstract

This study examined the effects of loneliness and attribution of causation of loneliness on self-focus, attention, and recall of self-referent and non-self-referent material. One hundred and eighty Introductory Psychology students were categorized into nonlonely, 'internal' lonely, and 'external' lonely groups on the basis of their score on the UCLA Loneliness Scale and a question determining whether they attributed their loneliness to internal or external sources. The three groups were compared with respect to the number of sentences constructed beginning with "I" or "WE" on the Pronoun Sentence Completion Form (measuring self-focus), recall of series of numbers in a Digit Span test (measuring attending behavior) and recall of a speech (measuring recall of non-self-referent material) or recall of items on a personality-interest inventory (measuring recall of self-referent material). Contrary to expectation, nonlonely subjects were more self-focused than lonely subjects, while the hypothesis that lonely subjects are less attentive than nonlonely subjects was supported when the data were reanalyzed using more extreme scores on the loneliness scale. No other tests of the hypotheses were significant. Results regarding self-focus were explained in terms of self-disclosure and self-esteem studies, and also in terms of the measure itself. The results of the attentiveness and recall measures were explained in terms of Eysenck's (1979) reformulation of the effects of anxiety on performance.

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Introduction

Loneliness is a common and distressing (Weiss, 1973; Gordon, 1976)--perhaps even life threatening--condition. Durkheim (1951), for instance, has linked an individual's lack of integration into some social group, such as a church or family, with suicide. Loneliness is a widespread phenomenon that seems to hit people of all ages and at all socioeconomic levels. In a national survey, one quarter of all Americans reported having felt lonely in the past few weeks (Bradburn, 1969). Empirical research on loneliness, however, has only recently begun, and is still sparse.

One of the more useful ways of looking at loneliness has been through a cognitive analysis (Peplau, Russell and Heim, 1979). The cognitive approach defines loneliness, not as social isolation per se, but as a state of perceived social deficiency in which a person's network of social relationships is smaller than he or she would desire (see Peplau and Caldwell, 1978).

Altman's (1975) conception of privacy is intimately related to loneliness. In his analysis, he views crowding (achieved privacy less than desired privacy) as being at opposite ends along the same continuum as what he refers to a 'social isolation', or what has been defined here as loneliness (achieved privacy more than desired privacy). Both crowding and loneliness are seen as a breakdown in achievement of desired levels of social contact. The effects of crowding, however, would seem to be less severe and of a different type than the effects of loneliness. Mild annoyances and some stress have been reported in sociological studies (Altman, 1975), whereas loneliness has been linked with dissatisfaction (Rubenstein,

Shaver, and Peplau, 1979), boredom (Weiss, 1973), anxiety (Moustakas, 1961), depression (Ortega, 1969), and suicide (Durkheim, 1951).

Defining loneliness as a discrepancy between desired and achieved social contact allows it to be a temporary state, as well as a pervasive and enduring condition. Various precipitating factors may include a breakup of a close emotional relationship by death or divorce, physical separation from family and friends, status changes such as retirement, and reduced satisfaction in the quality of a relationship as would be the case in marital discord. Another possible precipitating factor in becoming lonely is a change in one's expectations of social contact, such as expecting to meet and become friends with many new people at university (Peplau, Russell and Heim, 1979; Perlman and Peplau, 1979). It seems important to note that the objective state of social isolation need not result in loneliness in cases where social isolates adjust their expectations of social participation to a level which more closely approximates their reality. Lowenthal (1964) in fact found that elderly people with a long history of social isolation were less lonely than those with higher levels of social contact.

Various personality characteristics have been found to have some relationship to loneliness. Shyness is significantly correlated with loneliness (Zimbardo, 1977), and, along with low social risk-taking, lack of assertiveness and self-consciousness in a social setting, may contribute to loneliness (Perlman and Peplau, 1979). Loneliness, however, is not synonymous with these personality characteristics, as one study reports a correlation of .50 between shyness and loneliness, and a correlation of .45 between social anxiety and loneliness (Jones, Freemon, and Goswick, in press) instead of

correlations of close to unity as one would expect if what we consider here to be loneliness was in fact the same concept as shyness or social anxiety.

Another characteristic often associated with loneliness is lack of self-esteem. Again, however, the correlation between self-esteem and loneliness has been reported to be $-.45$ (Jones et al., in press), providing evidence that the two concepts are distinct from each other.

Loneliness is also distinct from lack of social skills, since, although they are often related, this relationship is not inevitable. Sisenwein (Note 1) found no relationship between self-reported loneliness and dating status or frequency of receiving mail from family and friends. Loneliness thus appears to be a separate entity, appropriate for empirical study.

In a cognitive analysis of loneliness, the person's attributions for his or her loneliness become important. Weiner's (1974) attributional framework has been adapted to apply to loneliness (Peplau et al., 1979; Peplau and Caldwell, 1978; Perlman and Peplau, 1979). In this analysis there are three perceived dimensions of loneliness: internal/external, stable/unstable, and controllable/uncontrollable. The discussion and experimental manipulations which follow will centre on locus of causality, which is the internal/external dimension. This dimension refers to whether or not the lonely person takes personal responsibility for his or her loneliness. Internal causes include physical attractiveness, shyness, and lack of social skills; whereas external causes of loneliness include lack of opportunity for developing social

relationships and lack of interest by others.

Attributions for loneliness have implications on various aspects of the lonely person's lifestyle and personality (Peplau and Caldwell, 1978). There are indications that individuals who ascribe their loneliness to stable causes are more hopeless about the future than those who attribute their loneliness to unstable causes. Depression is often seen in those who attribute their loneliness to internal, stable sources. It has also been suggested that low self-esteem is associated with internal attributions for loneliness. There is, finally, evidence to suggest that those lonely people with internal, unstable attributions for their loneliness have more effective, active coping skills.

