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Researching academic stress and anxiety in students: some methodological considerations

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Despite a long history of interest in North American and Western European literature, researchers in the UK are only now beginning to turn attention to the issue of academic stress in schoolchildren and how it may affect emotional well-being, health and performance on school assessments. Based on the author’s experiences of designing an extensive research project, this article explores the conceptual and methodological difficulties encountered when designing and conducting research in this area. First, there is a lack of precision in terminology used. The terms 'stress', 'anxiety' and 'worry' are used interchangeably in the literature as if they referred to the same phenomenon, and the domains of 'examination stress' and 'academic stress' are not clearly defined. As a consequence, it is not clear exactly what phenomenon the literature is actually referring to. Second, it is not always clear in the literature what the term 'stress' is referring to. In some cases, it is being used to refer to the properties of a stimulus (e.g. an examination) and in other cases to the subjective experience of distress. Assuming a subjective experience of distress will necessarily follow from a particular stimulus is problematic as it fails to account for the interpretation of that stimulus to the student involved. The much ignored construct of test anxiety may offer some advantages to the researcher by having a clearly defined domain and referent. Third, there is an overwhelming bias in the research towards quantification and ways of 'measuring' stress and anxiety in students. The usefulness of this approach is considered along with the potential advantages of alternative approaches.

Stress, anxiety, schoolwork and examinations in school students

The phenomenon of ‘stress’ (and the associated topics of ‘worry’ and ‘anxiety’) has been studied extensively in the field of psychology since the 1950s and there now exists an extensive literature on the antecedents, mediators and outcomes of stress. In the more specified field of Health Psychology, the relationship between stress and

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illness/disease has now achieved ‘fact’ status (Pollock, 1988). The field of Organisational Psychology has tended to concentrate on the management and reduction of stress in the workplace. Phrases such as ‘burnout’ have become commonplace and one can find plentiful references to stress in the mass media. In recent times, some academics in the UK have turned their attention to the topic of stress in schoolchildren, in particular the stress related to schoolwork itself.

Evidence suggests that academic work and its associated assessments represent a source of considerable worry for secondary school students. For instance, Gallagher and Millar (1996) sampled 3983 students aged 13–18 from Northern Ireland using their 138-item ‘Things I Worry About Scale’. This scale contains a number of dimensions relating to personal and social worries, including home life, school life, money, relationships with the opposite sex and so forth. Results showed six of the top ten ranked worries were related to schoolwork; passing examinations was ranked as the top worry and the consequences of failing examinations for future employment ranked third.

Other research has focused specifically on sources of stress in the school environment only. Kyriacou and Butcher (1993) administered a 30-item questionnaire to 78 Year 11 schoolchildren to examine sources of stress in the school environment as part of a case study. As in the Gallagher and Millar (1996) study, examinations were the most commonly reported source of stress, followed by deadlines for assessed work and revision as second and third most commonly reported sources of stress. The finding that examinations stand out as a particular source of worry and stress for secondary school students has been replicated in samples of students from Australia, South Africa and the republic of Ireland (Jegede et al., 1996; Hodge et al., 1997; Aherne, 2001; Kouzma & Kennedy, 2004).

Connor (2001) has extended the study of academic stress to infant and primary schoolchildren. In a survey of 15 infant and primary schools, 25 children in Key Stages 1 and 2 were identified as showing signs of stress and/or anxiety beyond a typical level.¹ The source of this anxiety is attributed to the Standard Assessment Tasks (SATS). Pressures experienced by teaching staff over target setting and school league table positions are inadvertently passed on to children and the SATS come to assume an importance in their minds as well. A follow-up survey replicated these findings (Connor, 2003) and highlighted the risk that SATS push levels of anxiety in some children beyond what is acceptable or manageable.

