

Test anxiety in school-age children: An examination of a national epidemic

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Abstract

Test anxiety has long been an issue with students, parents and in schools on a global level. Many students are becoming overwhelmed with the increased demands placed on test preparation and test performance. Accountability measures have become a major priority, with school children enduring standardised testing annually from grades 3–8, and once more in high school. This article will explore the many facets of test anxiety, what some schools are doing to try to reduce the anxiety and interventions, so that counsellors can use in their work with students.

Keywords: Test anxiety, schools, children, anxiety.

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1. Prevalence

Test anxiety is a debilitating condition in which an individual becomes so overwhelmed by the pressure of the test resulting in intense physiological, emotional and psychological/cognitive symptoms. Although psychologists acknowledge that test anxiety among school-age children is a prominent issue, estimates of exactly how many students are affected may vary. Most estimates fall in the range of 10%–40% of elementary and middle school students (Segool, Carlson, Goforth, von der Embse & Barterian, 2013; Von der Embse & Hasson, 2012). Some research indicates that these numbers may be higher among minorities (Tempel & Neumann, 2014; Turner, Beidel, Hughes & Turner, 1993). Educational policy of the last two decades has placed a strong emphasis on high-stakes test scores, causing schools to focus on testing and test preparation. With this increased focus on test performance, the prevalence of test anxiety has increased (Van der Embse & Hasson, 2012).

2. Research history

Test anxiety research began in 1914 with a study of urine (Folin, Demis & Smillie, 1914). Previous studies showed that patients in a psychiatric hospital with depression or anxiety had emotional glycosuria or elevated levels of sugar in the urine. Folin et al. (1914) conducted their study to determine if students would have similar levels of sugar before and after important examinations. Of 34 second-year students at Harvard Medical School (all male), one had high sugar levels during both collection periods, and an additional six students had high levels only after the examination. None of the 36 female students from Simmons College had elevated sugar levels before the examination, but six did have higher levels in their urine after testing. With these results, Folin et al. (1914) concluded that ‘pronounced mental and emotional strain may produce temporary glycosuria in man’(p. 519). Mandler and Sarason (1952) published a series of studies on test anxiety and developed the test anxiety questionnaire, the initial tool for assessing the disorder. A few years later, Sarason, Davidson, Lighthall, Waite and Ruebush (1960) developed a tool to assess test anxiety specifically in children, the test anxiety scale for children, highlighting the existence of the disorder in a younger population.

In the 1960s and 1970s, a distinction was formed between anxiety as a transitory state and anxiety as a static personality trait (Spielberger, 1980). The recognition of dimensions within the disorder came to pass in the 1970s, as worry and emotionality terms were coined to define these subcategories. Up until the 1970s, research focused on behavioural causes and interventions for test anxiety. The recognition of a need for cognitive strategies in the 1980s promoted a more effective and comprehensive approach to the disorder. A majority of past research has been conducted with college students. Given the rise in the amount of standardised testing required for kindergarten–12th grade students, researchers are beginning to focus more on younger students’ test anxiety (Larson, El Ramahi, Conn, Estes & Ghibellini, 2010; Segool et al., 2013; Weems et al., 2015; Yeo, Goh & Liem, 2016).

3. Recent influences

The culture of American education has changed dramatically over the past 30 years. Accountability measures have become a major priority with school children enduring standardised testing annually from grades 3–8, and once more in high school, as required by the No Child Left Behind Act (NCLB, NCLB of 2001, P.L. 107–110 C.F.R.). Consequences of failing to meet these standards may lead to a variety of legal sanctions, such as having to offer students tutoring or having to forfeit the school district to the State Department of Education (Von Der Embse, Barterian & Segool, 2013). The American Federation of Teachers (Nelson, 2013) reported that in one Eastern district studied, students in grades 6–11 spent up to 160 hours per school year preparing for and taking standardised tests. In addition to these accountability measures, tests designed to assess specific information related to student learning and needs are also administered annually, often twice per year to measure

growth. Testing measures are used throughout the school year in each academic class as well as in related arts classes.

Recent pushback from parents and educators has been founded on the principle that too much time is devoted to the assessments and preparing for the assessments, detracting from the overall education that students receive (Berliner, 2011; Naithram, 2014; Walker, 2014). This is a valid point, to be certain, but for some students, the testing experience itself is the concern. For these students, enduring a test can be so stressful and anxiety-provoking that it disrupts their ability to function.

