Understanding school burnout: Does self-control matter?

Gregory S. Seibert *, Ross W. May, Michael C. Fitzgerald, Frank D. Fincham

Family Institute, 310 Longmire, The Florida State University, Tallahassee, FL 32306-1491, United States

ARTICLE INFO

ABSTRACT

Three studies examined school burnout and self-control. Study 1 investigated their association in two independent undergraduate samples (N = 243, N = 126) and documented a consistent, negative relationship between dispositional self-control and school burnout when controlling for affective symptomology. Study 2 (N = 428) examined whether dispositional self-control moderated the relationship between school burnout and important academic outcomes (grade point average, absenteeism). A school burnout by dispositional self-control interaction emerged such that poorer academic outcomes occurred at higher levels of school burnout when levels of self-control were lower. Using an experimental design, Study 3 (N = 477) evaluated the casual relationship between school burnout and state self-control. Individuals induced to experience low rather than high state self-control demonstrated a stronger association between school burnout and arithmetic performance. These findings highlight the critical role of dispositional and state self-control in moderating school burnout. Directions for future research are discussed.

© 2016 Elsevier Inc. All rights reserved.

1. Introduction

Derived from the concept of occupational burnout, school burnout is conceptualized as a response to school-related stress characterized by exhaustion due to school work, cynical attitudes toward school, and belief of inadequacy in school related accomplishment (Parker & Salmela-Aro, 2011; Salmela-Aro, Kiuru, Leskinen, Nurmi, 2009; Salmela-Aro, Kiuru, Pietikäinen, & Jokela, 2008). School burnout has been associated with numerous negative conditions, including suboptimal physiological functioning (May, Sanchez-Gonzalez, Brown, Koutnik, & Fincham, 2014; May, Sanchez-Gonzalez, & Fincham, 2014), affective symptomatology (Dahlin & Runeson, 2007; Dyrbye, Thomas, Massie, et al., 2008; Dyrbye et al., 2011), inappropriate behaviors (Brazeau, Schroeder, Rovi, & Boyd, 2010; Dyrbye et al., 2010), and diminished cognitive and academic performance (May, Bauer, & Fincham, 2015; Salmela-Aro et al., 2008, 2009). School burnout has been found in middle school (Meylan, Doudin, Curchod-Ruedi, & Stephan, 2015), high school (Salmela-Aro et al., 2009; Walburg, 2014), undergraduate, (May, Sanchez-Gonzalez, Brown, et al., 2014; May, Sanchez-Gonzalez and Fincham, 2014) and graduate student (Dyrbye et al., 2011) samples.

Although school burnout impedes optimal mental and physical functioning, little is known about the conditions that exacerbate school burnout or the mechanisms which underlie its effects. One construct that might help explain the negative effects of school burnout is self-control. Self-control, defined as the capacity to alter immediate dominant responses or tendencies, thoughts, behaviors and emotions for a more delayed but desirable outcome (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012), is a construct implicated in many aspects of social and personal behavior (Baumeister, Heatherton, & Tice, 1994). The capacity to exert self-control relies on both dispositional and state characteristics that can vary from person to person (Baumeister, 2014; Galliot & Baumeister, 2007). The dispositional aspect of self-control tends to behave more like personality as it is fairly consistent over time and less susceptible to change. Dispositional self-control is typically measured using self-report measures and has been linked to psychopathology, physical and verbal aggression, and academic performance (Tangney, Baumeister, & Boone, 2004). State self-control on the other hand is more fluid in nature and can fluctuate throughout the day (Baumeister, 2014; de Ridder et al., 2012). Often state self-control is experimentally manipulated through a depletion task and examined on succeeding acts of self-control (see Baumeister, Bratslavsky, Muraven, & Tice, 1998).

According to the self-regulatory strength model of self-control, the capacity to exert self-control is dependent upon a resource (i.e., energy, willpower) that depletes the more one is required to control the self. As that resource becomes depleted, the ability to employ self-control becomes less effective (Baumeister & Heatherton, 1996), thus leading to poorer outcomes. Previous research has demonstrated that low levels of self-control underlie behaviors leading to such outcomes as obesity, substance use, and impulsive buying (Baumeister, 2002; Ford & Blumenstein, 2013; Lili, 2014). Conversely, people with high self-control are better able to manage their emotions, behaviors and thoughts,

---

* Corresponding author.
E-mail addresses: gss14@my.fsu.edu (G.S. Seibert), rossmay00@gmail.com, rmay@fsu.edu (R.W. May), mf15c@my.fsu.edu (M.C. Fitzgerald), ffincham@fsu.edu (F.D. Fincham).

and are generally happier (Baumeister et al., 1998; Cheung, Gillebaart, Kroese, & de Ridder, 2014). Research extending self-control into the workplace has documented that low levels of self-control are associated with counterproductive work behaviors (Bolton, Harvey, Grawitch, & Barber, 2012), absenteeism (Schmidt & Diestel, 2012) and job strain (Diestel & Schmidt, 2009). Although these findings demonstrate an association between self-control and work-related burnout, we do not know whether self-control is related to academic burnout.

The connection between school burnout and self-control potentially lies in their relationship with executive functioning. A recently proposed integrative model of self-control by Kotabe and Hofmann (2015) suggests that the exhaustion of resources is predicated on desire-goal conflict, which is managed via various factors including trait differences in executive functioning. Previous research on self-control has suggested that not only does executive functioning influence self-control performance (Hofmann, Schmeichel, & Baddeley, 2012), but that the two share the same depletable and restorable resource (Kaplan & Berman, 2010). Consistent with this view May et al. (2015) demonstrated that school burnout impairs cognitive performance tasks associated with executive control. Therefore, as school burnout taxes executive functions, it may draw from the shared resource(s) needed to employ self-control, thus diminishing self-control and leading to poorer outcomes. However, research has yet to examine their relationship.

To fill this gap, the present research examined self-control and school burnout in three separate studies. Study 1 investigated the association between self-reported school burnout and dispositional self-control while controlling for anxiety and depression in two samples. We hypothesized an inverse relationship between self-control and school burnout after controlling for similar affective symptomology. Study 2 evaluated the interplay between school burnout and dispositional self-control on key academic performance outcomes, namely grade point average (GPA) and absenteeism. We predicted that self-control would moderate the relationship between school burnout, GPA, and absenteeism. Specifically, the effects of high school burnout on GPA and absenteeism will be stronger at lower levels of self-control. Finally, Study 3 investigated a potential causal relationship between school burnout and state self-control using a laboratory manipulation. Similar to our predictions in Study 2, we hypothesized that self-control will moderate the relationship between school burnout and a performance task such that the effects of school burnout on the performance task will be stronger under lower levels of state self-control. Findings from the proposed studies can help lay the foundation for future research examining self-control as a point of intervention in ameliorating the harmful effects of school burnout on physical and mental health outcomes.