A similar interpretation is offered by Hall et al. (2004), who discuss the effects of ‘SATurated’ models of teaching in primary school as limiting the identities and subjective positions available for children. These authors suggest that certain children may be made excessively anxious by the constant reference to SATS, and the associated fear of failure. Connor (2003) concludes that:

> there is a need to recognise that children as young as 7 can experience stress and that, for some children, the SATs can be the source and scene of maladaptive signs and symptoms. (p. 106, emphasis in original)

The research discussed above provides some evidence that schoolchildren of all ages can find examinations a source of stress and worry. It is less clear from this
literature what the potential outcomes of this experience might be. Connor (2001) draws attention to the effects on children’s emotional well-being as the pressure of testing and the associated preparation stifle the development of social skills in children, citing a 1999 Mental Health Foundation report to support this claim. Children’s well-being has been highlighted by the British Educational Research Association as a research priority over the next decade (BERA, 2004) and there is considerable potential for further work in this area.

There is, however, another line of research focusing specifically on the educational and health outcomes of stress, rather than sources of stress and/or worry, using undergraduate samples. For instance, negative health outcomes of examination stress have been reported in terms of cardiovascular functioning (Lowe et al., 2000) and immune system functioning (Vedhara & Nott, 1996). Other research has examined the outcomes of academic stress in terms of performance outcomes; examination or course grades. For instance, Struthers et al. (2000) reported that a higher level of academic stress is related to lower course grades, moderated by coping style in Canadian undergraduate students. Akgun and Ciarrochi (2003) reported a similar finding where the relationship between higher stress and lower grades was moderated by learned resourcefulness in Australian undergraduate students.

It is particularly surprising, given the last outcome, that there is only a single reference in the literature to exploring a construct known as ‘test anxiety’ using samples of students from the UK (cf. Sarnoff et al., 1958). Test anxiety refers to the reactions of students in a variety of testing and assessment contexts, and since the early 1950s a large body of international literature has established the antecedents, correlates of and treatments for test anxiety. Measurement tools have been developed and standardised, individual and group norms established. A robust finding is that highly test anxious students perform worse in a wide variety of assessment contexts than low test anxious students of a similar ability. It could be argued that the importance of the test anxiety construct is principally derived from the effect it has on performance. The interested reader is referred in the first instance to a review paper by McDonald (2001) and for fully comprehensive reading to a book by Zeidner (1998).

The study of stress, anxiety and worry in schoolchildren in relation to their academic work and assessment is clearly one of importance given the potential of detrimental health, emotional and educational outcomes. It is not clear at present, from the existing literature, whether there are any positive or facilitative outcomes. Evidence would seem to suggest that recognition of academic stress in schoolchildren is slowly increasing by both teachers and researchers. An open-ended postal survey of 44 schools in the North-west of England conducted in 2003 revealed eight schools (18%) which had attempted some form of stress management or reduction with students in Key Stage 4 on an ad hoc basis in relation to academic stress. The author’s research in this area is just one of a number of projects in this area being undertaken in the UK at present (Keogh, Bond & Flaxman, 2007; Borrill, 2005).

The focus of this article will be to explore some of the conceptual and methodological difficulties involved in designing and conducting research in this area.
Academic or examination stress, worry or anxiety?

As the research alluded to in this brief introduction has suggested, the work students conduct as part of the normal school curriculum may be viewed as a greater source of stress than other potential concerns. These sources of stress have been grouped together under the general heading of ‘academic stress’. For example, in Connor’s (2001, 2003) surveys, academic stress referred to all of the work conducted in school lessons, the homework and preparation for the SATS as well as the examinations themselves. However, the consensus of this research has been that examinations are considered the most significant source of academic stress. Other research has focused on ‘examination stress’, which as the title suggests, refers specifically to the stress associated with (usually important) examinations. Research examining the debilitating health effects has examined examination rather than academic stress and the research examining the debilitating performance effects has focused on academic stress.

As the domains of academic and examination stress are not clearly defined in the literature, the extent to which these two concepts might overlap is not clear. As examinations refer to a particular type of academic work, examination stress might be seen as a subtype or context-dependent form of academic stress. If this is the case then one could question the extent to which the aversive health outcomes of examination stress would be extrapolated to more general forms of academic stress (coursework or class assignments for instance). As both Connor (2001, 2003) and Hall et al. (2004) highlight, many general classroom activities have become stressful precisely because of their examination focus. It could therefore be questioned whether the debilitating effects of academic stress are largely due to examination stress. Perhaps the differences between academic and educational stress are not as obvious as they might seem.

