



Stress overload as a red flag for freshman failure and attrition

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ABSTRACT

Freshman attrition is a major concern for universities, prompting research to identify red flags for academic failure. Stress might be one such signal, but universities have not incorporated it into predictive algorithms. It was hypothesized that “stress overload”, the destructive form of stress described in theories, would (1) predict grades and attrition as well as traditional algorithm variables, and (2) explain minority disparities in grades and attrition. The Stress Overload Scale (SOS) was tested for the first time as a predictor in two studies using different samples from the same cohort of freshmen entering a large public university. The first study ($n = 569$), conducted during the first semester, showed stress overload to predict term GPA better than most traditional predictors. Also, because SOS means differed and the SOS-GPA correlation was invariant across minority and white students, stress overload partially accounted for grade disparities. A second study ($n = 584$) in the second semester showed stress overload to remain among the best predictors of term GPA. However, no variable except GPA predicted attrition. Moreover, SOS means were now comparable for minority and white students, and because its association with GPA remained invariant, the SOS could no longer explain grade disparities. Together, results indicated that stress overload is a red flag for poor grades for all freshmen (minority and white) across their first year, but by the second semester, those grades become more proximal predictors of attrition. Possible reasons for these findings, and their implications for using the SOS in predictive algorithms, are discussed.

1. Introduction

Despite the efforts of universities to reverse the trend, student attrition continues to be a concern (Noble, Flynn, Lee & Hilton, 2007). An alarming number of students, reported to be one in three (U.S. News & World Report, 2015), drop out of college within the first year. And the loss is even more dramatic among minority students (U.S. Department of Education, 2013). One proposed solution was to develop an “early warning system” to better identify at-risk students (Beck & Davidson, 2001), and much research has been directed at determining which characteristics are most predictive of failure and attrition (Richardson, Abraham & Bond, 2012).

Stress has been identified as one red flag for academic failure (Daugherty & Lane, 1999; Vaez & Laflamme, 2008). Yet, despite calls for the inclusion of more psychosocial variables in predictive algorithms (Kahn, Nauta, Gailbreath, Tipps & Chartrand, 2002), few universities include stress in their student assessments (Peterson & Augustine, 2000). This may be due to problems in obtaining accurate readings of stress, which is more difficult to assess than traditional predictors like high-school GPA. In fact, most popular stress measures are detached from theory and psychometrically limited (Amirkhan,

2012). The current research utilizes a new measure of “stress overload”, the destructive form of stress identified by stress theories, which has demonstrated validity in predicting health problems (Amirkhan, Urizar & Clark, 2015). Here, its utility as a predictor of academic problems in freshmen at a large public university is tested vis-à-vis the variables typically used in university algorithms.

2. Literature review

2.1. Predicting student failure

There is a large literature devoted to the identification of warning signs for student failure (see Reason, 2009; Richardson, et al., 2012). For the most part, this research has focused on demographic (e.g., gender) and background variables, both historical (e.g., parents' education) and contemporary (e.g., unit load). Of these “traditional” predictors, Murtaugh, Burns and Schuster (1999) identified age, ethnicity, resident status, high-school GPA (HS GPA) and first-term GPA as having predictive value, and offered a multi-variable algorithm for assessing a student's likelihood of dropping out. Other researchers proposed formulae of their own; for example, Fike and Fike (2008) presented a

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multivariate model for predicting community college attrition that included factors such as unit load, parent education level, and financial aid.

Among the traditional predictors, it would seem that ethnicity should be particularly useful, given the persistently disproportionate attrition rate of minority students (Seidman, 2005; U.S. Department of Education, 2013). Yet ethnicity variables have been inconsistent in the prediction of academic performance. As a component of algorithms, researchers have found them to sometimes predict grades and attrition (Fike & Fike, 2008; Noble et al., 2007; Toven-Lindsey, Levis-Fitzgerald, Barber & Hasson, 2015), and sometimes not (D'Amico & Dika, 2013; Friedman & Mandel, 2009). As moderator variables, researchers have found them to sometimes affect the predictive power of algorithms (Schmitt et al., 2009), and sometimes not (Wei, Ku, & Liao, 2011). Moreover, when moderators, they sometimes show algorithms to work better among minority students (Zea, Reisen, Beil & Caplan, 1997; Young, Johnson, Hawthorne & Pugh, 2011), and other times worse (Alkhasawneh & Hargraves, 2014). It may be that such variables, which typically dichotomize students according to minority vs. non-minority status, collapse the variability across and within ethnic groups (Decuir-Gunby & Schutz, 2014). It may be, too, that ethnicity is complexly intertwined with other demographics, and whether it emerges as statistically significant depends upon the other variables in the model (Reason, 2009).

