Coping strategies as mediators in the relationship between test anxiety and academic achievement

Ana Genc

University of Novi Sad

In most modern societies, nearly every realm of life involves some form of evaluation of our knowledge, abilities and skills. Given the potentially significant consequences of exams, it is not surprising that they are often very stressful. This study aimed to determine the existence and nature of the relationships between level of test anxiety, coping strategies, and achieved success on a mid-term test. As well as examining the direct relations between the given variables, our primary interest was to investigate the potential mediating role of coping mechanisms between the input and output variables of the examined stressful transaction. The study was conducted on a sample of 263 students from the Psychology and German Studies Departments of the Faculty of Philosophy at the University of Novi Sad. According to our results, only emotion-focused coping mechanisms were statistically significant mediators in the relationship between level of test anxiety and mid-term test achievement. The results indicate that students with high test anxiety who employ predominantly emotion-focused coping strategies score lower on a pre-exam knowledge test.

Keywords: Test Anxiety, Coping Strategies, Academic Achievement, Mediation.

A student’s academic life will typically involve numerous evaluative situations, which aim to determine the individual’s success in acquiring professional and scientific knowledge and skills, and therefore greatly influence the student’s professional (and indirectly their personal) future (Mavilidi, Hoogerheide, & Paas, 2014; Oladipo, Ogungbamila, & Idemudia, 2015). Given the importance of achievement on exams, they can be exceedingly stressful for many students and induce a pronounced level of a specific subtype of anxiety known as test anxiety (Kavakci, Semiz, Kartal, Dikici, & Kuğu, 2014).

Test anxiety is a construct defined as a set of psychological and behavioral reactions that are a consequence of worry over the potentially negative outcomes of this stress situation (Hsieh, Sullivan, Sass, & Guerra, 2012). It is still unclear whether test anxiety represents a stable dispositional characteristic or
an ephemeral emotional state (Lufi & Awwad, 2013). Spielberger defined test anxiety as a situation-specific trait of anxiety (Thames et al., 2015) and thus successfully covered both the dispositional (stable) and the situational (variable) understanding of this “slippery” term. According to Spielberger, test anxiety is a person’s tendency to experience increased worry, intrusive thoughts, mental disorganization, and a heightened level of physiological arousal in evaluative situations (Spielberger, 1972; Steinmayr, Crede, McElvany, & Wirthwein, 2015). This definition of test anxiety allows for its treatment as a distinct kind of stressor (Stöber, 2004), as has been done in the present study.

High test anxiety has a rather paralyzing effect on many individuals. It often leads to lower academic achievement or abandonment of studies, and has negative consequences for general psychological well-being (Hoferichter, Raufelder, & Eid, 2014; Stöber, 2004; Zeidner, 1998). Numerous studies have shown an anticipated negative relationship between test anxiety and different measures of achievement (Hudek-Knežević & Kardum, 2005; Zeidner, 1995; Zeidner, 1998); however, the empirical data are not completely unambiguous. In a number of studies, these correlations did not reach the level of significance (Hsieh et al., 2012; Mavilidi et al., 2014; Owens, Stevenson, Hadwin, & Norgate, 2014). In the well-known and comprehensive meta-analysis conducted by Hembree (Hancock, 2001; Hembree, 1988), which comprised 562 studies, a statistically significant, albeit rather low negative correlation coefficient (−.18) for the relationship between test anxiety and various measures of achievement was revealed. These findings were mirrored in another well-known meta-analysis by Seipp (McCarthy & Goffin, 2005; Seipp, 1991), in which the correlation coefficient for the relationship between evaluative anxiety and academic achievement was −.23.