A closer examination of the measures used to assess academic stress would seem to support this interpretation. For instance, the measure of academic stress used by Struthers et al. (2000) is a 10-point Likert scale asking students to report how ‘worried, helpless and stressed’ they felt about their performance (a final course grade). As examinations form a significant proportion of course grades, to a large extent this measure may have been largely determined by examination rather than academic stress. Similarly, the measure of academic stress used by Agkun and Ciarrochi (2003) contains items relating to examinations. Given the importance of the role of examinations in determining academic stress, it should be properly questioned whether the real focus of attention should be examination rather than academic stress.

A related issue, brought to light by examining the terms used and their different referents, is the way in which the terms ‘stress’, ‘worry’ and ‘anxiety’ are used interchangeably as if they referred to the same thing. For example, despite the emphasis on the term ‘worry’ in the title of Gallagher and Millar’s (1996) paper and their scale used, as the paper develops, the term ‘stress’ is seamlessly introduced as if it has exactly the same referent as ‘worry’. A similar picture is found in the paper on ‘stress’ in Year 11 schoolchildren by Kyriacou and Butcher (1993) where the terms...
‘anxieties’, ‘concerns’ and ‘worries’ are used interchangeably with ‘stress’. Their questionnaire measure used a subjective perception of being ‘nervous’ or ‘upset’ to infer the presence of a stressful stimulus. Struthers et al.’s (2000) measure of stress was students’ reporting how ‘worried, stressed and helpless’ they felt about their performance on a 10-point Likert scale. Connor’s (2001, 2003) paper on stress asked staff to identify ‘significant signs of stress or anxiety’ in children.

The implication is that the presence of ‘stress’ can be inferred from the presence of ‘anxiety’ (or ‘worry’) and vice versa. The referents of these different terms need to be examined to clarify whether they refer to the same or different objects, and what the relation between them might be. Anxiety refers to a subjective experience of fear and apprehension accompanied by a state of physiological arousal where heart rate increases, palms become sweaty and so forth (Eysenck, 1992). Worry and concern specifically refer to the cognitive component of anxiety, the intrusive preoccupying thoughts related to a heightened sense of vulnerability. Anxiety clearly refers to the outcome or effect of a particular stimulus; worry and concern to the cognitive domain of anxiety. Nervousness (as referred to by Kyriacou & Butcher, 1993) would seem to refer to the physiological domain.

When the term ‘stress’ is used interchangeably with ‘anxiety’, ‘worry’ and ‘concern’, the reader is invited to identify stress also as a subjective experiential state, and one dominated primarily by the cognitive domain. Anxiety has acquired a pejorative status, an unpleasant emotional state by definition, possibly resulting from its psychoanalytic associations during the early to mid parts of the last century (Ball, 1995). With the repeated interchange and association of terms in the literature, stress becomes subject to the same association. This is despite the original mechanistic conception of stress in the 1950s as a state of adaptation to environmental pressure (Selye, 1956). This approach, using a metaphor borrowed from physics, implies that adaptation can have either positive or negative outcomes.

The ‘cognitivising’ of stress assumes stress to be a response, or an effect, but as Reber (1995) notes, stress can refer to either a cause or an effect. This issue is explored in greater depth below, but it is sufficient to highlight for the time being that in this respect, the literature briefly reviewed in the introduction is not clear. For instance, in the surveys conducted by Kyriacou and Butcher (1993) and Gallagher and Millar (1996), the presence of worry in students is used to refer to the subjective experience of stress (defining stress as an effect). However, the research goes on to identify referents, academic and otherwise (schoolwork, finding a job, finance, etc.) as representing a cause of stress (i.e. defining stress as a cause). The term stress is then being used for two different referents simultaneously. The reader is invited to infer that the subjective experience of stress will necessarily follow from the presence of stressful stimuli (e.g. examinations) and vice versa.

