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Delimitation of State-Trait Curiosity in Relation to State Anxiety and Learning Task Performance

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The present study tested the validity of the state-trait curiosity distinction, investigated the effect of manipulating state curiosity upon learning performance and assessed the reliability and validity of state (C-State) and trait (C-Trait) curiosity scales. Three hundred senior secondary school students were assigned randomly to (i) Curiosity Stimulating Instructions (CSI); (ii) Neutral Instructions (NI); or (iii) Boredom Inducing Instructions (BII) groups respectively. These treatments preceded the first administration of a test-battery (comprised of C-State, a state epistemic curiosity measure; .SECS, a state curiosity scale; A-State; and C-Trait). A learning task (prose passage) followed by a second administration of the test-battery. Finally a posttest of immediate retention permitted assessment of each group's learning performance. Cronbach alpha coefficients for both C-State and C-Trait scales ranged from .86 to .92. Stability (test-retest) correlations were higher for the C-Trait scale than for C-State. Both concurrent and discriminant validity correlations were significant. Only tentative support for the state-trait curiosity distinction resulted, since the analyses were dominated by reversed and nonreversed items and subscales. Only for females in grade 12 did the instructional sets influence C-State scores and subsequent learning performance as predicted.

On the basis of current theorizing, it appears that the interactional state-trait model might be most appropriate for research into human curiosity. Such a state-trait approach takes into account particular "interpretations of curiosity (e.g., specific/diversive, perceptual/epistemic, breadth/depth) and should be capable of much empirical investigation, which may help to clarify some of the contentious issues surrounding the various concepts of curiosity. Hence it seems important to assess empirically measures of state and trait curiosity, and to evolve better
measures as part of an ongoing attempt to refine the state-trait curiosity distinction.

The concepts of state and trait curiosity are likely to have particular relevance for classroom learning. Some children may exhibit elevated state curiosity in many different situations, whilst others may rarely do so. Stimulation of state curiosity therefore might have important learning consequences for some students. From Beswick's research (e.g., 1974), it is apparent that a student who is high in trait curiosity might exhibit 'high levels of state curiosity in some school subjects but not in others. It appears, however, that both sex and age interact with state and trait curiosity, and therefore with learning performance.

The first major attempt to investigate curiosity within a state-trait framework was undertaken by Naylor and Gaudry (Note 1). They utilized Spielberger's (1966, 1972) state-trait anxiety theory as a model for a similar distinction between state and trait curiosity. State-trait anxiety theory assumes that state anxiety is a transient, fluctuating motivational variable, whereas trait anxiety is a stable, enduring personality characteristic. Previously, Leherissey (1971, 1972) had suggested that conceptual clarity is gained by the distinction between curiosity as a state, and curiosity as a trait. Naylor and Gaudry developed separate state (C-state) and trait (C-Trait) curiosity scales based on the State-Trait Anxiety Inventory (STAI) of Spielberger, Gorsuch, and Lushene (1970). The STAI measures a broad spectrum of behaviours, ranging from simple neuromotor tasks to complex cognitive ones. Similarly the state and C-Trait scales were designed as broad measures, in order to encompass the multifaceted nature of previously existing curiosity measures (cf. Langevin, 1976). In view of the often reported negative relationship between anxiety and curiosity (see Boyle, Note 2, for a
comprehensive review of these studies), it appears that Naylor and Gaudry were justified in extending the state-trait approach to curiosity. Numerous investigations with the STAI had been encouraging for the development of similar measures of curiosity (cf. Boyle).

Using two samples ($N = 490$ and $344$ respectively) of grade 10, 11, and 12 students, Naylor and Gaudry determined that their C-State and C-Trait scales had satisfactory internal consistency, although that for the reversed item sub-scale of the C-Trait measure was a little low. They reported that distinct C-State and C-Trait factors emerged in their factor analyses. The reversed and nonreversed items, however, loaded orthogonal factors, thereby casting some doubt upon the validity of the reversed items. The question of the appropriateness of including reversed items in the C-State and C-Trait scales provided a point of departure for the present study.