Traditional conceptions assumed a negative or even linear relationship between test anxiety and achievement. This suggests, simply, that as test anxiety rises, achievement declines (Zeidner, 1998). However, the whole process within which anxiety leads to certain (under)achievement in exams is extremely complex, and involves many variables with a potential mediating role (Hsieh et al., 2012). The perception of threat, expectations, causal attributions of (under) achievement, invested effort, and actual and subjectively assumed coping strategies are only a few of many possible mediators (Cassady & Finch, 2014; Cohen, Ben-Zur, & Rosenfeld, 2008). Evaluative anxiety has an indirect effect on outcomes in the form of exam achievement, through the influence of many cognitive, motivational, and affective factors.

In this study, we have considered coping mechanisms as potential mediators in the relationship between test anxiety and exam achievement. Coping constitutes action (or lack thereof) of a behavioral or cognitive nature. The purpose of these actions is to overcome, reduce, or tolerate the conflict between a person and their environment, which is essentially a means to end the stress
process (Snyder & Mann Pulvers, 2001). Lazarus and Folkman, the founders of the transactional theory of stress, gave special attention to the functions of coping, and consequently provided the most well-known taxonomy of coping mechanisms in which the purpose of these mechanisms served as the criterion for classification (Lazarus & Folkman, 2004), as described below.

**Problem-focused coping strategies** can most easily be described as actions that involve defining a problem, seeking alternative solutions, weighing those options against anticipated outcomes, selecting a solution, and taking action (Wang & Saudino, 2011). The goal of **emotion-focused coping mechanisms** is to regulate emotions, maintain hope and optimism, and to refuse to accept the worst. These mechanisms lead to a change in the way an event is comprehended, whereby the stressed individual does not alter their objective situation (Hsieh et al., 2012; Lazarus & Folkman, 2004).

To complete the given typology, some authors have introduced a third category: **avoidant coping** (Elliot, Thrash, & Murayama, 2011; Wang & Saudino, 2011). This is described as cognitive or behavioral avoidance, and denial of the existence of a problem. Avoidance is a palliative measure reminiscent of suppression, except that it is a conscious process (Lacković-Grgin, 2004).

In a large number of studies, correlation coefficients for the relationships between avoidance, problem-focused coping, and emotion-focused coping are low and insignificant, which would suggest that these three dimensions are independent (Hudek-Knežević & Kardum, 2005; Snyder & Mann Pulvers, 2001; Sorić, 1999).

Evaluative or test anxiety has the same general characteristics as the anxiety experienced when facing any other stressor; however, it has some particularities that make it somewhat distinct. Over the past few decades, a large number of empirical studies have been conducted to investigate coping with evaluative anxiety (Raffety, Smith, & Ptacek, 1997; Rovira, Fernandez-Castro, & Edo, 2005; Snyder & Mann Pulvers, 2001). However, most of these studies aimed to determine regularities between the intensity of test anxiety, the ways people cope with it, and achievement in various tasks, and were focused primarily on individual direct relationships between these groups of variables (Hoferichter et al., 2014). Very few studies have simultaneously examined the complex relationships between test anxiety, various coping strategies as mediators, and the outcome of the stressful transaction (Ader & Erktin, 2010; Hsieh et al., 2012). Hence, the scientific findings accumulated thus far in this domain are rather fragmentary, and do not provide a sufficiently clear and comprehensive overview of this specific subtype of stress.

Our study was primarily concerned with supplementing the existing body of knowledge on the complex relationships between the relevant stress process variables. We included a wide spectrum of variables that potentially have complex, direct or indirect, mediating relationships with evaluative anxiety. With previously presented findings in mind, the problem of the study has been
formulated as the following question: what sort of relationships exist between test anxiety (stressor), coping mechanisms (potential mediators), and exam achievement (outcome variable for the examined stressful transaction)?

Based on the given study problem, we have posited the following hypotheses:

H1: We anticipate that participants with high test anxiety who employ problem-focused coping mechanisms will be more successful in the exam, compared to the students who are also highly anxious but do not rely on this type of coping.

H2: We anticipate that participants with high test anxiety who rely on emotion-focused coping mechanisms or avoidance will be less successful in the exam, compared to the students who are also highly anxious but do not rely on these types of coping.