**What is meant by the use of the word ‘stress’?**

As highlighted above, the phrase ‘stress’ has at least two clear referents. First, it is used to refer to the characteristics of a stimulus or situation which causes stress (e.g.
‘examinations are stressful situations’). Second, it is used to refer to a response; the subjective experience of feeling stress, an emotional state which may be accompanied by feelings of anxiety and or worry (e.g. ‘I worry about failing examinations’). In the first instance stress is being defined as a cause and in the second instance as an effect. In a review of 51 articles from the organisational literature, Jex et al. (1992) identified the phrase ‘stress’ as a cause in 41% of articles, an effect in 22% of articles and as both a cause and effect in 25%. In the remaining 14% it was not clear. Organisational research using the phrase ‘stress’, therefore, lacks a clarity over whether the referent should be the cause or the effect.

This lack of conceptual precision equally applies to the research on academic or educational stress. In some cases, ‘stress’ is clearly referred to as a cause. For instance, in Lowe et al.’s (2000) research, effects on the immune system were compared under examination (stress) and non-examination (non-stress) conditions. It is not clear whether this kind of research seems prepared to accept uncritically that examinations are stressful stimuli in order to examine health effects, or whether examinations can be inferred as stressful from the subsequent presence of negative health outcomes. The latter case involves a kind of post priori reasoning where stimuli are defined as stressful after a negative outcome has occurred. Not being able to specify or predict in advance what might be a stressful or non-stressful stimulus would be a serious drawback of this approach (Pollock, 1988).

As several writers have highlighted (e.g. Pollock, 1988; Vedhara & Nott, 1996) this approach fails to account for the meaning of the stimulus for the person involved. One person may find an examination stressful because of their strong fear of failure, where another person may not. Hence, defining stress in terms of the properties of a stimulus rather than the perceived stress will fail to account for the person’s interpretation of that stimulus. This focus on the interpretation or perception of a stimulus as stressful or not marks a return to the cognitivising of stress highlighted above, positioning stress as the property of particular individuals. Vedhara and Scott (1996) reported no immunological differences between an examination and no-examination conditions, only between perceived stress and no-perceived stress conditions. The assumption that the presence of a stressor will necessarily result in emotional distress is highlighted as misplaced and problematic by these authors.

Defining academic stress in terms of the outcome, or the perception of a stimulus, as the Struthers et al. (2000) and Agkun and Ciarrochi (2003) studies have done, involves inviting students to reflect and report on their experience about their learning and assessment. In the former study the effect on performance was lessened for those with a problem-focused coping style. In the latter study the negative impact of academic stress was moderated by learned resourcefulness, a repertoire of cognitive skills enabling the student to control internal emotions and cognitions which might interfere with performance. As noted earlier, anxiety is one stress outcome, and hence it is no surprise that measures of stress used in these studies invite students to self-report anxiety or worry. However, anxiety is only one of a number of potential psychological outcomes of stress which also include esteem,
perceived efficacy, depression, anger and other forms of negative affect. Defining measures of stress purely in terms of anxiety may only serve to limit knowledge of other important features of the stress response.

The ‘test anxiety’ construct, largely ignored in the UK, may confer several advantages over the ‘stress’ concept. First, as a measure of ‘anxiety’ rather than ‘stress’, it is clearly focused on the stress outcome or reaction to assessments. Unlike ‘stress’, there can be no confusion whether ‘test anxiety’ refers to a stimulus or a response; it is always the response. When conceptualised as a trait, test anxiety is referring to the differences that individual students have in their predisposition to finding examinations anxiety-provoking (Spielberger, 1980). By defining anxiety in this way, the difference in the individual person’s perception of the stimulus is explicitly acknowledged. However, as test anxiety is situation specific, or context defined, there is no problem of multiple sources of stimuli becoming defined as stressful. Second, test anxiety has a clearly mapped out domain, consisting of the worry and emotionality components. ‘Worry’ is defined as the cognitive component, intrusive worrisome thoughts, and ‘Emotionality’ refer to the subjective perception of physiological arousal (heart beating fast, sweaty palms, etc.). It is clear that the terms ‘anxiety’ and ‘worry’ are being used with precision in order to refer to different, though related, phenomena. Although the test anxiety literature has been used almost exclusively for educational aims to study the effects of anxiety on performance, in principle there is no reason why test anxiety could not be used to research outcomes in terms of health or emotional well-being of students.

