



The influence of negative affect on test anxiety and academic performance: An examination of the tripartite model of emotions



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ABSTRACT

Background: Investigating the role of positive and negative emotions within the context of test anxiety and test performance is a growing field of research.

Aim: Based on the tripartite model of emotions (TME), this study tested the hypothesis that higher tendencies to experience negative affect and physiological hyperarousal would predict higher levels of test anxiety, while the experience of positive affect would not influence test anxiety. The present study also explored whether the broadly defined dimensions of the tripartite model are useful for predicting educational outcomes.

Sample: One hundred and eighty-eight secondary school students (aged 16–19) were recruited in a prospective design study.

Method: Participants completed self-reported measures of the variables of interest. Structural equation modelling was employed to examine the relationships among these variables, and evaluate whether these relationships are consistent with the TME.

Results: The findings were partly consistent with the TME, in particular, negative affect contributed to greater levels of test-specific worries, such as the personal and social consequences of failing. Such worries, in turn, directly impaired test performance, while the influence of negative affect on test performance was mediated by test anxiety.

Conclusions: The general construct of negative emotions appeared to be too broad for its influence to be detected, while more specific constructs such as the factors of test anxiety were useful predictors of test performance. The facilitative role of test anxiety was also identified, insofar as emotional apprehension or tension in the absence of intrusive cognitive worries had a positive influence on test performance.

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1. Introduction

The experience of test anxiety in academic examinations has been well researched throughout the past seven decades, but the investigation into the effects of a broader range of emotions on learning has only recently gained momentum. Despite the overlap between test anxiety and broader negative emotions, they are often examined separately, and there has been limited theoretical development in combining these two fields of research. Instead, both areas of research have become increasingly specific in identifying the different factors that influence learning and performance.

Since Liebert and Morris (1967) distinguished between the *worry* and *emotionality* components of test anxiety, a long line of scholars have subsequently expanded on the distinction between the cognitive and physiological dimensions (e.g., Friedman & Bendas-Jacob, 1997; Hodapp & Benson, 1997; Sarason, 1984). For example, Friedman and

Bendas-Jacob (1997) argued that fear of failure was essentially a fear of derogation of one's self-image or self-efficacy, thus separating socially-based worries from the construct of social derogation. The concept of cognitive interference or obstruction has also been acknowledged as being part of test anxiety, whereby intrusive worrying thoughts take attention away from task-oriented cognitions (Friedman & Bendas-Jacob, 1997; Lowe & Lee, 2008; Sarason, 1984; Wine, 1980).

Much of the literature has found that the cognitive factors, such as worries about potential failure and its consequences, feeling unprepared for the test, and having self-oriented doubts over one's own capabilities, are related to poorer test performance, while physiological factors such as increased heart rate, stomach aches, and dizziness are not (Chapell et al., 2005; Deffenbacher, 1980; Hembree, 1988). However, the magnitude of the relationship between test anxiety and academic performance appears to be small, with studies typically demonstrating that test anxiety accounts for approximately 5–10% of the variance in exam grades (Cassady & Johnson, 2002; Chapell et al., 2005; Gregor, 2005; Hunsley, 1985; Karatas, Alci, & Aydin, 2013; Musch & Bröder, 1999). Hence, it soon became evident that test anxiety is only one of many emotional experiences that influence performance outcomes.

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Recent developments in test anxiety research have explored the role of other factors that may mediate the relationship between test anxiety and performance, such as impairment of working memory during preparation for an exam, which in turn reduces the cognitive resources available to perform a task (e.g., Derakshan & Eysenck, 2009; Eysenck & Calvo, 1992; Owens, Stevenson, Hadwin, & Norgate, 2012). Other factors that have also been identified to play a role in mediating the influence on performance include the students' achievement goals and motivation (Pekrun, Cusack, Murayama, Elliot, & Thomas, 2014; Putwain, Woods, & Symes, 2010), procrastination (Cassady & Johnson, 2002), coping style and resilience to academic stress (Putwain & Daly, 2013; Struthers, Perry, & Menec, 2000). Therefore, there are many ways in which test anxiety is linked to broader emotional variables in influencing learning and performance.

Test anxiety is also highly co-morbid with other forms of specific anxiety, general trait anxiety, and depression, all of which have been demonstrated to negatively influence academic performance as well. For example, individuals with higher test anxiety have endorsed more depressive symptoms and more hopelessness compared to less test-anxious peers (King, Mietz, Tinney, & Ollendick, 1995; Warren, Ollendick, & King, 1996). In terms of anxiety, Herzer, Wendt, and Hamm (2014) found large effect size differences in that those with high levels of test anxiety also had higher levels of trait anxiety and social fears compared to less test-anxious peers. Zettle and Raines (2000) also identified around 70% co-morbidity of test or maths anxiety with trait anxiety, consistent with other findings that suggest general trait anxiety serves as a precursor to the experience of test anxiety for children and adolescents (Beidel, Turner, & Trager, 1994; King et al., 1995).

