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The power of positive emotions? The link between young people's positive and negative affect and performance in high-stakes examinations

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ABSTRACT

A substantial body of research suggests that young people's emotions – both positive and negative – are linked to a wide range of future outcomes. This paper contributes to this literature by investigating the link between young people's positive and negative emotions and their performance in high-stakes examinations. Using Programme for International Student Assessment (PISA) data from England linked to the National Pupil Database (NPD), I investigate how 15-year-olds positive affect, negative affect and fear of failure is associated with the grades they achieve in high-stakes examinations. I find that low levels of positive affect – i.e. pupils rarely feeling happy, lively and cheerful – is associated with a 0.10–0.15 standard deviation reduction in young people's examination grades. On the other hand, little evidence is found of a substantive link between negative affect or fear of failure and examination performance.

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Introduction

Over the last decade there has been a sharp rise in mental health issues affecting children across the western world (Burns & Gottschalk, 2019; Twenge et al., 2019). Around one-in-twenty teenagers now report that they always feel miserable – with one-in-twelve saying that they never or rarely feel happy – across industrialised countries (author's calculations using the PISA 2018 database). Low-levels of wellbeing have emerged as a particular challenge facing adolescents in England – the empirical setting for this paper. Indeed, recent evidence suggests that young people in this country are less happy – and have lower overall levels of life-satisfaction – than their peers in almost all other developed nations (OECD, 2019). Wellbeing, mental health and young people's overall emotional state has consequently become a major policy issue (Parkin, 2016, 2020), with increasing emphasis placed on teachers and schools to provide yet more support for the emotional development of pupils.

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 Supplemental data for this article can be accessed [here](#)

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Importantly, the emotional state of young people during their formative years can have long-lasting implications for their development and later lifetime outcomes (Fletcher, 2013). A substantial body of work from the positive psychology literature argues that happier individuals tend to be more successful in life (Lyubomirsky et al., 2005). At the same time, work across the medical and social sciences has illustrated how negative emotions – such as frequently feeling miserable, anxious, scared or depressed – has a long-lasting negative impact upon an individual’s labour market status and health (McLeod et al., 2016).

An important body of work on this topic has also emerged within the education literature, with various scholars studying how positive and negative emotions may influence the academic progress young people make during their time at school. Pekrun et al. (2017) found positive emotions to be positively associated with subsequent achievement, while negative emotions negatively predicted achievement. This is consistent with the work of Rogaten and Moneta (2017) who found positive affect to be ‘*the strongest and sole psychological and direct predictor of students’ academic performance*’. Likewise, analysing data from a large sample of university undergraduates, Mega, Ronconi and De Beni (2014) concluded that ‘*students’ emotions influence their self-regulated learning and their motivation, and these, in turn, affect academic achievement*’. Such work has been picked up by the OECD (OECD, 2019), who have consequently claimed that ‘*positive affect is positively associated with motivation, self-efficacy and engagement at school, and indirectly with academic achievement*’. On the other hand, in the United States, Nickerson et al. (2011) find that positive emotions are *negatively* related to most objective measures of academic success. Relatedly, while Lewis et al (2009) found positive emotions to be related to school satisfaction and engagement, they were not predictive of students’ grades. Interestingly, Chin et al. (2017) suggest that the general construct of negative emotions is too broad for its influence to be detected upon academic performance. However, they also indicate that more specific constructs – particularly those related to test anxiety – are useful predictors of future test scores. This is consistent with a wide body of related work on the academic consequences of feeling anxious about upcoming tests (Howard, 2020; Von der Embse et al., 2018). Nevertheless, outside the specific realm of test anxiety, existing evidence of a relationship between young people’s emotions and their academic achievement remains mixed, particularly with respect to the role played by positive affect.

Although insightful, some clear gaps within the aforementioned evidence remain. First, with the exception of a sizeable literature specifically focused upon test anxiety, few existing studies have explicitly investigated the relationship between teenagers’ emotions and their performance in high-stakes examinations. This is despite the grades young people achieve on such examinations having long-lasting material consequences for their future (Machin et al., 2020). These examinations also often take place at an age when young people experience negative emotions and low levels of wellbeing (e.g. at age 15/16 in the case of England). Second, there is a particular dearth of evidence on this matter in England. This is despite England having a particularly large number of young people experiencing negative emotions at a time when they are taking high-stakes examinations – making it an ideal setting to conduct such research. Third, relatively few studies have investigated the link between emotions and academic outcomes using large-scale, longitudinal, nationally representative data.

The aim of this paper is to add new evidence on this matter to the existing evidence base. Specifically, I use PISA 2018 data from England linked to administrative records to explore how the positive and negative emotions expressed by 15/16-year-olds (as measured using short versions of the Positive and Negative Affect Scale for Children – Ebesutani et al., 2012 – and the Performance Failure Appraisal Inventory –; Conroy et al., 2002) are related to the grades they achieve in England’s high-stakes GCSE examinations.

Background and research questions

Although related, positive and negative emotions (or ‘affect’) are distinct psychological constructs (Tran, 2013). Both are thought to be independently associated with young people’s academic achievement. This section provides a brief overview of the background underpinning the literature on positive and negative affect, and why such emotions may be linked to young people’s performance in high-stakes examinations.

Positive affect and academic achievement

The ‘broaden and build’ theory of Fredrickson (2001), situated within the field of positive psychology, provides an overarching framework motivating a link between the positivity of young people’s emotions and their performance in high-stakes tests. In particular, the broaden and build theory suggests that positive emotions ‘*broaden people’s momentary thought-action repertoires and build their enduring personal resources ranging from physical and intellectual resources to social and psychological resources*’. Take the positive emotion of joy, for example. The broaden and build theory suggests that this emotion creates an urge to play, leading individuals to push boundaries and to be creative. Likewise, pride – another positive emotion that is a central component of positive affect – ‘*broadens by creating the urge to share news of the achievement with others and to envision even greater achievements in the future*’. Thus, critically, positive emotions are thought to lead individuals to have a broad mindset. This, in turn, allows them to build long-lasting social and cognitive resources. For instance, high levels of positive affect will help to increase attention, while also encouraging individuals to have more flexible, creative and efficient patterns of thought (Fredrickson, 2001). Likewise, such positive emotions may also lead individuals to be more open to new information.

These are all key attributes that will help young people to build academic skills as they progress through school, and may play a particularly important role in the build-up to high-stakes examinations. Specifically, it has been hypothesised that a link between positive affect and academic achievement may occur via three central channels (Zhou et al., 2010). First, positive emotions are thought to improve problem solving, memory and strategic thinking, helping young people to come up with innovative solutions to problems. Second, positive emotions are likely to lead to better behaviour and academic engagement, along with higher levels to intrinsic motivation (Pekrun et al., 2006, 2009). Finally, higher levels of positive affect may lead to young people having a better relationship with their teachers and school peers. This, in-turn, means young people may have better ‘social resources’ upon which they can draw when preparing for high-stakes examinations (e.g. support from teachers, forming study groups with their peers).