One of the more interesting factors which may be related to loneliness is self-focus. Self-report measures indicate that lonely people consider themselves to be more self-conscious than others (Jones et al., in press), and objective measures indicate that lonely people do, in fact, make significantly more self-references and ask few questions of their conversation partners, thus indicating that lonely people interact with less awareness of others, less responsiveness and in a more self-focused manner (Hockenbury, Kranau, Jones and Hobbs, Note 2). In another study it was discovered that, although situationally lonely people were more successful at communication sending than chronically lonely or nonlonely people, they were no better as communication receivers (Gerson and Perlman, 1979). This was attributed by the researchers to a greater degree of self-focus in the interaction patterns of lonely people.

It was therefore hypothesized that lonely people would

demonstrate a greater degree of self-focus as measured by a greater number of self-references on a sentence completion task.

One would also expect the direction of the causal attribution adopted by the individual to have an influence on the degree of self-focus of that subject. Since loneliness is a rather distressing condition, it seems reasonable to expect lonely people to spend time thinking about and focusing on those specific sources to which they attribute their loneliness. The person with internal attributions of causation would focus on those aspects of themselves which they consider to be the reasons for their loneliness. It also seems reasonable to believe that this focus on specific aspects of oneself may develop into a focus on the self in general. It was therefore hypothesized that those individuals who considered the cause of their loneliness to be internal would be demonstrated to be more self-focused than those individuals who considered the cause of their loneliness to be external in nature.

Although self-focus of lonely people has never been systematically studied, the effect of self-focus in shy people has been looked at. It was discovered that recall is impaired when shy individuals are performing an unstructured task consisting of processing complex information in a socially evaluative setting. This they attributed to the self-focus of the shy, and supported this explanation with the added finding that nonshy individuals, upon being induced to focus on their internal functioning as well as on task-relevant information displayed a similar decrement in recall (Hatvany, Silva and Zimbardo, Note 3).

If these researchers are correct in attributing these problems

in recall to self-focus, the same types of problems should be seen in lonely people, since evidence would seem to indicate that they are also self-focused. Given an unstructured, complex recall task in a socially evaluative setting, it was therefore hypothesized that lonely individuals would demonstrate a deficit in recall when compared to nonlonely people. The same sort of mechanisms that apply to shy people should hold for lonely people, that is, social evaluation anxiety in an unstructured setting is more closely monitored and thus more arousing and distracting for those individuals who are more self-focused (such as the shy and lonely individuals) than for less self-focused individuals. Lonely people may, in fact, be more generally distractable. A recent study demonstrated that lonely subjects had more difficulty learning paired associates when distracting music was being played than their nonlonely counterparts (Florentine, Perlman and McIntyre, Note 4).

Under this type of explanation, if the situation is not socially evaluative, there should be no evaluation anxiety to be monitored, and without this distraction, the lonely individuals would show no decrement in their performance of the recall task. This is partially supported by the fact that in the Hatvany et al. study, the shy subjects demonstrated no deficit in recall in the nonsocially evaluative setting. A socially evaluative setting, therefore, would seem to be important in studying recall in lonely people.

Given that lonely people with internal attributions of causation are expected to be more self-focused than those with external attributions, it would also seem reasonable to expect that those 'internal' people would demonstrate a greater deficit in recall under

socially evaluative settings than 'external' people, since a greater degree of self-focus is likely to lead to greater monitoring of social evaluation anxiety, and thus more distraction leading to a deficit in recall.

One aspect of self-focus that has never been studied is its effects on awareness of internal kinds of events, such as emotions and one's own reactions to external events and people. If self-focus in a socially evaluative setting leads to greater self-monitoring, it should then result in a greater awareness and better recall of events relating to oneself. It was therefore hypothesized that lonely individuals, when in a socially evaluative, nonstructured setting, would demonstrate greater recall of self-referent material than nonlonely people.

It was also hypothesized that the 'internal' lonely individuals would demonstrate greater recall of self-referent material in a socially evaluative setting, than 'external' individuals, since the former should show more self-focus and thus more self-monitoring than the latter.

A function somewhat related to recall is attention. Although it is admittedly a poor test of general intelligence, low scores on the Digit Span subtest of the Wechsler Adult Intelligence Scale are strongly related to inattention (Matarazzo, 1972). Since lonely people are presumably focusing mainly on themselves, they should therefore be less attentive to their environment than nonlonely people. It was therefore hypothesized that lonely people would manifest a deficit in attention as indicated by achieving a lower score on the Digit Span subtest than nonlonely people; and that

following similar reasoning, lonely people with internal attributions of causation would demonstrate less attentiveness than lonely people with external attributions of causation.

Summary of Hypotheses

In total there were three sets of hypotheses, two hypotheses in each of the first two sets and four hypotheses in the third set.

First Set

1. Lonely people are more self-focused than nonlonely people.
2. Lonely people with internal attributions of causation are more self-focused than those with external attributions of causation of loneliness.

Second Set

1. Lonely people attend less than nonlonely people.
2. Lonely people with internal attributions of causation attend less than lonely people with external attributions of causation of loneliness.

Third Set

1. Lonely people manifest a deficiency in recalling external events as compared with nonlonely people in a socially evaluative, unstructured setting.
2. Lonely people with internal attributions of causation manifest greater deficiencies in recalling external events in a socially evaluative nonstructured setting than lonely people with external attributions of causation.
3. Lonely people have greater recall of self-referent material than nonlonely people in socially evaluative, nonstructured settings.
4. Lonely people with internal attributions of causation have

greater recall of self-referent material than lonely people with external attributions of causation in socially evaluative, nonstructured settings.

Method

Overview

Subjects were selected and categorized into three groups; lonely, 'internal' lonely and 'external' lonely, on the basis of two parameters: the UCLA Loneliness Scale, and a question to determine direction of attribution of causation of loneliness. Upon reporting to the laboratory, all subjects in each loneliness group first completed a Pronoun Sentence Completion Form. After this task, six (one-half) of the testing groups were presented with a videotaped speech and the other half of the testing groups were given a personality and interest inventory. So that subjects would believe that they were going to be the objects of social evaluation, prior to the presentation of the videotape (personality inventory) subjects were told that they would subsequently be broken into groups of three to discuss the speech (get better acquainted).

