Reminiscence, a gain in performance after rest, amounts to the difference between the pre-rest decrement and post-rest increment. Howland (1951) defined it in terms of increments in learning which occur during a rest period. Whereas, Osgood (1953) defined reminiscence as a temporary improvement in performance without practice. It is true, that learning is usually indexed in terms of performance and to that extent the two definitions may be considered equivalent, but it is also true that modern learning theory makes a radical distinction between learning and performance, depending upon various conditions requiring careful investigation. The problems to name a few, according to Eysenck (1965), would be to consider Hull's concept of reactive inhibition equivalent to fatigue or negative motivation and recognizing the artifacts of measurement. Eysenck and Frith (1977) provide a synthesis of Howland's and Osgood's definitions, by defining reminiscence as the improvement in performance of a partially learned act that occurs while the subject is resting, i.e., not performing the act in question. Reminiscence has been explained by various theories. Ammons (1947 a) has suggested a correction for warm-up decrement, which depends for its plausibility on the interpretation of post-rest improvement in performance after the first trial as 'warm up'; if Eysenck's (1956) explanation of this phenomenon in terms of extinction
of conditioned inhibition is preferred, the 'correction' is seen as an artifact which distorts measurement.

The theories of Hull (1943), Ammons (1947 a) and Kimble (1949) involving such concepts as reactive inhibition and conditioned inhibition, are closely identified with a definition of the reminiscence phenomenon involving performance and performance decrement, while theories involving such concepts as consolidation and perseveration (Eysenck, 1964 a) lead rather to definitions involving learning and neural fixation of learning. Both of these sets of theoretical concepts are required to explain the facts of reminiscence, not as alternative explanations but rather as being complementary. The degree to which inhibition or consolidation will explain reminiscence depends very much on the nature of the task. Since theories of reminiscence are task specific, the extrapolation of hypothesis beyond the particular tests used, seems dangerous.

Eysenck (1965) proposed a three-factor theory of reminiscence making use of the concepts of reactive inhibition, conditioned inhibition and consolidation. Eysenck and Frith (1977) proposed that a one factor theory using the concept of consolidation could explain pursuit rotor reminiscence because in such a task requiring new learning consolidation is of prime
importance. In tasks such as inverted alphabet printing (Eysenck and Cookson, 1974) both inhibition and consolidation concepts are required to explain reminiscence. In the present experiment since the tasks being used fall in the category of inverted alphabet printing the discussion which follows is to be taken as a nucleic growth around Eysenck's (1965) three factor theory of reminiscence. Mohan (1966, 1974, 1978, 1979, 1980), Kumar (1976) and Jain (1976) also argue in favour of a three factor theory to explain reminiscence.

In the present investigation reminiscence in children was studied on two psychomotor tasks. The determination of reminiscence by personality, drive, age and sex variables is explained in terms of reactive inhibition, conditioned inhibition and consolidation. The results have been presented in Tables 2 to 10 and figures I to XI.

**Extraversion Group**

**Extraversion and Reminiscence**

It was hypothesised that Extraversion is expected to be positively related with reminiscence. The comparison of means, inspection of figures and F-ratios for Substitution and Backward Figure Writing revealed that results were in the predicted direction, though statistically significant in the case of Backward Figure Writing task only. High on Extraversion
(E⁺) groups showed superior reminiscence in comparison to low on Extraversion (E⁻) groups. The present results are in line with the earlier findings of Rysenok (1956; 1960a; b; 1962,1964), Rysenok and Rysenok (1960), Claridge (1960), Becker (1960), Lynn (1960), Germain and Pinillos (1962), Star (1963), Child (1964, 1965), Mohan (1966, 1968), Mohan and Neelam (1969), Samberg et al. (1969), Farley (1971), Mohan and Shashi (1972), Horn (1975 a), and Schroeder and Koenig (1978) who had reported that subjects high on Extraversion would show higher reminiscence scores than subjects low on Extraversion.