Yet, despite this theoretical background, *‘there is scant evidence of the associations between children’s positive emotions or dispositional positive emotionality and academic achievement’* (Valiente et al., 2012). Our first research question will speak to this issue, focusing upon 15/16-year-olds who are making the transition from childhood into young adulthood. Specifically, we will generate new evidence on the link between positive emotions and young people’s performance in high-stakes examinations in England:

Research question 1. Do teenagers with high levels of positive affect achieve better grades in high-stakes examinations than their peers with average or low levels of positive affect?

Negative affect and achievement

Another theoretical model linking young people’s emotions to their academic achievement is the ‘control-value’ theory of Pekrun (Pekrun, 2006; Pekrun & Perry, 2014). I draw upon this model to provide theoretical background as to why teenagers with high levels of negative affect may perform worse in high-stakes tests. In particular, negative emotions within the control-value theory can be further divided into two sub-groups. The first are ‘negative-deactivating’ emotions, such as feeling sad, miserable or low mood. It is thought that such feelings may reduce young people’s cognitive resources, resulting in decreased attention span. Similarly, such emotions of ‘feeling down’ can lead to low levels of motivation (Humensky et al., 2010). This combination may, in-turn, lead to ‘shallow information processing’ (Pekrun et al., 2017), with young people unable to effectively study, revise and prepare for high-stakes examinations. More generally, such emotions also have clear links with mental health problems such as depression, with a wide body of evidence linking such issues with lower levels of academic performance (for a systematic review of this literature see, Wickersham et al., 2020). Together, the effects of negative deactivating emotions are likely to lead to less progress being made at school, and lower grades achieved on high-stakes examinations.

The second component of negative affect can be conceptualised as ‘negative activating’ emotions. Examples here would include feelings of fear and anxiety (Anttila et al., 2017). Within control-value theory, it is thought young people’s cognitive resources are reduced due to such worries, with their ability to concentrate upon academic tasks impacted by irrelevant thoughts. In the context of high-stakes examinations, such emotions have clear links with test anxiety, on which there is a wide-ranging literature (Cassady, 2004; Hembree, 1988; Howard, 2020). Again, such emotions also have obvious links with mental health problems such as Generalised Anxiety Disorder, which have been linked to lower levels of educational attainment (Van Ameringen et al., 2003). Yet, in contrast to negative deactivating emotions, negative activating emotions may also have positive effects for some young people, such as acting as a motivating force driving them to try and avoid failure (Anthony et al 2012).

Nevertheless, a wide body of evidence suggests that – overall – having high levels of negative affect is detrimental to young people’s educational achievement and progress at school (Pekrun et al., 2017). Yet few previous studies have explicitly considered this relationship in the context of high-stakes tests, including in England. Consequently, the second research question is:

Research question 2. Do teenagers with high levels of negative affect achieve worse grades in high-stakes examinations than their peers with low or average levels of negative affect?

Fear of failure

Fear of failure is one specific example of a ‘negative activating’ emotion. For instance, McGregor and Elliot (2005) links fear of failure to shame. They note how achievement events such as school examinations are potentially shameful if one fails, thus ‘*threatening, judgment-oriented experiences that put one’s entire self on the line*’. This consequently leads individuals to ‘*keep themselves from the mistakes and failures that many achievement motivation theorists view as the grist for the mill of competence development*’. In other words, fear of failure can make individuals shy away from tasks, and thus not making mistakes (e.g. when attempting problems during examination revision) which is critical to the learning process. Fear of failure has similarly been linked to academic procrastination (Rothblum, 1990; Schouwenburg, 1995), with fearful students avoiding studying or engaging in otherwise poor study habits. This has also been noted by the OECD (OECD, 2019), who note how a fear of failure can lead to young people ‘*finding it difficult to concentrate on a given activity because their minds are too busy trying to cope with the associated stress and anxiety*’, with this resulting in ‘*avoidance behaviours, such as procrastinating, withholding effort and misbehaving, [and] can result in students not performing in a given activity or task as would be expected*’.

Yet, if such fear of failure is particularly intense, it could also spur motivation amongst young people to ensure that these potential negative outcomes do not become a reality. In other words, the effects of a fear of failure on examination performance could be non-linear, with both very high and very low levels being problematic. Indeed, Haghbin et al. (2012) notes that the relationship between fear of failure and negative activating emotions such as procrastination is complex, with evidence that the relationship may depend upon an individuals’ level of competence. Specifically, a fear of failure may lead less competent students to procrastinate but spur more competent individuals into action.

I am particularly interested in such fear of failure – as an example of one negative activating emotion that is likely to be especially relevant in this context – given how prevalent such feelings are amongst young people in the build-up to high-stakes examinations. For instance, at age 15, young people in England are more likely to be worrying about the consequences of failure than their peers in almost every other western OECD country (author’s calculations using the PISA 2018 database). Consequently, the final research question is:

Research question 3. Do teenagers who worry a lot over the consequences of failure achieve worse grades in high-stakes examinations than their peers without such worries?

Data

Overview

The data are drawn from the 2018 round of the Programme for International Student Assessment (PISA) for England. This is an international study measuring 15-year-olds skills in reading, science and mathematics. In England, the PISA data were collected in November/December 2018, with 97% of the sample in Year 11. A total of 5,174 pupils participated in PISA 2018 in England, with our main analytic models based upon the ~4,800 pupils with key information available. The timing of PISA in England is important, with the data gathered just six months before young people took the high-stakes

General Certificate of Secondary Education (GCSE) examinations (further details provided below). PISA uses a complex survey design, with schools first selected with probability proportional to size, and then a random sample of 40 pupils drawn within each school. The final school¹ and pupil response rates in England were 86% and 83% respectively (Sizmur et al., 2019).

A key feature of the PISA data for England is that it has been linked to the National Pupil Database (NPD) – administrative records capturing key details about pupils as they have progressed through primary and secondary school. This provides information about pupils' academic achievement prior (at age 11) and very soon after (at age 16) they took the PISA test. The PISA 2018-NPD linked data used in this paper has been accessed via the Office for National Statistics Secure Research Service.

Measurement of positive and negative affect

As part of PISA, Year 11 pupils (15/16-year-olds) in England completed a background questionnaire. This included the following question:

'Thinking about yourself and how you normally feel: how often do you feel as described below?'

- Happy (+)
- Scared (-)
- Lively (+)
- Miserable (-)
- Proud (+)
- Afraid (-)
- Joyful (+)
- Sad (-)
- Cheerful (+)

Young people were asked to respond to each item using a four-point scale (never, rarely, sometimes, always). This question closely follows the Positive and Negative Affect Scale for Children (Ebesutani et al., 2012), which has been widely used to study positive and negative emotions amongst young people.

Using responses to these statements, I construct a positive affect and a negative affect scale using a two-parameter graded response model (an application of item-response theory). The positive affect scale is based upon the five questions followed by a (+) symbol (happy, lively, proud, joyful, cheerful), while the negative affect scale is based upon the four questions followed by a (-) symbol (scared, miserable, afraid, sad). Appendix A provides a correlation matrix illustrating the association between each individual item, with Cronbach's alpha estimated to be 0.85 and 0.78 for the positive and negative affect scales respectively. There is a moderate correlation between the positive and negative affect scales (Pearson $r = -0.41$) indicating how these are capturing two related – but also distinct – constructs.