2. Study 1

2.1. Introduction

Study 1 was conducted to document a relationship between school burnout and dispositional self-control. As affective constructs may overlap with burnout, controlling for depressive and anxiety symptoms in studies investigating burnout is suggested (see Melamed, Shirom, Toker, Berliner, & Shapira, 2006; Schaufeli & Buunk, 2003; Shirom, 2009). Therefore, we explored the relationship between school burnout and dispositional self-control using two independent samples and hypothesized that individuals with higher school burnout would report poorer self-control independently of depressive and anxiety symptoms.

2.2. Methods

2.2.1. Participants

Two samples of undergraduate students from two separate semesters (Sample 1: N = 243, 88.4% females, M_{age} = 19.63 years, SD = 1.51; Sample 2: N = 126, 85.2% females, M_{age} = 20.56 years, SD =

2.53) participated in this study. Students who completed at least one full academic semester were eligible for study participation. For Sample 1, 72% of the participants reported being 'White', 10% 'Black', 9% 'Hispanic', 4% 'Asian or Pacific Islander', 1% 'American Indian or Alaskan', and 4% reported 'Other'. For Sample 2, 87% of the participants reported being 'White', 5% 'Black', 5% 'Hispanic', 1% 'Asian or Pacific Islander', 0% 'American Indian or Alaskan', and 2% reported 'Other'.

2.2.2. Measures

2.2.2.1. School burnout. School burnout was measured using the School Burnout Inventory (SBI: Salmela-Aro et al., 2009). The SBI consists of 9 items measuring three first-order factors of school burnout: (a) exhaustion at school (four items), (b) cynicism toward the meaning of school (three items), and (c) sense of inadequacy at school (two items). All items are scored on a 7-point frequency rating scale ranging from 0 (never) to 6 (always). High scores on exhaustion, cynicism and inadequacy are indicative of burnout. Summed scores from the first-order factors comprise a second-order overall burnout score with higher scores indicating greater school burnout. Sample 1 α = 0.88 and sample 2 α = 0.89.

2.2.2.2. Depression. Depressive symptoms were measured using the 10-item Center for Epidemiologic Studies Depression Scale (CES-D; Santor & Coyne, 1977) that assesses depressive symptoms over the past week. The 10-items are scored on a 4-point frequency rating scale ranging from 0 (Rarely or none of the Time) to 3 (Most or Almost All the Time). Summed scores can range from 0 to 30, with higher scores indicating greater depressive symptoms. Sample 1 α = 0.87 and sample 2 α = 0.84.

2.2.2.3. Anxiety. The State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) was used to assess anxiety, and differentiate anxiety from depression. The STAI consists of 20 items that are scored on a four point scale, ranging from 0 (Almost Never) to 3 (Almost Always). Higher scores on the items indicate higher levels of anxiety. Sample 1 α = 0.85 and sample 2 α = 0.83.

2.2.2.4. Self-control. Dispositional self-control was measured using the Brief Self-Control Scale, an abbreviated measure of the Self-Control Scale (BSCS; Tangney et al., 2004) which assesses self-control in five domains: controlling thoughts, controlling emotions, controlling impulses, regulating behavior and/or performance, and habit breaking. The BSCS is a 13 item measure with scores on each item ranging from 1 (not at all like me) to 5 (very much like me). Higher scores indicate greater self-control. Sample 1 α = 0.91 and sample 2 α = 0.86.

2.2.3. Procedure

Two cross-sectional waves of data were collected. All participants gave written consent prior to participating in the present study which was approved by the institutional review board. Sampling occurred between the 3rd and 9th weeks of the semester. All students were recruited from university classes in which professors offered the study as one of the options for extra credit.

2.2.4. Statistical analysis

Hierarchical multiple regression (HMR) analyses were utilized to demonstrate the incremental contribution of school burnout scores over and beyond that of depressive and anxiety symptoms in accounting for variance in self-control scores. Model 1 of the HMR contained the anxiety and depression predictors with Model 2 introducing school burnout as an additional predictor. Each wave of data was analyzed separately resulting in two HMR analyses.

3. Results & discussion

Regarding the relationship between dispositional self-control, overall burnout score, and the specific subscales of school burnout (exhaustion, cynicism, and inadequacy), Pearson correlations in sample 1 between BSCS and overall school burnout, exhaustion, cynicism, and

inadequacy were −0.30, −0.22, −0.33, and −0.30, respectively (all $p < 0.01$). Similarly, in sample 2, correlations between BSCS and overall school burnout, exhaustion, cynicism, and inadequacy were −0.33, −0.20, −0.36, and −0.34, respectively (all $p < 0.01$).

Given that the correlations are consistently negative and of similar magnitude, we chose to utilize the overall school burnout score for all three of our studies. Model 2 of the HMRs indicated that, after accounting for anxiety and depressive symptoms, overall school burnout scores significantly accounted for an additional 6% of variance in self-control scores for the first sample and 5% of the variance in self-control scores in sample 2 (see Table 1). Individuals experiencing higher levels of school burnout demonstrated lower levels of dispositional self-control while controlling for affective symptomatology.

This study provides a novel contribution by demonstrating a replicable relationship between school burnout and dispositional self-control. Supporting our hypothesis, there was a significant inverse relationship between school burnout and self-control, indicating that levels of increased school burnout corresponded with lower dispositional self-control. However, this study did not examine the effects of the relationship on important outcomes, and its correlational nature limits our ability to make causal inferences. These limitations are addressed in Study 2 and Study 3 respectively.

4. Study 2

4.1. Introduction

To expand our analysis of the relationship between dispositional self-control and school burnout on key academic outcomes, Study 2 investigated the relationship of school burnout and dispositional self-control on important academic performance indicators (grade point average [GPA], absenteeism) while controlling for affective symptomology (depression, anxiety). School burnout research has demonstrated negative associations with school related outcomes such as academic performance (Salmela-Aro et al., 2008; Yang, 2004), cognitive performance (May et al., 2015) and attendance (González-Morales, Peiró, Rodríguez, & Bliese, 2012). Similarly, self-control research has shown that high self-control is associated with greater academic achievement (Rui & Yi-Lung, 2015; Tangney et al., 2004), and that low self-control is linked to absenteeism and procrastination with subsequently poorer academic outcomes (Tice & Baumeister, 1997; Denise et al., 2012).