To measure or not to measure?

The discussion of research in this article has centred largely on the conceptual and definitional issues surrounding academic stress and anxiety. A fundamental characteristic of this research, which has so far gone unquestioned, is the attempt to quantify and measure in some way these concepts. Measurement tools are used, in the form of self-report questionnaires, to quantify students’ experience of stress, anxiety and worry in academic and examination contexts. In some cases the research uses standardised measures, such as the ‘Things I Worry About Scale’ in Gallagher and Millar’s (1996) survey or the ‘Undergraduate Stress Questionnaire’ used in Akgun and Ciarrochi’s (2003) experiment. (Although not discussed in detail in this article, the test anxiety literature also relies heavily on the use of standardised self-report measures.) Other studies such as Kyriacou and Butcher’s (1993) survey have used custom-designed questionnaires for a specific purpose or asked students to report on a Likert scale (Struthers et al., 2000). Connor’s (2001, 2003) surveys represent a minor departure. The frequency of signs and symptoms of stress in children are reported by staff observations, rather than self-reported by the children.

As with the considerable majority of research papers, those discussed here do not provide an explicit justification for either the choice of a quantitative methodology (either experimentation or survey) or the method of data collection (self-report questionnaire, Likert scale or observation frequency). The choice of methodology
and method of data collection seems to flow automatically from the particular research questions posed in each case, encouraging the reader to accept this choice uncritically. Hart (1998) makes the point that over a period of time a modus operandi can develop in particular strands of research where alternative ways of conceptualising research questions, methodologies and research techniques fail to be adequately addressed. An evaluation is required to address the reasons for the dominance of quantitative methodologies and methods in the academic stress literature.

Spielberger and Krasner (1988) have emphasised the practical benefits of self-report questionnaires to measure anxiety. Anxiety is an experiential phenomenon which can therefore be communicated to others (e.g. the researcher) and asking questions in the form of a questionnaire allows for the requirements of group administration and scoring. Jones and Kinman (2001) also note that the ability to collect data from large numbers of people allows the use of complex statistical analyses to reveal trends and relationships which are not immediately obvious, and that self-report questionnaires may be more objective than methods such as interviews and observations which rely on the interpretation of the researchers.

The so-called ‘objective’ status of self-report questionnaires has been questioned from different perspectives by highlighting how respondents are engaged in an active process when completing questionnaires. Different students, for instance, may interpret questions in different ways (Jex et al., 1992). One student might report stress as any factor which puts them under pressure and another won’t report a factor as stressful until it causes them difficulties. In addition, participants with a repressive coping style may be less willing to self-report negative affect and symptoms of stress and/or anxiety (Myers & Vetere, 1997). Repressive coping is an avoidance style of coping characterised by low anxiety and high defensiveness, and self-reports may be particularly unsuitable for this group, who may form up to 20% of the population (Myers, 2000).

Anderson and Strupp (1996) highlight what they refer to as the ‘social ecology’ of self-report questionnaires concerned with reporting emotional or psychological difficulties. The respondent completing a questionnaire is engaged in a process of self-presentation to an imaginary audience, which by virtue of the questionnaire method itself is in an undeniably one-way direction. The awareness of participating in a research study may influence this presentation and certain respondents will be eager to comply from the outset with what they perceive to be the researchers’ expectations. On the part of the respondent, this is not usually too hard to figure out as such questionnaires are written in such a way as to convey an assumption that the respondent will have significant emotional and psychological difficulties to report.