Evidently, the concepts of C-State and C-Trait require further elucidation. Naylor and Gaudry stressed the need for empirical validation of their scales. The present study attempted to assess the measures of state-trait curiosity theory, and simultaneously to investigate the feasibility of stimulating C-state, as a means of facilitating learning: Hence it was important to utilize reliable and valid measures of state and trait curiosity. The present study therefore investigated further the reliability and validity of the C-State and C-Trait scales with particular attention being given to the reliability and validity of the reversed and nonreversed item subscales.

In regard to the validity of the estate and C-Trait scales, correlations with other measures (both curiosity and anxiety) might provide tentative evidence. If valid, the C-State and C-Trait scales should correlate positively with other
measures of curiosity, but negatively with measures of anxiety. C-State and SECS (Leherissey, 1971) scales should intercorrelate more closely with each other than with C-Trait, since the latter scale was not intended to be sensitive to fluctuating levels of state curiosity. Since, according to Leherissey (1971, 1972), the SECS is a valid indicator of state curiosity, its correlations with both the C-State and C-Trait scales should provide some index of their concurrent validity. Similarly correlations between the C-State or C-Trait scales and a state anxiety measure (A-state) should give tentative evidence of discriminant validity. Both the SECS and A-State scales are state measures. Leherissey (1972) claimed that state measures are related to behaviour in a learning situation more closely than are trait measures. Others (e.g., Neary and Zuckerman, 1976) reported that state measures provide a more sensitive index (in terms of obtaining significant correlations) than do trait measures. On the basis of state-trait theory, and from previous findings with the STAI (e.g., Cable, 1.972), it was expected that stability (test-retest) correlations for the C-state scale would be considerably lower (about .5 or .6) than those for the C-Trait Scale (about .9). To test this prediction, it was necessary to administer the C-State and C-Trait scales on at least two separate occasions.

Factor analysis provided a possible means of assessing the construct validity of the e-state and C-Trait scales. The first hypothesis (H1) was that distinct C-State and C-Trait factors would emerge from the factor analyses. Whereas two C-State factors were expected (one for each testing occasion), only one C-Trait factor was expected in view of the greater theoretical stability of C-Trait. Rejection of this hypothesis would occur for example if the reversed
And nonreversed items or subscales loaded orthogonal factors. Alternatively, failure of separate C-state and C-Trait dimensions to emerge would also constitute grounds for rejecting H1.

In View of the research evidence (cf. Boyle, Note .2), it was decided to examine the effect of instructional sets on the various state and trait measures. A comparison using Curiosity Stimulating Instructions (CSI), Neutral Instructions (NI) and Boredom Inducing Instructions (BIT) seemed worthwhile. The second hypothesis (H2) was that on the first testing occasion, and for the respective treatment groups (CSI; NI; BIT) : (i) mean C-state scores would vary from high to low; (ii) mean SECS scores would vary from high to low; (iii) mean A-state scores would vary from low to high; (iv) no significant difference in mean C-Trait scores would occur. This hypothesis allowed testing of the possibility that written instructional sets can either stimulate or diminish levels of state curiosity. Moreover, since prior research clearly indicated that aroused C-State can facilitate learning performance, it was decided to examine effect of the instructional treatments upon learning outcomes from a prose passage. If the CSI could stimulate C-State, this should also enhance learning task performance. Hence the third hypothesis (H3) was that mean performance posttest scores on this learning task would vary from high to low for the respective treatment groups. The literature review also indicated that both sex and age interacted with curiosity as well as with learning performance. Since the evidence was often contradictory, it seemed inappropriate to formulate a sex x grade x instructions hypothesis.
Method

Subjects

The 300 subjects (159 males, 141 females) were senior secondary school students in grades 10, 11 and 12 of a Melbourne suburban high school, located in a predominantly working class socioeconomic area. Over 90 percent of the students were Australian born. Classes were not streamed. The sample of students ranged in age from 15 to 18 years.