In order to explain why reminiscence effects are stronger in extraverts than introverts Rysenok (1957, 1962) reported that Massed practice produces reactive inhibition which is generated more quickly in extraverts. Reminiscence is produced by the dissipation of the accumulated reactive inhibition during a programmed rest period. Since the extraverts have accumulated more reactive inhibition during pre-rest period they will have more l₂ to dissipate during rest and will consequently show greater reminiscence effects. However, Rysenok (1964) explained significant correlations between Extraversion and reminiscence in terms of both the inhibition and consolidation hypotheses. According to the inhibition theory of reminiscence the crucial score differentiating between extraverts and
introverts should be the last pre-rest score, which should be lower for extraverts due to the action of reactive inhibition. The first post-rest score should be equal for the two groups as the inhibition in both should have dissipated completely. But experimental studies of Eysenck (1965) showed that superior reminiscence in extraverts was due to better post-rest performance rather than poorer pre-rest performance. Eysenck (1962 a, 1965) showed that introverts condition more quickly and more strongly than do extraverts, therefore in consequence they should accumulate more \( y_{IR} \) which would depress their post-rest performance. This would give rise to a difference in reminiscence between extraverts and introverts in the predicted direction not because of poorer pre-rest performance of extraverts, but because of poorer post-rest performance of introverts. The main argument against the consolidation concept to account for differences in reminiscence scores of extraverts and introverts would be that introverts according to Eysenck (1957) have higher cortical arousal and would show greater consolidation and reminiscence than extraverts contrary to actual findings. However, Gray (1968) argued that "High arousal subjects would condition more \( y_{IR} \) which would not consolidate during pre-rest practice and would not therefore affect their level
of pre-rest performance but, following the rest, when the
S'R had consolidated, it would impair the performance of high
arousal subjects more than low-arousal subjects and result
in lowered reminiscence'".

Considering the arguments given above superior
reminiscence of extraverts over introverts appears to be an
established phenomenon, explicable in terms of both inhibition
and consolidation hypotheses.

Drive and Reminiscence

It was hypothesised that subjects working under
the condition of high-drive will show greater reminiscence as
compared to subjects working under the condition of low-drive.
In the present experiment drive was manipulated through
differential verbal instructions. On both Substitution and
Backward Figure Writing means were in favour of the high-drive
group though the results failed to reach an accepted level of
statistical significance. An inspection of the figures also
revealed that the high drive groups show greater reminiscence
than the low drive groups on both the psychomotor tasks. These
findings are in accordance with experimental results of
Alper (1948), Kimble (1950), Wasserman (1951), Eysenck and
Maxwell (1961), Eysenck and Willett (1961), Eysenck et al. (1962),
Mohan (1966, 1974, 1978, 1979), Mohan and Neelan (1969) and
Mohan and Shashi (1972) who reported reminiscence scores to
increase with motivation.
Kimble (1950) predicted that motivation-produced differences in tolerance for reactive inhibition are responsible for differences in reminiscence. Eysenck and Maxwell (1961), Eysenck and Willett (1961), Willett and Eysenck (1962 b) developed the drive level aspect of Kimble's general approach, wherein it was recognized that $l_R$ is considered to accrue until it equals drive ($D$). Hence, higher the level of drive, the higher the level of $l_R$ which can accumulate before the critical level is reached. However, the higher the critical level, the more $l_R$ will be there to dissipate during the scheduled rest period. It is evident that at and beyond the critical level, $l_R=D$, hence, reminiscence is equal to $l_R$ (given a long enough rest for $l_R$ to dissipate). It follows that reminiscence will continue to increase in a group high in drive, for lengths of practice which exceed that in which reminiscence has become maximal for a group low in drive. That is, "high drive levels should give rise to greater reminiscence scores than low drive levels" (Eysenck and Maxwell, 1961).

Studies by Willett and Eysenck (1962 b) and Feldman (1964 a) found no pre-rest differences in performance of high-drive and low-drive groups; the substantial differences found in reminiscence were all due to post-rest differences in performance. But according to inhibition theory differences in the two groups should be pre-rest
became of differential tolerance for $l_R$. According to Kysenek (1965) learning must be consolidated before it can be manifested in performance. Since consolidation cannot occur without rest, faster learning that results from high-drive cannot be manifested until after a rest. This accounts for failure to find differences in pre-rest performance scores of high- and low-drive groups.