The tools commonly used to measure depression and anxiety in test anxiety research often lack discriminant validity, in that they simultaneously capture both depression and anxiety (see Klein, Dougherty, & Olino, 2005; Seligman, Ollendick, Langley, & Baldacci, 2004; Silverman & Ollendick, 2005, for a review). Therefore, some researchers consider that many studies may have actually captured a broader construct of emotional distress, or *negative affect* (Ollendick, Seligman, Goza, Byrd, & Singh, 2003). Given the substantial body of research demonstrating how depression and anxiety are associated with poorer academic outcomes (e.g., Fletcher, Lovatt, & Baldry, 1997; Fröjd et al., 2008; Hysenbegasi, Hass, & Rowland, 2005; Lazaratou, Dikeos, Anagnostopoulos, & Soldatos, 2010; Owens et al., 2012; Van Ameringen, Mancini, & Farvolden, 2003), the question arises as to whether the identified relationship between test anxiety and test performance is better explained by co-morbid depression and anxiety, or even a global factor of emotional distress. This raises the need for a more encompassing theoretical perspective that considers both specific anxiety towards tests as well as broader, non-specific emotional experiences, such as negative affect.

Negative affect is described in the tripartite model of emotions (TME; Clark & Watson, 1991) to be a dispositional emotional distress factor that is common to both depression and anxiety (Ellard, Fairholme, Boisseau, Farchione, & Barlow, 2010; Wilamowska et al., 2010). The TME also proposed two other higher-order factors of *positive affect* (or lack thereof) and *physiological hyperarousal*, which serve as the distinctive predisposing factors for depression and anxiety, respectively (Clark & Watson, 1991). There is extensive research into the role of the tripartite dimensions as precursors to depressive and anxiety disorders in children and adults (Chorpita & Daleiden, 2002; Cook, Orvaschel, Simco, Hersen, & Joiner, 2004; Jacques & Mash, 2004; Joiner & Lonigan, 2000; Teachman, Siedlecki, & Magee, 2007). However, recent research has highlighted that the model does not apply consistently across all anxiety symptoms due to the heterogeneity among different anxiety disorders (De Bolle & de Fruyt, 2010; Watson, 2008). For example, physiological hyperarousal may be particularly specific to panic disorder but not to other types of anxiety (e.g., Kring, Person, & Thomas, 2007). Low positive affect, while initially proposed to only influence depression, may also influence the development of social phobia (Anderson, Veed, Inderbitzen-Nolan, & Hansen, 2010; Hughes &

Kendall, 2009). As such, the relationship between the tripartite dimensions and the experience of test anxiety remains unclear.

The tripartite factors have been identified to influence various psychological and educational outcomes (e.g., Anderman, 1999; Lonigan, Phillips, & Hooe, 2003; Owens et al., 2012). Recently, Rogaten and Moneta (2016) found positive affect, along with prior academic performance, directly predicted future performance. This follows earlier studies that highlighted the importance of feeling enjoyment during learning in promoting better academic performance (Pekrun, 2006; Rogaten, Moneta, & Spada, 2013). Conversely, a study by Owens et al. (2012) with 80 young adolescents concluded that negative affect may have an indirect negative influence on academic performance. However, this finding was inferred based on measures of depression and anxiety rather than a specific measure of negative affect. Other studies have examined how emotional states interact with cognitive appraisal processes to influence an individual's motivation and behaviours towards learning and their performance (Pekrun, Frenzel, Goetz, & Perry, 2007; Pekrun et al., 2014).

Given that the influence of the tripartite factors across different types of anxiety remains to be tested, the present study aimed to examine whether the tripartite model is applicable to test anxiety. Specifically, it was hypothesised that the general distress factors of negative affect and physiological hyperarousal would influence test anxiety, while positive affect would not. In contrast to previous studies, the tripartite factors were measured specifically and separately from specific test anxiety symptoms, so that the influence of these emotional distress factors may be examined independently. Subsequent to this, it was hypothesised that negative affect and physiological hyperarousal would have indirect effects on test performance which were mediated by the factors of test anxiety.

2. Method

2.1. Participants

The present study is part of a larger study into the relationships between emotional experiences related to test anxiety, involving a total sample of 642 participants. A subsample of 188 participants gave consent for their examination results to be used for this study to investigate the influence of emotions in predicting academic performance. Between-group analyses indicated that this subsample of 188 did not differ from the rest of the larger sample on any of the tripartite factors or test anxiety variables.

Participants were 188 senior high school students recruited from five high schools in the North Island of New Zealand. Participants were required to be 16 years of age or older and in Year 12 or 13, the final two years of their secondary education, because most had experienced external examinations in the previous school year and were more likely to be aware of their level of test-taking anxiety. The sample had an average age of 16.80 years ($SD = 0.72$, range 16–19), consisting of 59 (31%) males and 129 (69%) females. The majority of participants identified themselves as New Zealand European (78%), while the other main ethnic groups were Asian (10%), Māori (6%, the indigenous people of New Zealand), and Pacific Islander (3%). The study was approved by the Massey University Human Ethics Committee (MUHEC Northern, Application 10/035R) and was conducted in accordance with the Committee's code of ethical conduct in research with human participants.

2.2. Measures

2.2.1. Affect and Arousal Scale (AFARS; Chorpita, Daleiden, Moffitt, Yim, & Umemoto, 2000)

The AFARS is a 27-item measure that assesses the three factors in the tripartite model, which are the predictor variables in the current study. A particular feature of the AFARS is that its items were defined to assess

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