Despite school burnout (May et al., 2015; Salmela-Aro et al., 2008; Salmela-Aro et al., 2009), and self-control literatures (Rui & Yi-Lung, 2015; Tangney et al., 2004; Tice & Baumeister, 1997; Denise et al., 2012) demonstrating significant associations with academic outcomes, a large gap remains regarding the relationship *between* school burnout and self-control in relation to key academic outcomes. Therefore, the present study investigated the moderating role of self-control on the

relationship between school burnout and important academic outcomes (GPA, absenteeism). Grounded in the self-regulatory strength model of self-control, we expect the relationship between school burnout and both GPA and absenteeism to depend on levels of dispositional self-control. Specifically, we hypothesized that school burnout and academic outcomes would be more strongly related among those with lower self-control scores than among those with higher self-control scores.

4.2. Methods

4.2.1. Participants

A total of 546 undergraduate students consented to the study. Owing to missing data, a total of 476 were retained for the analyses (89% female; $M_{age} = 19.63$, SD = 1.90). Participant demographics consisted of 64.2% 'White', 16.7% 'Hispanic', 11.6% 'Black', 3.3% 'Asian or Pacific Islander,' and 3.7% responded 'other'.

4.2.2. Measures

As in Study 1 measures of school burnout (SBI; Salmela-Aro et al., 2009; $\alpha = 0.89$), self-control (BSCS; Tangney et al., 2004; $\alpha = 0.84$), anxiety (STAI; Spielberger et al., 1970; $\alpha = 0.92$), and depression (CES-D; Santor & Coyne, 1977; $\alpha = 0.77$.) were used.

4.2.2.1. Academic performance. GPA and absenteeism were used as indicators of academic performance. Using self-report, GPA was measured on a 4-point scaling system ranging from 0.0 to 4.0 where scores approaching 4.0 on the scale represent greater academic success. Absenteeism was measured using participants self-report on the total number of classes they missed (to date) during the semester of the study.

4.2.3. Procedure

All participants were recruited from university classes in exchange for an opportunity to earn extra credit; the study was one extra credit option and was approved by the institutional review board. Prior to participation, all participants provided written consent. Participants were then instructed to complete all surveys online.

4.2.4. Statistical analysis

HMR analyses were used to evaluate whether self-control moderated the relation between school burnout and academic outcomes, independent of depression and anxiety symptoms. Model 1 consisted of anxiety and depression composites, Model 2 introduced centered school burnout and self-control scores as predictors, and finally Model 3 incorporated the interaction (centered school burnout scores X centered self-control scores) term. Centering predictor variables is recommended when testing moderation to deal with potential multicollinearity and increase the interpretability of results. When the

Table 1
Hierarchal multiple regression of depression, anxiety, and school burnout scores accounting for variance in self-control scores cross-sectionally over 2 semesters.

Criterion (M, SD)	Model	Predictors (M, SD)	β	sr	p	R^2	ΔR^2	Model F
Sample 1	Model 1	STAI (18.02, 4.11)	−0.08	−0.06	0.309	0.13		$F(2240) = 18.17, p < 0.001$
BSCS (41.63, 9.42)		CES-D (9.21, 5.12)	−0.30	−0.22	<0.001			
	Model 2	STAI	−0.01	−0.00	0.950	0.18	0.06	$\Delta F(1, 239) = 18.54, p < 0.001$
		CES-D	−0.21	−0.15	0.012			
N = 243		SBI (20.69, 8.55)	−0.29	−0.24	<0.001			
Sample 2	Model 1	STAI (19.09, 9.22)	−0.11	−0.10	0.101	0.11		$F(2123) = 7.94, p < 0.001$
BSCS (42.59, 8.97)		CES-D (9.96, 4.93)	−0.26	−0.21	<0.001			
	Model 2	STAI	−0.02	−0.01	0.232	0.16	0.05	$\Delta F(1, 201) = 7.24, p = 0.008$
		CES-D	−0.16	−0.12	0.035			
N = 126		SBI (19.67, 9.49)	−0.29	−0.22	0.001			

Note. sr = semi-partial correlation; BSCS = Brief Self-Control Scale; CES-D = Center for Epidemiologic Studies Depression Scale; STAI = State-Trait Anxiety Inventory; SBI = School Burnout Inventory.

predictor variable does not contain a meaningful 0, it redefines the 0 point of the predictor to its mean so that the intercept is more meaningful and easier to interpret (see Cohen, Cohen, West, & Aiken, 2003 for a full explanation).

5. Results & discussion

HMR was conducted to determine whether the relationship of school burnout and academic outcomes (GPA, absenteeism) depends on levels of dispositional self-control after controlling for depressive (CES-D; M = 8.71; SD = 4.74) and anxiety (STAI; M = 38.45; SD = 10.71) symptoms. The interaction between school burnout (SBI; M = 26.79; SD = 8.48) and self-control (BSCS; M = 42.39; SD = 8.57) was significant for both GPA (b = 0.001, SE_b = 0.000, β = 0.108, $p < 0.05$) and absenteeism (b = −0.002, SE_b = 0.001, β = −0.098, $p < 0.05$) after controlling for depression and anxiety and the main effects of school burnout and self-control (see Tables 2 and 3). Consistent with our hypothesis, these findings demonstrate that the effects of school burnout on academic performance (GPA, absenteeism) are dependent upon levels of self-control. Simple slope analysis for the association between school burnout and academic outcomes were tested at very low (−2 standard deviations; SD), low (−1 SD), moderate (mean), high (+1 SD) and very high (+2 SD) levels of self-control (see Figs. 1, 2). It can be seen that dispositional self-control moderated the effects of high levels of school burnout on academic outcomes, with stronger relationships at lower levels of self-control than at higher levels of self-control. Findings from Study 1 and Study 2 provide evidence suggesting that dispositional self-control plays an important role in understanding the deleterious effects of school burnout. However, even though Study 2 replicates the findings from Study 1 in the context of academic performance outcomes, both studies are correlational limiting our ability to infer causality.