Within the analysis, I am particularly interested in those pupils at the top and bottom ends of the positive and negative affect distributions. Consequently, young people are divided into three groups based upon these scales. Take negative affect, for example. I begin by dividing the scales into quintiles. Those in the bottom quintile are then defined as having low levels of

negative affect, while those in the top quintile are defined as having high levels of negative affect. The middle three quintiles (representing 60% of pupils) are then combined into a single group. A similar process is then followed to categorise the positive affect scale.²

Some descriptive information about these scales is provided in Appendix B. This illustrates how, for instance, 96% of pupils categorised as having ‘low’ negative affect said that they never or rarely felt miserable. In contrast, 35% of those with high negative affect said that they always – and a further 62% said they sometimes – feel this way. Similarly, 99% of pupils with ‘high’ positive affect said they always feel cheerful, compared to essentially none of those categorised as having ‘low’ positive affect. This hence clearly illustrates how these groups differ substantially in their positive and negative affect in both an absolute (as well as a relative) sense.

Fear of failure

A separate question included in the PISA background questionnaire was designed to measure 15-year-olds ‘fear of failure’, using three items from the Performance Failure Appraisal Inventory (Conroy et al., 2002):

‘How much do you agree with the following statements?’

- When I am failing, I worry what others think of me.
- When I am failing, I am afraid that I might not have enough talent.
- When I am failing, this makes me doubt my plans for the future.

Responses to these statements were provided using a four-point Likert scale (strongly disagree to strongly agree). The correlation between these three items is reported in Appendix A, with Cronbach alpha standing at 0.83. The survey organisers have then formed a ‘fear of failure’ scale using pupils’ responses to these questions via an item-response theory model. I follow a similar process to that outlined above for the positive and negative affect scales, categorising pupils into ‘low’, ‘average’ and ‘high’ levels of fear of failure based upon the quintile in which they fall.

Outcome measure

The primary outcome is young people’s performance in England’s high-stakes GCSE examinations. These are England’s main school leaving examinations taken at the end of Year 11 (May/June 2019 for the cohort in question) when most pupils are 16-years-old and have important consequences for both pupils and their schools. For instance, GCSE grades are important for educational progress and future outcomes (Machin et al., 2020), while schools are publicly ranked in ‘league tables’ based upon the results. There is hence evidence of GCSEs causing young people anxiety and stress (Putwain, 2007), which gets widely reported in the media (Hazell, 2019).

As part of their GCSEs, young people typically sit a series of examinations in around eight or nine subjects. For each subject, they are awarded a grade between nine (the top grade) and one (the lowest grade). A widely used summary measure of performance in these examinations – which also has a key role in school accountability metrics – is their ‘attainment 8’ score (Department for Education, 2016). This combines information on the GCSE grades achieved in English (double weighted), mathematics (double weighted),

sciences, humanities, a foreign language and three other subjects (e.g. art, physical education). I use this as the primary outcome within this paper, which I standardise to mean zero and standard deviation one. All estimates can hence be interpreted in terms of an effect size.

To test the robustness of results I also present alternative estimates focusing upon young people's (a) mathematics and (b) English language GCSE grades. These subjects have been chosen as they are taken by all young people and are particularly important for educational progression. Specifically, I investigate the association between positive affect, negative affect, fear of failure and maths/English grades, when treating GCSE outcomes in these subject as continuous variables (see Appendix C and D).

Key control variables

Within the statistical models, a set of key variables are included as controls, as briefly summarised below.

- Key Stage 2 achievement scores. Before entering secondary school, at age 11 pupils in England sit national examinations – known as Key Stage 2 tests – in English and mathematics. Together, these capture young people's academic skills in these subjects prior to entering secondary education.
- PISA achievement scores. Six months before sitting GCSEs, young people in the sample took the PISA test. This is a two-hour assessment measuring skills in reading, science and mathematics. It thus captures young people's academic skills near the start of Year 11. PISA scores are derived by the survey organisers and are generated via a complex item-response theory model. A set of so-called 'plausible values' are then provided in the PISA database, providing an estimate of the achievement of each pupil in each PISA subject (*author cite*). The first plausible value is used throughout this analysis.
- School and classroom environment. As part of the PISA background questionnaire, pupils were asked a series of questions about the environment within their school and, in particular, their English classes. This included details about discipline within their school, teachers support for their learning, the interest shown by their class teachers in their work and the use of different teaching approaches. Further details – including example questions – are provided in [Table 1](#).
- Education activities. PISA also asked pupils a series of questions about their educational activities. This includes whether they receive home tutoring in various subjects, the amount of time they spend studying before/after school and whether they ever play truant or are late from school. See, [Table 1](#) for further details.
- Other attitudinal scales. A range of additional attitudinal scales were gathered within PISA – with an overview provided in [Table 1](#). This includes emotional support pupils feel they receive from their parents, how they perceive competition and competitiveness amongst pupils at their school, the value they place upon education/schooling and their willingness to work hard.

Table 1. Additional scales used from the PISA 2018 database.

	Example question
School and classroom environment	
Teacher interest	The enthusiasm of the teacher inspired me.
School discipline	Students don't listen to what the teacher says.
Teacher support	The teacher helps students with their learning.
Teaching approach 1 (direct instruction)	The teacher asks questions to check whether we have understood what was taught.
Teaching approach 2 (direct instruction)	The teacher tells me in which areas I can still improve.
Adaptivity of teaching	The teacher adapts the lesson to my class's needs and knowledge.
Educational activities	
Received home tutoring in various subjects	Do you currently attend additional instruction? Enrichment lessons in mathematics
Whether skipped or arrived late for school	I skipped a whole school day
Amount of time studied before/after school	On the most recent day you attended school, how long did you study after leaving school?
Other attitudinal scales	
Parental emotional support	My parents support me when I am facing difficulties at school.
Competition at school	It seems that students are competing with each other.
Cooperation at school	It seems that students are cooperating with each other.
Value of school	Trying hard at school will help me get a good job.
Competitiveness at school	It is important for me to perform better than other people on a task.
Work mastery	I find satisfaction in working as hard as I can.

Descriptive statistics

Table 2 provides some descriptive information about the cognitive test/exam measures used in this paper (either as outcomes or as controls). Panels (a) and (b) illustrate the distribution of GCSE total points scores and GCSE grades – the key outcome measures – including how they are associated with PISA scores (one of the key controls). Panel (c) then presents a correlation matrix between GCSE grades, PISA scores and Key Stage 2 scores. These figures illustrate how the measures are all positively correlated with one another.

Table 3 provides an overview of the key groups of interest – those pupils with particularly low/high values on the positive affect, negative affect and fear of failure scales. Starting with gender, females are much more likely to have high levels of negative affect (28% versus 11%) and fear of failure (27% versus 13%) than males. On the other hand, gender differences in terms of high levels of positive emotions is comparatively small (22% for females versus 18% for males). In terms of socio-economic status, disadvantaged pupils are much more likely to have low levels of positive affect than their disadvantaged peers. On the other hand, they are less likely to fear failure. Low-achieving pupils (as measured by the end-of-primary school Key Stage 2 test scores) are more likely to have low levels of negative affect – and low-levels of fear of failure – than their higher achieving peers. Finally, in terms of truancy, the main difference seems to be that those who skipped classes have notably lower levels of positive affect (and higher levels of negative affect) than those who do not.

