# Coping with Test Anxiety and Academic Performance in High School and University: Two Studies in Brazil

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Adolescence is a period of life between 12 and 18 years old with psychophysiological changes and hormonal and bodily changes that may predispose to vulnerability to developmental and behavioral problems (Skinner & Zimmer-Gembeck, 2016; Zimmer-Gembeck, 2011; Zimmer-Gembeck & Skinner, 2008). In addition to the developmental changes typical of this phase of life, stressful experiences are added,

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including taking school tests, relationships at school, professional choice, the entrance exam for university admission, and social and affective relationships, which are stressors that can affect the physical and mental health of adolescents (Grant et al., 2006) and their academic engagement, that is, the quality of their participation or involvement in the learning process (Skinner, 2016). Thus, in high school, the adolescent has numerous challenges to face in his or her developmental journey.

Admission to university, in turn, represents a significant change in the student's life, when compared to the school trajectory undertaken until high school, both in relation to studying and learning, and in the personal and social sphere (Graner & Cerqueira, 2019). The need for long hours of study, the change in teaching methodology, which usually requires greater student autonomy, and the demands of teachers, family members, and the students themselves may lead to the development of stress and anxiety, which may require interventions in student support services (Ramos et al., 2018a). To this end, Brazilian (e.g., Ariño & Bardagi, 2018; Silva et al., 2018) and international (e.g., Auerbach et al., 2018; Bayram & Bilgel, 2008; Eisenberg et al., 2007) literature shows that this population of young adults is more vulnerable to mental health problems than the general population.

Students at different levels of education have common stressors in the academic context, such as test anxiety (Putwain et al., 2016; Sarason, 1958; Skinner & Saxton, 2019). Stress and anxiety albeit are normal and adaptive responses of the human species to cope with threats (whether real or imagined). However, stress at excessive levels becomes harmful, as it provokes psychophysiological reactions, and can limit the individual's ability to perform in various areas of life (Morais et al., 2010). Both emotional states – anxiety and stress – involve physiological, behavioral, and cognitive components that occur in an intertwined manner (Folkman & Lazarus, 1985). One of the situations with the greatest potential to trigger stress and anxiety, both in high school and university students, are tests and other school assessment activities (Gonzaga & Enumo, 2018; Gonzaga et al., 2016; Sarason, 1958).

The test is an assessment tool widely used in various fields, such as education, government, and private institutions, to assist in decision-making regarding the competencies, performance, and abilities of individuals (Rana & Mahmood, 2010). In a culture of heightened appreciation of assessment components in the teaching-learning process, the result of which can influence or even determine the future of an individual in the most diverse aspects (academic, emotional, family, social, professional, among others), it is evident the magnitude of the importance of these tests and therefore, it is understandable that states of stress and anxiety are experienced in this situation (Gonzaga et al., 2016).

Test anxiety is defined as a set of psychological, physiological, and behavioral reactions that occur in association with concern about negative results in assessment situations. Thus, the psychophysiological and behavioral reactions, arising from the anticipated concern about negative results and poor performance in assessment situations, stand out (Folkman & Lazarus, 1985; King et al., 2000; Zeidner, 1998). In this context, anxiety reactions typically occur at times before, during, or after an examination period (Folkman & Lazarus, 1985), these being referred to,

respectively, as the anticipatory phase, the confrontation phase, and the waiting phase (King et al., 2000; Zeidner, 1998). A last phase is proposed by Folkman and Lazarus (1985), the *outcome stage*, after learning how he or she has done the test.

In the anticipatory phase, in which the assessment situation is about to occur, the individual tends to experience concern about the demands associated with the test and the uncertainty of its result. In the confrontation phase, which occurs during the test situation, anxiety may reach a peak in the initial moments of contact with the assessment instrument, but it usually stabilizes during the resolution process. Finally, the waiting phase for the exam results usually generates apprehension, which can be resolved if the grade obtained is favorable or redirected to the possible consequences of an unfavorable grade (King et al., 2000; Zeidner, 1998).

Data from international literature indicate that over 33% of elementary and high school students experience test anxiety at some point (Methia, 2004). A study with a sample of 2435 English high school students pointed out that 16.4% of participants had test anxiety, with a higher proportion in female students (22.5%) (Putwain & Daly, 2014). In the Brazilian context, the literature is incipient in this area, although there is a growing interest in the influence that test anxiety exerts when addressing variables such as academic performance and academic motivation (e.g., D'Avila & Soares, 2003; Gonzaga & Enumo, 2018; Rodrigues & Pelisoli, 2008).

Brazilian studies investigating emotional changes in test situations found that many young people facing selective processes did not consider themselves physically and psychologically prepared. Reports of difficulties in concentration, restlessness, headaches and muscle pain, and dizziness are common, in addition to many presenting levels of anxiety, stress, fear, insecurity, and distress (D'Avila & Soares, 2003; Rodrigues & Pelisoli, 2008). The study by Gonzaga and Enumo (2018) pointed out the prevalence of 62.53% of students with test anxiety, with a significant difference in favor of girls (66.96%), in a sample of 379 high school students from a public school, in the city of São Paulo, Brazil.