Instruments

The test-battery comprised four different scales each containing 20 questionnaire items. The scales were: C-State: State Curiosity Scale (Naylor and Gaudry, Note 1), modified for use with secondary school students (see items were simplified). The scale contained both reversed and nonreversed items (e.g., "I will want to probe deeply into things", and "I will not care about what I am doing", respectively) SECS. State Epistemic Curiosity Scale (Leherissey, 1971). The items in this scale contain more words than did the C-State, and they were more specifically related to a learning context. A typical item was "When I read a sentence that puzzles me, I will keep reading it until I understand it". The scale contained only six reversed items (e.g., "I will find myself getting bored when the material is redundant"), as compared with 10 reversed C-State items. In view of the item wording, it seems likely that the SECS would be more appropriate for use at the tertiary, rather than at the secondary educational level.

A-State: State Anxiety Scale for Children (Spielberger, Edwards, Lushene, Montuori, and Platzek's, 1972, version of the STAI A-State scale, designed specifically for use with secondary school children). C-Trait: Trait Curiosity Scale
(Naylor and Gaudry, Note 1), modified for use with secondary school students. The scale contained items identical with regard to content to those in the C-State scale but required the student to respond as to how he generally feels, whereas in the C-State scale the student was required to respond as to how he felt (or would feel) at a particular moment in time.

In all but the A-State scale, the student was required to read each statement and then circle one of four response categories (only three response categories for the A-State scale), according to the applicability of the particular item to the student. For the C-Trait scale, the response categories were: 1 = Almost Never, 2 = Sometimes, 3 = Often, and 4 = Almost Always. For the C-State scale, the response categories were: 1 = Not at All. 2 = Somewhat, 3 = Moderately So, and 4 = Very Much So.

**Design and Procedure**

The students were allocated randomly to one of three treatment groups: (i) CSI, (ii) NI, or (iii) BII groups respectively. Each group comprised equal proportions of males and females. Each student received a test booklet which contained the particular instructional set on the cover. These short single paragraph instructions indicated to the student whether he would encounter a stimulating task (CSI), a boring task (BII), or a neutral task (NI). The CSI were designed to induce uncertainty as based on the criteria of Leherissey (1971). According to her rationale, CSI should increase a student's desire to (a) know more about a learning task; (b) approach a novel or unfamiliar learning task; (c) approach a complex or ambiguous learning task; and (d) persist in information seeking behavior in a learning task (p. vii).
On the other hand, the BIT was designed to reduce uncertainty, and to induce boredom. Students in the NI group received a short introductory passage only. The subsequent pages of the test booklet contained the C-State, SECS, A-State, and C-Trait scales in that order. The learning material (a short prose passage, which described some of the experiences of the first astronauts to land on the moon) was interpolated between the first and second administration of the test-battery. This passage was chosen on the basis of three criteria: (i) reading level: this prose passage gave a SMOG grading (McLaughlin, 1969) of 10, and a Fry grading (Fry, 1978) of 9, thereby indicating that the reading level was appropriate for the sample under study; (ii) reading time: since it took only a few minutes to read the prose passage, it satisfied the experimental requirement of a short time interval (15-20 minutes) between the two testing occasions, which allowed an assessment of the sensitivity of the C-State scale at its extreme; (iii) topic familiarity: this topic was chosen since C-State is most aroused when the topic is neither too familiar nor too unfamiliar (cf. Berlyne, 1960; Bull and Dizney, 1973). Finally a performance posttest consisting of 10 multiple choice objective questions, and designed to assess immediate factual retention of the learning material was administered.