Table 2. The distribution of the test/examination measures.

(a) GCSE total points score				
Statistic	GCSE TPS			
P10	19			
P25	28			
P50	39			
Mean	39			
P75	50			
P90	60			
Standard dev	15.26			
Observations	5212			

(b) GCSE English and mathematics grades				
Grade	Mathematics		English	
	%	Average PISA maths score	%	Average PISA reading scores
9	3.88%	628	2.74%	616
8	8.27%	586	5.97%	586
7	11.07%	563	9.47%	568
6	12.39%	531	17.55%	539
5	20.19%	506	22.20%	505
4	22.34%	467	17.84%	476
3	11.17%	436	17.88%	431
2	6.68%	398	4.62%	380
1	3.15%	359	1.06%	347
Ungraded	0.87%	365	0.68%	429
Observations		4,858		4,860

(c) Correlation matrix between cognitive measures							
N = 4,560	KS2 Maths	KS2 English	GCSE Maths	GCSE English	GCSE total points	PISA Maths	PISA Read
KS2 Maths	1	-	-	-	-	-	-
KS2 English	0.68	1	-	-	-	-	-
GCSE Maths	0.76	0.60	1	-	-	-	-
GCSE English	0.53	0.59	0.68	1	-	-	-
GCSE total points	0.65	0.64	0.87	0.85	1	-	-
PISA Maths	0.60	0.58	0.68	0.54	0.68	1	-
PISA Read	0.53	0.63	0.62	0.58	0.67	0.78	1

Methodology

The empirical methodology is based upon a series of OLS regression models, with each including an additional set of covariates. Using the relationship between negative affect and GCSE outcomes as an example, the analytic model is specified:

$$GCSE_{ij} = \alpha + \beta.N_i + \gamma.D_i + \delta.KS2_i + \vartheta.PISA_i + \tau.E_i + \pi.Ed_i + \theta.A_i + u_j + \varepsilon_{ij} \quad (1)$$

Where:

$GCSE_{ij}$ = Attainment 8 GCSE points score, standardised to mean zero and standard deviation one.

N_i = A set of dummy variables capturing low/high levels of negative affect (reference group = middle 60% of the negative affect scale).

D_i = A vector of demographic background characteristics (gender and socio-economic status).

Table 3. The demographic composition of the low/high positive affect, negative affect and fear of failure groups.

	n	Positive affect		Negative affect		Fear of failure	
		Low	High	Low	High	Low	High
(a) Percentages							
Gender							
Male	2,331	19%	22%	31%	11%	29%	13%
Female	2,519	21%	18%	11%	28%	11%	27%
Socio-economic status							
Disadvantaged pupils	1,158	24%	17%	19%	23%	21%	18%
Advantaged pupils	1,158	15%	23%	21%	18%	16%	22%
Key Stage 2 English scores							
Low-achieving pupils	1,086	23%	21%	25%	17%	23%	17%
High-achieving pupils	951	21%	16%	17%	23%	17%	23%
Truancy							
Not skipped classes	4,009	19%	20%	21%	19%	20%	20%
Skipped classes	649	29%	18%	20%	26%	20%	23%
(b) Cell counts underlying the percentages							
Gender							
Male	2,331	443	513	723	256	676	303
Female	2,519	529	453	277	705	277	680
Socio-economic status							
Disadvantaged pupils	1,158	278	197	220	266	243	208
Advantaged pupils	1,158	174	266	243	208	185	255
Key Stage 2 English scores							
Low-achieving pupils	1,086	250	228	272	185	250	185
High-achieving pupils	951	200	152	162	219	162	219
Truancy							
Not skipped classes	4,009	762	802	842	762	802	802
Skipped classes	649	188	117	130	169	130	149

Figures refer to the percent of the demographic group who fall in the low/high categories of the three covariates of interest (positive affect, negative affect and fear of failure). Advantaged/disadvantaged pupils refers to top/bottom quartile of the ESCS scale. High/low-achieving pupils refers to the top/bottom quartile of Key Stage 2 English scores.

$KS2_i$ = A vector of variables capturing end of primary Key Stage 2 mathematics and English scores (taken at age 10/11).

$PISA_i$ = A vector of variables capturing PISA reading, mathematics and science scores.

E_i = A vector of variables capturing pupils' views of the class and school environment within their school. These are captured by the teacher interest, school discipline, teaching approach and adaptivity of teaching scale described in Table 1.

Ed_i = A vector of variables capturing pupil's educational activities, encompassing their out-of-school study time, receipt of private tutoring and whether they have recently been truant from school.

A_i = A vector of other attitudinal scales captured by PISA, encompassing the parental emotional support, competition at school, cooperation at school, value of school, competitiveness at school and work mastery scales described in Table 1.

u_j = School fixed-effects.

ε_{ij} = Random individual error term.

Multiple specifications of model (1) are estimated, with each adding extra sets of controls.

To begin, model M1 includes only a basic set of demographic controls (D), with all other parameters (other than β – the parameter of interest) constrained to zero. These baseline estimates provide a first initial description of whether any of the three variables

of interest (positive affect, negative affect and fear of failure) are independently associated with performance in the high-stakes GCSE examinations. For instance, the estimated β parameters from model M1 will illustrate whether young people with particularly high or low levels of negative emotions achieve better or worse GCSE grades than their peers in the 'average' reference group.

Next, in model M2, Key Stage 2 scores are added (i.e. the δ parameter is no longer fixed to zero). These are measures of pupil's achievement at the end of primary school (Year 6 – when most pupils are age 11) and are thus prior to the measurement of positive/negative affect (captured mid-way through Year 11 – most pupils age 15) and GCSE grades (outcomes at the end of Year 11 – most pupils age 16). Thus, rather than capturing differences in overall GCSE attainment, the β parameters now capture the extent that the covariate of interest (negative affect in the context of equation 1) is associated with the academic progress young people make throughout their time at secondary school. In other words, results from this model will account for the fact that young people with different emotions may be of different academic abilities before they reach adolescence.

The third model (M3) additionally includes school fixed-effects. These strip away all the between-school variation from the estimates. Hence the β parameter estimates will now capture the extent that young people with different emotions progress differentially, amongst those who attend the same secondary school. In doing so, this will effectively control for all school-level inputs that are broadly constant across pupils attending the same school, as well as school-level peer group effects.

PISA scores are then added in model M4. Hence, rather than capturing the relationship between children's emotions and their progress throughout secondary school, the β parameters now provide an estimate of the academic progress young people make during Year 11 (the final year of secondary school in England). Specifically, to extent that the PISA tests capture pupil's academic competencies, M4 can be thought of as a six-month 'value-added' model, exploring the factors associated with the academic progress young people make between the time of the PISA tests (November/December 2018) and their GCSEs (May/June 2019). In other words, do Year 11 pupils with particularly high or low levels of negative emotion make differential progress during their final six-months at secondary school?