All subjects were then given a Digit Span test, after which they did the appropriate recall task, that is, they answered questions on the speech or recalled inventory items. The Pronoun Sentence Completion Form provided a measure of self-focus, the Digit Span test provided a measure of attention, and the two recall tests provided measures of learning on external and self-referent materials, respectively.

The first set of hypotheses was tested using a 3X2 ANOVA design with loneliness grouping and sex as the independent variables and with the number of sentences beginning with personal (self-referent) pronouns, that is, "I" or "WE", constructed in a Pronoun Sentence Completion Task as the dependent measure. The second set of

hypotheses was also tested using a 3X1 ANOVA design with loneliness grouping as the independent variable, and number of digits 'forward' remembered as a test of Digit Span. The third set of hypotheses was tested using a 3X2 fixed effects ANOVA design with loneliness grouping and type of task as independent variables. The dependent variable corresponding to the 'external' task was the number of questions answered correctly about a videotaped speech, and the dependent variable corresponding to the 'internal' task was the number of self-referent questions recalled after their presentation on a questionnaire.

Subjects and Subject Classification

Approximately 1000 male and female students taking Introductory Psychology at the University of Manitoba were screened for participation in this study by filling out the UCLA Loneliness Scale and answering a question about what they attributed their loneliness to. By serving in this study, subjects partially fulfilled a course research participation requirement. Of the approximately 500 eligible students, about 1/3 were willing and available to participate as a subject. A final sample of 180 subjects was classified into three groups; nonlonely ($N=60$), 'internal' lonely ($N=60$) and 'external' lonely ($N=60$), on the basis of their responses to the independent variable pretesting measures.

Each loneliness group was further subdivided on a random basis into two halves (N per group = 30), each with approximately the same number of male and female subjects. One half was administered the 'self-referent' task, and the other half was administered the 'non-self-referent' task. Subjects were tested in groups of 20 to 30

subjects each. Each testing group consisted of approximately the same number of nonlonely, 'internal' lonely and 'external' lonely subjects.

Independent Variables

The UCLA Loneliness Scale (Russell, Peplau and Ferguson, 1978), used in screening subjects, consists of 20 general items to which the subject indicates that he or she "often", "sometimes", "rarely" or "never" feels this way (Appendix A). The answers are given 4, 3, 2, or 1 points respectively. The lowest score possible is 20, and the highest score possible is 80, indicating nonlonely and very lonely extremes respectively. A sample item is:

"I have nobody to talk to."

The test was reported by its developers to have high internal consistency (coefficient alpha = .96) and test-retest correlation over a two-month period was .73. Concurrent validity of this scale was demonstrated by a correlation between a subjective self-report question about current loneliness and UCLA Loneliness Scale of .79, and by a significant difference in mean scores between control subjects and those people who felt troubled enough by loneliness that they volunteered for a three-week clinic/discussion program. Further validation is provided by correlations of scores on the UCLA Loneliness Scale with such theoretically related constructs as depression, anxiety, boredom, dissatisfaction, unhappiness, shyness and feelings of emptiness. Loneliness Scale scores did not correlate with self-ratings of irrelevant adjectives such as "hard-working" and "wide range of interests" (Russell et al., 1978).

The UCLA Loneliness Scale was chosen over several alternative scales. One scale which has been subjected to examination for its validity and reliability is the ABLIS (Abbreviated Loneliness Scale) developed by Ellison and Paloutzian (Note 5). Its internal consistency was lower than that of the UCLA Loneliness Scale, with coefficient alpha of .67, compared to that of the UCLA Scale which had a coefficient alpha of .96. Test-retest correlation for the ABLIS was slightly higher at .85 than that of the UCLA Scale (which had a correlation of .73) but the ABLIS test-retest was taken over a one-week period, whereas that of the UCLA Scale was taken over a two-month period. The ABLIS Scale's validity measures were also lower, with the correlation between test score and self-reported loneliness being .61, compared to the correlation between UCLA test score and self-reported loneliness of .79.

Another loneliness scale which has received close scrutiny with respect to reliability and validity is the Belcher Extended Loneliness Scale (Belcher, Note 6). In a comparison of the two scales, Solano (1980) concluded that both the UCLA Loneliness Scale and Belcher's Loneliness Scale have high internal consistency, high test-retest reliability, and both correlate well with a single question relating to global loneliness. The UCLA Scale, however, appears to identify a subjective lack of social companionship, which seems to be the definition of loneliness used by college students. The Belcher Scale seems to be more sensitive to philosophically and politically determined forms of loneliness, and to be more related to more pathological forms of loneliness such as depression and anxiety, than the UCLA Scale.

All things taken into account, the more desirable length and easier accessibility of the UCLA Scale, the fact that the scale seems to identify and measure those aspects of loneliness most relevant to this study, as well as the high reliability and validity measures, the UCLA Loneliness Scale seemed to be the most suitable screening device for this study.

A revised version of the UCLA Scale has been developed recently (Russell, Peplau and Catrona, in press). It has the added advantage of eliminating the possible "yea-saying" type of social desirability effects by not coding items all the same way. It was, however, not yet available to the author at the time this present study was being initiated, so the original version of the scale was used. The two versions correlate very highly at $r = .92$.

Those subjects who scored below 30 on the UCLA Loneliness Scale became members of the nonlonely group, with an average score of 24.9. Those subjects who scored above 40 on the scale became members of the lonely group. Mean score in this group was 50.4. These cut-off scores were chosen because of studies indicating average scores for college students of 36 or 37 (Russell et al., 1978).

The question given to the subjects to determine externality or internality of attribution of causation was: "If you have been feeling lonely lately, has your loneliness been primarily due to something about you or something about your situation?"

due to self	due to situation
1.....2.....3.....4.....5.....6	

The left half of the scale indicated internal, while the right half of the scale indicated external attributions of causation. A structured scale measure was chosen for measuring causal attribution

because of research done by Elig and Frieze (1979). They demonstrated the superiority of rating scales over open-ended questions and percentage ratings in situations like this where hypotheses of particular causal attributions are being tested.