Even an algorithm comprised of the best traditional predictors, however, would likely be enhanced by the addition of psychosocial variables (Robbins et al., 2004). Several researchers have shown psychosocial variables to match traditional variables in predictive power (Friedman & Mandel, 2009; Richardson et al., 2012). Psychological test scores, for example, were found to predict freshman grades and retention even after controlling for traditional predictors (Kahn et al., 2002). Others have shown psychosocial variables to exceed traditional variables in predictive ability. Among freshmen, an algorithm incorporating predictors such as social support and coping style explained more than twice the variance in grades than one using traditional variables alone (DeBerard, Spielmanns & Julka, 2004). And in a largely freshman sample of college students, traditional variables proved to have *no* statistically significant association with academic performance, while emotional and social factors did (Pritchard & Wilson, 2003).

Of the psychosocial variables, there are indications that stress may be particularly important. Pritchard and Wilson (2003) found it to be a strong correlate of college grades; and although its association with attrition was not statistically significant, they nevertheless concluded, “The ability to deal successfully with the multitude of emotional stresses encountered in college life appeared to be an important factor in student retention” (p. 25). Moreover, there is evidence that minority students bear an additional burden of stress (Cokley, McClain, Enciso & Martinez, 2013), which has been proffered as an explanation for their lower grades (Smedley, Myers & Harrell, 1993). The premise of the current study was that stress, if properly conceptualized and measured, could prove a powerful predictor of poor grades and attrition for all freshmen. In so doing, being a more proximal predictor than ethnicity itself, it could also explain the disparities in those academic outcomes.

2.2. Stress and student failure

The college years in general (Hales, 2009), and the freshman year in particular (Dyson & Renk, 2006; Hicks & Heastie, 2008), are widely considered among the most stressful periods in life. College students report stress to be the primary impediment to academic success (American College Health Association, 2008). And there is evidence that stress negatively impacts grades (Chow, 2007; Leppink, Odlaug, Lust, Christenson, & Grant, 2016) and retention (Vaez & Laflamme, 2008) in college students, and in freshmen specifically (Perrine, 1999; Struthers, Perry & Menec, 2000).

Yet, surprisingly, this evidence is not overwhelming. First, the

number of studies investigating the association between stress and academic performance is limited (Schraml, Perski, Grossi & Makower, 2012), perhaps because the link is seen as a truism. Second, among the studies that have been conducted, some have failed to show any association at all (e.g., Baker, 2003). Third, among the studies that did show an association, there has been ambiguity about the direction of causality, that is, whether stress caused poor grades or vice versa (Schraml et al., 2012). Fourth, it is argued here that past studies have been stymied by incomplete measures of stress, which fail to assess all facets of the theoretical construct of stress overload. A measure specific to stress overload has outperformed other stress scales in predicting health-related dysfunction (Amirkhan, 2012). The purpose of the present study was to determine if it could also improve the prediction of academic “dysfunction”, as well as explain ethnic disparities.

2.3. Stress vs. stress overload

Exposure to the demands of college can produce stress in students, just as exposure to life's demands can evoke stress reactions in any person (Holmes & Rahe, 1967). But according to stress theories, such reactions do not necessarily lead to dysfunction. Selye (1956) first proposed that while any demand can disrupt homeostasis and induce feelings of distress, resources are typically rallied to counter the demand, so that homeostasis is restored and distress dissipates. It is only when one's resources are exhausted that demands become destructive. Subsequent theories differed in focus, but retained this same basic mechanism. For example, McEwen (2000) posited that it is the allostatic, not homeostatic, mechanism that prepares the body to deal with impinging demands; it is when this system is overloaded that disruptions in normal functioning occur. Even theorists who see stress as a psychological rather than physiological phenomenon agree. Lazarus and Folkman (1984) stated that a demand may elicit unpleasant feelings upon recognition, but it is only when that demand is subsequently appraised as exceeding coping resources that it assumes the dimensions of a “threat”. Threat appraisals lead to stress and pathology. Hobfoll (1989), too, argued that demands may feel stressful, but pathogenic stress is typically held at bay by the belief that there are adequate resources. However, when demands are numerous or incessant, resource expenditure may be seen as spiraling out of control, and this perception induces dysfunction.

In sum, theories indicate that stress is neither a unitary nor simple phenomenon. First, there are different forms of stress: Initial feelings of distress vs. an end state disruptive to functioning. Second, the latter form is complexly determined, requiring that a surfeit of demands coincide with a dearth of resources (Cohen, Kessler, & Gordon, 1995). The label “stress overload” has been used to distinguish the destructive from more transitory and benign forms of stress (Amirkhan, 2012; Lunney, 2006). The assumption here was that true stress overload, rather than fleeting stress feelings, would be most predictive of academic dysfunction.

2.4. Stress overload in students

“The literature suggests that stress is a common theme among college students, and when stressful experiences are greater than the coping resources, multiple problems often arise” (Murff, 2005, p. 103). In other words, there appears to be an implicit recognition in the literature that stress overload is a source of student problems, and that both demands and resources must be considered in its calculation. Each of these has been well documented for college students.

2.4.1. Demands

There are new demands experienced during the transition to college by all students, whether in the United States (Ross, Niebling & Heckert, 1999) or other countries (Ji & Zhang, 2011; Vaez & Laflamme, 2008). In a meta-analysis of 40 qualitative studies from around the world, these

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