Models M5 to M7 then each add additional blocks of variables that may also explain the progress young people make during Year 11. First, model M5 adds a selection of school and classroom environment controls. These are added at this point because I consider them unlikely to be 'endogenous' (i.e. they are unlikely to be caused by young people's emotional state), but might conceivably confound the relationship between pupils' emotions and their GCSE grades. Thus the β estimates from M5 will reveal whether there is differential academic progress during Year 11 amongst pupils of the same demographic background, who attend the same school and who study in classes with a similar environment – but who differ in terms of their emotional state during this important academic year.

The educational activities of children are added in model M6. This includes the time they spend studying outside of school, whether they receive private tutoring and whether they have recently played truant from school. Some of these variables could of course be affected by young people's emotional state. For instance, adolescents with high levels of negative affect could be less motivated to spend time studying (or less able to

concentrate) and/or be more likely to skip classes. In other words, these variables are potentially endogenous with respect to young people's emotions and may thus be channels via which emotions affect GCSE outcomes (rather than confounders). Nevertheless, the change in the β coefficients between M5 and M6 is thus likely to provide some handle on the extent that the emotion-GCSE attainment relationship is being driven by differences in young people's study habits and educational investments.

Finally, model M7 presents results from the full model specification presented in equation (1). This adds extra attitudinal and psychological traits of young people into the model, such as the extent that they value school, the emotional support they receive from parents and their views of competitiveness at their school. As with the variables added in model M6, these could be affected by young people's emotions, and thus potentially reflect channels that mediate the emotion-GCSE attainment relationship. Nevertheless, results from this final specification will illustrate how Year 11s with different levels of negative affect progress during their final six months at school, amongst those with the same demographic background, attending the same school, studying in classes with similar environments, who have similar study habits, making similar educational investments and who otherwise hold similar attitudes.

Note that the above example refers specifically to the models I estimate to explore the relationship between negative affect and GCSE outcomes. A separate set of analogous models are estimated with respect to the link between positive affect and GCSE attainment, and for the link between fear of failure and GCSE attainment. I do not include all these scales together in a single model due to potential collinearity affecting the interpretation of estimates.

Throughout this modelling process the final PISA student and balanced-repeated-replication weights are applied. These fully account for the complex PISA survey design, including the clustering of pupils within schools. Mean imputation and missing dummy categories are used to account for missing covariate data in the main text, with alternative results using multiple imputation presented in Appendix E to test the robustness of the results. When interpreting the results, effect sizes below a threshold of 0.1 are considered to be trivially small, while statistical significance is always tested at the five percent level.

Results

Positive affect

Table 4 presents results regarding the link between positive affect and teenagers GCSE grades. Starting with high levels of positive affect, in model M1 (demographic controls only) there is a modest, statistically significant difference compared to the average group (effect size = 0.12). This, however, is in the opposite of the expected direction; high levels of positive emotions are associated with *lower* GCSE grades. Yet, in all other model specifications (M2-M7), the effect size for the difference between high versus average levels of positive affect sits close to zero – approximately 0.05 or less – and is never statistically significant at the five percent level. Hence, overall, Table 4 provides little evidence that young people with high levels of positive affect achieve difference GCSE grades to their peers with average levels of positive affect.

Table 4. The relationship between positive affect and GCSE total point scores.

(a) Models M1 to M4								
	M1		M2		M3		M4	
	Effect size	SE	Effect size	SE	Effect size	SE	Effect size	SE
Positive affect (Ref: Middle 60%)								
High positive affect	-0.118*	0.051	-0.033	0.043	-0.055	0.031	0.006	0.025
Low positive affect	-0.169*	0.039	-0.139*	0.031	-0.179*	0.027	-0.164*	0.024
Observations	4,836		4,836		4,836		4,836	
Controls								
Demographics	Y		Y		Y		Y	
Key Stage 2 scores	-		Y		Y		Y	
School fixed-effects	-		-		Y		Y	
PISA scores							Y	

(b) Models M5 to M7						
	M5		M6		M7	
	Effect size	SE	Effect size	SE	Effect size	SE
Positive affect (Ref: Middle 60%)						
High positive affect	0.000	0.024	-0.014	0.024	-0.026	0.023
Low positive affect	-0.155*	0.025	-0.144*	0.024	-0.127*	0.024
Observations	4,836		4,836		4,836	
Controls						
Demographics	Y		Y		Y	
Key Stage 2 scores	Y		Y		Y	
School fixed-effects	Y		Y		Y	
PISA scores	Y		Y		Y	
Teacher interest	Y		Y		Y	
School discipline	Y		Y		Y	
Teacher support	Y		Y		Y	
Teaching approach	Y		Y		Y	
Adaptivity of teaching	Y		Y		Y	
Tutoring	-		Y		Y	
Out-of-school study	-		Y		Y	
Truancy	-		Y		Y	
Parent emotional support	-		-		Y	
Competition at school	-		-		Y	
Cooperation at school	-		-		Y	
Value of school	-		-		Y	
Competitiveness at school	-		-		Y	
Work mastery	-		-		Y	

Figures refer to effect size differences relative to the middle (reference) group. * indicates statistically significant difference from the reference group at the five percent level.

Turning to low levels of positive affect, the opposite seems to hold true. In particular, a consistent modest negative association (compared to the average group) can be observed across all seven model specifications. The estimated effect size across the seven models sits within a reasonably narrow range – between approximately 0.10 and 0.15 standard deviations – and is always statistically significant at the five percent level. Interestingly, the wide array of additional covariates added between models M1 and M7 seem to have little impact upon the estimated effect size, and thus the substantive results. In other words, low levels of positive affect are clearly associated with lower GCSE grades (M1) and progress in secondary school (M2), including during Year 11 (M4). This holds true even amongst young people who attend the same secondary school (M3), make similar investments/effort in their schooling (M6) and who otherwise have similar

attitudinal and psychological traits (M7). The same broadly holds true for the difference between the high and low positive affect groups. Estimates from models M2 to M7 suggest that there is a difference in GCSE achievement between 0.1 and 0.15 standard deviations between Year 11s with high and low levels of positive emotions. Overall, [Table 4](#) thus provides reasonably strong evidence that 15-year-olds with low levels of positive emotions achieve modestly lower GCSE grades than their peers with average or high levels of positive emotions.

Appendix C and Appendix D illustrate how we continue to find a modest association between low levels of positive affect and GCSE outcomes when focusing specifically upon mathematics and English grades (rather than Attainment 8 scores). Likewise, Appendix E demonstrates how we continue to find low levels of positive affect to be associated with GCSE outcomes when multiple imputation is used to handle missing covariate data.

Negative affect

Results capturing the association between negative emotions and GCSE outcomes can be found in [Table 5](#).

Focusing upon low levels of negative emotions to start, model M1 indicates that there may be a modest, statistically significant association with GCSE grades (at least compared to the ‘average’ group). The magnitude of the estimated effect sizes declines however in all other model specifications, to below 0.05 standard deviations, and does not reach statistical significance at the five percent level. The same holds true with respect to the difference between the high and low negative affect groups, where differences are consistently small and not statistically significant. Similar results emerge across Appendix C and D when GCSE mathematics and English grades are used (rather than Attainment 8 scores) and Appendix E when multiple imputation is used to handle missing covariate data. [Table 5](#) – and the supplementary results presented in the appendices – hence provide no clear evidence that low levels of negative emotions are associated with achievement in high-stakes examinations.