The gender difference was also found by Feldman et al. (2008) in university students from Venezuela. This study also found that 53.73% of 442 undergraduate students presented stress, generally related to "excessive amount of material to study" (89.30% of students), "lack of time to study" (83.80%), and "entering or leaving the classroom that has already started" (81.30%). The study showed relationships among other relevant variables to understanding test anxiety, such as social support and stress, indicating that the higher the academic stress and the lower the perceived social support, the higher the perceived anxiety and the report of mental health problems. Furthermore, the authors found that the situations, taking a written exam, preparing for an upcoming test, and waiting for and receiving the results of a test, were reported by more than 90% of the participants as being the greatest generators of academic stress.

In the same way, García-Ros et al. (2012) found 82% of 199 first-year Psychology and Pedagogy students in Spain with perceived stress, related to academic activities. The main anxiety and stress-causing activities were taking tests, giving oral presentations, academic overload, and lack of time. Among the main difficulties encountered by students in university, Sahão and Kienen (2021) in a systematic review

study (with 23 articles), pointed out interpersonal relationships, leaving home, lack of support network, financial situation, and level of demand in university, the latter being the most mentioned factor (in 73.9% of the analyzed articles).

The studies thus show that stress and test anxiety are variables that influence students' psychological well-being (Conley & Lehman, 2012; Putwain, 2009; Putwain et al., 2016) and their performance, both in high school (Lufi & Darliuk, 2005) and in university (Latifa et al., 2012). With this focus, this chapter analyzes aspects of coping with academic test anxiety and its relationships with students' academic performance, illustrating with data from research conducted at the high school and university levels in two capital cities in the Southeast Region of Brazil.

## Coping with Test Anxiety

The study of coping is fundamental in the academic environment, as coping strategies influence student engagement and exam study behavior, which consequently affect academic performance (Yumatov et al., 2001; Skinner et al., 2008, 2013; Skinner & Saxton, 2019). Any attempt to manage stressors in the academic context from the individual's personal and social resources, whether successful or not, is considered a form of coping (Freire & Noriega, 2011; Skinner & Saxton, 2019).

Coping refers to the process of self-regulating emotion, behavior, and motivational orientation under conditions of psychological stress, according to the Motivational Theory of Coping (MTC) (Ramos et al., 2015; Skinner & Wellborn, 1994; Skinner & Zimmer-Gembeck, 2007). This more recent definition of coping as part of the self-regulation process under stress was preceded, in the 1980s, by Lazarus and Folkman's (1984) cognitive and transactional perspective of stress-coping. The initial categorization of coping strategies, elaborated by these authors, is "problem-focused" coping, in which the subject actively seeks to modify the situation causing stress, and "emotion-focused" coping, whose main function is the regulation of the emotional response provoked by the stressor (Seidl et al., 2001).

The categorization of coping strategies into problem-focused and emotion-focused proposed by Lazarus and Folkman (1984) is, however, widely debated by researchers in the field in relation to the category system used to describe coping and the classification of problem-focused coping as adaptive and emotion-focused coping as maladaptive (Skinner et al., 2003). This form of categorization, however, has been and continues to be applied in studies in this area.

Using these two categories, the study by Doron et al. (2011), for example, pointed to the relationship between coping strategies and student motivation. The authors' analysis revealed that problem-focused coping is negatively associated with demotivation, while emotion-focused coping has a positive correlation with demotivation. Thus, the more demotivated a student is, the less likely he/she is to cope with the test situation actively, focusing on the problem, and the more likely he/she is to cope with the test from emotion regulation. Complementing this framework, Liu et al. (2021) showed, in a sample of 1266 medical students in China, that

psychological resilience plays a mediating role between emotional regulation and test anxiety, indicating the importance of training focused on psychological resilience for cases of test anxiety.

Other studies have used Lazarus and Folkman's framework for investigating coping in the context of university (e.g., Piemontesi et al., 2012; Strack & Esteves, 2015). Analyzing the relationships between anxiety/stress and academic test coping, Piemontesi et al. (2012) assessed test anxiety and coping styles in undergraduate students with low, high, and moderate anxiety. The results showed that the most anxious students were those who use self-blame and rumination (repeatedly focusing on the negative aspects of the situation) coping strategies, and the least anxious students used approach stressor (e.g., problem-solving, information seeking) and accommodation (acceptance, resignification) coping strategies.

The transactional approach to coping also emphasizes the meaning of emotions, such that positive and negative emotions experienced after a stressful event reflect assessments of benefit and harm. Negative emotions experienced prior to the occurrence of a stressful event are associated with threat assessments, and positive emotions with perceived challenge (Lazarus & Folkman, 1984). In the academic context, the study by Strack and Esteves (2015), for instance, showed, in a sample of 103 Portuguese undergraduate students, that interpreting pre-test anxiety as a facilitating emotion was associated with the perception of the situation as motivating rather than threatening or emotionally exhausting. They concluded that the same stressful moment can be experienced as threatening or as motivating, depending on how people interpret their anxiety, thus affecting how they assess events and situations. Authors such as Abella and Heslin (1989) also identified, in 174 North American Psychology students, that an interpretation of anxiety as a facilitator was associated with evaluating the test situation as a challenge, suggesting that the relationship between stress/anxiety and test coping may be mediated by the perception of the stressful situation.