These hypotheses are based on the results of empirical studies which suggest that problem-focused coping mechanisms, which reflect a more adaptive mode of coping, are the better choice in those stressful circumstances characterized by a higher level of personal control (Lacković-Grgin, 2004; Lazarus & Folkman, 2004). Given that individuals in an exam are largely in control of the situation, the assumption that problem-focused coping mechanisms will support higher achievement on the exam, even in those affected by a high level of test anxiety, seems justified. In contrast, emotion-focused coping mechanisms and avoidance are considered far less appropriate coping strategies in controllable circumstances (Kurbanoğlu & Nefes, 2015); thus, we expect that their application will contribute to lower test achievement.

Method

Participants

The study was conducted on a sample of 263 participants. These individuals were students of the Psychology (n = 156) and German Studies Departments (n = 107) of the Faculty of Philosophy at the University of Novi Sad. Participants were mixed in terms of gender (although there were significantly more females) and university year. The sample comprised 33 male and 230 female students. Fifty-six of the participants were in their first study year, 23 were in their second study year, 168 were in their third study year, and 16 were in their fourth study year. The majority of the participants were aged 19 to 24 years, with a mean age of 23 years.

Research organization and procedure

Data collection coincided with the time of a mid-term test, known as the pre-exam test in our university system. These pre-exam tests have high stress potential for students (Hoferichter et al., 2014; Whitaker Sena, Lowe, & Lee, 2007) given that achievement in these tests contributes greatly to a student’s final grade in a given subject.
Immediately before the exam, students completed a questionnaire that assessed their level of test anxiety, and right after taking the exam, they completed a questionnaire to determine the specific coping strategies employed during the exam situation.

Mid-term test achievement is calculated based on the number of points earned by the specific student on the knowledge test. As the participants of this study belonged to two different departments and were in different study semesters, the tests applied during the examination were different. To enable comparison between test achievements, the points the students earned on the knowledge tests were converted into percentages. The span of acquired scores varied between 6.52 and 100, with a mean of 69.29, and a standard deviation of 21.15.

Standard introductory instructions were given to participants regarding the test. The anonymity of participation was emphasized and every student who volunteered to take part in the research signed a consent form.

**Instruments**

Test anxiety was assessed using the Test Anxiety Inventory (TAI; Spielberger, 1980, translated and adapted to Serbian by Genc, 2014). The TAI consists of 20 items (with questions such as “I feel confident and relaxed while taking tests” and “I wish examinations did not bother me so much”). Answers are offered in the form of a four-point Likert scale. Although the TAI represents the operationalization of two main components of the test anxiety construct, namely worry and sensitivity, for the purpose of this study we decided to use the total TAI score. The TAI was shown to be a highly reliable scale in our sample: the Cronbach alpha coefficient of internal consistency for the entire questionnaire was .92.

Coping strategies were assessed using the Coping Inventory for Task Stress questionnaire (CITS; Matthews & Campbell, 1998, translated and adapted to Serbian by Genc, 2014). The questionnaire differs from most inventories used for measuring coping in that the statements pertain directly to coping with particular kind of stressor situations that involve executing various cognitive tasks. The CITS comprises 21 items, arranged into three five-point Likert subscales that assess: task-focused coping (e.g. “concentrate hard on doing well”), emotion-focused coping (e.g. “worry about what I will do next”), and avoidance used as a coping strategy (e.g. “stay detached or distanced from the situation”) (Matthews et al., 2006). The scores are calculated for each of the subscales separately. In our sample, the Cronbach alpha coefficients were: .80 for the task-focused coping subscale, .85 for the emotion-focused coping subscale, and .77 for the avoidance dimension subscale.

