Personality and Individual Differences 198 (2022) 111801

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Dispositional predictors of perceived academic competitiveness: Evidence from multiple countries

David L. Weissman [a,*], Andrew J. Elliot [a], Nicolas Sommet [b]

[a] Department of Psychology, University of Rochester, NY, USA
[b] NCCR LIVES, University of Lausanne, Switzerland

ARTICLE INFO

Keywords:
Perceived competitiveness
Trait competitiveness
Fear of failure
General self-efficacy
Achievement motivation

ABSTRACT

Perceiving learning environments as competitive shapes how students think, feel, and behave. We conducted two preregistered studies designed to examine three central constructs in the achievement motivation literature as predictors of perceived academic competitiveness: Trait competitiveness, fear of failure, and general self-efficacy. In Study 1, we (a) *replicated* and (b) *extended* prior work using a sample of nearly 700 undergraduates (41.9 % Male; M_{age} = 19.57 ± 1.43). In Study 2, we (c) examined how these findings *generalized* using a sample of approximately half a million secondary school students from 73 countries (49.0 % Male; M_{age} = 15.79 ± 0.29). Students higher in trait competitiveness, fear of failure, and general self-efficacy perceived more competitiveness; this was observed across cultural contexts. Cross-cultural generalizability and the joint influence of dispositional and situational predictors on perceived academic competitiveness are discussed.

1. Introduction

Perceiving learning environments as competitive shapes how students think, feel, and behave (Ames & Archer, 1988; Deutsch, 1949). Students who perceive competition among their classmates typically adopt goals that emphasize normative performance (e.g., striving to perform better than others; Bardach et al., 2019), which in turn influence important downstream educational outcomes such as academic performance and access to post-secondary education (see Elliot & Hulleman, 2017 for a review). In short, perceptions of academic competitiveness matter for students in both the short and long runs. Accordingly, a critical question is "What gives rise to these consequential competitiveness perceptions?"

Most existing work on perceived academic competitiveness has focused on the situational predictors that students encounter at school, such as competition-relevant messages, comparison-focused instructional practices, or other cues in the learning environment (see Ames, 1992; Meece et al., 2006; Urdan, 2010 for reviews). Students, however, are not blank slates whose competitiveness perceptions are shaped solely by the learning environment itself. Rather, students enter classrooms with competence-based motives (Conroy, 2017) and self-perceptions (Marsh et al., 2017) that likely also guide their competitiveness perceptions. The field of personality psychology has long held that behavior is a function of not only the situation but also the person (B = *f*(S,P); Lewin, 1951). The present research extends beyond existing work that focused primarily on the situation by assessing the role that the person plays in shaping their perceptions of academic competitiveness. Accordingly, the critical question narrows to "What dispositions give rise to consequential competitiveness perceptions?"

In the present work, we focus on three specific dispositional predictors of perceived academic competitiveness: trait competitiveness, fear of failure, and general self-efficacy. We targeted this set of dispositional predictors because (a) they represent constructs of foundational significance within the achievement motivation literature (competence-based motives and self-perceptions were integral to the first formal model of achievement motivation; as proffered by Lewin et al., 1944), and (b) they remain important and robust explanatory constructs within the contemporary achievement motivation literature (see Elliot & Dweck's, 2005, list of "central constructs" p. xiii). Accordingly, we aim to examine how trait competitiveness, fear of failure, and general self-efficacy—as both foundational and integral dispositions within the achievement motivation literature—are uniquely associated with perceived academic competitiveness and whether these associations generalize cross-culturally.

* Corresponding author.
E-mail address: david.weissman@rochester.edu (D.L. Weissman).

https://doi.org/10.1016/j.paid.2022.111801
Received 12 February 2022; Received in revised form 13 June 2022; Accepted 29 June 2022
Available online 20 July 2022

1.1. Dispositional predictors

1.1.1. Trait competitiveness

Trait competitiveness refers to individual differences in the desire to compete with others across time and situations (Brown et al., 1998; Spence & Helmreich, 1983). In educational settings, competitive students are those who generally enjoy, value, and engage in competition. Recent empirical work has found that trait competitiveness positively predicts perceived academic competitiveness (Elliot et al., 2018). Specifically, competitive undergraduate students are more likely to perceive their classmates and shared learning environments as competitive. This phenomenon can be conceptualized as a form of social projection. Social projection occurs when perceivers infer that others think, feel, or behave as they do themselves (Krueger, 2000). By extension, competitiveness projection occurs when perceivers infer competitiveness in others (or in the broader situation) based on their own competitive disposition. Student trait competitiveness is, therefore, likely an important foundation—an appetitive achievement motive—on which academic competitiveness perceptions are formed. Specifically, we test the hypothesis that trait competitiveness positively predicts perceived academic competitiveness.