The students were required to work through their test booklets without turning back or looking at pages in advance. This procedure ensured that the learning material was read only once.
Results

Not only was the present study designed to test the formal hypotheses, but also as a further investigation into the reliability and validity of the C-State and C-Trait scales. Reliability was assessed (for the three treatment groups combined) using the alpha coefficient of internal consistency, for both the total scales and their subscales. The obtained coefficients were averaged over the two occasions by means of the Z-transformation. Table 1 presents these data. Clearly, the high alpha coefficients, which range from .86 to .92, suggest that both the C-State and C-Trait subscales and total scales were reliable.

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>Reliability (Alpha) Coefficients for the Subscales and Total Scales of the Test-Battery (N=300)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
<td>Reversed Items</td>
</tr>
<tr>
<td>---------</td>
<td>----------------</td>
</tr>
<tr>
<td>C-State</td>
<td>.86</td>
</tr>
<tr>
<td>SECS</td>
<td>.76</td>
</tr>
<tr>
<td>A-State</td>
<td>.89</td>
</tr>
<tr>
<td>C.Trait</td>
<td>.87</td>
</tr>
</tbody>
</table>

As for validity, it was essential that C-State and C-Trait scales should correlate positively with each other, but negatively with the A-State scale. The product-moment intercorrelations for the various scales were averaged across the two occasions via the Z-transformation (see Table 2). To test the possibility that the C-State and A-State scales shared common variance,

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Total Scale Intercorrelations for the Scales in the Test-Battery (N = 300)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
<td>State</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>C-State</td>
<td>.64</td>
</tr>
<tr>
<td>A-State</td>
<td>-.25</td>
</tr>
<tr>
<td>SECS</td>
<td>.80</td>
</tr>
<tr>
<td>C-state</td>
<td></td>
</tr>
</tbody>
</table>

Note: All correlations are significant ($p < .01$)
Ferguson’s (1966) method for determining the significance of the difference between two correlation coefficients for correlated samples was utilized. Results indicated that the correlation between the e-State and A-State scales was significantly lower ($t_{(297)} = 12.87, p < .001, \text{two tail}$) than that between the C-State and SECS measures (both of which measured state curiosity). Likewise the negative correlation between the A-State and C-State scales was significantly lower ($t_{(297)} = 7.69, p < .001, \text{two tail}$) than was that between the C-State and C-Trait scales. Whilst encouraging, these correlational findings did not prove that the C-State and C-Trait scales were valid. Stability correlations accorded with predictions based on state-trait theory, in so far as the-State scale exhibited moderate stability across the two testing occasions, whereas the C-Trait scale exhibited greater stability. Since, however, the C-Trait scale was supposed to measure a stable and enduring personality characteristic, the obtained stability coefficient for the C-Trait scale (.77) was somewhat lower than expected, particularly over such a short time interval. This finding cast some doubt on the validity of the C-Trait scale. The stability correlations for the scales and subscales of the curiosity measures, for all treatment groups combined, are presented in Table 3.

**Table 3**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Reversed Subscale</th>
<th>Nonreversed Subscale</th>
<th>Total Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-State</td>
<td>.56</td>
<td>.52</td>
<td>.56</td>
</tr>
<tr>
<td>SECS</td>
<td>.46</td>
<td>.57</td>
<td>.58</td>
</tr>
<tr>
<td>C.Trait</td>
<td>.77</td>
<td>.76</td>
<td>.77</td>
</tr>
</tbody>
</table>
In the factor analyses, two separate approaches were undertaken, in accord with both Harris (1967), and Child (1970), in order to assess the robustness of the obtained factors. Only the results of the first approach are reported here. The first approach utilized the reversed and nonreversed subscale intercorrelations as the starting point for the factor analysis. This avoided the unreliability and specificity of individual items. Cable (1972) had previously reported a successful separation of state and trait anxiety using this method. The eight subscales were intercorrelated over both testing occasions with all treatment groups combined, and yielded a 16 x 16 matrix. Using Kaiser's (1958) eigenvalue criterion for determining significant factors, a first-order solution of six oblique factors resulted. The oblique rotation was a direct oblimin one as outlined by Nie, Hadlai Hull, Jenkins, Steinbrenner, and Bent (1975). The 6 x 6 intercorrelation matrix derived from the first-order oblique solution served as the starting point for a second-order principal components analysis. On the basis of Kaiser's criterion, a two-component solution resulted which was subjected to varimax rotation (see Table 4).