**Results**

Table 1

Descriptive results for the measured variables (test anxiety, task-focused coping, emotion-focused coping, avoidance, mid-term test achievement)

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>Sk</th>
<th>Ku</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test anxiety</td>
<td>46.11</td>
<td>12.25</td>
<td>.22</td>
<td>-.58</td>
<td>20</td>
<td>78</td>
</tr>
<tr>
<td>Task-focused coping</td>
<td>18.68</td>
<td>5.20</td>
<td>-.57</td>
<td>-.04</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>Emotion-focused coping</td>
<td>8.65</td>
<td>6.37</td>
<td>.76</td>
<td>.10</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>Avoidance</td>
<td>5.32</td>
<td>4.87</td>
<td>1.36</td>
<td>1.63</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>Mid-term test achievement</td>
<td>69.29</td>
<td>21.15</td>
<td>-.69</td>
<td>-.20</td>
<td>6.52</td>
<td>100</td>
</tr>
</tbody>
</table>

1 Approval to use the TAI was obtained from the official distributor of this instrument (Mind Garden, Menlo Park, California, USA).
This study aimed to examine whether coping mechanisms (task-focused coping, emotion-focused coping, and avoidance) act as mediating variables in the relationship between the level of test anxiety (the input variable of the observed stressful transaction) and exam achievement (the output variable). In accordance with the posited aim and hypotheses, we applied the method of multiple mediation analysis, with three suggested “simple” mediators, using the PROCESS macro (Hayes, 2013). PROCESS enables the execution of complex mediation analyses based on the ordinary least squares approach.

A simple mediation model describes any system in which it is assumed that at least one antecedent (input or independent/predictor variable – X) affects a certain investigated outcome (output variable or dependent/criterion variable – Y) via one intervening, in this case mediating (M), variable (Hayes, 2013; Kenny & Judd, 2014). Simple mediation analysis involves examining the existence of a direct effect of X on Y (effect of X on Y without the involvement of M) and testing the indirect effect (effect of X on Y via M) (Hayes, 2013). When there are several assumed mediators, mediation analysis can be conducted separately for each mediator or simultaneously for all mediators. The advantage of simultaneously observing mediators is that it is possible to establish whether the identified mediations are independent from the effects of other mediators. This may confirm that the mediators are conceptually distinct, as the correlation coefficients are not high (Kenny & Judd, 2014). In the case of the mediators in this study (task-focused coping strategies, emotion-focused coping strategies, and avoidance) both assumptions were fulfilled. Namely, the correlation coefficients of all three variables were around .30, and they are three distinct hypothetical mechanisms. Furthermore, all three coping mechanisms are part of a single theoretical construct and, as expected, function simultaneously, which theoretically justifies the simultaneous observation of their mediations.

The tested model can be graphically presented as shown in Figure 1.
Figure 1. Statistical diagram of the parallel multiple mediation model with three mediators. 

\[ X = \text{input variable (test anxiety); } M_1 = \text{first mediator (task-focused coping); } M_2 = \text{second mediator (emotion-focused coping); } M_3 = \text{third mediator (avoidance); } Y = \text{output variable (mid-term test achievement); } a_1 = \text{effect of test anxiety on the choice of task-focused coping mechanisms; } a_2 = \text{effect of test anxiety on the choice of emotion-focused coping mechanisms; } a_3 = \text{effect of test anxiety on the choice of avoidance coping mechanisms; } b_1 = \text{effect of applied task-focused coping mechanisms on exam achievement; } b_2 = \text{effect of applied emotion-focused coping mechanisms on exam achievement; } b_3 = \text{effect of applied avoidance coping mechanisms on exam achievement; } c' = \text{direct effect of the level of test anxiety on mid-term test achievement with all mediators present.} \]

The multiple mediation analysis results (Table 3)\(^2\) indicate that test anxiety is directly linked to only one of the three investigated mediators – emotion-focused coping. Our findings suggest that students with higher test anxiety rely more on emotion-focused coping strategies.