6. Study 3

6.1. Introduction

Despite the demonstration that dispositional self-control is negatively related to school burnout (Study 1) and moderates the effects of school burnout on important academic performance indicators (Study 2), little is known regarding how fluctuations in state self-control can help explain the effects of school burnout on academic performance. Therefore, Study 3, first sought to reproduce the results from Study 1 and Study 2 to demonstrate consistency among our samples' dispositional self-control, then, using a laboratory manipulation, aimed to deplete state levels of self-control and examine the relationship between school burnout and task performance (using an arithmetic task). Prior research has established that school burnout is related to poorer arithmetic performance as shown in a serial subtraction task (May et al., 2015). However, school burnout and arithmetic performance have yet to be examined within the context of varying levels of self-control. The utilization of an experimental design examining the effects of state self-control on school burnout and academic performance yields stronger data for causal inferences and thereby addresses a limitation of the previous two studies.

The ego depletion task used to manipulate self-control (participants cross off the letter "e" in some form of text such as a research article, see Baumeister et al., 1998) is a commonly used to reduce self-control capacity by depleting the resources necessary for volition (see Hagger, Wood, Stiff, & Chatzisarantis, 2010 for a meta-analysis). Under the assumptions of the self-regulatory strength model of self-control (Baumeister & Heatherton, 1996), we expect depleted levels of state self-control to moderate the relationship between school burnout and arithmetic performance. Specifically, we hypothesized that the relationship between school burnout and task performance will be contingent upon levels of manipulated state self-control such that the relation between school burnout and performance would be stronger for the low self-control than high self-control condition.

6.2. Methods

6.2.1. Participants

Four hundred seventy-seven undergraduate students (84.2% females, M_{age} = 19.89 years, SD = 1.82) participated in this study. Students who completed at least one full academic semester were eligible for study participation. Regarding ethnicity, 70% of the participants reported being 'White', 12% 'Black', 7% 'Hispanic', 6% 'Asian or Pacific Islander', 0% 'American Indian or Alaskan', and 5% reported 'Other'.

6.2.2. Measures

As in Study 1 and Study 2, measures of school burnout (SBI; Salmela-Aro et al., 2009; α = 0.92), self-control (BSCS; Tangney et al., 2004; α = 0.86), anxiety (STAI; Spielberger et al., 1970; α = 0.93), and depression (CES-D; Santor & Coyne, 1977; α = 0.78.) were utilized in Study 2.

6.2.2.1. Depletion task. Two conditions of a modified ego depletion task (see Experiment 4, Baumeister et al., 1998) were constructed by having participants identify the total number of occurrences of the letter "e" in a 200 word essay. A low depletion task provided the participants with the direction to "please cross out each letter 'e' on this page". A high depletion task included directions stating "please cross out the letter 'e' except when it is followed by a vowel or appears in a word with a vowel 2 letters before it". An index of sentence progress (how many sentence lines did the participant complete during the depletion task), number of incorrect responses (incorrectly marked or omitted e's), post-test self-reported energy exertion ("How tiring was the letter task you completed? Respond from 0 to 100, with 0 being not tired at all and 100 extremely tired"), and perceived task difficulty ("How difficulty was the letter task? Respond from 0 to 100, with 0 being not difficult at all and

Table 2
Hierarchal multiple regression of depression, anxiety, school burnout scores and self-control scores accounting for variance in grade point average.

	Predictors	β	p	Model R^2	Model ΔR^2	Model F
Model 1	STAI	0.04	0.494	0.014		$\Delta F(2, 472) = 3.37, p = 0.035$
	CES-D	−0.14	0.021			
Model 2	STAI	0.11	0.088	0.059	0.045	$\Delta F(2, 470) = 11.13, p < 0.001$
	CES-D	−0.07	0.261			
	SBI_C	−0.13	0.016			
	$BSCS_C$	0.17	< 0.001			
Model 3	STAI	0.09	0.149	0.070	0.011	$\Delta F(1, 469) = 5.75, p = 0.017$
	CES-D	−0.06	0.369			
	SBI_C	−0.12	0.022			
	$BSCS_C$	0.18	< 0.001			
	SBI × BSCS	0.11	0.017			

Note. sr = semi-partial correlation; $BSCS_C$ = Brief Self-Control Scale centered; CES-D = Center for Epidemiologic Studies Depression Scale; STAI = State-Trait Anxiety Inventory; SBI_C = School Burnout Inventory centered.

Table 3
Hierarchal multiple regression of depression, anxiety, school burnout scores and self-control scores accounting for variance in absenteeism.

	Predictors	β	p	Model R^2	Model ΔR^2	Model F
Model 1	STAI	−0.04	0.554	0.023		$\Delta F(2, 473) = 5.49, p = 0.004$
	CES-D	0.17	0.005			
Model 2	STAI	−0.11	0.076	0.076	0.053	$\Delta F(2, 471) = 13.58, p < 0.001$
	CES-D	0.09	0.133			
	SBI$_C$	0.15	0.005			
	BSCS$_C$	−0.18	< 0.001			
Model 3	STAI	−0.10	0.122	0.085	0.009	$\Delta F(1, 470) = 4.85, p = 0.028$
	CES-D	0.08	0.194			
	SBI$_C$	0.14	0.007			
	BSCS$_C$	−0.19	< 0.001			
	SBI × BSCS	−0.10	0.028			

Note. sr = semi-partial correlation; BSCS$_C$ = Brief Self-Control Scale centered; CES-D = Center for Epidemiologic Studies Depression Scale; STAI = State-Trait Anxiety Inventory; SBI$_C$ = School Burnout Inventory centered.

100 being extremely difficult") was collected to serve as depletion manipulation checks.

6.2.2.2. Serial subtraction task. A 5-min serial subtraction arithmetic task was utilized (see May et al., 2015). The arithmetic task was conducted using the DirectRT computer software program. Instructions informed participants that the arithmetic task would involve subtracting 7 from a randomly selected number. To eliminate time related pressure as a potential confound participants were not told there was a time limit of 5 min. Prior to data collection, a practice trial demonstrated how a number would appear (e.g. 1107) and how the correctly computed answer (1100) would be accepted through a keystroke response. This correct response would then be the base number for the next subtraction trial. The trial would repeat if an incorrect solution was provided. The program ended after 5 min and the total number of correct computations was then collected.