4. Risk factors

Reviewing the last 30 years, females consistently score higher on self-reported measures of test anxiety (Hembree, 1988; Lowe, 2015; Rahafar, Maghsudloo, Farhangnia, Vollmer & Randler, 2015). Socioeconomic status appears to have a small negative relationship to test anxiety and negative correlations have been shown between intelligence levels and test anxiety (Hembree, 1988). In a study conducted by Nelson, Lindstrom and Foels (2015), they found that those with higher general intelligence, nonverbal skills and working memory had lower levels of test anxiety. Individuals with learning disabilities and those with behaviour disorders demonstrate elevated levels of test anxiety (Bryan, Sonnefeld & Grabowski, 1983; Dan & Raz, 2015; Nelson et al., 2015), as do adolescents with intellectual disabilities (Poulomee, 2013).

As part of the recently developed biopsychosocial model of test anxiety, Lowe et al. (2008) proposed that there are many etiological factors that contribute to the emergence of test anxiety in children. Zeidner's findings serve as a foundation for this model, as he noted several environmental and experiential factors which have been shown to contribute to test anxiety. Factors identified include biological, socialisation, school environment and past learning experiences. Anxiety is a biological response intended to detect dangerous situations in order for a person to avoid or prepare to respond to the threat. Yet, some people have overactive hazard-detection systems which exaggerate the consequences of threats, such as testing situations. Therefore, some people are genetically predisposed to developing test anxiety.

Some children are socialised into developing test anxiety through early parent-child interactions (Raufelder et al., 2016). Other empirically-based models, like the cognitive-behavioural model, show that test anxiety is influenced by a child's social context, past learning experiences and self-efficacy (Segool, Nathaniel, Mata & Gallant, 2014). Putwain, Woods and Symes (2010) found significant relationships between pressure from parents and worry, test-irrelevant thinking and physiological symptoms of test anxiety. When a child's academic performance does not meet a parent's high expectations, the child internalises the messages that the parent's negative reaction sends. This leads to low self-worth, hostility towards the parent and guilt for harbouring negative feelings. As a result, the child tries to repress these feelings, which leads to anxiety in evaluative situations. Children may have similar reactions to teachers that are strict and hold excessively high standards (Putwain & Best, 2011). Furthermore, test anxiety may develop from a desire to garner praise or prevent censure from parents, teachers and even peers.

Children whose parents do not teach them independent problem-solving skills and coping strategies are more likely to develop test anxiety. Studies have demonstrated a correlation between parent over-involvement and test anxiety (Shadach & Ganor-Miller, 2013). Parents are also likely to foster test anxiety when they inconsistently praise and reprimand a child for the same behaviour. Test anxiety may also be a learned behaviour. Children may learn to be anxious in evaluative situations from their role models (parents, siblings, teachers, peers, etc.) who also exhibit this behaviour (Zeidner, 1998). Research also indicates that children from families with low cohesion and high anxiety may be more likely to experience test anxiety (Peleg-Popko, 2004).

Classrooms that promote competition and test performance often create test anxiety in lower performing students. The students focus on their failures rather than completing assignments to the best of their ability. Students that report being anxious during tests also report an excess of punishment, unrealistic expectations and lack of support from their teachers. Other classroom factors associated with test anxiety are social comparison and ability grouping. Such comparisons cause children to form negative self-images which trigger test anxiety that leads to poor test performances and the cycle begins again. This cyclical pattern of failure further reinforces test anxiety. If effective interventions are not implemented to stop repeated failures in early elementary grades, the increasing pressure of high-stakes testing will result in heightened test anxiety in struggling students (Segool, Carlson, Goforth, Von Der Embse & Barterian, 2013).

5. Components of the disorder

Test anxiety is currently recognised as having multiple components: Physical, emotional and psychological/cognitive. The physical component involves reactions of the body similar to those seen in other forms of acute anxiety, including stomach discomfort or pain, increased respiration, muscle tension, increased heart rate and dry mouth. Emotional reactions include fear or panic, despair and feelings of intense frustration. Psychological and cognitive aspects of test anxiety include irrational thoughts, difficulty in concentrating and negative thought patterns.

While normal levels of anxiety can produce a performance-enhancing effect, test anxiety has the opposite outcome. Those experiencing test anxiety report *shutting down* and being unable to concentrate or recall previously learned material, increasing the likelihood of errors. A study by Owens, Stevenson, Hadwin and Norgate (2014) found that this shutting down phenomenon could be due to the worry aspect of test anxiety temporarily blocking working memory processes. This prevents students from being able to store and use information efficiently while testing and learning. Tymms and Merrell (2007) found that students approaching the Standardized Assessment Tests in England showed diminished learning ability because of their anxiety. Test anxiety has also been implicated in diminished effective immune system functioning (Satsangi & Begum, 2016).