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\(^2\) In accordance with recommendations (Hayes, 2013), the table displays non-standardized coefficient values.
### Table 3
**Multiple mediation analysis results (test anxiety, coping mechanisms and exam achievement)**

<table>
<thead>
<tr>
<th>Input variable</th>
<th>$M_1$ (Task-focused coping)</th>
<th>$M_2$ (Emotion-focused coping)</th>
<th>$M_3$ (Avoidance)</th>
<th>$Y$ (Dependent variable: achievement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X$ (Test anxiety)</td>
<td>$a_1$ $-0.017$ $0.026$ $0.513$</td>
<td>$a_2$ $0.304$ $0.027$ $&lt;.001$</td>
<td>$a_3$ $-0.004$ $0.024$ $0.882$</td>
<td>$c'$ $0.046$ $0.129$ $0.724$</td>
</tr>
<tr>
<td>$M_1$ (Task-focused coping)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$M_2$ (Emotion-focused coping)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$M_3$ (Avoidance)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Constant</td>
<td>$iM_1$ $19.469$ $1.279$ $&lt;.001$</td>
<td>$iM_2$ $-5.386$ $1.191$ $&lt;.001$</td>
<td>$iM_3$ $5.477$ $1.136$ $&lt;.001$</td>
<td>$i_Y$ $65.162$ $7.761$ $&lt;.001$</td>
</tr>
</tbody>
</table>

$R^2 = 0.002$  
$f^2 = 0.002$  
$F(1,261) = 0.429$,  
$p = 0.513$  

$R^2 = 0.342$  
$f^2 = 0.52$  
$F(1,261) = 125.962$,  
$p < 0.001$  

$R^2 = 0.0001$  
$f^2 = 0.0001$  
$F(1,261) = 0.022$,  
$p = 0.882$  

$R^2 = 0.206$  
$f^2 = 0.259$  
$F(4,258) = 11.664$,  
$p < 0.001$  

**Note.** $B$ = non-standardized partial correlation coefficient; $f^2$ = indicator of statistical effect size of multiple correlation coefficient was estimated using Cohen’s $f^2$ statistic, calculated by the formula: $f^2 = R^2/(1-R^2)$, where $0.02$, $0.15$, and $0.35$ are proposed thresholds for low, moderate, and high effects, respectively (Cohen, 1992).
Test anxiety in the presence of the mediators (and in their absence: $R^2 = .009$, $f^2 = .009$, $p = .12$) is not statistically significantly related to mid-term test achievement, while all three coping mechanisms show a direct link to achievement. Task-focused coping is positively linked to mid-term test achievement, whereas emotion-focused coping and avoidance are negatively linked to test achievement. Despite the absence of a direct link with achievement (with or without the presence of mediators), test anxiety still shows general and statistically significant tendencies that suggest an indirect negative relationship with achievement, involving the coping mechanisms (see “Total” coefficients).

Table 4

<table>
<thead>
<tr>
<th>Effect</th>
<th>Standard error</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>c-c’ TOTAL</td>
<td>-.210</td>
<td>.096</td>
</tr>
<tr>
<td>$a_1*b_1$</td>
<td>-.013</td>
<td>.020</td>
</tr>
<tr>
<td>$a_2*b_2$</td>
<td>-.201</td>
<td>.088</td>
</tr>
<tr>
<td>$a_3*b_3$</td>
<td>.004</td>
<td>.027</td>
</tr>
</tbody>
</table>

Note. The results were obtained based on bootstrapping with 5000 parallel sets. CI = confidence interval; $c =$ direct effect of test anxiety on mid-term test achievement in the absence of task-focused coping, emotion-focused coping, and avoidance; $c’ =$ direct effect of test anxiety on mid-term test achievement in the presence of task-focused coping, emotion-focused coping, and avoidance; $c-c’$ TOTAL = total indirect effect of test anxiety on mid-term test achievement; $a_1*b_1$ = indirect effect of test anxiety on mid-term test achievement via task-focused coping; $a_2*b_2$ = indirect effect of test anxiety on mid-term test achievement via emotion-focused coping; $a_3*b_3$ = indirect effect of test anxiety on mid-term test achievement via avoidance.