The lonely subjects who had internal attributions of causation of loneliness became members of the 'internal' lonely group, while the lonely subjects who had external attributions of causation became members of the 'external' lonely group. This provided 60 subjects in each of the nonlonely, 'internal' lonely and 'external' lonely groups.

Tasks and Dependent Measures

To test the self-focus of nonlonely and lonely individuals, the hypotheses in Set 1, a Pronoun Sentence Completion Form (Appendix B) was used. Each question in the scale consisted of a given verb, and a choice of six pronouns. The subject was required to write a sentence for each item, using the given verb and one pronoun. A sample question of the Pronoun Sentence Completion Form is:

ATE

WE THEY I HE YOU SHE

A sample answer would be:

"He ate the cake."

This Pronoun Sentence Completion Form has 60 items. Examination of its validity has yielded a correlation of $r(53) = .35$ at $p < .005$, between this scale and self-consciousness (Spinner and Adair, Note 7).

A Digit Span task similar to the one on Wechsler's Adult Intelligence Scale was administered to the subjects. Five series of numbers ranging from four to eight digits in length were read out by

the experimenter to the subjects in standard administration fashion, that is, the series was read out at a rate of approximately one digit per second. Subjects were asked to write down each series on paper from memory after it had been read out by the experimenter. The series of digits which were read out to the subjects were:

3-2-7-9

1-5-2-8-6

5-3-9-4-1-8

8-1-2-9-3-6-5

9-4-3-7-6-2-5-8

Each series was read out once and only one series of each length was administered.

Subjects were also asked to do a 'digits backward' task, that is, five more series of numbers were read out and subjects were asked to write down the series backward from memory. These data were dropped from the analysis, however, because a significant number of subjects 'cheated' by recording the digits from right to left rather than doing the backward manipulation of numbers in their heads.

This task was scored by the experimenter; any series of numbers with at least one digit wrong or in the wrong order was marked incorrect. The Digit Span score for each subject was the total number of series recalled correctly.

Two types of recall tasks were set up to compare the three loneliness groups on recall of non-self-referent material (the 'external' task) and recall of self-referent material (the 'internal' task). The 'external' task was similar to one of the tasks given to shy subjects by Hatvany, Silva and Zimbardo (Note 4). Subjects were

first shown a 30 minute videotaped speech based on an article called "Superkids" by May Pines (1979). The article describes children 'at risk', that is, children of mentally ill or extremely poor parents, who, contrary to expectations, are able to overcome their difficulties and become competent and achieving adolescents and adults. The length of the videotaped speech was chosen to attempt to simulate a class lecture.

A questionnaire (Appendix C) was developed to test recall of the speech. This questionnaire contains both multiple choice (recognition) and point-form short answer (recall) questions. There were 14 questions on the test. A pretest item analysis was performed in which item to total test score point biserial correlations were calculated. There were only two items which did not have a correlation of at least .2 and had to be replaced for the final questionnaire. Subjects' scores on the questionnaire in the actual study ranged from 1 to 15 out of a possible score of 23. The average score was 6.8 with a standard deviation of 2.9. Questionnaires were scored by the experimenter. Since the questions were multiple choice or point form questions with very specific correct answers, very little in the way of judgement was required on the part of the experimenter.

The 'internal' task was a personality inventory (Appendix D) which consisted of 25 self-referent items, that is, statements about interests and personality traits of the subject. A sample item on the scale was:

"I make friends easily."

The subjects were asked to indicate on a five point scale how well

the statement described them. Subjects were asked to complete these items as an inventory, however, the primary purpose of the instrument was not to elicit information about the subject; rather, the inventory served as the stimulus material in a learning task. The subjects were then asked to list the items they had been presented with on the interest inventory.

The average score on this task was 10.9 with a standard deviation of 3.2. The scores ranged from 0 to 19 out of a possible score of 25. Scoring was again done by the experimenter. A response was marked correct if it conformed to the basis idea of the test item. An example of an item which would be an acceptable match to:

"I have an interest in astronomy." might be:

"I like to learn about the stars and planets."

An unacceptable answer might be:

"I like astrology."

Since the scoring criterion on this scale was slightly less well defined than on the other tasks, special care was taken by the experimenter to ensure that the scoring was done blind with respect to the loneliness grouping of the individual.

At the end of each experimental session, subjects were debriefed with respect to the hypotheses and the functions of the various measures. The definition of loneliness, as it was used in this study, and various correlates of loneliness were also discussed with the subjects. Subjects were given the opportunity to request that final results be mailed to them after analysis of the data was completed.

Results

Although recall and attention may be considered in many instances to be related enough for the data generated from these two concepts to be analyzed together, in this study the hypotheses are dissimilar enough to allow separate consideration in analysis of data. The hypotheses about recall look specifically at direction of focus of the individual, that is, inward or outward focus, while the hypotheses regarding attention do not look at direction of attention but merely at the presence or absence of it. For this reason the data from these two sets of hypotheses, that is, the hypotheses in Sets 2 and 3, were analyzed separately. Additionally, since sex of subject did not have any main or interaction effects in Digit Span and recall tasks, the variable was dropped and male and female groups were combined for analysis.

Results of Set 1 Hypotheses

These two hypotheses were:

1. Lonely people are more self-focused than nonlonely people.
2. Lonely people with internal attributions of causation are more self-focused than those with external attributions of causation of loneliness.

Results of this set of hypotheses are shown in Table 1. Results were analyzed using two one-tailed a priori contrasts and an overall two-way, fixed effects ANOVA. The first contrast comparing lonely and nonlonely scores was significant ($t = 2.47, p < .025$) indicating that, contrary to predictions of Hypothesis 1, nonlonely subjects used significantly more self-referent pronouns than lonely subjects.