Outcomes for these students are also affected in several areas. Students with test anxiety are more likely to be retained (Beidel & Turner, 1988) and are more likely to drop out prior to graduation (Lowe et al., 2008). These individuals are also more likely to suffer from generalised anxiety, depression, suicide and feelings of hopelessness (King, Mietz, Tinney & Ollendick, 1995; Weems et al. 2015).

6. Sources of anxiety

The sources of test anxiety vary. External sources include pressure placed on students by parents whose goal of academic success for their child may lead them to inflate the importance of test scores, promoting the idea that the student's performance is tied to their worth (Shadach & Ganor-Miller, 2013). Teachers may also put excessive pressure on students to perform. Teacher evaluations and compensation are often tied to the performance of their students. This type of pressure has a trickle-down effect, and can often be traced to those in higher authority at the district and state level (Au, 2011; Ravitch, 2010; Shea & Ceprano, 2013).

Peer pressure can be a third source of external stressors related to test performance. Students in high-achieving settings may compare their scores, lauding those who perform well and mocking those who do not. Peer-to-peer relations have been demonstrated to affect students' levels of test anxiety (Malone & Bertsch, 2016). Internal sources of test anxiety can have an equally detrimental effect. Students with negative affect, or low self-confidence, are much more likely to experience test anxiety that leads to poor academic performance (Owens, Stevenson & Hadwin, 2012).

7. Assessment of test anxiety

In order to effectively implement interventions in those with test anxiety, it is essential to accurately assess the condition. Until recently, measures have been limited to assessing only one or two dimensions of the anxiety or targeted a specific age group within childhood or adolescence. The Spielberger (1980) test anxiety inventory addressed only worry and emotionality. The Westside test anxiety scale (2007) assesses only worry and performance impairments. The Alpert and Haber (1960) 10 item Debilitative anxiety scale looked solely at anxiety performance impairments. Additionally, past assessments have focused exclusively on the experiences of the individual during a testing situation. It is recognised that different stages of test anxiety exist (Lotz & Sparfeldt, 2017) and these stages differ in both their characteristics and effective coping skills (Raffety, Smith & Ptacek, 1997). It is necessary that assessment practices reflect this understanding and glean relevant information on the individual's functioning during each of these stages.

In recent years, new instruments have sought to correct these lapses. The Test Anxiety Inventory for Children and Adolescents, or TAICA, emerged in 2004. This assessment is a 45 item, self-reported measure which consists of four test anxiety subscales. Cognition obstruction/inattention focuses on the distraction and inability to focus on tasks resulting from anxiety. The physiological hyperarousal subtest addresses physical symptoms of anxiety the individual experiences. Social humiliation seeks to identify fears of negative perceptions of others related to testing. The worry subtest highlights the concerns an individual has in related to testing. A performance enhancement/facilitation anxiety scale identifies the level to which test anxiety may support performance in testing. A lie scale addresses beliefs about *ideal test behaviour* and *ideal test performance* (Lowe et al., 2008).

The Emotional Regulation during Test-taking scale focuses on regulation of affect during testing (Schutz, Distefano, Benson & Davis, 2004). This assessment delineates four dimensions of emotional regulation, including cognitive appraising procedures, task-focusing processes, regaining task-focusing processes and emotion-focusing processes. Cognitive appraisal procedures address goal congruence, agency and testing problem efficacy. Task-focusing processes include an individual's ability to focus on the test items and regaining task-focusing procedures include the ability to reduce tension and reappraisal methods. Emotion-focusing processes include processes such as wishful thinking and self-blame.

Computer-based assessments have become more sought after since the recent boom in technology in the fields of education and psychology. Computerised adaptive testing (CAT) is an assessment tool that evaluates students' trait level and tailors test questions to particular trait items to keep students challenged while taking tests (Chang, 2015). While this seems like a great improvement for academia as a whole, this tool fails to accommodate students with test anxiety. Ortner and Casper (2011) explored the effects of test anxiety on academic performance using CAT, and found that students with high test anxiety scored lower compared to their low anxiety counterparts, indicating a potential bias against students with test anxiety. They also found that high test anxiety students scored higher on the fixed item test compared to the CAT test (Ortner & Casper, 2011), another factor indicating that adaptive testing misses the mark on helping those with test anxiety. The current literature indicates a need for more academic-based assessments that can accurately evaluate test anxiety traits from a holistic perspective. This would allow professionals in the field to develop effective computer-based tests that could potentially assist students with test anxiety to succeed in school.