The study by Au (2015) showed this process in more detail, using the theoretical framework of MTC on the role of perceived control, to examine the joint action of three types of beliefs about control: (a) internal locus of control (perceiving one's own actions as being responsible for an outcome), (b) self-efficacy (perceptions about one's ability to succeed at a specific task), and (c) perceived control over outcomes, prior to mid-year and end-of-year exams, in 225 Asian undergraduate students. The author identified that internal locus of control and self-efficacy contribute exclusively to students' academic experiences. They also observed that perceived level of control is an important mediator between (a) internal locus of control and self-efficacy on mid-year exams and (b) level of perseverance, course-specific stress, and satisfaction or enjoyment with the course in the end-of-year exams.

The Motivational Theory of Coping conceptualizes coping as a regulatory action, part of the individual's broader self-regulation processes, in a model that encompasses cognition, emotion, and motivational orientation toward the stressor, according to Skinner and Wellborn (1994). For these authors, stress occurs when an event or situation threatens or challenges the basic psychological needs (BPN) proposed by the Self-Determination Theory (SDT) by Deci and Ryan (1985) – the BPN of

Relatedness, Competence, and Autonomy, affected by stressful situations. The Relatedness BPN includes the need to feel connected, being part of other people's lives; the Competence BPN corresponds to the need to experience effectively in interactions with social and physical environments; and the Autonomy BPN points to the need to express the self authentically and to feel it as the source of action (Connell & Wellborn, 1991). These three BPN are considered universal and innate and have adaptive evolutionary value (Skinner & Wellborn, 1994). Therefore, coping is understood as individual efforts to maintain, restore, or repair one or more of the three BPN.

In view of the diversity of existing coping classifications in the field, an international consortium coordinated by Skinner and collaborators (Skinner et al., 2003) proposed another way to analyze the coping process, based on a hierarchical system composed of (a) family of coping, with high-order categories associated with adaptive processes, containing (b) ways of coping, categorized according to the purpose, meaning, or functional value of the behavior (and involving actions based on efficacy to produce desired outcomes and prevent undesired ones), and (c) at its base, instances of coping – what the person does, thinks, and feels in the face of stressors (Skinner et al., 2003, 2013). Coping strategies can thus be activated if the event is assessed as a threat or challenge to the self and to the context (Skinner et al., 2003). Therefore, this categorization system represents a theoretical advance in explaining the relationship of coping strategies with their adaptive functions and their likely consequences on development and mental health in the medium and long term, in addition to having a developmental perspective, considering coping processes according to different ages (Skinner & Zimmer-Gembeck, 2007, 2016).

The coping families, proposed after the analysis of more than 400 types of coping strategies described in the literature, and elaborated according to the rules for the best construction of a category system, were classified as being more adaptive or maladaptive in developmental terms, from mental health and academic and social performance. Families with adaptive outcomes are associated with the perception of challenge to BPN (Skinner et al., 2003): Self-Reliance and Support-Seeking (presented in the face of perceived challenge to the Relatedness BPN), Problem-Solving and Information-Seeking (Competence BPN), Accommodation, and Negotiation (Autonomy BPN). The coping families with maladaptive outcomes in the medium and long term are associated with perceived threat to the BPN: Delegation and Isolation (threat to Relatedness BPN), Helplessness and Escape (Competence BPN), and Submission and Opposition (Autonomy BPN).

The Self-Confidence coping family encompasses, for example, strategies such as emotional regulation, behavioral regulation, emotional expression, and emotional approach. Support-Seeking, on the other hand, includes strategies such as seeking contact, seeking comfort, instrumental help, and social referencing. In Problem-Solving, the person tries to plan strategies by means of instrumental action aiming at mastering the stressor. The Information-Seeking family involves strategies such as reading, observing, and asking others. In Accommodation, the person presents cognitive distraction, cognitive restructuring, minimization, and acceptance of the

stressor. Negotiation involves the use of bargaining, persuasion, and priority setting (Skinner et al., 2003).

Strategies such as complaining, self-blame, regret, and seeking maladaptive support belong to the Delegation family. In the Isolation coping family, strategies such as social withdrawal, avoidance of others, dissimulation, and freeze are used. The Helplessness family, in turn, is associated with confusion, cognitive interference, cognitive exhaustion, and passivity. The behavioral avoidance, mental withdrawal, denial, and wishful thinking strategies are associated with the Escape family. The Submission coping family, on the other hand, features strategies such as rumination, intrusive thoughts, and rigid perseverance; while the Opposition family involves strategies such as blaming others, projection, aggression, and defiance (Skinner et al., 2003; Skinner & Zimmer-Gembeck, 2007). Thus, the classification performed by MTC in coping families organizes the many possibilities that the individual may have when faced with various stressful situations into only 12 categories, which can encompass countless strategies. The theoretical framework of the MTC was used to assess anxiety and coping in academic tests in two research studies conducted with Brazilian high school students from the city of São Paulo, and from a public university in the state of Espírito Santo, as described in this chapter.