<table>
<thead>
<tr>
<th>TABLE 4</th>
<th>Second-Order Varimax Rotated Solution for the First Factor Analytic Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-Order Factor</td>
<td>Component 1</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>1. Reversed C-Trait</td>
<td>-.72</td>
</tr>
<tr>
<td>2. Nonreversed A-State</td>
<td>-.03</td>
</tr>
<tr>
<td>3. Reversed A-State</td>
<td>.27</td>
</tr>
<tr>
<td>4. State Curiosity (on second occasion)</td>
<td>.75</td>
</tr>
<tr>
<td>5. Nonreversed Curiosity</td>
<td>.82</td>
</tr>
<tr>
<td>6. Reversed Curiosity</td>
<td>-.43</td>
</tr>
<tr>
<td>Eigenvalue:</td>
<td>2.04</td>
</tr>
<tr>
<td>% Variance:</td>
<td>40.0</td>
</tr>
</tbody>
</table>

Note: Loadings ± .40 are italicized.
As is evident, the first orthogonal component might be labelled as "Reversed Trait Curiosity vs. Nonreversed State Curiosity", given the labels of the first-order factors. The component represents "State Anxiety". Clearly the factor analytic results provide tentative support for H1 since a weak state-trait dimension emerged (this result was also obtained using the second approach which was based on the intercorrelations of the total 160 items (80 items on each measurement occasion) as reported in detail in Boyle (Note 2).

In order to test H2 concerning the effects of instructional sets on the various state and trait measures, repeated-measures ANOVAs were performed on the various scale scores. Between subjects factors were sex, grade level, and instructional treatment. The within subjects factor was the item-type (reversed/nonreversed). ANOVA results for C-State scores indicated that there was no significant main effect for instructional set. A significant sex x grade x instructional set interaction (F (4,270) = 2.62, p < .05) suggests, however, that the instructional sets influenced the C-State scores, but that this influence was dependent upon both sex and grade level. The responses of the grade 12 students were largely responsible for the interaction reaching significance. More specifically, the grade 12 females appear to have responded as hypothesized, with a significant main effect for instructional treatment (F (2,270) = 10.22, p < .001). It is clear, however, that this significant effect was due almost entirely to their very low score under the BII condition, as compared with their mean scores under either the NI or CSI conditions.

Males in grade 12 also partially accorded with expectations, in that their mean C-State score under the NI condition was considerably lower than that under the CSI treatment. Contrary to expectations, their mean score under the BII
condition was higher than that under the NI condition. There was no significant main effect for grade 12 males with respect to instructional treatment. A significant item-type x instructional treatment interaction (F (2,270) = 2.89, p < .05) indicates that whilst the nonreversed mean C-State scores were ordered from high to low for the CSI, NI, and BII treatment groups respectively, the reversed item scores did not exhibit this ordering. This finding suggests an incompatibility between the reversed and nonreversed items in the C-State scale.

ANOVA results for SECS scores revealed a significant item-type x sex x grade x instruction set interaction (F (4,270) = 4.24, p < .01). This interaction partially supported the second-order interaction for C-State scores, since only grade 12 females and grade 11 males showed lower mean nonreversed SECS scores in the NI condition than in the BII condition, in accord with H2 (part ii). However, only for grade 12 males and grade 10 and 11 females was there an appreciable difference in mean nonreversed SECS scores from the CSI condition to the NI condition. Whilst the instructional sets influenced both C-State and SECS scores, they had no significant effect upon either A-State or C-Trait scores.

