Creativity and positive emotions in studying: Novel possibilities for improving students' learning

Conference or Workshop Item

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Introduction

Introduction

Recent research on students learning identified that positive affect is a strong predictor of higher academic performance even when statistically controlling for prior academic performance (Rogaten et al., 2013). Creativity is a variable that has been systematically found to link in with positive affect in achievement contexts.

Experimentally induced positive mood has been found to result in more flexible and inclusive categorization of information, more unusual word associations, better problem solving, more cognitive flexibility and more divergent thinking (e.g., Hirt et al., 2008; Isen et al., 1987; Vosburg, 1998). Therefore, positive affect appears to facilitate various cognitive processes associated with creative thinking.

The predictive effects of use of creative cognition on positive affect have rarely been studied. A notable exception is represented by Amabile and co-workers' (2005) longitudinal diary study of team project work in organizations. They found evidence of lagged effects in a qualitative analysis of free open-ended descriptions of the workday. The analysis revealed that creative work was often followed by the positive emotions of "Eureka", pride, and relief.

Positive Affect as a Facilitator of Creativity

The found effects of positive affect on the use of creative cognition are consistent with the *broaden and build theory* of positive emotions (Fredrickson, 1998) and with the *mood as input model* (Martin et al., 1993). The *broaden and build theory* and the *mood as input model* in combination entail that positive affect in a task will facilitate the activation and prolonged application of creative cognition (creative thinking strategies) to the task.

Creativity as a Facilitator of Positive Affect

The found effect of creativity on positive affect is consistent with the *control-process model* of self-regulation of intentional behavior (Carver & Scheier, 1990) and with the *self-determination theory* (Ryan & Deci, 2000). In combination these two theories entail that insofar as creative thinking accelerates progression toward the goal, positive affect will increase and that if people freely decide to use their creative thinking in delving into an endeavour, they will tend to be more intrinsically motivated, will enjoy more the activity, and hence will be more likely to experience a heightened positive affect throughout and after the endeavour.

Aims and Hypotheses

This study investigates the longitudinal relationships between positive affect and use of creative cognition in the domain of studying, using a two-wave (semester 1, semester 2) study design. Based on the reviewed empirical evidence and the proposed theoretical arguments, the following two hypotheses are posited:

H1: Positive affect in studying in semester 1 will be positively associated with use of creative cognition in studying in semester 2.

H2: Use of creative cognition in studying in semester 1 will be positively associated with semester 2 positive affect.

Method

Participants and Procedure

An opportunity sample of 130 undergraduate students (30 males, 100 females) from a London University took part in this two-wave study. For each participant, the data were gathered in semester 1 (first wave) and semester 2 (second wave) of the academic year.

Measures

Use of Creative Cognition Scale (UCCS) in Studying is a 5-item self-reported questionnaire measuring the tendency to deploy creative cognition to problem solving in studying (e.g., "I find effective solutions by combining multiple ideas") (Rogaten & Moneta, in press).

Positive and Negative Affect Schedule – Short Form (I-PANAS-SF) is a list of ten adjectives, five measuring positive affect (e.g., "attentive") and five measuring negative affect (e.g., "nervous") (Thompson, 2007).

Data Analysis

The hypothesized and alternative models were tested using structural equation modeling as implemented in LISREL 8.8. In all models, positive affect and use of creative cognition were defined as latent variables.

Four competing structural equation models were estimated:

- The *stability model* (Model 1) specifies temporal stabilities between semester 1 positive affect and semester 2 positive affect and between semester 1 use of creative cognition and semester 2 use of creative cognition as well as cross-sectional correlations between positive affect and use of creative cognition.
- The *causality model* (Model 2) has paths identical to the stability model (Model 1) but additionally includes a cross-lagged structural path from semester 1 positive affect to semester 2 use of creative cognition.
- The *reversed causality model* (Model 3) has paths identical to the stability model (Model 1) but additionally includes a cross-lagged structural path from semester 1 use of creative cognition to semester 2 positive affect .
- The *reciprocal model* (Model 4) has paths identical to the stability model (Model 1) but additionally includes cross-lagged structural paths from Model 2 and Model 3.