Though, the results in the present experiment indicate a positive relationship between drive and reminiscence, the importance of task specificity (Feldman, 1964) cannot be ruled out in deciding a relationship between motivation and reminiscence.

**Age and Reminiscence**

Reminiscence appears to increase and then decrease as a function of increasing chronological age. For the chronological ages that yield most reminiscence (late childhood and early adulthood) amount of reminiscence appears to be an increasing function of mental age (Thurstone, 1962). As the present investigation employed 10, 12 and 14 year old children it was hypothesized that reminiscence will improve with age. Comparison of means and inspection of figures indicated that reminiscence increases with age in substitution task and decreases with age in Backward Figure writing. The F-ratios for age in both the tasks were found
to be insignificant.

The results support the findings of Ammons et al. (1955), Lele et al. (1956), Mohan and Mohan (1967), Horn (1975 b) in substitution task who found reminiscence scores to improve with age and are contrary to the findings in the case of Backward Figure Writing. This emphasizes the task specific nature of relation between age and reminiscence.

**Sex and Reminiscence**

In view of the equivocal literature available on sex differences in reminiscence, no clear direction was hypothesized though it was predicted that reminiscence scores of boys and girls would differ from each other. On both the psychomotor tasks boys were superior on reminiscence in comparison to girls although the results were statistically insignificant. The findings were in accordance with the studies of Ammons et al. (1955), Mohan and Meelam (1969), Horn (1975 b, 1976) and Kumar (1976) who found boys to show more reminiscence scores than girls.

According to McGaffrey and Payne (1977) and Resick and Payne (1978) sex dominance in reminiscence and related tendencies, whatever be the developmental phase of
the subjects occur because males and females release $I_R$ at different rates. They reported experimental support for this hypothesis based on studies of pre- and post-pubertal children.

**Interactions**

The only significant interaction in the Extraversion group was the four-factor interaction among personality ($E^+, E^-$), drive, age and sex on the Substitution task (Contingency Table I and Figure V). It shows that high on Extraversion group in comparison to low on Extraversion group, high-drive group in comparison to low-drive group, older age groups in comparison to younger age groups and boys in comparison to girls yield greater reminiscence scores. t-ratios between different conditions were calculated and large number of them were found to be significant (Table 8).

The high level of significance of this interaction indicates a very dependable alignment of these four factors vis-à-vis Extraversion, drive, age and sex in substitution task with regard to reminiscence.

**Neuroticism Group**

**Neuroticism and Reminiscence**

It was hypothesized that Neuroticism is expected to be positively related with reminiscence. The
Table 6 (Extraversion Group)

Correlations between various conditions of Personality x Drive x Age x Sex Interaction on the Substitution Game (N = 10)

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Ranks
- T: High on Extraversion
- D: Low on Extraversion
- A: 10 year age group
- B: Boys
- A: 12 year age group
- B: Girls
- H: High Drive
- L: Low Drive

Note: * Significant at .05 level
** Significant at .01 level
comparison of means, inspection of figures and F-ratios for Substitution and Backward Figure Writing revealed that results were in the predicted direction significant at the 1 percent level in both the tasks. High on Neuroticism (N+) groups showed superior reminiscence in comparison to low on Neuroticism (N−) groups. The present results are in accordance with the earlier findings of Eysenck (1956, 1962), Lynn (1960), Child (1966), Mohan (1968), Mohan and Neelam (1969), Shanberg et al. (1969), Mohan and Shaishi (1972) and Horn (1975 a) who found Neuroticism to be a significant determinant of reminiscence.

Neuroticism is considered as an autonomic drive and is thought to have motivational potentials equivalent to drive (Dollard and Miller, 1950; Spence and Taylor, 1951; Furneaux, 1961; Hall and Lindsey, 1962, and Eysenck, 1964, 1967, 1971), therefore it is expected to be positively related with reminiscence. Eysenck (1957, 1962) had suggested that the higher the drive one worked under, the greater the amount of $L_2$ he would be able to tolerate and accumulate. Thus two groups differing in Neuroticism would be expected to differ in reminiscence with the high-Neuroticism group showing greater reminiscence.

The results of the present experiment clearly point towards a significant relationship between Neuroticism
and reminiscence in children.