In the academic area, Skinner et al. (2013) highlight five adaptive coping strategies – strategizing, help-seeking, comfort-seeking, self-encouragement, and commitment – and six maladaptive ones, confusion, escape, concealment, self-pity, rumination, and projection. These adaptive strategies are related to "academic motivational resilience" as opposed to maladaptive strategies, including 11 of the 12 coping families proposed by MTC. It is thus possible to understand the dynamics between ongoing engagement, emotional reactivity, coping, and re-engagement in the face of difficulties and setbacks in the school environment.

With this motivational perspective, Skinner and Saxton's (2019) review shows there are differences in the coping pattern across development between elementary school students and in adolescent students. Children show more adaptive coping, with improvement especially in problem-solving, and lower levels of maladaptive coping. This pattern, however, reverses in early adolescence, returning midway through this developmental stage. The authors highlight that, at all ages, adaptive coping in the school context is associated with high levels of personal resources (perceived competence, goal orientation and autonomy, intrinsic motivation, sense of belonging, engagement, self-esteem, optimism, future aspirations, and personality) and interpersonal resources (warm environment, structure provider, and autonomy promoter), while maladaptive coping is related to high levels of personal vulnerabilities and low levels of interpersonal support. The latter include the type of support from teacher, family, and peers. Thus, the "coping repertoire" makes a difference in academic engagement or disengagement, with impacts on academic performance, as discussed in more detail below.

## Coping with Test Anxiety and Its Relationship to Student Academic Performance

Research on school test anxiety points to the importance of studying the processes associated with this phenomenon in their relationship with student academic performance (Cassady & Johnson, 2002; Chapell et al., 2005; Gaudry & Spielberger, 1971; Hancock, 2001; Khalid & Hasan, 2009; Nicholson, 2009; Oludipe, 2009). Studies on the relationship between levels of anxiety and stress in test situations and academic performance show divergent results regarding the interference of these emotional states in the results of assessments to which students are submitted, as shown below.

For university students, Feldman et al. (2008) found a positive association between academic performance and stress level, i.e., the higher the stress experienced by the student, the higher his/her test scores; a result also found in the study of García-Ros et al. (2012). On the other hand, Baqutayan (2011), in an experiment that sought to help Malaysian university students manage their levels of academic stress using social support, demonstrated that students who managed to reduce their stress level had greater satisfaction with their academic performance. In a similar direction, the studies by Chapell et al. (2005), Masson et al. (2004), and Stober (2004) demonstrated that students with low test anxiety had higher academic performance than students with moderate and high level in test anxiety. The study by Durako and Hoxha (2018) also demonstrated a positive association of social support as a protective factor for test anxiety for 284 undergraduate students (60.3%) and high school students in Kosovo.

In high school, Rana and Mahmood (2010) found a negative correlation between test anxiety and performance in a sample of 414 Iranian adolescents, aged 15–19 years old, such that the higher the test anxiety, the lower the students' academic performance was, and vice versa. Similar results were found by Gill (2020) in a sample of 264 high school students from India.

One of the reasons why test anxiety may negatively impact academic performance is its influence on attention and concentration, which, in turn, have effects on memory, and thus may impair academic performance (Yousefi & Redzuan, 2010). This view is also shared by Cassady and Finch (2015) who maintain that students with test anxiety may perform poorly due to the inability to effectively interpret, organize, or understand the content to be used during the assessment situation.

In the case of the relationship between the coping strategies used by students and their academic performance, Endler et al. (1994), for example, pointed out in a study of 272 students at a Canadian university, that students who developed problem-focused coping strategies obtained better grades because they turned to action, whereas students who developed emotion-focused strategies obtained lower academic performance. The authors also found that task-oriented coping was related to test scores, but such an association was found only among male undergraduate students.

The importance of coping in academic performance could also be observed in the study by Edwards and Trimble (1992) of 75 Psychology students in the USA. It was shown that task-oriented coping is a significant predictor of test performance, even when the baseline variables (gender, trait anxiety, and coping styles) were controlled by hierarchical regression analysis. To this end, in a sample of 325 English students at the end of high school, Putwain et al. (2016) identified that higher anxiety or concern predicted lower exam grades. This result was partially mediated by a lower use of effective pre-examination coping strategies.

By contrast, some research has pointed to inexpressive correlations between the coping variables and academic performance, such as the study by Carver and Scheier (1994). These authors found that undergraduate students' coping reactions, prior to the test, generally did not predict their grades, with the exception of mental disengagement, which was inversely related to the grades obtained. Other studies have also reported non-significant predictive effects of coping on test performance (Abella & Heslin, 1989; Edelmann & Hardwick, 1986).

This body of studies shows that there is divergence in the literature regarding the effects of test anxiety and coping on student academic performance. Considering that such relationships are most often studied in undergraduate students, a survey conducted with high school students that sought to assess the relationship between these variables is described below.