Table 1

Mean Number of Personal Pronouns Used
By Three Loneliness Groups

Group	<u>N</u>	Number of Pronouns			
		Female		Male	
		<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Nonlonely	35/25	26.6	8.4	26.3	8.6
External Lonely	40/20	22.9	7.9	24.1	8.2
Internal Lonely	41/19	21.7	6.2	28.1	4.9

Analysis of Variance

Source	<u>MS</u>	<u>df</u>	<u>F</u>	<u>p<</u>
Group	184.7	2	3.23	.042
Sex	112.3	1	1.96	.163
Group X Sex	226.1	2	3.95	.021

The second contrast, comparing 'internal' and 'external' lonely subjects was not significant, indicating no significant difference in self-referent pronoun use between lonely subjects with internal and those with external attributions of causation of loneliness.

The overall ANOVA demonstrated a significant sex by lonely group interaction ($F(2,173) = 3.95, p < .025$). This indicates that among lonely subjects, 'internal' males used more self-referent pronouns than 'internal' females, but that there was no such discrepancy between pronoun usage of males and females in the 'external' lonely or nonlonely groups.

Results of Set 2 Hypotheses

The two hypotheses tested in this section were:

1. Lonely people attend less than nonlonely people.
2. Lonely people with internal attributions of causation attend less than lonely people with external attributions of causation of loneliness.

Results of this set of hypotheses are shown in Table 2. Results were analyzed using a one-way (3X1) ANOVA, and two one-tailed a priori contrasts, none of which was significant at the $p < .05$ level. Further analysis, however, using more extreme scores on the loneliness scale, was done, at which point, the first contrast, testing Hypothesis 1, became significant at $t = 1.861, p < .05$. This means that when the data is analyzed using a minimum Loneliness Scale score cut-off point of 47 (rather than 40) for the lonely groups and the same nonlonely cut-off score as before, the lonely subjects remembered fewer digits on the Digit Span test than nonlonely

Table 2

Mean Number of Digits Recalled
By Three Loneliness Groups

Group	<u>N</u>	Number of Digits	
	Female/Male	<u>M</u>	<u>SD</u>
Nonlonely	35/25	3.43	1.05
External Lonely	40/20	3.33	1.13
Internal Lonely	41/19	3.61	1.06

Analysis of Variance

Source	<u>MS</u>	<u>df</u>	<u>F</u>	<u>p</u> <
Between Groups	1.57	2	1.35	.26
Within Groups	1.16	177		

subjects (Table 3). A cut-off scale score of 47 was chosen because it raised criterion score but retained adequate power by leaving over half of the subjects eligible for inclusion of their data in the analysis.

Results of Set 3 Hypotheses

The four hypotheses tested in this section were:

1. Lonely people manifest a deficiency in recalling external events in a socially evaluative, unstructured setting, compared with nonlonely people.
2. Lonely people with internal attributions of causation manifest greater deficiencies in recalling external events in a socially evaluative, nonstructured setting, than lonely people with external attributions of causation.
3. Lonely people have greater recall of self-referent material than nonlonely people in socially evaluative, nonstructured settings.
4. Lonely people with internal attributions of causation have greater recall of self-referent material than lonely people with external attributions of causation in socially evaluative, nonstructured settings.

To enable direct comparison between 'internal' task scores and 'external' task scores, both sets of scores were converted to z-scores. An overall two-way, loneliness by task, fixed effects ANOVA failed to demonstrate any significant effects (Table 4).

Summary

In summary, then, analysis of the results indicated that the nonlonely groups of subjects used significantly more personal

Table 3

Mean Number of Digits Recalled by Three Loneliness Groups
Using More Extreme Scores

Group	<u>N</u>	Number of Digits	
	Female/Male	<u>M</u>	<u>SD</u>
Nonlonely	35/25	3.43	1.04
External Lonely	22/14	3.09	.99
Internal Lonely	20/12	3.06	1.12

Analysis of Variance

Source	<u>MS</u>	<u>df</u>	<u>F</u>	<u>p</u> <
Between Groups	1.93	2	1.73	.18
Within Groups	1.11	120		

Table 4

The Z-Score Conversions of the Scores on the Two Recall Tasks
of the Three Loneliness Groups

Group	<u>N</u>	Internal Task		External Task		
		Female/Male	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Nonlonely	35/25		-.13	1.5	-.07	.18
External Lonely	40/20		.13	.97	.14	.16
Internal Lonely	41/19		-.03	.91	-.03	.20

Analysis of Variance

Source	<u>MS</u>	<u>df</u>	<u>F</u>	<u>p</u> <
Group	.90	2	.88	.41
Task	.00	1	.00	.99
Group X Task	.02	2	.02	.98

pronouns in the Sentence Completion task than the lonely subjects, particularly the female subjects. Upon reanalysis of the data using more extreme scores for the lonely groups of subjects, nonlonely subjects had better recall in the Digit Span task than lonely subjects. No other results were significant.

Discussion

Of the three sets of hypotheses advanced in this study, none was fully supported by the data. First, the unexpected finding that nonlonely subjects formed more self-referent sentences will be considered. Then the data on attention and recall will be discussed. Various aspects of the design will be examined to see if there were any inadequacies which may have contributed to the lack of expected findings. A new theoretical framework which may explain the obtained results will also be discussed.

Personal Pronoun Usage

A comparison of self-focus of lonely and nonlonely subjects indicated that, contrary to expectations, nonlonely subjects, especially females, were more self-focused than lonely subjects. This seems to contradict earlier studies with opposite findings (Jones et al., in press; Hockenbury et al., Note 3; Gerson and Perlman, 1979). These earlier studies, however, used either a self-report measure of 'self-consciousness' or observations of actual interactions. The lonely subject's greater self-consciousness and use of self-references in conversation may be a result of a self-focus that is only evidenced in social, and to the lonely individual, stressful situations.