The whole notion of appealing to objectivity at all is revealed as misleading by Sayer (1998), who argues that it is one ‘of the most ambiguous words in the vocabularies of social scientists and philosophers’ (p. 58). Sayer’s (1998) argument is that the word objective is used in at least three ways; objective\textsubscript{1} in the sense of being value-free (subjective being defined as value-laden), objective\textsubscript{2} in the sense of being ‘true’ and objective\textsubscript{3} defined as properties of the object irrespective of the way in which they are thought about (subjectivity defined as characteristics of the subject:...
experience, feeling and behaviour). Jones and Kinman’s (2001) suggestion that questionnaires are objective is proposing that in order to make true statements about the world, these statements must be value-free. In this proposition, objective1 has been confused with objective2.

Sayer (1998) points out that there is no reason why true statements about the world need be value-free, even if we find them unpalatable. As value-ladenness and lack of objectivity2 are independent, objective2 research may be subjective1. There is also a sense in which objective2 and objective3 have also been confused. As noted earlier, self-report questionnaires are used precisely because the participant is able to report their subjective3 experience of stress and anxiety to the researcher. So this represents another way in which it is possible to conduct objective2 research that is subjective3. Indeed, the use of questionnaires relies on this very premise. The methods rejected in Jones and Kinman’s (2001) argument, interviews and observations, may therefore be used to generate objective2 data about the world.

So having considered the usefulness of questionnaires as a method for collecting data from a practical or pragmatic viewpoint, it is also possible to evaluate their usefulness by considering the methodological context in which they are used. The literature briefly reviewed in the introduction of this article is of two types; survey and experimentation. The aim of the survey research is primarily descriptive. In Gallagher and Millar’s (1996) survey, for instance, this was to describe what kinds of events in and out of school students find stressful. In principle, other methods could be used to collect data to fulfil this aim. However, if one of the goals of research is to describe the sources of stress from a large number of participants (1983 in this study), or to generalise results from a representative sample, then the practicalities of administration and analysis favour self-reporting. In short, there is no practical alternative to the self-report questionnaire for dealing with large numbers of participants.

The aim of experimental research is explanatory. In Struthers et al.’s (2000) experiment, for instance, this was to find out if academic stress can cause lower performance in examinations. In this case, measurement is used to fulfil the basic successionist criteria of causality; causality inferred on the basis of regularities among sequences of events. For example, it if is shown in a sufficient number of cases that students who experience high academic stress also have low examination marks, all things being equal, academic stress can be identified as a cause of low examination performance. This type of methodology does not necessarily preclude alternative methods of data collection such as observations or interviews. However, if such methods are used then data must be quantified for the purposes of statistical analysis.

For instance, Wine (1979) used the process of observation as a method of data collection in an experiment to assess the impact of test anxiety on a range of classroom behaviours of 8–9 year-olds. The observations were collected as frequencies rather than descriptions of certain classroom behaviours, such as communicating with the teacher, communicating with other students and so forth. Similarly, techniques such as content analysis can be used to quantify the data from interviews, which could then be used for the purposes of experimentation.
Experiments do not require self-reports as a method per se, they require quantification. Where the phenomenon that requires quantification is a subjective experience, the ease of group administration and scoring again favours the self-report questionnaire.

Experiments and surveys continue in the tradition of a positivist epistemology, which has come under sustained attack from post-structuralist positions. This type of criticism can be seen in Pollock’s (1988) argument that the concept of stress itself is an unwitting invention of the social scientists of the last 60 years or so. Adopting a sceptical stance on the reality claims of the stress and illness discourse, he suggests that the cognitivised version of stress has only gone unquestioned in Health Psychology so long as it so neatly reproduces a Rooseveltian liberal-individual cultural agenda in North America. The echoes of this type of argument for the field of examination stress would be remarkably similar, diverting attention away from socio-political context and function of school assessment with individualised discourses of achievement. As Sayer (1998) notes, the typical reaction from positivist researchers has been to ignore rather than engage with these arguments.