Closer inspection of the indirect coefficients and their reliability intervals indicates that the described indirect effect of test anxiety can be primarily attributed to the mediator of emotion-focused coping. In other words, emotion-focused coping is directly related to lower exam achievement (Table 3). Emotion-focused coping simultaneously acts as a mediator, via which test anxiety indirectly predicts lower achievement (Table 4), regardless of there being no direct link between test anxiety and mid-term test achievement.

Discussion

Considering the now widely accepted and repeatedly empirically confirmed finding which indicates that test anxiety does not have a simple direct relationship with cognitive performance (Stöber, 2004; Zeidner, 1998), we wanted to ascertain whether coping mechanisms in a given sample had a mediating role in the relationship between test anxiety and exam achievement.

Our findings pertaining to direct relationships between the examined variables confirm the results of numerous past studies (e.g. Cohen et al., 2008; Owens et al., 2014) which suggest that the level of test anxiety per se is a relatively weak predictor of achievement in cognitive tasks. That is, knowledge
of only the intensity of this uncomfortable cognitive-emotional state is not sufficient to accurately predict one’s achievement in a particular knowledge-based test. Our results also suggest that higher test anxiety predicts a greater likelihood of using emotion-focused coping mechanisms, but is not a significant predictor of the likelihood of using the other two coping strategy subtypes. In addition, our findings indicate that cognitive performance is influenced by the coping mechanism employed. Specifically, the participants who relied on task-focused coping scored higher on the mid-term test, while students more prone to emotion-focus coping and avoidance had significantly less success.

Most previous research aimed to identify regularities between the intensity of test anxiety, methods of coping with this type of stressor, and success in various tasks, focusing primarily on the individual direct relations between these variables (Hsieh et al., 2012). Many studies reported a tendency in individuals with high test anxiety to rely mainly on emotion-focused coping mechanisms, and various avoidant actions, with particular emphasis on mental exclusion and cognitive distancing (Ader & Erktin, 2010; Cohen et al., 2008; Putwain, Chamberlain, Daly, & Sadreddini, 2014; Sorić, 1999; Stöber, 2004; Zeidner, 1995). However, the relationship between test anxiety level and problem-focused coping is not as straightforward: although a number of studies report an expected negative relationship between exam fear and choice of task-focused coping strategies (Hsieh et al., 2012; Lazarus & Folkman, 2004), the correlation coefficients between these variables are often quite low (.10 to .30) (Zeidner, 1998). Additionally, in line with our results, a number of studies failed to determine a statistically significant direct relationship between the level of test anxiety and the tendency to choose task-focused coping mechanisms (Lazarus & Folkman, 2004; Stöber, 2004). To complicate things further, Raffety and colleagues, in their well-known paper on the differences between facilitative and debilitative test anxiety, stated that an elevated level of so-called “helpful anxiety”, experienced as motivating positive fright, is linked to the more dominant use of “proactive coping” as a special form of problem-focused coping (Raffety et al., 1997).

Numerous previous studies have examined the direct relationships between applied coping strategies for test anxiety and various measures of success on tasks that require higher-order cognitive processes (Stöber, 2004; Wong, 2008; Zeidner, 1995). Although a few authors report an absence of statistically significant associations between specific coping methods and (under) achievement (Cohen et al., 2008; Rovira et al., 2005), we still find that, as in the case of the findings presented here, coping mechanisms are commonly revealed to be quality (direct) predictors of academic success. Setting clear goals, focusing one’s attention, and increasing efforts to avoid errors while solving problems (all of which are forms of active task-focused coping) regularly display a direct positive correlation with better exam achievement (Cohen et al., 2008; Sorić, 1999). On the contrary, emotion-focused coping, and avoidant actions especially, are considered to be quality predictors of lower academic achievement (Cohen et al., 2008; Zeidner, 1998).
In this study, findings regarding the mediating role of coping are of primary interest. Of the three coping strategy subtypes, only emotion-focused coping was a statistically significant mediator in the relationship between pre-mid-term test anxiety and mid-term test achievement; task-focused coping and avoidance were not statistically significant mediators in the observed relation. This suggests that an intense unpleasant state of elevated test anxiety increases the likelihood that a particular individual will score lower on their mid-term test. This is partly because intense test anxiety raises the probability that the person in question will rely on emotion-focused coping strategies, which, in turn, will contribute to their lower score on the knowledge test. Emotion-focused coping is, therefore, directly related to lower mid-term test scores. Emotion-focused coping simultaneously acts as a mediator, via which test anxiety indirectly predicts lower achievement, regardless of the lack of a direct relationship between test anxiety and mid-term test achievement.