It may also be that sentence writing was seen as a form of self-disclosure on an intimate level. There is evidence to believe that loneliness is associated with low self-esteem (Moore and Sermat, 1974; Perlman and Peplau, 1979) and with less assertiveness (Aimbaro, 1977). Low self-esteem, in turn, seems to be associated

with greater psychological 'distance', particularly in women, in dealing with people (Tolor, Cramer, D'Amico, and O'Marra, 1975). This psychological 'distance' would quite naturally lead to fewer self-disclosures, particularly of a type that is perceived as intimate. The fact that in this study, there was a greater difference in self-referent pronoun use between lonely and nonlonely women than between lonely and nonlonely men, as well as the overall greater personal pronoun use of nonlonely (high self-esteem) subjects than of lonely (low self-esteem) subjects would seem to fit in well with Tolor et al. (1975) results. Further corroboration can be found in studies indicating that lonely people self-disclose less to an opposite sex partner in conversation, and choose less intimate topics for discussion than nonlonely people (Solano and Batten, Note 8), and that lonely people of both sexes see themselves as self-disclosing less than nonlonely people (Solano and Parish, Note 9). Lonely people may therefore use more self-references in conversation, yet actually disclose less material of an intimate nature than nonlonely people. This would seem to be particularly true of women.

The Failure to Find Learning Differences

Another surprising finding is that although nonlonely subjects were more attentive, that is, they did better on the Digit Span task, there were no differences between lonely and nonlonely subjects on either of the recall tasks.

One possible explanation of the nonsignificance of results in any study is that the design may have been faulty. With respect to the design, there are potentially three problems which could contribute to nonsignificance of results: an inadequate number of

subjects, poor outcome measures, and inadequate or inappropriate manipulation of independent measures.

Although the power of the test for the analyses concerned with recall (power $>.80$) was not as high as the power of the tests concerned with self-focus and attention (power $>.96$), the power was still more than adequate, suggesting that one would have expected that there were enough subjects to pick up any true differences between groups.

Another possible factor in the nonsignificance of the recall tasks is the sensitivity of the tasks to detect differences in recall. The standard deviation of each task, however, was approximately three (with means of seven and ten for the 'external' and 'internal' tasks respectively). This provided a sufficiently large range of scores to provide differentiation between good and poor recall in both tasks.

An assessment of the manipulation of independent variables in this study is similarly unrevealing with respect to inadequacies. Since the manipulation of variables was adequate to provide for a significant difference in Digit Span between lonely and nonlonely subjects, it should have been adequate to provide for finding existing differences between lonely and nonlonely subjects on the recall tasks. The lonely and nonlonely subjects' average scores on the UCLA Scale were 50.5 and 24.9 respectively, providing a large enough difference in means to ensure that the two groups were sufficiently different with respect to loneliness.

One important factor held constant in this study was the condition that the subjects felt that they were going to be

evaluated by their peers, by way of having a discussion with two other people. The 'social evaluation' instructions seem to have been successful, in view of the fact that upon enquiry, almost all subjects indicated that they had been 'taken in' and very few suspected that they were going to be given a recall task.

It is possible, however, that the internal task was not seen by the subjects as self-referent, but as an external task. Subjects in this condition may have focused on answering and recalling general items on a scale rather than on answering and recalling personal statements. The internal task, therefore, may have been inadequate in its function as a task requiring recall of self-referent material. This, however, does not explain the lack of significance in the external task condition.

The Digit Span task and the two recall tasks are conceptually quite similar: all three are memory tasks and all three require attention. The problem, then, is to develop an explanation for the disparate findings. The initial formulation, that is of lonely people's self-focus affecting attention and recall, was not upheld by the data, despite the data providing a relatively good test.

A Reformulation

Eysenck has recently developed a new theoretical framework for looking at the role of anxiety in the performance of learning and memory tasks (Eysenck, 1979). Briefly, Eysenck indicates that anxious subjects engage in task-irrelevant processing which detracts from the task at hand. To compensate for the detrimental effects of this task-irrelevant processing, Eysenck argues that these anxious subjects increase the effort put into the task. Thus trait anxiety,

while it always reduces the effectiveness and efficiency of processing, may not impair actual performance measures because of the increased effort the subjects expend in order to counteract the task-irrelevant processing.

Interestingly enough, there is evidence to indicate that anxiety impairs performance of a subsidiary or secondary task more than performance of the primary task (Norman and Bobrow, 1975). Eysenck explains this in terms of greater effort being expended by anxious subjects for the primary task than for the secondary task. A secondary task, according to Eysenck, may be a subsidiary task, such as an incidental learning task, or a task which is presented as relatively less important than another task, the main or primary task. There is, according to Eysenck, a limited reserve of energy available to the subject, and the subject tends to expend this energy on the primary task, leaving little excess energy available for improving performance on the secondary or subsidiary task.

It is possible that this sort of process was occurring in this study. The correlation between loneliness and anxiety, the main construct in Eysenck's model, is quite strong (see Florentine et al., Note 5). Perhaps the effects of loneliness on recall parallel the effects of anxiety. The pattern of results found in this study would seem to fit with Eysenck's conceptualization. The Digit Span, which was presented as a secondary task, "one thing to do before you get into your discussion groups", demonstrated a deficit in the performance of the lonely subjects in comparison to the nonlonely subjects. The two recall tasks were presented in the experimental sessions as the primary tasks, and neither task demonstrated

performance differences between lonely and nonlonely subjects. It is possible that anxiety was responsible for lonely people doing task-irrelevant processing in the Digit Span task, and, in the absence of extra effort on such a secondary task, Eysenck's model would predict the obtained outcome--poor performance by anxious, lonely subjects. Since the recall tasks were the 'primary' tasks in both 'internal' and 'external' task conditions, lonely people may well have been anxious and doing task-irrelevant processing like in the Digit Span, but also expending more effort in order to counteract the detrimental effects of this processing. This would tend to produce few differences in performance outcome measures between lonely and nonlonely subjects in the recall tasks.