**Drive and Reminiscence**

It was hypothesized that subjects working under the condition of high-drive will show greater reminiscence as compared to subjects working under the condition of low-drive. In the present experiment drive was manipulated through differential verbal instructions. On both the psychomotor tasks Substitution and Backward Figure Writing means were consistently in favour of the high-drive group though the F-ratio emerged significant only in the Backward Figure Writing task. An inspection of the figures also revealed that high-drive groups were superior in magnitude of reminiscence in comparison to low-drive groups on Substitution and Backward Figure Writing. These results are in line with the findings of Alper (1948), Kimble (1950), Wasserman (1951), Eysenck and Maxwell (1961), Eysenck and Willett (1961), Eysenck et al. (1962), Eysenck (1964), Feldman (1964), Farley (1966), Child (1966), Mohan (1966, 1974, 1978, 1979), Mohan and Neelam (1969), and Mohan and Shashi (1972) who found reminiscence scores to increase with drive.

Kimble (1950) predicted that motivation-produced differences in tolerance for reactive inhibition
are responsible for differences in reminiscence. Eysenck and Maxwell (1961), Eysenck and Willett (1961), Willett and Eysenck (1962 b) developed the drive level aspect of Kimble's general approach, wherein it was recognised that $l_R$ is considered to accrue until it equals drive ($D$). Hence, higher the level of drive, the higher the level of $l_R$ which can accumulate before the critical level is reached. However, the higher the critical level, the more $l_R$ will be there to dissipate during the scheduled rest period. It is evident that at and beyond the critical level, $l_R=0$; hence, reminiscence is equal to $l_R$ (given a long enough rest for $l_R$ to dissipate). It follows that reminiscence will continue to increase in a group high in drive, for lengths of practice which exceed that in which reminiscence has become maximal for a group low in drive. That is, "high drive levels should give rise to greater reminiscence scores than low drive levels" (Eysenck and Maxwell, 1961).

Experimental studies by Willett and Eysenck (1962 b) and Feldman (1964 a) found no pre-rest differences in performance of high-drive and low-drive groups; the substantial differences found in reminiscence were all due to post-rest differences in performance. But according to the inhibition theory differences in the two groups should be
pre-rest because of differential tolerance for $l_R$. According to Rysenek (1965) learning must be consolidated before it can be manifested in performance. Since consolidation cannot occur without rest, faster learning that results from high drive cannot be manifested until after a rest. This accounts for failure to find differences in pre-rest performance scores of high- and low-drive groups.

Though, the results of the present study indicate that reminiscence is related to drive level, one would agree with Feldman (1964) that task variables and motivational variables combine in ways that are not yet completely clear to determine the outcome of experiments on motivation and reminiscence.

**Age and Reminiscence**

Reminiscence appears to increase and then decrease as a function of increasing chronological age. For the chronological ages that yield most reminiscence (late childhood and early adulthood) amount of reminiscence appears to be an increasing function of mental age (Thumin, 1962). As the present study employed 10, 12 and 14 year old children it was hypothesised that reminiscence will improve with age. Comparison of means and inspection of figures revealed that reminiscence improves with age in children on Substitution task. $F$-ratio for age was also found to be
significant. In the case of Backward Figure Writing the 10 year age group showed the maximum reminiscence while the 12 and 14 year age groups in contrast showed lesser and almost comparable reminiscence. The F-ratio for age was found to be insignificant.

In the Substitution task the results support the findings of Ammons et al. (1955), Lele et al. (1956), Mohan and Mohan (1967) and Horn (1975 b) but are contrary to their results in the case of Backward Figure Writing. Results of the present study emphasise the task specific nature of relation between age and reminiscence.

Sex and Reminiscence

In view of the equivocal literature available on sex differences in reminiscence, no clear direction was hypothesised, though it was predicted that reminiscence scores of boys and girls would differ from each other. On both Substitution and Backward Figure Writing inspection of means and figures revealed that girls were superior on reminiscence in comparison to boys, the F-ratio being significant at .05 level in the Substitution task. These results are in line with the finds of Geblewiczowa (1973), Jain (1976), Kumar (1976), Payne and Huang (1977) who reported girls to be superior to boys in magnitude of reminiscence.
According to McCaffrey and Payne (1977) and Resick and Payne (1978) sex dominance in reminiscence and related tendencies, whatever be the developmental phase of the subjects occurs because males and females release $L_R$ at different rates. Studies on pre- and post-pubertal children provided experimental support for their hypothesis.