## *Relationships Between Test Anxiety, Coping, and Academic Performance: An Example of a Study with Brazilian High School Students*

This study was conducted by Gonzaga and colleges initially with the delivery of the consent form to 567 adolescents of both genders, high school students – HS (1st to 3rd year) of a public school in the city of São Paulo, Brazil (Gonzaga, 2016; Gonzaga & Enumo, 2018; Gonzaga et al. 2016, 2018). Of these, 150 were not interested in participating in the research, and 6 were excluded from the research for having dropped out during the data collection phase (exclusion criterion), resulting in 411 students who participated in the research.

As a result of this incident, in the data collection process, not all students answered all the instruments, which implied a change in the sample number for each phase of the instrument applied, as can be seen in the number of students in the research instruments.

The ethical requirements in research were followed, with the approval of the university's Ethics Committee in Research (Protocol No. 1.055.076), the authorization from the institution's school coordination, and the consent of the guardians and/or participants. Students were characterized by means of an identification form, with 26 open and closed questions about gender, date of birth, age, education, number of siblings, who they live with, their age, work, and parents' occupation. To

measure anxiety in academic tests, we applied the Test Anxiety Scale (TAS) (Sarason, 1958), authorized by the author of the instrument, after its translation and adaptation to Brazilian Portuguese. To assess academic performance, we considered the student's overall mean in the previous semester in the 12 subjects he/she took (Portuguese, English, Arts, Physical Education, Mathematics, Biology, Physics, Chemistry, History, Geography, Philosophy, and Sociology), as it is considered an objective indicator for this analysis.

The Test Anxiety Scale (TAS), originally developed by Sarason (1958), was translated into Portuguese, with the author's authorization. The instrument aims to assess the subjects' level of anxiety in facing situations of academic tests based on the classification of 37 statements as being true or false, with the participant's answers being compared to a "template," and the result generated refers to the number of corresponding items between the template and the subject's resolution, the more alike the answers, the higher the individual's test anxiety level (Gonzaga & Enumo, 2018).

The way in which adolescents deal with test anxiety prior to, during, and after taking a test (before the results) was assessed by the Coping with Academic Test Scale (CATS), specially developed by Gonzaga and Enumo (2018) based on the Coping Response Booklet (Lees, 2007), supported by MTC (Skinner & Wellborn, 1994; Skinner & Zimmer-Gembeck, 2007). This scale assesses the coping strategies used before, during, and after taking school tests, corresponding to the three phases of test anxiety: anticipation, confrontation, and waiting. For each phase, the participant must read a short text that contains a test-related situation (the news that there will be a test, the time of taking the test itself, and waiting for and receiving the test result) and answer 21 items on a five-point Likert-type scale, indicating how he/she feels in the situation, so that point 1 represents that he/she would feel "a little" as described in the item and point 5 represents that he/she feels "very much." Each of these items is assessed for analysis of different measures: emotional reaction, threat assessment, challenge assessment, orientation, identification, adaptive coping (mean score of six coping families related to perceived challenge to BPN: Self-Confidence, Support-Seeking, Problem-Solving, Information-Seeking, Accommodation, and Negotiation) and maladaptive (mean score of six coping families related to the perceived threat to BPN: Delegation, Isolation, Helplessness, Escape, Submission, and Opposition). The CATS has a good level of internal consistency in all three situations: S1-before the test ($\alpha = 0.70$); S2-during the test ($\alpha = 0.72$) and S3-after the test ($\alpha = 0.77$), as well as in the Adaptive Coping (AC) subscale ($\alpha = 0.83$) and in the Maladaptive Coping subscale (MC) ($\alpha = 0.88$), indicating a good level of internal consistency for both (Gonzaga & Enumo, 2018).

Spearman's correlation coefficient was used for the relationships between scale scores and school grades, due to the lack of normal distribution of the variables. The significance level adopted for the statistical tests was 5% ($p \leq 0.05$, according to Fife-Schaw, 2010). To perform the statistical analyzes described below, the Statistical Analysis System [SAS] software for Windows©, version 9.2, was used.

A total of 411 adolescents, aged between 14 and 20 years old ($M = 16.27$; $SD = 1.04$) participated in the study, 59.85% of them girls, and a greater number of

students from the 2nd year of high school (1st year, 126/30.66%; 2nd year, 148/36.01%; 3rd year, 137/33.33%). Most participants did not work (76.58%) and had a medium-high (54.31%) or medium (40.47%) socioeconomic status, according to the Brazilian Economic Classification Criteria, of the Brazilian Association of Research Companies (ABEP, 2013).

To measure academic performance (outcome or dependent variable), the overall mean of the student in the previous semester was considered, through the 12 subjects taken by him/her (Portuguese, English, Arts, Physical Education, Mathematics, Biology, Physics, Chemistry, History, Geography, Philosophy and Sociology), as it was considered an objective indicator for this analysis. Academic performance, assessed by the school means in the subjects taken by the students, corresponded to the outcome or dependent variable. Table 1 presents the descriptive statistics of the sample variables ($n$ = 406). The students in this study presented, in descending order, a higher mean in the subject of Arts, followed by English and Mathematics. The lowest means were in the subjects of Biology and Geography. Moreover, the school means did not fall below five points in any of the subjects (Table 1). Of the 406 students, 93.35% ($n$ = 379) had a mean above score 5, so that only 27 students (6.65%) had a lower mean, indicating failure.