The four models were compared by means of the chi-square difference test. The fit of each model was evaluated using the following indices for satisfactory fit: the Comparative Fit Index (CFI) and the Non-Normed Fit Index (NNFI) with the cutoff point of .95, the Standardized Root Mean Square Residual (SRMR) with the cutoff point of .08, and the Root Mean Square Error of Approximation (RMSEA) with the cutoff point of .08 (Hu & Bentler, 1999).

Results

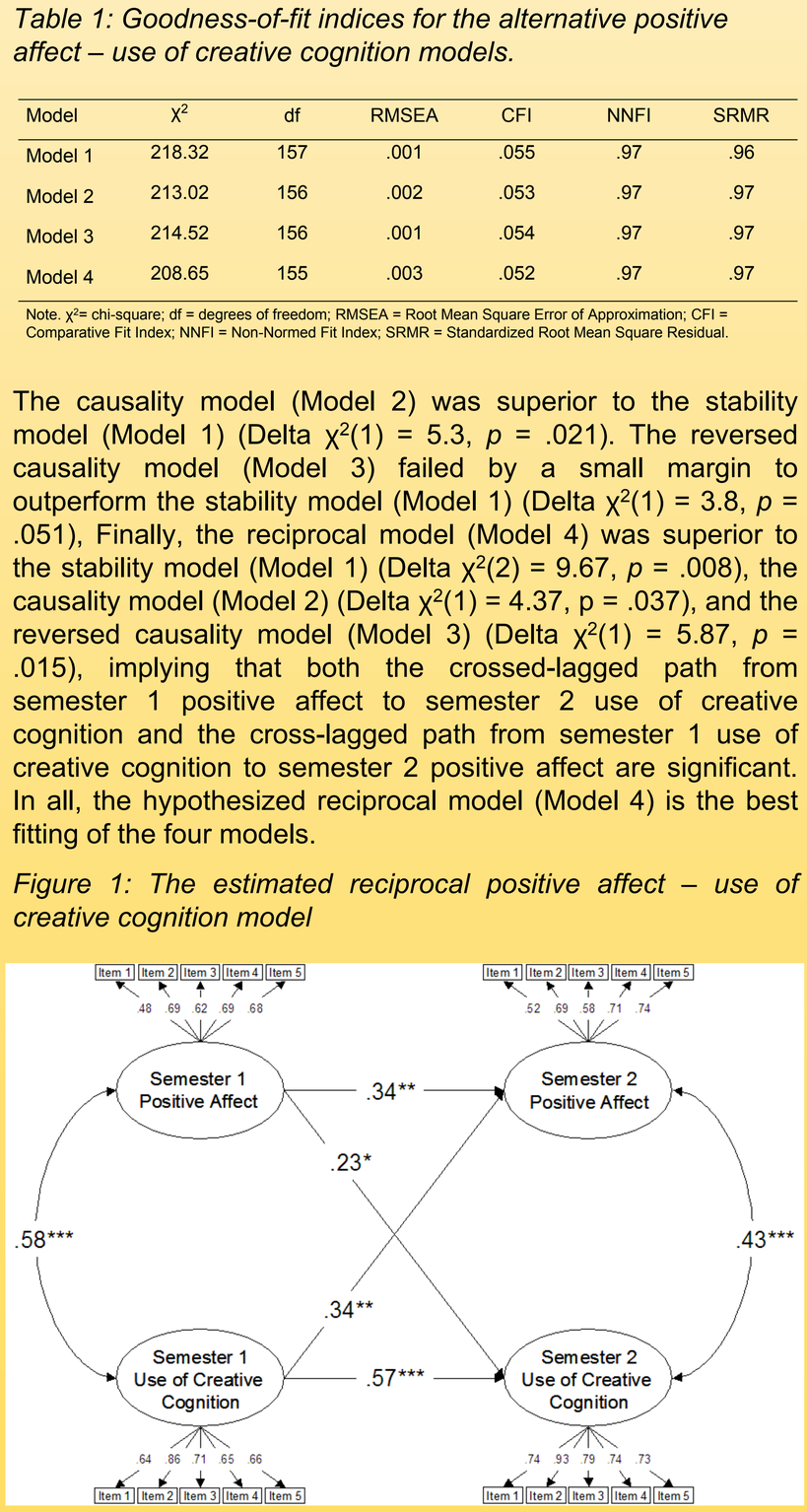
Table 1: Goodness-of-fit indices for the alternative positive affect – use of creative cognition models.