The findings with respect to high levels of negative affect are somewhat more nuanced. There is evidence of a statistically significant association across most of the seven model specifications between the ‘high’ and ‘average’ groups (though, as noted above, no difference between the ‘high’ and ‘low’ groups). However, even the estimated effect size for the difference between the high and average groups is consistently small, falling within a narrow range between approximately 0.05 and 0.10. The addition of extra controls into the model thus clearly has relatively little impact upon the estimated association between negative affect and GCSE grades (and thus the substantive results). Overall, the results presented in [Table 5](#) fall below the 0.1 effect size threshold, with any relationship between negative emotions and GCSE outcomes considered to be trivially small.

Fear of failure

To conclude, [Table 6](#) explores how Year 11 pupil’s ‘fear of failure’ is associated with their GCSE grades. Starting with pupils who report high levels of fear of failure, I find little evidence that they achieve higher or lower GCSE grades than pupils with moderate or low fear of failure levels. The effect sizes reported in [Table 6](#) are consistently below the 0.1

Table 5. The relationship between negative affect and GCSE total point scores.

(a) Models M1 to M4								
	M1		M2		M3		M4	
	Effect size	SE	Effect size	SE	Effect size	SE	Effect size	SE
Negative affect (Ref: Middle 60%)								
High negative affect	-0.039	0.038	-0.078*	0.033	-0.094*	0.020	-0.091*	0.017
Low negative affect	-0.104*	0.036	-0.043	0.032	-0.049*	0.023	-0.026	0.022
Observations	4,797		4,797		4,797		4,797	
Controls								
Demographics	Y		Y		Y		Y	
Key Stage 2 scores	-		Y		Y		Y	
School fixed-effects	-		-		Y		Y	
PISA scores							Y	
(b) Models M5 to M7								
	M5		M6		M7			
	Effect size	SE	Effect size	SE	Effect size	SE		
Negative affect (Ref: Middle 60%)								
High negative affect	-0.080*	0.016	-0.076*	0.016	-0.062*	0.017		
Low negative affect	-0.029	0.021	-0.031	0.021	-0.040	0.021		
Observations	4,797		4,797		4,797			
Controls								
Demographics	Y		Y		Y		Y	
Key Stage 2 scores	Y		Y		Y		Y	
School fixed-effects	Y		Y		Y		Y	
PISA scores	Y		Y		Y		Y	
Teacher interest	Y		Y		Y		Y	
School discipline	Y		Y		Y		Y	
Teacher support	Y		Y		Y		Y	
Teaching approach	Y		Y		Y		Y	
Adaptivity of teaching	Y		Y		Y		Y	
Tutoring	-		Y		Y		Y	
Out-of-school study	-		Y		Y		Y	
Truancy	-		Y		Y		Y	
Parent emotional support	-		-		-		Y	
Competition at school	-		-		-		Y	
Cooperation at school	-		-		-		Y	
Value of school	-		-		-		Y	
Competitiveness at school	-		-		-		Y	
Work mastery	-		-		-		Y	

Figures refer to effect size differences relative to the middle (reference) group. * indicates statistically significant difference from the reference group at the five percent level.

threshold and never approach statistical significance at the five percent level. A broadly similar finding emerges for young people with very low fear of failure levels. Specifically, the difference in GCSE grades between pupils with low, average and high levels of fear of failure is almost always small (below an effect size of 0.1) and statistically insignificant. Thus, on the whole, [Table 6](#) clearly paints a picture of a null effect, with little sign of any meaningful association between fear of failure and GCSE grades. This conclusion is also supported by the supplementary results, where similar small and statistically insignificant effects continue to be found when GCSE mathematics grades ([Appendix C](#)) or English grades ([Appendix D](#)) are used as the outcome measure, or when imputation is used to account for missing covariate data (see [Appendix E](#)).

Table 6. The relationship between fear of failure and GCSE total point scores.

(a) Models M1 to M4									
	M1		M2		M3		M4		
	Effect size	SE	Effect size	SE	Effect size	SE	Effect size	SE	
Fear of failure (Ref: Middle 60%)									
High fear of failure	0.065	0.041	0.015	0.035	0.005	0.026	0.017	0.023	
Low fear of failure	-0.063	0.041	-0.044	0.032	-0.069*	0.025	-0.015	0.022	
Observations	4,821		4,821		4,821		4,821		
Controls									
Demographics	Y		Y		Y		Y		
Key Stage 2 scores	-		Y		Y		Y		
School fixed-effects	-		-		Y		Y		
PISA scores							Y		
(b) Models M5 to M7									
	M5		M6		M7				
	Effect size	SE	Effect size	SE	Effect size	SE			
Fear of failure (Ref: Middle 60%)									
High fear of failure	0.020	0.023	0.011		0.023	0.008	0.023		
Low fear of failure	-0.017	0.022	-0.019		0.021	-0.019	0.021		
Observations	4,821		4,821		4,821		4,821		
Controls									
Demographics	Y		Y		Y		Y		
Key Stage 2 scores	Y		Y		Y		Y		
School fixed-effects	Y		Y		Y		Y		
PISA scores	Y		Y		Y		Y		
Teacher interest	Y		Y		Y		Y		
School discipline	Y		Y		Y		Y		
Teacher support	Y		Y		Y		Y		
Teaching approach	Y		Y		Y		Y		
Adaptivity of teaching	Y		Y		Y		Y		
Tutoring	-		Y		-		Y		
Out-of-school study	-		Y		-		Y		
Truancy	-		Y		-		Y		
Parent emotional support	-		-		-		Y		
Competition at school	-		-		-		Y		
Cooperation at school	-		-		-		Y		
Value of school	-		-		-		Y		
Competitiveness at school	-		-		-		Y		
Work mastery	-		-		-		Y		

Figures refer to effect size differences relative to the middle (reference) group. * indicates statistically significant difference from the reference group at the five percent level.

Conclusions

The wellbeing of young people has become a prominent academic and public policy issue across the western world (Burns & Gottschalk, 2019). Although this is a complex matter, affected by many aspects of the home and school environment (Basu & Banerjee, 2020), there has been particular concern surrounding low-levels of wellbeing – and associated mental health problems – in the build-up to high-stakes examinations. This is, of course, an important issue in its own right, with the emotional wellbeing of teenagers linked to their mental health outcomes as adults (Johnson et al., 2018). Yet such emotions may also have a direct effect upon young people's educational outcomes. Indeed, many previous authors have argued that teenagers' emotions are both theoretically and empirically linked to academic achievement (Fredrickson, 2001; Pekrun et al., 2017; Valiente et al.,

2012). This is important as any impact of teenage emotions on educational outcomes – particularly the grades achieved in high-stakes examinations – would represent one mechanism via which teenage emotions may influence outcomes in later life.

This paper has contributed new empirical evidence on this issue, using large, nationally representative longitudinal data from England. Specifically, I have investigated how positive emotions, negative emotions and fear of failure expressed by 15-year-olds is related to the grades they achieved in England's high-stakes GCSE examinations. This represents an ideal setting to conduct such work given (a) the high-stakes nature of GCSEs; (b) teenagers in England have particularly low-levels of wellbeing compared to other OECD countries (OECD, 2019) and (c) the dearth of existing empirical evidence on this matter within this national setting.