Sayer (1998) promotes a kind of third way between these two extremes of what he refers to as ‘naïve positivism’ and ‘defeatist post-modernism’, in a critical realist epistemology. This presents a significant challenge to both extremes by accepting the need to identify causal phenomena as a central tenet of social science alongside the need for an interpretative dimension. The irony is that as discourse analysts like to claim, discourses have effects, or in other words, are causal. Critical realism does not involve dispensing with measurement in favour of non-measurement, but does involve a rejection of the successionist view of causality. As Sayer (1998) says:

What causes something to happen is nothing to do with the number of times we have observed it happening. Explanation depends on identifying causal mechanisms and how they work and discovering if they have been activated and under what conditions. (p. 14)

This argument has clear implications for the choice of methodology and method used to research examination stress and anxiety in students. Sayer’s (1998) argument is suggesting that the notions under which measurement is used may have been misplaced. The power of academic stress to cause illness, or lower academic performance, will only occur under certain conditions related to the school, child, subject, examination room and so forth. The essence of explanation should be to identify causal mechanisms, how they work, if they have been activated and under what conditions. This critical realist model of causality does not rule out the use of experiments, or self-reports, but opens the way for alternative research strategies to contribute to the understanding of academic stress and anxiety. This is a theme reiterated in a recent paper by Nash (2005) in the context of poverty and educational attainment.

Experiments work most efficiently in ‘closed systems’ of research producing consistent regularities; the object possessing causal power is stable and the external conditions are constant. The real-life world of schools, examinations and stress is a very different place. In such an ‘open system’ of research, the causal power of
examination stress is situated within a specific spatial context (schools, classrooms, examination halls, etc.) and in a specific temporal context (during assessments and examinations). Experiments can research these phenomena by stabilising these contexts, although this does not happen naturally. An alternative approach would be to use a research strategy more suited to open systems of research.

Qualitative approaches to research offer a degree of flexibility sensitive to the changing context of open-systems research. An example of this type of approach can be seen in the work of Aherne (2001), who examined sources of stress in Irish students aged 17–22 via a series of interviews. These interviews were analysed using principles of grounded theory to identify three principal patterns: over-identification with academic success (similar to academic/examination stress), social inadequacy, and conflict with parents. This type of approach provides a contrast to the survey-based approaches of identifying student stress, demonstrating the viability of qualitative approaches to a similar research question. There is considerable scope in developing this type of approach to research the more complex and subtle aspects of academic stress.

The measurement-based approaches of experimental and survey research undoubtedly have an important place in researching academic stress and anxiety, but there is also considerable benefit to be gained from the use of alternative research strategies in the open systems of schools. Non-measurement-based qualitative methodologies and ways of analysing data should not be rejected as subjective, as Sayer's (1998) argument has exposed them as no more subjective than self-report questionnaires. In a critical realist epistemology such methodologies can even be used to identify causal mechanisms, traditionally the realm of experiments, in the open systems unsuited to experimental research. Although existing literature has followed the measurement route, future research should not be constrained out of uncritical acceptance of objectivity and causality.

Conclusion

There is considerable future research potential in researching academic stress in the educational contexts offered in the UK, particularly its potential role in detrimental health, educational and emotional outcomes. Existing research has been limited by a lack of precision over (1) whether the subject of investigation should be ‘academic’ or ‘examination’ stress, (2) the use of terms with different meanings (‘academic’ or ‘examination’, ‘stress’, ‘anxiety’ or ‘worry’), and (3) whether stress is referring to a cause or an effect. Future research could solve many of these problems by providing more clearly defined domains, definitions and referents. However, serious consideration should be given to the test anxiety construct as many of the context, domain and definitional issues have already been extensively researched, albeit not in the UK literature. Serious consideration should also be given to qualitative research strategies, especially appropriate for investigating academic stress in the open system of schools. By employing these methodologies in a critical realist framework such methods need not be rejected as subjective or unable to elicit causality.
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Notes

1. Students in Key Stage 1 are aged 5–7 years (school years 1 and 2) and students in Key Stage 2 are aged 7–11 years (school years 3, 4, 5 and 6). The end of each Key Stage is followed by a National Curriculum test referred to as a Standard Assessment Task.

2. Students in Key Stage 4 are aged 14–16 years (school years 10 and 11). The end of Key Stage 4 is followed by a school leaving certificate, the General Certificate of Secondary Education, or equivalent (e.g. General National Vocational Qualification).

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