The present study reveals that sex is an important determiner of reminiscence in children.

**Interactions**

The interaction of age and sex, yielded an F-ratio of 4.79 significant at .01 level (Contingency Table II, Figure X) on Substitution task. It revealed that overall reminiscence scores of elder age groups were higher than that of younger age groups and girls yielded greater reminiscence scores than boys. But, in boys, reminiscence decreases with age, while in girls it improves with age. t-ratios for different conditions reveal that t-ratios between 10 year boys and 14 year girls, 10 year girls and 12 year girls, 10 year girls and 14 year girls, 12 year boys and 14 year girls and 14 year boys and 14 year girls were found to be significant (Table 9).

The interaction between personality (Neuroticism) and sex (Contingency Table III and Figure XI) yielded
### Table 9 (Neuroticism Group)

*p*-values between various conditions of Age x Sex interaction on the Substitution task (N=40)

<table>
<thead>
<tr>
<th>$A_1^S_1$</th>
<th>$A_1^S_2$</th>
<th>$A_2^S_1$</th>
<th>$A_2^S_2$</th>
<th>$A_3^S_1$</th>
<th>$A_3^S_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>0.15</td>
<td>-1.30</td>
<td>0.37</td>
<td>-2.86 **</td>
<td>1.53</td>
</tr>
<tr>
<td>0.81</td>
<td>-2.18 *</td>
<td>-0.61</td>
<td>-5.67 **</td>
<td>1.53</td>
<td></td>
</tr>
<tr>
<td>-1.53</td>
<td>0.19</td>
<td>-2.83 **</td>
<td>-3.02 **</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Symbols**

- $A_1$ - 10 year age group;
- $A_2$ - 12 year age group;
- $A_3$ - 14 year age group;
- $S_1$ - Boys;
- $S_2$ - Girls;

**Note:**

- * Significant at .05 level;
- ** Significant at .01 level;

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Table 10 (Neuroticism Group)

$t$-ratios between various conditions of Personality x Sex Interaction on the Backward Figure Writing Task ($N=50$)

<table>
<thead>
<tr>
<th></th>
<th>$N^+S_1$</th>
<th>$N^+S_2$</th>
<th>$N^-S_1$</th>
<th>$N^-S_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$N^+S_1$</td>
<td></td>
<td>-2.98''</td>
<td>1.67</td>
<td>1.86</td>
</tr>
<tr>
<td>$N^+S_2$</td>
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<td></td>
<td>4.52''</td>
<td>4.40''</td>
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<tr>
<td>$N^-S_1$</td>
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<td></td>
<td></td>
<td>0.24</td>
</tr>
<tr>
<td>$N^-S_2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Symbols**

$N^+$ - High on Neuroticism; $S_1$ - Boys;
$N^-$ - Low on Neuroticism; $S_2$ - Girls;

**Note:** * Significant at .05 level;
** Significant at .01 level;
an F-ratio of 4.60 significant at .05 level on Backward Figure Writing task. It revealed that reminiscence scores of $H^+$ groups were higher than $H^-$ groups for both the sexes. Although, overall reminiscence scores of girls were higher than that of boys, scores on reminiscence of the two sexes compared separately in the two personality groups showed superiority of girls in $H^+$ group and superiority of boys in $H^-$ group. Even t-ratios between $H^+$ boys and $H^+$ girls, $H^+$ girls and $H^-$ boys, $H^+$ girls and $H^-$ girls were found to be significant (Table 10). All the other two factor, three-factor and four-factor interactions in both the tasks were found to be insignificant.

Present investigation, in the field of experimental child psychology, upholds a theoretical model of psychomotor reminiscence which asserts the inhibition-consolidation explanation. The implications are fairly obvious and certain that psychomotor reminiscence in children, depends on personality factors of Extraversion, Neuroticism, verbally induced drive, sex and age within the constraints of the nature of the task. As an extension of three or multifactor theory of reminiscence this experiment is expected to usher in more research in children with a greater variety of determinants and tasks.