8. Interventions

One common treatment for test anxiety is Beck's (Beck & Alford, 2009) cognitive therapy (CT). CT helps people with depression or anxiety to identify the cognitive patterns that are activated by stress and dominate the person's thinking and behaviour. Once the patterns are identified, they can look at their reactions objectively and learn to reduce them in the future (Beck & Alford, 2009). For people

with test anxiety, CT helps them recognise that failure is not unavoidable and the consequences of the test are not as monumental as they may think (Brown et al., 2011). CT also contains a behavioural component that helps to change focus from past failures and negative experiences to past successes (Beck & Alford, 2009). Some research has indicated that full CT is no more effective than the use of the behavioural aspects alone (Beck & Alford, 2009; Brown et al., 2011). A new alternative to CT is acceptance-based behaviour therapy (ABBT). Instead of teaching people suffering from depression or anxiety to change negative thoughts and emotions, ABBT encourages them to accept these feelings. Although little research currently exists on ABBT, Brown et al. (2011) found it to be more effective than CT at improving test scores.

As students encounter stressful testing situations most often in their classrooms, school-based test anxiety interventions have the potential to be very effective. Weems et al. (2015) found school-based group-administered test anxiety interventions were effective with at-risk students aged 8–17. Third-graders who were taught deep breathing and muscle relaxation techniques at school experienced less test anxiety than their peers in the control group (Larson et al., 2010). Yeo et al. (2016) conducted a four-session intervention with fourth grade students using cognitive-behaviour therapy. They taught the students how to recognise symptoms of test anxiety and use deep breathing and self-talk to reduce them. Furthermore, they taught the students effective study strategies to prepare for important tests. The students demonstrated a significant reduction in test anxiety 2 months after the interventions sessions (Yeo et al., 2016). Therefore, school-based interventions can have long-term benefits for anxious students.

Cognitive-behaviour therapy coupled with psychoeducational instruction was shown to be effective in a study (Weems et al., 2009) in which 73 ninth grade students who were survivors of Hurricane Katrina addressed their test anxiety. Skills-based interventions have been shown to be effective in increasing achievement and reducing test anxiety in students with IEPs, aged 15–19 (Carter et al., 2005). Combined cognitive and skill-based interventions may prove to be effective intervention for most students, as demonstrated in Ergene's (2003) meta-analysis.

Nontraditional approaches have also been successfully utilised in addressing test anxiety. One recent study found that a simple writing exercise allowing students to express their concerns prior to a test which improved performance and relieved anxiety (Ramirez & Beilock, 2011).

Dietary enhancement may have an effect on test anxiety as well. In a 2013 study (Yehuda, Rabinovitz & Mostofsky, 2013), a correlation was demonstrated between the consumption of essential fatty acids and a reduction in test anxiety. The use of biofeedback in Bradley's et al. (2010) study noted a correlation between biofeedback participants and reduced test anxiety.

9. Conclusion

In this era of high-stakes testing, test anxiety has become a significant problem for even the youngest of students. Excessive amounts of instructional time are lost to testing preparation or the assessments themselves. Students from groups who are already at-risk for school difficulty (i.e., low-income, minorities, low-achieving, learning disabled and intellectually disabled) have an increased likelihood of experiencing test anxiety. When these students are faced with assessments that have a tremendous impact on their futures, along with pressure from parents, teachers and peers, they experience overwhelming physical, emotional and psychological symptoms that temporarily impair their cognitive abilities. Many students with test anxiety also have low self-confidence. Their test anxiety can further decrease their self-worth by causing poor academic performance and further psychological problems, such as general anxiety and depression. Therefore, it is essential that educators, counsellors and psychologists remain abreast of current research in the area of test anxiety. To better support our students as they navigate these stress-inducing situations, we must implement evidence-based interventions and preventive measures. Current research has shown school-based cognitive-behavioural and skills-based interventions to be effective in reducing test

anxiety in a wide range of students. When students are able to manage the symptoms of their test anxiety, we can be sure that information gleaned from these assessments is accurate and effective in informing instructional practices and utilisation of resources. Without interventions, students will be unable to maximise their potential. Through ensuring that test anxiety is managed, we promote our student's mental health, essential not only to their academic success but also to their overall progress and wellbeing.

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