Model	χ^2	df	RMSEA	CFI	NNFI	SRMR
Model 1	218.32	157	.001	.055	.97	.96
Model 2	213.02	156	.002	.053	.97	.97
Model 3	214.52	156	.001	.054	.97	.97
Model 4	208.65	155	.003	.052	.97	.97

Note. χ^2= chi-square; df = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; SRMR = Standardized Root Mean Square Residual.

The causality model (Model 2) was superior to the stability model (Model 1) (Delta $\chi^2(1) = 5.3$, $p = .021$). The reversed causality model (Model 3) failed by a small margin to outperform the stability model (Model 1) (Delta $\chi^2(1) = 3.8$, $p = .051$), Finally, the reciprocal model (Model 4) was superior to the stability model (Model 1) (Delta $\chi^2(2) = 9.67$, $p = .008$), the causality model (Model 2) (Delta $\chi^2(1) = 4.37$, p = .037), and the reversed causality model (Model 3) (Delta $\chi^2(1) = 5.87$, $p = .015$), implying that both the crossed-lagged path from semester 1 positive affect to semester 2 use of creative cognition and the cross-lagged path from semester 1 use of creative cognition to semester 2 positive affect are significant. In all, the hypothesized reciprocal model (Model 4) is the best fitting of the four models.

Figure 1: The estimated reciprocal positive affect – use of creative cognition model



Discussion

Unique Contribution

There is an asymmetry between the two causal relationships in terms of the empirical support they have received to date. On one hand, the relationship from positive affect to use of creative cognition has received robust support in both experimental studies and longitudinal studies. On the other hand, the relationship from use of creative cognition to positive affect has been under researched and has proven elusive. As such, the finding that this relationship holds for students in university settings is an important addition to knowledge that opens novel opportunities for improving students' learning.

Applications

Research consistently found that the positive affect students experience when engaging in study activities predicts better academic performance (e.g., Artino et al., 2012; Saklofske et al., 2012; Rogaten et al., 2013). Therefore, positive affect in studying should be considered as a core target variable for intervention. However, positive affect is hard to intervene on directly.

The longitudinal relationship found in the present study between use of creative cognition in studying and subsequent positive affect in studying indicates that the use of creative cognition is a promising target variable for interventions aimed at enhancing students' positive affect and, in turn, their academic performance.

Limitations

This study has three key limitations that should be considered in interpreting the findings and be addressed in future research.

1. The self-reported nature of the data could have inflated the strength of the reciprocal relationship between positive affect and use of creative cognition.
2. A two-wave design can only suggest causality; this is particularly the case for a reciprocal model, as a third, unmeasured variable might be a cause or a mediator of both variables involved in the reciprocal relationship.
3. A two-wave design with a relatively short follow-up time does not support inferences concerning the dynamics and long-term development of the found reciprocal relationship.

Conclusions

Despite its limitations, the present study is the first one to establish the reciprocal relationship between positive affect and use of creative cognition in educational settings. Moreover, it provides a preliminary framework for designing interventions aimed at improving students' positive affect in studying by stimulating their use of creative cognition in studying.

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