6.2.3. Procedure

All participants gave written consent prior to study participation. Institutional review board approval was obtained prior to any study participation. All students were recruited from university classes in which professors offered the study as one of the options for extra credit. As in Study 1, sampling occurred between the 3rd and 9th weeks of the semester. After completing an online questionnaire containing the measurement scales, participants were randomly assigned to either the high or low condition of the depletion task. Following the depletion task, participants completed the serial subtraction arithmetic task. Participants then finished post-test measures, were debriefed and thanked for their participation.
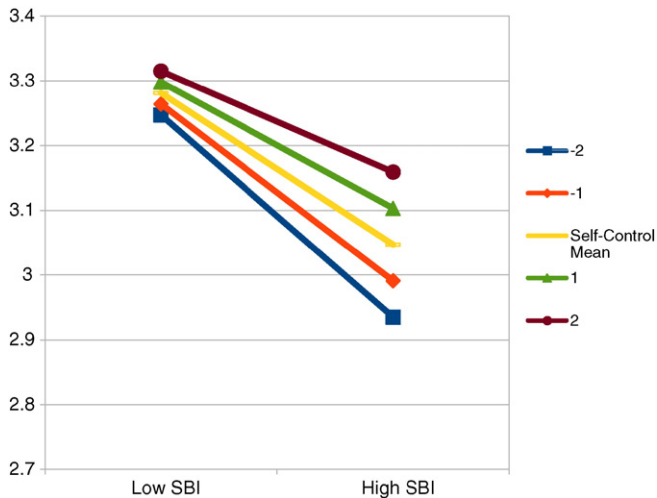
6.2.4. Statistical analysis

To replicate the findings of Study 1 an HMR analysis examined the incremental contribution of school burnout scores above that of depression and anxiety symptoms to variance in self-control scores. Independent sample t-tests evaluated pre-test measurement scale differences between depletion conditions as well as depletion task manipulation checks
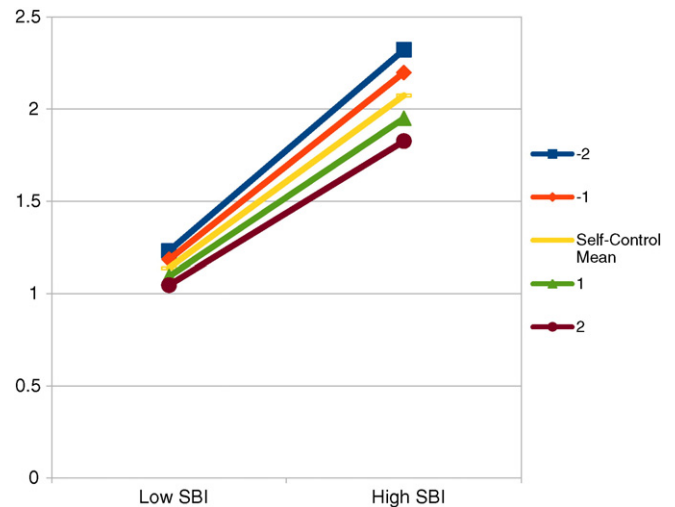
To examine the impact of manipulated depletion on arithmetic performance HMR was again used. In Model 1 anxiety and depression scores were used as predictors. The main effects of depletion task (low vs. high) and school burnout were then added in Model 2 with the depletion task X school burnout interaction added in Model 3. Interaction follow up analyses were conducted by regressing successful computation attempts on school burnout scores under each depletion task.

7. Results & discussion

Replicating findings from Study 1 and Study 2, Model 2 of the HMR indicated that after accounting for anxiety and depressive symptoms school burnout scores significantly accounted for an additional 4% of variance in self-control scores (see Table 4). Regarding pretest

Fig. 1. Simple slope analyses testing the interaction between school burnout and self-control on GPA. Note. SD, standard deviation; −2 (blue line/square), −2 SD below the mean; −1 (orange line/diamond), −1 SD below the mean; self-control mean (yellow line), mean; 1 (green line/triangle), 1 SD above the mean; 2 (burgundy line/circle), 2 SD above the mean.

Fig. 2. Simple slope analyses testing the interaction between school burnout and self-control on absenteeism. Note. SD, standard deviation; −2 (blue line/square), −2 SD below the mean; −1 (orange line/diamond), −1 SD below the mean; self-control mean (yellow line), mean; 1 (green line/triangle), 1 SD above the mean; 2 (burgundy line/circle), 2 SD above the mean.

measurement scores, independent sample t-tests showed that there were no significant differences in participant SBI, BCSC, CES-D, or STAI scores between the high (N = 224) and low (N = 253) depletion conditions with all t's < 1, p > 0.05.

Providing a check of the depletion manipulation, sentence progress, incorrect responses, self-reported energy exertion, and perceived task difficulty significantly differed by depletion condition. In regards to sentence progress, participants in the low depletion condition (M = 38.89, SD = 12.03) showed significantly more task progress compared to the high depletion condition (M = 27.20, SD = 12.11), $t(475)$ = 10.63, p < 0.001, Cohen's d = 0.969. Number of incorrect responses also differed by depletion condition, with low depletion (M = 32.40, SD = 21.52) showing significantly less task errors compared to the high depletion condition (M = 38.40, SD = 25.87), $t(475)$ = 2.85, p < 0.005, Cohen's d = 0.252. Low depletion also produced significantly less self-reported energy exertion scores (M = 30.23, SD = 24.56) than the high depletion condition (M = 50.81, SD = 26.81), $t(475)$ = −9.00, p < 0.001, Cohen's d = −0.800. Similarly, perceived task difficulty was significantly lower in the low depletion condition (M = 49.24, SD = 26.14) than in the high depletion condition (M = 68.74, SD = 30.40), $t(475)$ = −7.36, p < 0.001, Cohen's d = −0.688.

As hypothesized, Model 3 of the HMR (controlling for anxiety and depressive symptoms in Model 1, Model R^2 = 0.11, p < 0.001, and the main effects of depletion task and school burnout in Model 2, Model R^2 = 0.14, p < 0.001) demonstrated a significant depletion task (low vs. high) X school burnout interaction (Model R^2 change = 0.17, b = 0.58, SEb = 0.145, β = 0.53, sr = 0.17, p < 0.001). Fig. 3 displays the interaction of school burnout and depletion condition on successful computations. Although both conditions yielded was a significant negative relationship between school burnout and successful computations (at low depletion sr = −19, p = <0.001; at high depletion sr = −0.47, p < 0.005), it can be seen that in the high depletion condition (lower state self-control) there is stronger school burnout-to-successful computation relationship than in the low depletion condition.