In the evaluated sample ($n$ = 379), there was a prevalence of 62.53% of students with test anxiety, with a mean TAS of 17.09 points for males and 22.35 for females, this difference being significant. Compared with grades and ages, the prevalence of test anxiety was higher in the 1st year, followed by the 3rd year, as well as for younger students, but these differences were not statistically significant (Table 2).

Compared to the boys, 3rd year female students showed more test anxiety (Table 3).

**Table 1** School means in subjects taken by high school students ($N$ = 406)

| Subjects | Mean (SD) | Median (range of variation) |
|---|---|---|
| Arts | 7.33 (±1.58) | 8 (1–10) |
| English | 7.18 (±1.76) | 7 (2–10) |
| Mathematics | 7.02 (±1.62) | 7 (1–10) |
| Portuguese | 6.97 (±1.52) | 7 (0–10) |
| History | 6.96 (±1.51) | 7 (2–10) |
| Chemistry | 6.78 (±0.99) | 7 (4–9) |
| Philosophy | 6.74 (±2.03) | 7 (0–10) |
| Physical education | 6.66 (±1.39) | 7 (2–10) |
| Sociology | 6.46 (±1.74) | 6 (1–10) |
| Physics | 6.32 (±1.61) | 6 (3–10) |
| Geography | 5.81 (±1.86) | 6 (1–10) |
| Biology | 5.29 (±1.59) | 5 (1–9) |
| Average | 6.63 (±1.18) | 6.67 (2–9.25) |

*Source:* Report of the school subject means provided by the school (Author elaboration)

**Table 2** Frequency of high school students with test anxiety by TAS, by gender, age, and grade (N = 379)

| Variables | With test anxiety *n* (%) | Without test anxiety *n* (%) | Mean with test anxiety (SD) | Mean without test anxiety (SD) | *p-value |
|---|---|---|---|---|---|
| *Gender* | | | | | |
| Female (*n* = *227*) | 152 (66.96) | 75 (33.04) | 25.91 (±3.67) | 16.00 (±3.22) | |
| Male (*n* = *152*) | 85 (55.92) | 67 (44.08) | 21.74 (±4.32) | 11.00 (±3.36) | 0.030* |
| Total | 237 (62.53) | 142 (37.47) | | | |
| *Age* | | | | | |
| 14–15 years (*n* = 88) | 62 (70.45) | 26 (29.55) | 23.10 (±3.67) | 15.00 (±4.14) | |
| 16 years (*n* = 138) | 82 (59.42) | 56 (40.58) | 24.82 (±4.56) | 13.00 (±3.90) | 0,209 |
| ≥17 (*n* = 153) | 93 (60.78) | 60 (39.22) | 24.84 (±4.58) | 13.00 (±3.94) | |
| Total | 237 (62.53) | 142 (37.47) | | | |
| *Grade* | | | | | |
| 1st year (*n* = 115) | 75 (65.22) | 40 (34.78) | 23.28 (±4.06) | 14.50 (±4.16) | |
| 2nd year (*n* = 144) | 86 (59.72) | 58 (40.28) | 24.58 (±4.59) | 13.00 (±3.91) | 0.647 |
| 3rd year (*n* = 120) | 76 (63.33) | 44 (36.67) | 25.22 (±4.34) | 13.00 (±3.85) | |
| *Total* (*n* = 379) | 237 (62.53) | 142 (37.47) | 24.38 (±4.40) | 13.31 (±3.94) | |

*Source*: Gonzaga et al. (2016)
Note: *TAS* Test Anxiety Scale (Sarason, 1958)
$p \leq 0.05$ = * Significant values by Chi-Square test

**Table 3** Frequency of high school students with test anxiety by TAS, by gender and grade (N = 237)

| Grade | Female | Male | Total | *p-value |
|---|---|---|---|---|
| | *n* (%) | *n* (%) | | |
| 1st year | 35 (70.00) | 40 (61.54) | 75 | 0.345 |
| 2nd year | 60 (62.50) | 26 (54.17) | 86 | 0.337 |
| 3rd year | 57 (70.37) | 19 (48.72) | 76 | 0.021* |
| Total | 152 | 85 | 237 | |

*Source*: Gonzaga et al. (2016)
Note: *TAS* Test Anxiety Scale (Sarason, 1958)
$p \leq 0.05$ = * Significant values by Chi-Square test

In the assessment of test anxiety coping, some coping families showed differences in relation to the three stressful situations (before, during, and after the test). In these three situations, the most frequent coping families were Problem-Solving (before, 59.13%; during, 55.81%; after, 42.9%) and Information-Seeking (before, 55.07%; during, 47.1%; after, 44.06%), with emphasis on Self-Confidence (47.53%)

after the test. Analyzing the types of coping families most chosen by the students (at least by 50%), it was noticed that these three stressful moments of the test were more a challenge than a threat to their BPN.