It is difficult to compare our findings with the pre-existing, empirically supported data from the research area of interest. For a start, the vast majority of authors asked participants to recall a certain exam situation from their past (Lazarus & Folkman, 2004). Although some authors advised caution in accepting the presented results because of the retrospective manner in which the data in these studies were collected, most researchers rely on such results without questioning the accuracy and reliability of the accumulated data those findings are based on. It is questionable as to how accurate one can be at recalling specific past events. Some empirical research indicates that memories of emotionally intense events are very prone to distortions (Levine & Safer, 2002). Other researchers expected their participants to imagine, using their more or less vivid imaginations, that they were currently in the testing situation (Smith, Leffingwell, & Ptacek, 1999), thus creating artificial exam circumstances. Even those studies that assessed test anxiety, coping, and cognitive achievement in real-life circumstances were conducted either in the anticipatory phase (usually a few days before the exam itself) or after the exam had already ended and the achieved scores had been shared with the students (Zeidner, 1998). In contrast, our study involved collecting data from participants at the very time they were facing a real exam situation. This rare study design enhances ecological validity; however, the differences in methodology complicate comparison with pre-existing scientific findings.

As previously stated, most previous research has focused on the direct predictive relationships between particular groups of variables, whereas research on the mediating role of coping mechanisms in the relationship between test anxiety level and achievement has been neglected (Hsieh et al., 2012). Ader and Erktin’s research on coping with “mathematical anxiety” is one of the few studies to investigate indirect relations, warranting a more detailed description of their results (Ader & Erktin, 2010). These authors examined whether different coping actions had a mediating role in the relationship between the experience of mathematical anxiety and entrance exam success (for mathematics studies).
Their results differ to the findings of our study and appear to be quite unexpected. Although Ader and Erktin confirmed a negative direct relationship (albeit with a low correlation coefficient) between so-called non-productive coping and entrance exam success, when they “assigned the role of mediator” to coping, they found that higher mathematical anxiety, through non-productive coping, predicted even higher achievement. They also found that task-focused coping, by intensifying test anxiety, indirectly led to poorer results in the entrance exam. The authors proposed that these alleged “illogical results” could be explained by culturally determined factors. The study in question was conducted in Turkey. In contrast, the majority of theories and empirical data that emphasize the benefits of adaptive problem-focused coping mechanisms within an academic context, and highlight the inadequacy and even detriment caused by emotion-focused coping and avoidance, come from Western countries. Ader and Erktin believe it is completely possible that differences in the value systems of these societies (e.g. individualism vs collectivism, careerism vs prioritizing family, high esteem of utilitarian combativeness vs respecting moderation, being more reserved) led to the Turkish students valuing quasi-unproductive coping methods more, and applying them in an entirely adequate and adaptive way.

The results of our study, which suggest that emotion-focused coping mechanisms act as significant mediators in the relationship between stressors and achievement as an outcome variable, fully match the expectation formulated in the second hypothesis. Close inspection of the TAI contents related to level of test anxiety shows items that describe feeling tense, very worried, upset, and uncomfortable before an exam. The CITS items postulated to assess emotion-focused coping describe being preoccupied with self-blame during the test (“blame myself for not knowing what to do”, “blame myself for not doing better”) and feeling worried over self-perceived inadequate ability (“worried about my inadequacies”, “worried about what I would do next”). It becomes obvious that there is some overlap in the contents of these two questionnaires.