In order to test H3 concerning effects of instructional sets on performance on the learning task, mean performance posttest scores were subjected to a simple 2 (sex) x 3 (grade) x 3 (instructional set) ANOVA design. As hypothesized, there was a significant main effect for instructional set (F (2,270) = 3.07, p < .05). A significant grade x instructional set interaction (F (4,270) = 2.35, p < .05) revealed that the main effect was largely due to the responses of the grade 12 students. Table 5 presents the means and standard deviations on the posttest for all grade levels, and both sexes, in relation to the instructional sets.
Orthogonal contrasts indicated that the mean posttest score for grade 12 students was significantly greater for the CSI group than for the NI and BII groups combined ($t_{(62)} =1.75$, $p < .05$, one tail). Moreover, the NI and BII groups differed significantly ($t_{(40)} =1.70$, $p < .05$, one tail). Hence H3 received partial support. Clearly at grade 12 level, the NI and CSI groups both significantly exceeded the BII group, but did not significantly differ from each other. There were no significant differences across the instructional treatments at either grade 10 or grade 11 levels. As is apparent from Table 5 though, it was only the females in grade 12, who responded completely in accord with H3.

### Discussion

The results suggest that the C-State and C-Trait scales and subscales were reliable (in terms of internal consistency). In accord with state-trait expectations, stability correlations indicated that the C-State scale was moderately stable (.56) only. The correlation for the C-Trait scale (.77) was, however, lower than expected.
across such a short time interval, and given that the C-Trait scale was purportedly measuring a relatively enduring, stable personality characteristic, this instability of the C-Trait scale cast doubt on its validity, particularly since others (e.g., Cable, 1972) had reported stability correlations of .9 or higher for an anxiety trait measure over much longer time intervals. Tentative validational evidence was provided by the significant positive intercorrelations among the curiosity measures (C-State, SECS, C-Trait), as well as significant negative correlations of each of these scales with the A-State scale. The corresponding subscale correlations (reported in Boyle, Note 2) supported these findings.

Tentative evidence of the construct validity of the C-State and C-Trait scales, and of state-trait curiosity theory more generally, was provided since a weak state-trait curiosity dimension emerged in the factor analyses. Both state and trait curiosity aspects loaded a bipolar factor (in each approach).

However a C-State dimension only emerged for the second testing occasion and the C-Trait dimension was dominated by reversed items and subscales. Possibly the fining-up of the reversed subscales with C-Trait, and the nonreversed subscales with state curiosity (C-State and SECS loadings) was "forced" due to the strong polarization of the first component into reversed and nonreversed aspects. The second bipolar component with anxiety at one pole and a weak reversed C-Trait dimension at the other might have reflected the extremes of high anxiety and lack of anxiety.

According to Naylor and Gaudry (Note 1),

There is a sense in which the negative definition of C-Trait, in terms of boredom, listlessness, and so on, reveals nothing of its approach character (p.13).
Since the reversed C-Trait loadings were less than ±.40, the second component was labelled "State Anxiety" (see Table 4). In the second factor analytic approach (reported in Boyle, Note 2), reversed and nonreversed curiosity items loaded orthogonal factors. Whereas the state-trait bipolar factor accounted for 14.6 percent of the variance, the reversed and nonreversed factors accounted for 10.6 percent and 21.2 percent of the variance respectively. Hence reversed and nonreversed loadings accounted for a considerably greater proportion of the variance (31.8 percent), than did state and trait aspects. The nonreversed curiosity factor accounted for twice the amount of variance as did the reversed factor. Hence the reversed items seem less important than the nonreversed items for measuring curiosity. The reversed items may suggest a boredom interpretation; thereby invalidating their inclusion in the C-State and C-Trait scales. Indeed mean reversed C-State scores on the second testing occasion increased for the BII group, whereas they decreased for the CSI group ($F_{(2,270)} = 4.50, p < .01$). It appears therefore that the reversed items should be eliminated from the C-State and C-Trait scales. In their present form it seems that the C-State and C-Trait scales are psychometrically inadequate.

