Personality and Individual Differences 104 (2017) 397–400

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Short Communication

Does test anxiety increase as the exam draws near? – Students' state test anxiety recorded over the course of one semester

Christin Lotz *, Jörn R. Sparfeldt

Saarland University, Department of Educational Science, Campus A5 4, D-66123 Saarbrücken, Germany

ARTICLE INFO

Article history:
Received 19 April 2016
Received in revised form 16 August 2016
Accepted 23 August 2016
Available online xxxx

Keywords:
Test anxiety
State test anxiety
Trait test anxiety
High-stake exam
College students

ABSTRACT

State test anxiety (STA) assumingly increases as an exam draws near. However, only few studies (with short time intervals or just two measurement points) seem to confirm this assumption; especially the longer-term STA-course remains unexamined. The present study investigated $N = 192$ college students' STA over the course of one semester with four measurement points. STA-assessments at the first, third and fourth measurement point referred to the final obligatory exam, the second to an unmarked mock exam. Regarding the final exam, the students chose from two dates two months apart. A 2 (early vs. late exam date) × 4 (measurement points T1–T4) mixed ANOVA revealed a significant main effect of the exam date, indicating higher STA for students choosing the early exam, and a significant main effect for the measurement points. Planned contrasts indicated an overall STA-increase with a peak directly before the exam and an expected STA-drop at T2 (referring to the mock exam). Criterion validity was evidenced by substantial convergent correlations between STA and trait test anxiety (worry, emotionality). The psychological and educational relevance of the results is discussed.

1. Introduction

Impending examinations often elicit test anxiety (TA). It is widely believed that TA increases as an exam draws near (Zeidner, 1998). However, especially the longer-term TA-course is still unexplored. Therefore, this study investigated the development of state test anxiety (STA) in a larger sample of college students over the course of one semester in the context of an upcoming obligatory exam. Additionally, STA and trait test anxiety (TTA) were differentiated.

TA refers to a "set of phenomenological, physiological, and behavioral responses that accompany concern about possible negative consequences or failure on an exam" (Zeidner, 1998, p. 17). STA as a transitory emotional state experienced in a specific situation is distinguished from TTA as a stable personal disposition to interpret situations as threatening. Regarding TTA, Liebert and Morris (1967) introduced the distinction of worry (ruminating about self-threatening consequences of failure) and emotionality (perceived physiological stress reactions). The relations between STA and these TTA-facets ranged usually within $.40 \leq r \leq .70$ (e.g., Laux et al., 2013). Conceptually, TA can be regarded as a situation-specific trait (Spielberger, 1966): Individuals with higher TTA interpret specific situations as more threatening and react with more STA. Moreover, the specific examination type influences the TA-level: High-stake assessments elicit higher TA than developmental low-stake assessments (Reeve, Bonaccio, & Charles, 2008) as, for example, mock exams.

The STA-course can be conceptualized as a dynamic temporal process unfolding over time with an increase as an exam draws near. Students do not exactly know beforehand what the exam and its outcome are like and typically become more and more concerned with the demands, corresponding constraints, and threats of the upcoming exam. Thus, concerns and aversive emotions associated with the exam are rising with decreasing temporal distance to the exam (Zeidner, 1998). Empirical evidence – although with short time intervals or only two measurement points – supports this hypothesized STA-increase (Bolger, 1990; Dimitriev, Saperova, & Dimitriev, 2016; Lay, Edwards, Parker, & Endler, 1989; Raffety, Smith, & Ptacek, 1997; Skinner & Brewer, 2002; Zeidner, 1994). For example, Bolger (1990) applied a daily diary measure 17 days before the exam to 50 students: A descriptive inspection of the corresponding graph (p. 531) revealed a substantial TA-increase from day six up to the day before the examination. Likewise, 158 college students reported their daily experience of worry, distraction, and tension during the week before an exam, resulting in a substantial TA-increase (Raffety et al., 1997). Therefore, short-term STA-increases seem to be confirmed, but the longer-term (>4 weeks) course remains an open question.

Thus, this study investigated STA-tendencies over the course of one semester and the STA-relations to TTA-facets. We expected (1) an overall STA-increase when referring to a high-stake exam and a STA-drop when referring to a low-stake assessment (mock exam). Moreover,

* Corresponding author.
E-mail address: c.lotz@mx.uni-saarland.de (C. Lotz).

http://dx.doi.org/10.1016/j.paid.2016.08.032
0191-8869/

(2) substantial convergent correlations were expected between STA and TTA that might be lower for a low-stake assessment.

2. Method

2.1. Participants and procedure

Participants were $N = 192$ German teacher-education students (mean age: 22.36 years, $SD = 3.17$, 63% female) who attended a weekly third semester lecture on educational assessment ending with an obligatory exam. Data were collected at four measurement points (T1–T4) over the course of one semester. At T1 (first course lecture) students completed a STA-questionnaire (referring to the final exam) and a TTA-questionnaire. At T2 (sixth course lecture) students completed the STA-questionnaire, referring to a low-stake, not graded mock exam taken straight away and dealing with the course topics. T3 was actualized as an online assessment during the week of the last lecture and STA-measures again referred to the obligatory high-stake exam at the end of the semester. T4 took place in the auditorium right before students took their exam. For administrative reasons, students could choose from two possible exam dates, eight weeks apart. For the early exam group ($n = 97$), the third measurement point was one week prior to their exam. For the late exam group ($n = 95$) the third measurement point was nine weeks prior to their exam. These differing temporal distances to the exams in both groups might be relevant for the STA-experiences. The lectures and both examinations took place from 2 to 4 pm.