Comparative analyses were performed between groups with and without test anxiety in relation to academic performance, showing no significant differences between groups. However, analyzing the relationships between academic performance and test anxiety coping, significant correlations were obtained for the coping families defined by the MTC as more adaptive (Self-Confidence, Support-Seeking, Problem-Solving, Information-Seeking, and Accommodation), with the adaptive coping repertoire being related to good academic performance, and the lower performance being related to the lower frequency of these coping families. On the other hand, there was a significant negative correlation of the overall indicator of Maladaptive Coping [MC], with ways of coping of Delegation and Submission, which are associated with lower academic performance and vice-versa. These results are consistent with data found in studies using MTC (Skinner et al., 2013) and in the review by Skinner and Saxton (2019).

It is observed, therefore, that the coping resources used in the situation of school tests can influence student motivation and academic motivational resilience (Skinner et al., 2013). These are variables that influence academic performance, as already pointed out by authors in the field (e.g., Piecontesi et al., 2012; Putwain et al., 2016; Zeidner, 1995), conditions that also occur in undergraduate students, as illustrated below.

## *Coping with School Tests in University: An Example of a Study with Brazilian Undergraduate Students*

This study met the ethical requirements for research, being approved by the Ethics Committee for Research (Protocol No. 1.345.372). Data collection took place during three workshops offered as part of an Extension Project for psychological care at the Center for Applied Psychology at the Federal University of Espírito Santo (UFES), in Vitória, capital of the State of Espírito Santo, Brazil. The workshops were offered in three modalities, one focused on study orientation, the other focused on the development of social skills, and the third dedicated to the new experience of being a university student. The members of the workshops were invited to participate in the research, being informed about the objectives of the study, the fact that participation is voluntary, not causing harm to the continuation of the workshop if they chose not to participate.

The sample consisted of 26 students from different areas of knowledge, with a mean age of 32 years (*SD* = 15.55; range of variation: 18 to 52 years), with 20 female participants. Most students were in the first semesters of their undergraduate degree: 1st to 3rd semester= 46.15%; 4th to 7th semester = 34.4%; 8th semester

onwards = 13.7% (one student was already in graduate school and one did not inform). Most students (69%) reported not working.

All participants signed an Informed Consent Form (ICF) and completed a general data protocol, the Test Anxiety Scale (TAS) (Sarason, 1958; translated into Portuguese) and the Coping with Academic Test Scale (CATS) (Gonzaga & Enumo, 2018), described above, evaluating the coping strategies used before, during, and after school assessments. The General Data Registration Protocol aimed to survey participants' sociodemographic variables, such as gender, age, family income, and course, among others. In addition, it contained two questions about identification and satisfaction with the course. Thus, the undergraduate student answered whether he was "very," "a little," or "not at all" satisfied with his degree course; and how much he/she identifies with the course ("a lot," "a little," or "not at all").

The instruments were applied in a single session, collectively, and the responsible researcher accompanied this application, making himself/herself available to answer any questions individually. After completing the instruments, each participant received, as feedback, a booklet on fear of exams and how to deal with stress and anxiety in this context (Gonzaga & Enumo, 2018). The data from the instruments were submitted to descriptive statistical analysis, in order to evaluate the test anxiety indicators and the coping strategies presented by the undergraduate students.

Most students reported identifying a lot with the course (75.8% of participants) or identifying "a little" (24.2%); none of the participants reported identifying "not at all" with the course. Half of the sample said they were very satisfied with the course, 46.5% said they were "a little" satisfied, and 3.5% reported being "not at all" satisfied with the course.

Regarding the TAS assessment, half of the students (50%, $n = 13$) scored above this mean for test anxiety ($M = 29.69$; $SD = 3.68$), and the other half were below this mean ($M = 14.23$; $SD = 5.29$). Among the 13 students rated above the mean in test anxiety, eight were a little or not at all satisfied with the course, while only five were very satisfied. Among the other 13 students without test anxiety, four were a little satisfied, eight were very satisfied, and one student was unable to respond. These results show the relationship between test anxiety and the degree of student satisfaction with their courses, as in this sample these variables were inversely proportional. In this regard, further research with a larger number of students is suggested, in order to allow statistical analyses that confirm the direction of the relationship of these variables.

The Coping with Academic Test Scale data were analyzed at three moments: before, during, and after the test (anticipation, confrontation, and waiting phases), classifying the responses in adaptive coping (Adaptive Coping Subscale = mean score of six coping families – *Self-Confidence, Support-Seeking, Problem-Solving, Information-Seeking, Accommodation, and Negotiation*) and maladaptive coping (mean score of *Delegation, Isolation, Helplessness, Escape, Submission, and Opposition*), as shown in Table 4. Among the 26 participants, two did not answer all the questions of the instrument, which invalidated the data.