Hypotheses concerning the effects of instructional sets on the various trait and state measures received only partial support. The instructional sets did influence mean C-State scores, but in a complex way. In relation to the NI condition, higher mean C-State scores were obtained under the CSI condition for both grade 12 males and females, for grade 11 females; and for grade 10 females. More notable was the clear difference in mean C-State scores for grade 12 females, between the NI and the BII condition. This suggests that by reducing uncertainty by means of the BII, C-State was decreased accordingly, thereby
indicating that C-State can be manipulated via instructional sets, in either a positive or negative direction. The present findings in relation to the BII support those of Judd, Leherissey, McCombs, and O'Neil (1973) who reported that the instructional materials diminished uncertainty and reduced state epistemic curiosity, and consequent information-seeking behaviour. The present results also suggest that instructional sets might be used more successfully to manipulate C-State amongst older students (grade 12 level) than amongst younger ones, although younger females might be more sensitive to such treatments than younger males. ANOVA results for the SECS scores supported those for C-State scores, in so far as the grade 12 students were responsible for a major part of the third-order interaction. Greater assent was generally given to the nonreversed SECS items than to the nonreversed C-State items. Possibly this could be related to the more complex wording of the former, which might have been more stimulating.

Whilst the instructional treatments influenced both mean C-State and mean SECS scores, no such effect occurred for either the A-State or C-Trait scores. The lack of any significant treatment effects for mean C-Trait scores supported H2 (part iv), and accorded with state-trait curiosity theory. Whereas the C-State scale was intended to be situationally sensitive, the C-Trait scale was designed to be more stable (observed empirically in the present study), and therefore not to be susceptible to situational influences. The A-State results, whilst unexpected (in view of the vast evidence on the negative relationship between curiosity and anxiety) suggest that the instructional sets did not induce an elevation or diminution of mean A-State scores. Nevertheless since the present study found significant treatment effects for the C-State scores, but *none* for the C-Trait scores,
it is clear that Cable's (1972) findings in the anxiety domain have been replicated to some extent in the curiosity domain.

The instructional treatments were only partly successful in stimulating or depressing learning performance on the prose passage: As indicated in Table 5, it was only the females in grade 12 who responded as hypothesized. Moreover the ANOVA results for both the C-State and SECS scores also suggested that this effect was possibly due to the responses of the grade 12 females. This partial support for H3 nevertheless supports Beswick (1971), Heinrich and Hansen (1972), and Leherissey (1971, 1972) who all reported that instructional sets could stimulate C-State and enhance learning task performance. Since, however, the present support for H3 was only partial, it must be conceded that the instructional sets were largely ineffective in enhancing learning from the prose passage, although they had some effect for grade 12 females.

In summary, the present findings provided tentative support for the state-trait curiosity distinction, as well as for the validity of C-State and C-Trait scales themselves. Clearly the Naylor and Gaudry scales require refinement and further development. Research using the C-State and C-Trait scales seems, however, to offer more promise of significant new knowledge within the curiosity domain, particularly in view of the multifaceted nature of previous curiosity measures (cf. Langevin, 1976). The present findings also suggested that a student's C-State level can be altered in either a positive or negative direction by the use of instructional sets. This finding is, however, qualified in its interpretation with regard to sex differences, and grade level as pointed out. Likewise some tentative evidence suggested that such instructional sets might influence learning task performance, as a consequence of altering C-State levels. Empirical assessment of the curiosity
arousing potential of various instructional sets might therefore provide an
educationally useful focus of some future research project. Consequently it might
be possible to teach specific strategies which could stimulate C-State in students,
and thereby enhance school learning.

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Notes.


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