Not every student participated in all testing sessions. Out of $N = 391$ students that took the exam and answered the corresponding T4-STA-questionnaire, $n = 355$ students participated in T1 (T2: $n = 346$, T3: $n = 271$). Only participants with complete data were included in the analyses, resulting in $N = 192$. Regarding for example T3 (largest amount of missing data), students who did and who did not participate in T3 were comparable regarding gender ($\chi^2(1) = 0.04$; $p = .84$); age ($t(352) = -1.48$, $p = .14$); worry ($t(345) < 1$); emotionality ($t(344) < 1$). This was also true for STA-assessments at T1, T2, and T4 (all $t < 1$).

2.2. Instruments

TTA was assessed using nine items from the German adaption (TAI-G; Hodapp, 1991) of the Test-Anxiety-Inventory (TAI; Spielberger, 1980). Based on prior findings (e.g., Sparfeldt, Rost, Baumeister, & Christ, 2013) five items of the worry-subscale and four items of the emotionality-subscale were administered with a four-point rating scale, ranging from *almost never* (1) to *almost always* (4).

STA was measured using eight items (adjectives: e.g., anxious, worried, nervous; Jacobs, 1981) with a seven-point rating scale ranging from *very* (1) to *not at all* (7). Students indicated their feelings if they had to take the exam right now. Answers were rescored so that higher numerical values corresponded to higher STA.

2.3. Analyses

Regarding Hypothesis (1), we computed a 2 (early vs. late exam date) × 4 (measurement points T1–T4) mixed ANOVA ($\alpha = .05$). Because there were eight weeks between the exams in both groups, the exam date was considered. In case of a significant main effect for the exam date, the STA-course was examined by two repeated measures ANOVAs (separately for the early vs. late exam group), especially focusing on four a priori contrasts: (1) STA-level at T1 is higher than at T2 (mock exam); (2) T2-STA-level is lower than at T3; (3) T3-STA-level is higher than at T1; and (4) T4-STA-level is higher than at T3. Additionally, we conducted four post hoc *t*-tests for independent samples to examine whether both groups differed at each measurement point ($\alpha = .01$ because of multiple comparisons).

Concerning Hypothesis (2), we inspected whether the STA-TTA-correlations differed meaningfully between the two groups at all measurement points by computing the effect size q (cf. Cohen, 1988). Additionally, we compared separately (also by computing q) for both groups and separately for worry and emotionality whether the STA-TTA-correlations at T2 were lower compared to the STA-TTA-correlations at the other three measurement points.

3. Results

Descriptive statistics are shown in Table 1; STA-TTA-correlations are displayed in Table 2. TA-measures reached good reliabilities and the means were located well within the possible range, indicating an absence of bottom- or ceiling-effects.

Regarding Hypothesis (1), the mixed ANOVA revealed significant main effects for the within-subject factor measurement point, $F(3, 570) = 157.69$, $p < .05$, $\eta^2 = .454$, for the between-subject factor exam date, $F(1, 190) = 11.80$, $p < .05$, $\eta^2 = .058$, and a significant interaction effect, $F(3, 570) = 4.50$, $p < .05$, $\eta^2 = .023$ (see Fig. 1). Regarding the early exam group, analyses revealed a significant main effect of measurement point, $F(3, 288) = 102.46$, $p < .05$, $\eta^2 = .516$. Examining the STA-curve, contrasts showed the expected significant STA-drop from T1 to T2, $F(1, 96) = 118.07$, $p < .05$, $\eta^2 = .552$. Then, STA increased significantly from T2 to T3, $F(1, 96) = 155.61$, $p < .05$, $\eta^2 = .618$, but the T3-STA-level did not exceed significantly the T1-STA-level, $F(1, 96) = 2.13$, $p = .15$, $\eta^2 = .022$. T4-STA-level was significantly higher compared to T3, $F(1, 96) = 11.86$, $p < .05$, $\eta^2 = .110$. Regarding the late exam group, a significant effect of measurement point was revealed as well, $F(3, 282) = 58.21$, $p < .05$, $\eta^2 = .382$. The STA-curve showed a result pattern that was comparable to the early exam group: T2-STA-level was significantly lower compared to T1, $F(1, 94) = 114.18$, $p < .05$, $\eta^2 = .548$ and T3, $F(1, 94) = 70.33$, $p < .05$, $\eta^2 = .428$, but T3-STA-level did not differ significantly from T1, $F(1, 94) < 1$, $p = .67$, $\eta^2 = .002$. STA-level increased significantly from T3 to T4, $F(1, 94) = 10.49$, $p < .05$, $\eta^2 = .100$.

Furthermore, post hoc *t*-tests revealed that the late exam group showed significantly lower STA-levels than the early exam group at T1, $t(190) = 2.87$, $p < .01$, $d = 0.52$, at T3, $t(190) = 3.86$, $p < .01$, $d = 0.56$, and at T4, $t(190) = 3.49$, $p < .01$, $d = 0.50$, but not at T2, $t(190) < 1$, $p = .37$, $d = 0.13$ (see Table 1).

Table 1
Descriptive statistics of state test anxiety for both exam date groups and trait test anxiety.

	State test anxiety								Trait test anxiety	
Measurement point	T1		T2		T3		T4		Worry	Emotionality
Exam date	Early	Late	Early	Late	Early	Late	Early	Late		
M	4.30	3.71	2.55	2.38	4.47	3.64	4.80	4.04	2.67	2.09
SD	1.42	1.45	1.47	1.25	1.38	1.60	1.53	1.48	0.72	0.77
Minimum	2.00	1.00	1.00	1.00	1.50	1.00	1.00	1.00	1.00	1.00
Maximum	7.00	7.00	6.63	6.13	7.00	6.88	7.00	7.00	4.00	4.00
Cronbach's α	.93	.94	.95	.93	.94	.96	.95	.95	.85	.88