Supporting the self-regulatory strength model of self-control (see Section 1), results from Study 3 identify self-control as an important construct to consider in explaining the negative effects of school burnout. As hypothesized, the relationship between school burnout and task performance is contingent upon levels of state self-control. Specifically, participants in the high depletion condition lacked the capacity to exert the level of self-control necessary to ameliorate the harmful effects of school burnout on task performance. Although the experimental design allows stronger casual interpretation, a limitation of the study is that these findings are not fully generalizable to academic outcomes. Moreover, the demands of the arithmetic performance task and depletion manipulation (e-task) are similar and therefore may reflect a decrease in motivation rather than a self-control effect per se. Future studies should investigate additional performance tasks disparate from the depletion task, especially ones more closely related to academic success (i.e., attention, working memory, goal setting).

8. Conclusions

School burnout has been shown to be an important construct of inquiry as it is negatively associated with cognition (May et al., 2015),

physiology (May, Sanchez-Gonzalez, Brown, et al., 2014), affect (Dyrbye et al., 2008; Dyrbye et al., 2011), and academic outcomes (Salmela-Aro et al., 2008, 2009). However, few studies on school burnout have investigated factors that may moderate its effects or tested mechanisms that may account for its effects. To investigate these issues, we conducted three studies that examined the relationship between school burnout, self-control, and negative outcomes. Consistent with our hypotheses, results demonstrate that: 1) school burnout and dispositional self-control were negatively correlated after controlling for similar affective symptomology (anxiety, depression) within multiple samples, 2) that dispositional self-control moderated the relationship between school burnout and important academic outcomes (GPA, absenteeism), and 3) the effects of school burnout on task performance (arithmetic) were dependent upon experimentally manipulated state levels of self-control.

Overall findings from these three studies help extend the literature by establishing a link between school burnout and negative outcomes via self-control, a relationship that can theoretically be explained by their relationship to executive functioning, as suggested earlier, and the self-regulatory strength model of self-control. The model postulates that the ability to override dominant responses depends on a common resource (i.e., energy, willpower) and as that resource diminishes, the less effective we are at exercising self-control (Baumeister & Heatherton, 1996). Consistent with previous findings linking self-control to mental and behavioral performance (see Hagger et al., 2010), the combined results from our current studies might be interpreted to suggest that school burnout depletes the necessary shared resource(s) needed to exercise self-control, negatively impacting academic outcomes (GPA, absenteeism; see Study 2) and task performance (see Study 3).

Although self-control has not previously been associated with school burnout, our findings help to establish it as an important construct to consider in future studies interested in academic populations. Furthermore, findings linking executive functioning to self-control may be pertinent in informing clinical intervention as effective management of self-control resources appears vital to moderating the harmful effects of school burnout.

The present studies are not without limitations as all three are demographically restricted by use of samples consisting predominately of young Caucasian adult females, making it difficult to assess potential sex, cultural, and age differences. Moreover and importantly, the cross-sectional design used limits our inferences regarding causality. Though, the use of an experimental manipulation in Study 3 strengthens the causal interpretations of self-control and school burnout on academic performance. Finally, the self-regulatory strength model of self-control is one of heavy criticism and revision over the past decade. Researchers have suggested that depletion can be conceptualized as motivation and attention (Inzlicht & Schmeichel, 2012) and the notion of limited willpower is a myth (Job, Dweck, & Walton, 2010). Moreover, alternative models (Beedie & Lane, 2012) have been proposed and recently adapted into the strength model of self-control. However, despite criticism, model revision, and a possible need for further revision, the core assumption of depletion has yet to be dislodged (Baumeister & Vohs, 2014), making it a viable model to conceptualize the present studies' findings.

Table 4
Hierarchal multiple regression of depression, anxiety, and school burnout scores accounting for variance in self-control scores: Study 1 replication.

Criterion (M, SD)	Model	Predictors (M, SD)	β	sr	p	R^2	ΔR^2	Model F
BSCS (42.44, 8.57)	Model 1	STAI (17.99, 5.70)	−0.16	−0.12	0.007	0.11		$F(2474)$ = 31.92, p < 0.001
		CES-D (8.53, 4.65)	−0.22	−0.16	<0.001			
	Model 2	STAI	−0.10	−0.07	0.093	0.15	0.04	$\Delta F(1, 473)$ = 15.64, p < 0.001
		CES-D	−0.16	−0.12	0.006			
N = 477		SBI (20.52, 8.47)	−0.20	−0.17	<0.001			

Note. sr = semi-partial correlation; BSCS = Brief Self-Control Scale; CES-D = Center for Epidemiologic Studies Depression Scale; STAI = State-Trait Anxiety Inventory; SBI = School Burnout Inventory.
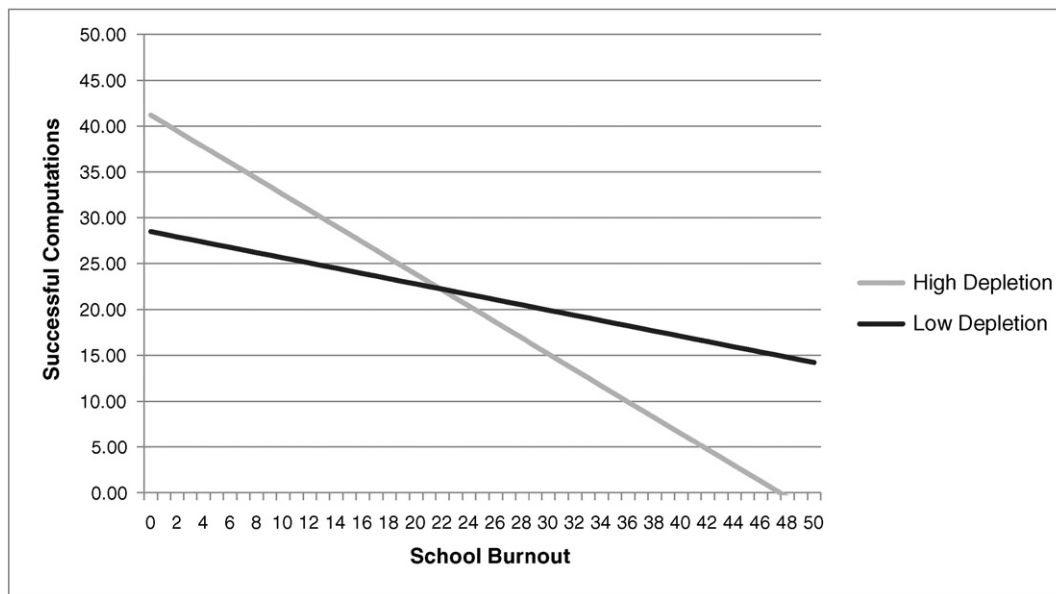
Fig. 3. Interaction of school burnout and depletion condition on successful computations.