Also based on CATS, the coping families most and least used by students in each phase of test anxiety were identified:

**Table 4** Adaptive and maladaptive coping in the three phases of coping with test anxiety by Brazilian undergraduate students ($N = 24$)

| Phases of test anxiety | CATS | | | |
|---|---|---|---|---|
| | Adaptive coping | | Maladaptive coping | |
| | *M* | *SD* | *M* | *SD* |
| Anticipatory phase | 3.43 | ±0.53 | 2.79 | ±0.84 |
| Confrontation phase | 3.22 | ±0.60 | 2.77 | ±1.00 |
| Waiting phase | 3.19 | ±0.73 | 2.75 | ±0.89 |

Note: *CATS* Coping with Academic Test Scale (Gonzaga & Enumo, 2018)

**Table 5** Emotional reactions of Brazilian undergraduate students in the three phases of coping with test anxiety ($n = 24$)

| Phases of test anxiety | CATS | | | | |
|---|---|---|---|---|---|
| | Fear | | Sadness | | Anger |
| | *M* | *DP* | *M* | *DP* | *M DP* |
| Anticipatory phase | 3.9 | ±1.26 | 3.44 | ±1.29 | 2.56 ± 1.42 |
| Confrontation phase | 3.27 | ±1.48 | 2.48 | ±1.40 | 1.72 ± 1.03 |
| Waiting phase | 3.48 | ±1.32 | 3.2 | ±1.17 | 2.2 ± 1.26 |

Note: *CATS* Coping with Academic Test Scale (Gonzaga & Enumo, 2018)

(a) Anticipatory phase: Problem-Solving ($M = 4.24$; $SD = 0.68$) and Information-Seeking ($M = 3.93$; $SD = 0.96$); lowest scores: Delegation ($M = 2$; $SD = 1.16$), Submission ($M = 2.24$; $SD = 1.35$), and Opposition ($M = 2.28$; $SD = 1.38$).
(b) Confrontation phase: Problem-Solving ($M = 3.96$; $SD = 0.94$) and Escape ($M = 3.65$; $SD = 1.61$); less frequent: Delegation ($M = 2.27$; $SD = 1.38$) and Opposition ($M = 2.13$; $SD = 1.52$).
(c) Waiting phase: Escape ($M = 3.93$; $DP = 1.46$) and Problem-Solving ($M = 3.72$; $DP = 1.06$); lower scores: Delegation ($M = 1.86$; $SD = 1.21$), Submission ($M = 2.44$; $SD = 1.35$), and Opposition ($M = 2.24$; $SD = 1.37$).

These data show that the Competence BPN was the most challenged, but also threatened in the context of testing. At the beginning, before the test, students cope with stress in an adaptive way, perceiving the situation as a challenge to their competence. This Competence BPN, however, was also perceived as threatened during the test, so much so that Escape was the second most frequent coping family, after Problem-Solving. These positions were reversed after the test, with Escape predominating. This coping family is composed of behaviors associated with avoidance and is usually associated with emotions such as fear, pessimism, and hopelessness (Ramos et al., 2015).

The Coping with Academic Test Scale also assesses participants' emotional reactions in the three phases, since emotions are also part of the coping process, as defined by the MTC. The emotional reactions assessed by the scale (fear, sadness, and anger) are shown in Table 5.

According to the data obtained, in the three phases of test anxiety assessed by CATS, the emotional reaction most presented by undergraduate students was fear,

especially in the anticipatory phase. This finding is consistent with the literature, as this is one of the main symptoms of general anxiety, and in the case of test anxiety, it is the fear of failure, indicating a perception of threat to the Competence BPN (Skinner & Pitzer, 2013).

Most undergraduate students in this sample showed test anxiety above the mean shown by a Brazilian sample, despite presenting a more adaptive coping in all three phases of the test situation, aimed at Problem-Solving, especially in the anticipatory phase, indicating a self-perception of efficacy, feeling safe and competent. However, during the test, and particularly in the phase of waiting for the results, they reported escape as a frequent strategy.

These results indicate that, despite the predominance of adaptive coping, interventions may be necessary to reduce fear and anxiety related to the assessment situation, as proposed by authors in the field (e.g., Furlan, 2013; Serrano-Pintado & Escolar-Llamazares, 2014), with emphasis on Liu et al. (2021), who indicated interventions in psychological resilience to control test anxiety. Thus, it may be interesting to develop stress and anxiety management workshops for students (e.g., Ramos et al. 2019), helping them to manage such emotional states, using psychoeducational and interventional material, such as the Deck of Cards for Test Anxiety (Gonzaga & Enumo, 2021), a useful and playful resource, empirically based, for students and professionals in the clinical and educational field in Brazil. The literature also points out that intervention programs generally involve the use of techniques to control anxiety and those that seek to develop the subjects' study skills, both demonstrating efficacy in reducing these emotional states (Ramos et al., 2021; Ramos et al., 2018b).

## Concluding Remarks

School life can present many stressful events from its beginning, even afterwards, in high school and university. In this context, test anxiety stands out, which may negatively affect the student, in terms of performance and mental health. How the student copes with the situation, depending on his/her personal and interpersonal resources, coping repertoire, and psychological and academic resilience, can particularly influence academic performance.

It is important to highlight that, in the relationship between emotional states and academic performance, the highest levels of stress do not always occur together with better academic performance, or vice-versa, since the relationship between these variables is not of direct causality, but of multidirectional and reciprocal influences. New research with high school and undergraduate students may contribute to advances in the area, elucidating the relationships between test anxiety, coping, and academic performance.

In situations where the effects of anxiety and stress on test situations are detrimental, interventions are needed to reduce such emotional reactions in students. Therefore, it is possible to foresee a likely benefit for this population in participating in intervention programs specifically aimed at test anxiety.

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