I find consistent evidence that low levels of positive affect – i.e. young people rarely feeling emotions such as happiness, pride and joy – is linked to lower GCSE grades. The magnitude of the association is however quite modest (effect size between 0.10 and 0.15), while there is no evidence of a link between GCSE grades and high levels of positive affect. Indeed, outside of low positive affect, I find little robust evidence of a link between teenagers' emotions and their GCSE outcomes. Across various different model specifications and outcome measures, estimates of the association between fear of failure and GCSE grades has produced null or very small effects. Likewise, evidence of an association between negative affect and GCSE grades was mixed at best, with estimated effect sizes consistently small (below 0.1 standard deviations) and often failing to reach statistical significance at the five percent level. Overall, the results thus provide only quite limited evidence that teenagers emotions are related to performance on high-stakes examinations, being confined to a modest reduction in grades for those pupils with particularly low levels of positive affect.

There are of course some limitations of this work. First, the PISA-NPD data analysed are observational rather than experimental. Hence, as with most work in this area, it is prudent to interpret estimates as conditional associations only, rather than necessarily capturing cause and effect. Second, measurement of the constructs of interest (positive affect, negative affect and fear of failure) has been based upon a limited number of questionnaire items. Although these display good levels of internal consistency, future research should look to use an extended battery of items. Third, young people's emotions have only been measured at a single – although key – time point (towards the end of the first term of Year 11). Collecting data at additional time points, capturing variation in young people's emotions throughout their time at secondary school, would help facilitate a more fine-grained analysis of how these constructs are related to academic achievement over a prolonged time horizon. Fourth, relatedly, this work has focused on the situation in England at a particularly important point during young people's schooling. The extent that the findings can be generalised to other national settings or time points – particularly those where high-stakes examinations are not looming on the horizon – is not clear. A contemporary example is that the data used in this research was collected prior to the COVID-19 pandemic, which has had profound impact upon young people's wellbeing and school experiences (for international evidence on this matter, readers are directed to the International Association for the Evaluation of Educational Achievement's Responses

to Educational Disruption Survey – <https://www.iea.nl/studies/iea/REDS>). Whether different findings might emerge as the world recovers from the pandemic is an important issue for future research.

Despite these limitations there are some important implications stemming from this work. Initiatives to improve positive affect amongst teenagers who rarely feel happy, proud and joyful are likely to be important in their own right. Yet results from this study suggest that they may also have some modest spillover benefits for academic achievement as well. On the other hand, my findings suggest that previous claims of a link between negative affect, fear of failure and educational outcomes are somewhat exaggerated. In reality, these emotions seem to be largely unrelated to young people’s performance in high-stakes examinations. Policy and practice should thus focus upon such emotions as being of importance and concern in their own right, rather than due to any potential link with future educational outcomes.

Notes

1. PISA allows substitute schools to take the place of non-respondents. The before-replacement school response rate in England was 72%, with an after-replacement response rate of 86%.
2. As there is some bunching of observations at particular points on the positive and negative affect scales, a very small amount of random noise has been added to ensure the quintiles form equally sized groups (with the PISA weights applied).

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References

- Anthony R. A., JR., Eric, S. Holmboe & Steven J. D. (2012) Control-value theory: Using achievement emotions to improve understanding of motivation, learning, and performance in medical education: *AMEE Guide No. 64, Medical Teacher*, 34(3), e148–e160. <https://doi.org/10.3109/0142159X.2012.651515>
- Anttila, H., Pyhältö, K., Soini, T., & Pietarinen, J. (2017). From anxiety to enthusiasm: Emotional patterns among student teachers. *European Journal of Teacher Education*, 40(4), 447–464. <https://doi.org/10.1080/02619768.2017.1349095>
- Basu, S., & Banerjee, B. (2020). Impact of environmental factors on mental health of children and adolescents: A systematic review. *Children and Youth Services Review*, 119(1), 105515. <https://doi.org/10.1016/j.childyouth.2020.105515>
- Burns, T., & Gottschalk, F. (2019). *Educating 21st Century Children: Emotional Well-being in the Digital Age*. OECD Publishing, Paris. <https://doi.org/10.1787/b7f33425-en>
- Cassady, J. (2004). The impact of cognitive test anxiety on text comprehension and recall in the absence of external evaluative pressure. *Applied Cognitive Psychology*, 18(3), 311–325. <https://doi.org/10.1002/acp.968>
- Chin, E., Williams, M., Taylor, J., & Harvey, S. (2017). The influence of negative affect on test anxiety and academic performance: An examination of the tripartite model of emotions. *Learning and Individual Differences*, 54, 1–8. <https://doi.org/10.1016/j.lindif.2017.01.002>
- Conroy, D., Willow, J., & Metzler, J. (2002). Multidimensional fear of failure measurement: The performance failure appraisal inventory. *Journal of Applied Sport Psychology*, 14(2), 76–90. <https://doi.org/10.1080/10413200252907752>
- Department for Education. 2016. *Progress 8. How Progress 8 and Attainment 8 measures are calculated*. Retrieved February 09, 2021 from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/561021/Progress_8_and_Attainment_8_how_measures_are_calculated.pdf
- Ebesutani, C., Regan, J., Smith, A., Reise, S., Higa-mcmillan, C., & Chorpita, B. (2012). The 10-Item positive and negative affect schedule for children, child and parent shortened versions: Application of item response theory for more efficient assessment. *Journal of Psychopathology and Behavioral Assessment*, 34(2), 191–203. <https://doi.org/10.1007/s10862-011-9273-2>
- Fletcher, J. (2013). Adolescent depression and adult labor market outcomes. *Southern Economic Journal*, 80(1), 26–49. <https://doi.org/10.4284/0038-4038-2011.193>
- Fredrickson, B. (2001). The role of positive emotions in positive psychology. The broaden-and-build theory of positive emotions. *The American Psychologist*, 56(3), 218–226. <https://doi.org/10.1037//0003-066x.56.3.218>
- Hagbin, M., McCaffrey, A., & Pychyl, T. (2012). The complexity of the relation between fear of failure and procrastination. *Journal of Rational-Emotive Cognitive-Behavior Therapy*, 30(4), 249–263. <https://doi.org/10.1007/s10942-012-0153-9>
- Hazell, W. (2019). *Investigation: More pupils experiencing 'dark thoughts' about exams*. TES. April 19th 2019. Retrieved April 19th, 2021 from <https://www.tes.com/news/investigation-more-pupils-experiencing-dark-thoughts-about-exams>
- Hembree, R. (1988). Correlates, causes, effects, and treatment of test anxiety. *Review of Educational Research*, 58(1), 47–77. <https://doi.org/10.3102/00346543058001047>
- Howard, E. (2020). *A review of the literature concerning anxiety for educational assessments*. Ofqual research report. Retrieved January 20, 2021, from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/865832/A_review_of_the_literature_concerning_anxiety_for_educational_assessment.pdf