8.1. Directions for future research

The construct of school burnout has largely been researched in European populations (Parker & Salmela-Aro, 2011; Salmela-Aro, Kiuru, Leskinen, Nurmi, 2009) with only a few studies conducted in the United States (see May, Sanchez-Gonzalez, Brown, et al., 2014; May, Sanchez-Gonzalez and Fincham, 2014; May et al., 2015). In addition to these three studies, further research investigating the impact of school burnout in American schools is necessary due to potential differences between American and European populations and school systems. Furthermore, school burnout has been shown to be negatively related to individual differences in the general ability to cope with stress and remain healthy (May & Casazza, 2012), thus research measuring and or manipulating specific self-control strategies (i.e., construal-level intervention; see Chiou, Wu, & Chang, 2013) is necessary to help improve our understanding of how students manage the effects of school burnout. Finally, longitudinal studies investigating the developmental patterns associated with school burnout and self-control are warranted in order to help better establish direction of effects (See Salmela-Aro, Savolainen, & Holopainen, 2009; Parker & Salmela-Aro, 2011; Salmela-Aro & Upadyaya, 2014 for examples of longitudinal investigations of burnout).

References

Baumeister, R. F. (2002). Yielding to temptation: self-control failure, impulsive purchasing, and consumer behavior. *Journal of Consumer Research, 28*(4), 670–676. http://dx.doi.org/10.1086/338209.

Baumeister, R. F. (2014). Self-regulation, ego depletion, and inhibition. *Neuropsychologia, 65*, 313–319.

Baumeister, R. F., & Heatherton, T. F. (1996). Self-regulation failure: An overview. *Psychological Inquiry, 7*, 1–15. http://dx.doi.org/10.1207/s15327965pli0701_1.

Baumeister, R. F., & Vohs, K. D. (2014). *Strength model of self-regulation as limited resource: Assessment, controversies, update.* (Manuscript submitted for publication) Florida State University.

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*, 1252–1265 (doi:0.1037/0022–3514.74.5.1252).

Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation.* San Diego: Academic Press, Inc.

Beedie, C. J., & Lane, A. M. (2012). The role of glucose in self-control: Another look at the evidence and analternative conceptualization. *Personality and Social Psychology Review, 16*, 143–153. http://dx.doi.org/10.1177/1088868311419817.

Bolton, L. R., Harvey, R. D., Grawitch, M. J., & Barber, L. K. (2012). Counterproductive work behaviours in response to emotional exhaustion: A moderated mediational approach. *Stress and Health, 28*(3), 222–233. http://dx.doi.org/10.1002/smi.1425.

Brazeau, C. M., Schroeder, R., Rovi, S., & Boyd, L. (2010). Relationships between medical student burnout, empathy, and professionalism climate. *Academic Medicine, 85*, 33–36. http://dx.doi.org/10.1097/ACM.0b013e3181ed4c47.

Cheung, T., Gillebaart, M., Kroese, F., & de Ridder, D. D. (2014). Why are people with high self-control happier? The effect of trait self-control on happiness as mediated by regulatory focus. *Frontiers in Psychology, 51–22.* http://dx.doi.org/10.3389/fpsyg.2014.00722.

Chiou, W., Wu, W., & Chang, M. (2013). Think abstractly, smoke less: A brief construal-level intervention can promote self-control, leading to reduced cigarette consumption among current smokers. *Addiction, 108*(5), 985–992. http://dx.doi.org/10.1111/add.12100.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Erlbaum.

Dahlin, M. E., & Runeson, B. (2007). Burnout and psychiatric morbidity among medical students entering clinical training: A three year prospective questionnaire and interview-based study. *BMC Medical Education, 7*, 6. http://dx.doi.org/10.1186/1472-6920-7-6.

de Ridder, D. T., Lensvelt-Mulders, G., Finkenauer, C., Stok, F. M., & Baumeister, R. F. (2012). Taking stock of self-control: A meta-analysis of how trait self-control relates to a wide range of behaviors. *Personality and Social Psychology Review, 16*(1), 76–99. http://dx.doi.org/10.1177/1088868311418749.

Diestel, S., & Schmidt, K. (2009). Mediator and moderator effects of demands on self-control in the relationship between work load and indicators of job strain. *Work and Stress, 23*(1), 60–79. http://dx.doi.org/10.1080/02678370902846686.

Dyrbye, L. N., Harper, W., Durning, S. J., Moutier, C., Thomas, M. R., Massie, F. S., Jr., ... Shanafelt, T. D. (2011). Patterns of distress in US medical students. *Medical Teacher, 33*(10), 834–839. http://dx.doi.org/10.3109/0142159X.2010.531158.

Dyrbye, L. N., Massie, F. S., Jr., Eacker, A., Harper, W., Power, D., Durning, S. J., ... Shanafelt, T. D. (2010). Relationship between burnout and professional conduct and attitudes among US medical students. *JAMA, 304*(11), 1173–1180. http://dx.doi.org/10.1001/jama.2010.1318.

Dyrbye, L. N., Thomas, M. R., Massie, F. S., et al. (2008). Burnout and suicidal ideation among U.S. medical students. *Annals of Internal Medicine, 149*(5), 334–341. http://dx.doi.org/10.7326/0003-4819-149-5-200809020-00008.

Ford, J. A., & Blumenstein, L. (2013). Self-control and substance use among college students. *Journal of Drug Issues, 43*(1), 56–68. http://dx.doi.org/10.1177/0022042612462216.

Galliot, M. T., & Baumeister, R. F. (2007). Self-regulation and sexual restraint: Dispositionally and temporarily poor self-regulatory abilities contribute to failures at restraining sexual behavior. *Personality and Social Psychology Bulletin, 33*(2), 173–186.

González-Morales, M. G., Peiró, J. M., Rodríguez, I., & Bliese, P. D. (2012). Perceived collective burnout: A multilevel explanation of burnout. *Anxiety, Stress, and Coping, 25*(1), 43–61. http://dx.doi.org/10.1080/10615806.2010.542808.

Hagger, M. S., Wood, C., Stiff, C., & Chatzisarantis, N. L. (2010). Ego depletion and the strength model of self-control: A metaanalysis. *Psychological Bulletin, 136*, 495–525. http://dx.doi.org/10.1037/a0019486.

Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. *Trends in Cognitive Sciences, 16*, 174–180. http://dx.doi.org/10.1016/j.tics.2012.01.006.

Inzlicht, M., & Schmeichel, B. J. (2012). What is ego depletion? Toward a mechanistic revision of the resource model of self-control. *Perspectives on Psychological Science, 7*, 450–463.

Job, V., Dweck, C. S., & Walton, G. M. (2010). Ego depletion—Is it all in your head? Implicit theories about willpower affect self-regulation. *Psychological Science, 21*, 1686–1693. http://dx.doi.org/10.1177/0956797610384745.

Kaplan, S., & Berman, M. G. (2010). Directed attention as a common resource for executive functioning and self- regulation. *Perspectives on Psychological Science*, 5, 43–57. http://dx.doi.org/10.1177/1745691609356784.

Kotabe, H. P., & Hofmann, W. (2015). On integrating the components of self-control. *Perspectives on Psychological Science*, 10(5), 618–638. http://dx.doi.org/10.1177/1745691615593382.

Lili, W. (2014). Body mass index, obesity, and self-control: A comparison of chronotypes. *Social Behavior and Personality: An International Journal*, 42(2), 313–320. http://dx.doi.org/10.2224/sbp.2014.42.2.313.

May, R. W., & Casazza, S. P. (2012). Academic major as a perceived stress indicator: Extending stress management intervention. *College Student Journal*, 46(2), 264–273.

May, R. W., Bauer, K. N., & Fincham, F. D. (2015). School burnout: Diminished academic and cognitive performance. *Learning and Individual Differences*, 42, 126–131. http://dx.doi.org/10.1016/j.lindif.2015.07.015.

May, R. W., Sanchez-Gonzalez, M. A., & Fincham, F. D. (2014a). School burnout: Increased sympathetic vasomotor tone and attenuated ambulatory diurnal blood pressure variability in young adult women. *Stress: The International Journal on the Biology of Stress*, 1–9. http://dx.doi.org/10.3109/10253890.2014.969703.

May, R. W., Sanchez-Gonzalez, M. A., Brown, P. C., Koutnik, A. P., & Fincham, F. D. (2014b). School burnout and cardiovascular functioning in young adult males: A hemodynamic perspective. *Stress*, 1, 79–87. http://dx.doi.org/10.3109/10253890.2013.872618.

Melamed, S., Shirom, A., Toker, S., Berliner, S., & Shapira, I. (2006). Burnout and risk of cardiovascular disease: Evidence, possible causal paths, and promising research directions. *Psychological Bulletin*, 132(3), 327. http://dx.doi.org/10.1037/0033-2909.132.3.327.

Meylan, N., Doudin, P. A., Curchod-Ruedi, D., & Stephan, P. (2015). Burnout scolaire et soutien social: L'importance du soutien des parents et des enseignants. *Psychologie Française*, 60(1), 1–15. http://dx.doi.org/10.1016/j.psfr.2014.01.003.

Parker, P. D., & Salmela-Aro, K. (2011). Developmental processes in school burnout: A comparison of major developmental models. *Learning and Individual Differences*, 21, 244–248. http://dx.doi.org/10.1016/j.lindif.2011.01.005.

Rui, Z., & Yi-Lung, K. (2015). The role of self-discipline in predicting achievement for 10th graders. *International Journal Of Intelligent Technologies & Applied Statistics*, 8(1), 61–70. http://dx.doi.org/10.6148/IJITAS.2015.0801.05.

Salmela-Aro, K., & Upadyaya, K. (2014). Developmental trajectories of school burnout: Evidence from two longitudinal studies. *Learning and Individual Differences*, 36, 60–68. http://dx.doi.org/10.1016/j.lindif.2014.10.016 (December).

Salmela-Aro, K., Kiuru, N., Leskinen, E., & Nurmi, J. E. (2009a). School burnout inventory (SBI): Reliability and validity. *European Journal of Psychological Assessment*, 25, 48–57. http://dx.doi.org/10.1027/1015-5759.25.1.48.

Salmela-Aro, K., Kiuru, N., Pietikäinen, M., & Jokela, J. (2008). Does school matter? The role of school context in adolescents' school-related burnout. *European Psychologist*, 13(1), 12–23. http://dx.doi.org/10.1027/1016-9040.13.1.12.

Salmela-Aro, K., Savolainen, H., & Holopainen, L. (2009b). Depressive symptoms and school burnout during adolescence: Evidence from two cross-lagged longitudinal studies. *Journal of Youth and Adolescence, 38*, 1316–1327.

Santor, D. A., & Coyne, J. C. (1977). Shortening the CES–D to improve its ability to detect cases of depression. *Psychological Assessment*, 9, 233–243. http://dx.doi.org/10.1037/1040-3590.9.3.233.

Schaufeli, W. B., & Buunk, B. P. (2003). Burnout: An overview of 25 years of research and theorizing. *The handbook of work and health psychology*, 2, 282–424. http://dx.doi.org/10.1002/0470013400.

Schmidt, K., & Diestel, S. (2012). The relation of self-control demands to job strain: The moderating role of organisational commitment. *Applied Psychology: An International Review*, 61(3), 479–497. http://dx.doi.org/10.1111/j.1464-0597.2011.00479.x.

Shirom, A. (2009). Burnout and health: Expanding our knowledge. *Stress and Health*, 25(4), 281–285. http://dx.doi.org/10.1002/smi.1283.

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *Manual for the state-trait anxiety inventory*. Palo Alto, CA: Consulting Psychologists Press (Flourishing (Diener). doi:10.1002/9780470479216.corpsy0943).

Tangney, R. F., Baumeister, A. L., & Boone (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, 72, 271–322. http://dx.doi.org/10.1111/j.0022-3506.2004.00263.x.

Tice, D. M., & Baumeister, R. F. (1997). Longitudinal study of procrastination, performance, stress, and health: The costs and benefits of dawdling. *Psychological Science, 8*(6), 454–458.

Walburg, V. (2014). Burnout among high school students: A literature review. *Children and Youth Services Review*, 4228–4233. http://dx.doi.org/10.1016/j.childyouth.2014.03.020.

Yang, H. J. (2004). Factors affecting student burnout and academic achievement in multiple enrollment programs in Taiwan's technical–vocational colleges. *International Journal of Educational Development*, 24(3), 283–301. http://dx.doi.org/10.1016/j.ijedudev.2003.12.001.