As with most post hoc theorizing, this explanation of the results can be criticized. In particular, two points are worth noting. First, one could challenge the classification of the recall and Digit Span tasks as primary and secondary, respectively. Second, using Eysenck's model suggests that anxiety rather than loneliness, per se, is the true causal factor.

Both these criticisms may be valid to some extent. However, the second criticism is probably primarily of theoretical rather than practical importance. Unlike a good experimenter, nature does not manipulate variables in isolation. Loneliness correlates highly with anxiety and therefore lonely people are very apt to face the same learning problems as anxious people.

In further support of Eysenck's model, it can be used to explain the Florentine et al. (Note 5) results. In that study, lonely subjects performed poorly on a primary learning task when, and only

when, music was being played. One can argue that under normal conditions, the greater effort of anxious lonely subjects offsets their tendency to engage in task-irrelevant processing. However, when music is being played, this distraction further (and differentially) increases the task-irrelevant processing of the lonely subjects. Despite their effort, lonely subjects under these conditions would be expected to show learning deficiencies.

All in all, Eysenck's model appears to have sufficient promise to warrant further investigation as a model for predicting the effects of loneliness on learning. Such research should involve tasks which are unequivocally primary or secondary. It should assess both anxiety and loneliness so that the true causal importance of each factor can be assessed. Finally, it should measure effort and task-irrelevant processing as well as performance, per se.

Summary

In summary, there were two positive findings in this study. First, contrary to expectation, lonely subjects formed fewer sentences with personal pronouns. This was explained in terms of the effects of self-esteem and psychological 'distance' on self-disclosure behavior. Second, the extremely lonely subjects performed less well on a Digit Span task. The non-significant differences in the recall of information on the two main tasks of this study undermine the author's original idea that lonely subjects learn self-referent material better than impersonal material.

Taken collectively, the learning performance findings of this study can be interpreted in terms of Eysenck's anxiety model. According to his view, performance is a function of both effort and

task-irrelevant processing. Lonely anxious people are seen as high in both effort and task-irrelevant processing. Under many circumstances the facilitating effect of effort balances the inhibiting effect of task-irrelevant processing. Under these conditions, lonely and nonlonely subjects should perform equally well. It is only when the balance of effort to irrelevant processing is unequal (as caused by distracting music or on secondary tasks) that lonely subjects perform less well. Eysenck's model appears to have sufficient merit to warrant further, direct testing as an explanation of the learning deficiencies manifested by lonely people.

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Appendix A

UCLA LONELINESS SCALE

Directions:

For the following questions you are to circle the choice that best illustrates how often each of the statements would be descriptive of you.

O represents "I often feel this way"

S represents "I sometimes feel this way"

R represents "I rarely feel this way"

N represents "I never feel this way"

- | | |
|---|---------|
| 1. I am unhappy doing so many things alone. | O S R N |
| 2. I have nobody to talk to. | O S R N |
| 3. I cannot tolerate being so alone. | O S R N |
| 4. I lack companionship. | O S R N |
| 5. I feel as if nobody really understands me. | O S R N |
| 6. I find myself waiting for people to call or write. | O S R N |
| 7. There is no one I can turn to. | O S R N |
| 8. I am no longer close to anyone. | O S R N |
| 9. My interests and ideas are not shared by those around me. | O S R N |
| 10. I feel left out. | O S R N |
| 11. I feel completely alone. | O S R N |
| 12. I am unable to reach out and communicate with those
around me. | O S R N |
| 13. My social relationships are superficial. | O S R N |
| 14. I feel starved for company. | O S R N |
| 15. No one really knows me well. | O S R N |
| 16. I feel isolated from others | O S R N |

- | | |
|---|---------|
| 17. I am unhappy being so withdrawn. | O S R N |
| 18. It is difficult for me to make friends. | O S R N |
| 19. I feel shut out and excluded by others. | O S R N |
| 20. People are around me but not with me. | O S R N |

Appendix B
Pronoun Sentence Completion Form

Example

ATE

WE THEY I HE YOU SHE

Sample responses:

He ate the apple.

or

We ate supper at my house.

If you have understood the instructions, please turn the page and complete the sixty remaining verb-pronoun sets.

1. BECAME
SHE HE YOU WE THEY I

2. NEEDED
YOU I THEY HE WE SHE

3. WAITED
YOU I WE HE SHE THEY

4. GOT
WE YOU THEY HE I SHE

5. RODE
I SHE THEY YOU WE HE

6. FELT
WE I SHE YOU THEY HE

7. HAD
WE HE YOU I THEY SHE

8.

KEPT

THEY YOU SHE WE HE I

9.

GREW

WE YOU SHE I THEY HE

10.

DID

SHE YOU I WE HE THEY

11.

CALLED

SHE WE THEY HE YOU I

12.

RAN

I SHE THEY YOU WE HE

13.

CAME

SHE THEY I HE YOU WE

14.

DREW

SHE YOU HE THEY WE I

15. READ
YOU WE THEY HE SHE I

16. SHOWED
I WE SHE HE YOU THEY

17. BLEW
SHE HE I YOU THEY WE

18. ADDED
THEY I WE YOU SHE HE

19. BROUGHT
SHE WE HE I YOU THEY

20. BURNED
SHE WE THEY HE YOU I

21. FELL
WE THEY I HE YOU SHE

22.

BELIEVED

SHE HE I YOU THEY WE

23.

CARED

SHE THEY I HE YOU WE

24.

WAS

THEY I WE YOU SHE HE

25.

TALKED

I WE YOU SHE HE THEY

26.

LOVED

THEY HE I YOU SHE WE

27.

STOOD

I WE YOU HE SHE THEY

28.

SLEPT

I THEY YOU HE SHE WE

29.

WENT

WE HE YOU SHE I THEY

30.

CARRIED

SHE THEY YOU HE WE I

31.

ANSWERED

YOU THEY SHE WE I HE

32.

RAISED

YOU WE THEY HE SHE I

33.

LIVED

THEY WE I HE YOU SHE

34.

