Validation of the three-factor optimal arousal model

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Abstract

Separate curiosity state (C-State) and anxiety state (A-State) measures were administered before and after a learning task, to 300 secondary school students. The students were randomly allocated to one of three curiosity treatment groups: Curiosity Stimulating Instructions (CSI); Neutral Instructions (NI); and Boredom Inducing Instructions (BII) respectively. Correlations between C-State and A-State scores for these treatment groups on the separate testing occasions couldn’t be accounted for by the two-factor optimal arousal model. In contrast, the three-factor optimal arousal model provided a satisfactory explanation of the obtained data.
Spielberger and Butler (1971), as well as Berlyne (1971) posited that curiosity (both specific and diversive) and anxiety are separate, antagonistic drive states activated by distinct reward and aversion systems. Thus at low stimulus levels, diversive curiosity and anxiety state (A-state) both merge towards indifference in hedonic affect. For the two-factor optimal arousal model, a negligible or small positive correlation between curiosity state (C-State) and A-State should result at low levels of physiological arousal. Leherissey (1971) proposed a three-factor version of the optimal arousal model to account for observed differences between the states of specific curiosity, diversive curiosity, and anxiety. For this version, A-State decreases in hedonic intensity whereas (diversive) C-State increases in hedonic affect. Accordingly, at low stimulus levels a negative correlation between measures of C-State and A-State should result. The present study therefore, attempts to assess the validity of the three factor optimal model, as opposed to the two-factor version.

Method

Subjects

The 300 subjects (159 males, 141 females) were all secondary school students in Grades 10, 11 and 12 from a Melbourne suburban high school. The students were allocated randomly to three treatment groups, each comprising equal proportions of males and females.
Measures

The C-State scale (modified for use with secondary school students) was originally developed by Naylor and Gaudry (1976). It consists of 20 items in both reversed and non-reversed directions of scoring. The A-State scale is Spielberger, Edwards, "Lushene, Monturi, and Platzek's (1972) state anxiety scale for children.

Procedure

Each of the three groups received separate sets of instructions prior to the first administration of the C-State and A-State measures. Curiosity was stimulated via a written passage (CSI) designed on the basis of conative stimulus properties (cf. Berlyne, 1971) to trigger C-State. Students in a neutral instructions (NI) group received a single introductory passage only, while a third group received boredom inducing instructions (BII). Subsequently, the C-State and A-State measures were administered before and after a learning task.

Results

A repeated measures analysis of variance was performed. Between subjects factors comprised curiosity treatment, grade level, and sex. Within-subjects factors included item-type (reversed/non-reversed), as well as testing occasion or particular interest was a highly significant interaction between curiosity treatment and testing occasion \[ F (2,270) = 5.03, p < .01 \]. Thus whereas the CSI group obtained the highest mean C-State score on the first testing occasion, this same group also achieved the lowest mean C-State score on the second testing occasion.
In addition, the mean C-State scores of both the NI and BII groups increased on the second testing occasion. Conceivably therefore, the CSI group may have experienced a diversive C-State on the second testing occasion, whereas the NI and BII groups may have experienced diversive C-State on the first occasion. For the former, a negative correlation of -.13 resulted between C-State and A-State scores on the second testing occasion. For the latter two groups, a negative correlation of -.20 (significant at better than the 1% level) resulted on the first testing occasion, between C-State and A-States scores.

**Conclusion**

These correlational findings for particular curiosity treatment groups on particular testing occasions cannot be accounted for by the two-factor version of the optimal arousal model. In contrast, the three-factor optimal arousal model seemingly provides a satisfactory explanation of the obtained data.

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References