This observation of overlap may have some relevant implications. For instance, the discovered direct positive relationship between evaluative anxiety and the tendency to choose emotion-focused coping processes is theoretically grounded and not unexpected. It is quite easy to imagine that a student who is overwhelmed with intense fear and worry during the exam will concentrate more on these unpleasant feelings (emotion-focused coping strategies) than on task solving. Furthermore, if we imagine a student who, directly before the mid-term test, is notably worried, upset, and tense, it should not be surprising that the same person would spend the duration of the test worrying more intensely, resenting themselves for struggling in the exam situation, and, accordingly, complaining of a consuming sense of guilt. If we link this kind of response with test anxiety, it is entirely possible that the individuals in question will easily find themselves in a vicious cycle of preoccupation with metacognitions of their own incompetence; they will fear possible failure and its consequences, and the unpleasant state of anxiety will then extend or even intensify. Given the working memory’s preoccupation with this kind of content, it is not surprising if the
student lacks sufficient cognitive capacity to solve concrete test assignments, and, as a result, scores lower on the mid-term test (Moran, 2016). This logic adequately explains why operationalized emotion-focused coping in particular was shown to be a significant mediator in the test anxiety and achievement relation.

Of relevance, the CITS items formulated by Matthews and Campbell (1998) for the assessment of emotion-focused coping are notably different from other authors’ descriptions of this category of coping. Previous studies typically reveal descriptions that reflect: efforts to decrease or even eliminate emotional pain (and it is unlikely that self-blame will contribute to this kind of relief), open emotional venting, wreaking one’s anger, seeking emotional support from loved ones, and so on (Beer & Moenta, 2012). Leading authors in the stress process domain (e.g. Lazarus & Folkman, 2004) stress that the goal of emotion-focused coping is affect-regulation, maintaining hope and optimism, and refusing to accept that the stressful encounter may end unfavorably (Lazarus & Folkman, 2004). The items in the questionnaire used in this study are inconsistent with the given, widely accepted descriptions of emotion-focused coping. This raises some doubt as to the validity of this particular CITS scale: does it truly measure emotion-focused coping in the same way as other, perhaps better known and more commonly used questionnaires that assess coping? It would be desirable for future research to include other measures of coping in order to check the generalizability of our findings related to direct and indirect relationships between the studied phenomena.

As previously stated, most prior research into test anxiety has been conducted in Western countries, predominantly the USA. This fact significantly impacts our research in several ways and can be viewed as a limitation of this study. For instance, the educational systems, study characteristics, types and nature of knowledge assessments, and the consequences of exam failure, are notably different in Western countries compared to our society. In Western countries, test anxiety has most often been studied in the context of so-called high-stakes testing (von der Embse & Hasson, 2012); that is, in circumstances which, arguably, present much more threatening situations, with far more serious consequences in the situation of failure (for example, a student who fails the exam must leave their studies). Conversely, in this study, it was the mid-term test situation that functioned as a stressor. In accordance with the Bologna system, students have the option of retaking a mid-term test (if they fail their first attempt or are dissatisfied with their score). Hence, it becomes clear that a stressor operationalized in this way is probably not equally as intense or frightening for most participants. The question arises whether this study would have provided the same results had we conducted our research in a “true” exam situation. However, considering the characteristics of our educational system, where even final exams can be repeatedly retaken (i.e. where students have the right to annul their marks), it is unclear whether it would even be possible to find an evaluative situation that fully corresponds with exam situations in most Western societies.
Another limitation of our study is the relatively small sample size of the study (n = 263). It is suggested that future research replicates the same statistical analysis on a larger sample, to provide more generalisable findings and greater certainty to our conclusions.

References


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