RECEIVED

I YOU THEY SHE HE WE

35.

LOST

THEY HE I YOU SHE WE

36.

ASKED

YOU THEY SHE WE I HE

37.

DROPPED

WE SHE THEY YOU HE I

38.

TOLD

I HE SHE THEY WE YOU

39.

HELD

THEY YOU SHE WE HE I

40.

OPENED

YOU THEY HE SHE WE I

41.

SAID

I SHE WE HE YOU THEY

42.

CHANGED

SHE YOU WE I HE THEY

43.

TRIED

I HE SHE THEY WE YOU

44.

MOVED

YOU I THEY HE WE SHE

45.

REACHED

YOU I THEY SHE HE WE

46.

BEGAN

SHE HE YOU WE THEY I

47.

MADE

YOU HE THEY SHE I WE

48.

SPOKE

I THEY YOU HE SHE WE

49.

TOOK

I WE YOU SHE HE THEY

50.

PAID

YOU WE HE I SHE THEY

51.

COVERED

SHE YOU WE I HE THEY

52.

KNEW

THEY YOU I HE WE SHE

53.

SET

I WE SHE HE YOU THEY

54.

CUT

SHE YOU I WE HE THEY

55.

SENT

I WE YOU SHE THEY HE

56.

STAYED

I WE YOU HE SHE THEY

57.

FOUND

WE YOU THEY HE I SHE

58.

WENT

WE YOU SHE I THEY HE

59.

LIKED

THEY WE SHE HE YOU I

60.

OWNED

YOU THEY HE SHE WE I

Appendix C

External Task Questionnaire

1. On Anthony's "risk" assessment, those children who are at high risk score between:
 - a) 0 - 6
 - b) 0 - 13
 - c) 28 - 42
 - d) 40 - 58
 - e) 50 - 65

2. "Schizophrenogenic" refers to:
 - a) children of schizophrenic mothers
 - b) mothers of schizophrenic children
 - c) siblings of schizophrenics
 - d) all of the above

3. The risk of children of one schizophrenic parent becoming schizophrenic is:
 - a) 1 - 2%
 - b) 12 - 14%
 - c) 35 - 45%
 - d) 65 - 70%
 - e) 80 - 85%

4. The risk of children of two schizophrenic parents becoming schizophrenic is:
 - a) 1 - 2%
 - b) 12 - 14%
 - c) 35 - 45%
 - d) 65 - 70%
 - e) 80 - 85%

5. Children with two risk factors are _____ as likely to develop psychiatric disorders as children with none.
- a) equally
 - b) twice
 - c) three times
 - d) four times
6. Maximum period at risk for mental breakdown is between the ages of:
- a) 5 - 12
 - b) 10 - 12
 - c) 15 - 30
 - d) 15 - 45
7. Superkids are:
- a) children of schizophrenics
 - b) abused children
 - c) children of manic-depressives
 - d) both a) and c)
 - e) all of the above
8. The chances of a child being schizophrenic are _____ if his mother is schizophrenic rather than his father:
- a) three times as great
 - b) twice as great
 - c) equally as great
 - d) half as great
 - e) one-third as great

9. Most of the strength of the 'invulnerables' comes from:
- a) their particular genetic endowment
 - b) a favorable environment during gestation
 - c) their own experiences during early years
 - d) all three of the above are equally important
 - e) there is no information available on this
10. According to Anthony, 'invulnerable' children
- a) have been generally protected from risk
 - b) have been constantly exposed to risk
 - c) have been exposed to some risk
11. The most effective type of intervention was found to be
- a) group psychotherapy
 - b) strengthening of the child's self-confidence
 - c) 'cathartic' interventions
 - d) 'corrective' interventions
 - e) classical psychotherapy
 - f) behavior modification
12. Which of these statements is true:
- a) Children of schizophrenic parents either become schizophrenic or are 'invulnerable'.
 - b) After the age of 12, a 'normal' child of schizophrenics will not likely become schizophrenic.
 - c) Some 'invulnerables' may have problems in dating and intimate relationships.
 - d) Maintaining a close relationship with the parents is important in becoming an 'invulnerable'.
 - e) All of the above are false.

13. How many risk-research projects are there in the U.S., Denmark and Sweden that study the children of schizophrenic parents?
- a) 5
 - b) 10
 - c) 20
 - d) 40
14. Who was the author of this paper?
- a) Maya Pines
 - b) Anthony
 - c) Norman Garnezy
 - d) Rutter
15. What are the three necessary conditions for becoming 'superkids'?
- a)
 - b)
 - c)
16. What risk factors did Rutter identify as being strongly related to psychiatric disorder in 10 year old children?
- a)
 - b)
 - c)
 - d)
 - e)
 - f)

Appendix D

Personality-Interest Inventory

For each of the following statements, circle the choice that best illustrates how well that statement describes you.

	very like me			not like me		
	1	2	3	4	5	6
1. I make friends easily.						
2. I am cheerful most of the time.						
3. I enjoy working with tools.						
4. I worry a good deal.						
5. I like to solve puzzles.						
6. I am a religious person.						
7. I enjoy reading Shakespeare.						
8. I am generally honest.						
9. I enjoy going to parties.						
10. I am an impulsive person.						
11. I enjoy classical music.						
12. I almost never get into a dispute.						
13. I enjoy going to art museums.						
14. I often lose my temper.						
15. I am a perfectionist.						
16. I dislike mathematics.						
17. I enjoy being a student.						
18. I often tend to put things off.						
19. I have definite career plans.						
20. I am an assertive person.						
21. I am a self-confident person.						
22. I have an interest in astronomy.						
23. I am a somewhat disorganized person.						

- | | very | like | me | | not | like | me |
|------------------------------------|------|------|----|---|-----|------|----|
| 24. I enjoy a good discussion. | 1 | 2 | 3 | 4 | 5 | 6 | |
| 25. I often go to "horror" movies. | 1 | 2 | 3 | 4 | 5 | 6 | |