- Humensky, J., Kuwabara, S., Fogel, J., Wells, C., Goodwin, B., & Van Voorhees, B. (2010). Adolescents with depressive symptoms and their challenges with learning in school. *The Journal of School Nursing: The Official Publication of the National Association of School Nurses*, 26(5), 377–392. <https://doi.org/10.1177/1059840510376515>
- Johnson, D., Dupuis, G., Piche, J., Clayborne, Z., & Colman, I. (2018). Adult mental health outcomes of adolescent depression: A systematic review. *Depression and Anxiety*, 35(8), 700–716. <https://doi.org/10.1002/da.22777>
- Lewis A. D., Huebner E. S., Reschly A. L., & Valois R. F. 2009. The incremental validity of positive emotions in predicting school functioning. *Journal of Psychoeducational Assessment*, 27(5), 397–408. <https://doi.org/10.1177/0734282908330571>
- Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*, 131(6), 803–855. <https://doi.org/10.1037/0033-2909.131.6.803>
- Machin, S., McNally, S., & Ruiz-Valenzuela, J. (2020). Entry through the narrow door: The costs of just failing high stakes exams. *Journal of Public Economics*, 190, 104224. <https://doi.org/10.1016/j.jpubeco.2020.104224>
- McGregor, H., & Elliot, A. (2005). The shame of failure: Examining the link between fear of failure and shame. *Personality & Social Psychology Bulletin*, 31(2), 218–231. <https://doi.org/10.1177/0146167204271420>
- McLeod, G., Horwood, L., & Fergusson, D. (2016). Adolescent depression, adult mental health and psychosocial outcomes at 30 and 35 years. *Psychological Medicine*, 46(7), 1401–1412. <https://doi.org/10.1017/S0033291715002950>
- Mega, C., Ronconi, L., & De Beni, R. (2014). What makes a good student? How emotions, self-regulated learning, and motivation contribute to academic achievement. *Journal of Educational Psychology*, 106(1), 121–131.
- Nickerson, C., Diener, E., & Schwarz, N. (2011). Positive affect and college success. *Journal of Happiness Studies*, 12(4), 717–746. <https://doi.org/10.1007/s10902-010-9224-8>
- OECD. (2019). *PISA 2018 Results (Volume III): What School Life Means for Students' Lives*, PISA. <https://doi.org/10.1787/acd78851-en>
- Parkin, E. (2016). *Mental health policy in England*. House of Commons briefing paper 07547. Retrieved February 09, 2021, from https://dera.ioe.ac.uk/26071/2/CBP-7547_Redacted.pdf
- Parkin, E. (2020). *Mental health policy in England*. House of Commons briefing paper CNP 07547. House of Commons Library: London. Retrieved February 09, 2021, from <https://commonslibrary.parliament.uk/research-briefings/cbp-7547>
- Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review*, 18(4), 315–341. <https://doi.org/10.1007/s10648-006-9029-9>
- Pekrun, R., Elliot, A., & Maier, M. (2006). Achievement goals and discrete achievement emotions: A theoretical model and prospective test. *Journal of Educational Psychology*, 98(3), 583–597. <https://doi.org/10.1037/0022-0663.98.3.583>
- Pekrun, R., Elliot, A. J., & Maier, M. A. (2009). Achievement goals and achievement emotions: Testing a model of their joint relations with academic performance. *Journal of Educational Psychology*, 101(1), 115–135. <https://doi.org/10.1037/a0013383>
- Pekrun, R., Lichtenfeld, S., Marsh, H., Murayama, K., & Goetz, T. (2017). Achievement emotions and academic performance: Longitudinal models of reciprocal effects. *Child Development*, 88(5), 1653–1670. <https://doi.org/10.1111/cdev.12704>
- Pekrun, R., & Perry, R. (2014). Control-value theory of achievement emotions. In R. Pekrun & L. Linnenbrink-Garcia (Eds.), *Handbook of emotions in education* (pp. 120–141). Taylor & Francis.
- Putwain, D. (2007). Test anxiety in UK schoolchildren: Prevalence and demographic patterns. *British Journal of Educational Psychology*, 77(3), 579–593. <https://doi.org/10.1348/000709906X161704>

- Rogatén, J and Moneta, G. B. (2017). Positive and negative structures and processes underlying academic performance: A chained mediation model. *Journal of Happiness Studies*, 18(4), 1095–1119.
- Rothblum, E. D. (1990). Fear of Failure. In H. Leitenberg (Ed.), *Handbook of Social and Evaluation Anxiety* (pp. 497–537). Springer . https://doi.org/10.1007/978-1-4899-2504-6_17
- Schouwenburg, H. C. (1995). Academic Procrastination. In *Procrastination and Task Avoidance. The Springer Series in Social Clinical Psychology* (pp 71–96). Boston, MA: Springer. https://doi.org/10.1007/978-1-4899-0227-6_4
- Sizmur, J., Ager, J., Bradshaw, J., Classick, R., Galvis, M., Packer, J., Thomas, D., & Wheeler, R. (2019). *Achievement of 15-year-olds in England: PISA 2018 results*. NFER: Slough. Retrieved January 15, 2021, from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904420/PISA_2018_England_national_report_accessible.pdf
- Tran, V. (2013). Positive affect negative affect scale (PANAS). In M. D. Gellman & J. R. Turner (Eds.), *Encyclopedia of Behavioral Medicine*. Springer.
- Twenge, J., Cooper, A., Joiner, T., Duffy, M., & Binau, S. (2019). Age, period, and cohort trends in mood disorder indicators and suicide-related outcomes in a nationally representative dataset, 2005–2017. *Journal of Abnormal Psychology*, 128(3), 185–199. <https://doi.org/10.1037/abn0000410>
- Valiente, C., Swanson, J., & Eisenberg, N. (2012). Linking students' emotions and academic achievement: When and why emotions matter. *Child Development Perspectives*, 6(2), 129–135. <https://doi.org/10.1111/j.1750-8606.2011.00192.x>
- van Ameringen, M., Mancini, C., & Farvolden, P. (2003). The impact of anxiety disorders on educational achievement. *Journal of Anxiety Disorders*, 17(5), 561–571. [https://doi.org/10.1016/S0887-6185\(02\)00228-1](https://doi.org/10.1016/S0887-6185(02)00228-1)
- von der Embse, N., Jester, D., Roy, D., & Post, J. (2018). Test anxiety effects, predictors, and correlates: A 30-year meta-analytic review. *Journal of Affective Disorders*, 227 February 2018, 483–493. <https://doi.org/10.1016/j.jad.2017.11.048>
- Wickersham, A., Epstein, S., Sugg, H., Stewart, R., Ford, T., & Downs, J. (2020). Systematic Review and Meta-analysis: The Association Between Child and Adolescent Depression and Later Educational Attainment. *Journal of the American Academy of Child and Adolescent Psychiatry*, 60(1), 105–118. <https://doi.org/10.1016/j.jaac.2020.10.008>
- Zhou, Q., Main, A., & Wang, Y. (2010). The relations of temperamental effortful control and anger/frustration to Chinese children's academic achievement and social adjustment: A longitudinal study. *Journal of Educational Psychology*, 102(1), 180–196. <https://doi.org/10.1037/a0015908>