1.1.2. Fear of failure

Fear of failure refers to individual differences in the desire to avoid failing across time and situations (Atkinson, 1957). In educational settings, students who fear failure are those who generally make global negative appraisals (e.g., incompetence) and experience shame after performing poorly on academic tasks, especially relative to others (Atkinson & Feather, 1966; McGregor & Elliot, 2005). Because of their strong aversion to failure, these students are likely to be hypervigilant for cues in the learning environment that signal the possibility of failure (e.g., perceiving that others are more capable than oneself; Birney et al., 1969; Higgins, 1997). Thus, students high in fear of failure may perceive a great deal of competitiveness in their classes, even when competition is subtle, ambiguous, or even nonexistent. Positive bivariate correlations have been observed between fear of failure and constructs conceptually related to perceived academic competitiveness (e.g., perceived performance goal structures; Giel et al., 2020; Michou et al., 2013). However, a direct test of the association between fear of failure and perceived academic competitiveness is missing from the literature. We view student fear of failure, like trait competitiveness, as an important foundation—an aversive achievement motive—on which academic competitiveness perceptions are formed. Specifically, we test the hypothesis that fear of failure positively predicts perceived academic competitiveness.

1.1.3. General self-efficacy

General self-efficacy refers to individual differences in the perceived ability to meet or exceed performance standards across time and situations (Chen et al., 2001). In educational settings, self-efficacious students are those who generally believe that their personal resources are sufficient to cope with the situational demands that they encounter at school (e.g., homework, exams; Schunk & DiBenedetto, 2021). When self-efficacy is low, however, students approach academic tasks with less confidence in their abilities and likely view classmates' performance as a threat (Jerusalem & Schwarzer, 1992). Thus, low self-efficacy may prompt more vigilant social comparison and make the school environment seem highly competitive. Negative bivariate correlations have been observed between self-efficacy and constructs conceptually related to perceived academic competitiveness (e.g., perceived performance goal structures; Anderman & Midgley, 1997; Høigaard et al., 2015; Urdan et al., 1998; but see Jiang et al., 2014; Wolters, 2004 for positive correlations). However, a direct test of the association between general self-efficacy and perceived academic competitiveness is missing from the literature. We view general self-efficacy, like trait competitiveness and fear of failure, as an important foundation—a competence perception—on which academic competitiveness perceptions are formed. We focus on general rather than academic self-efficacy to match the scope of trait competitiveness and fear of failure—dispositions that are broader than academic contexts per se (Choi, 2005). Specifically, we test the hypothesis that general self-efficacy negatively predicts perceived academic competitiveness.

1.2. Cultural differences

In the present work, we not only aim to examine how trait competitiveness, fear of failure, and general self-efficacy are associated with perceived academic competitiveness, but we also seek to investigate whether these associations generalize cross-culturally. On one hand, the predictive utility of basic motivation constructs like the three examined herein may be grounded in basic human nature and transcend national boundaries. For example, Ryan and Deci (2019) argue for the universality of the need for autonomy, which was demonstrated by its psychometric invariance (Chirkov & Ryan, 2001), as well as its cross-cultural benefits for student learning (Vansteenkiste et al., 2005), emotional well-being (Yu et al., 2018), and life satisfaction (Sheldon et al., 2009). On the other hand, evidence suggests that the predictive utility of such basic motivation constructs may depend on the cultural context and vary from one nation to the next. For example, Zusho and Clayton (2011) argue that a universalist approach should not apply to motivational constructs in general, which is demonstrated by cross-cultural differences in goal constructs such as performance-approach goals (King et al., 2012) and their culturally-dependent implications for key educational outcomes such as motivational engagement, self-reliance, sense of purpose, and self-concept (King et al., 2017). Accordingly, both universality and cross-cultural variability are plausible with regard to motivation constructs.

In the present work, we aim to estimate the cross-cultural variability of these associations, and then examine whether this variability can be explained using several common cultural dimensions. Specifically, we will test whether Hofstede et al.'s (2010) six country-level cultural dimensions moderate the three focal student-level associations with perceived academic competitiveness (see Study 2 for details). Consistency across different cultural contexts would demonstrate the robustness and generalizability of the predicted associations; variability would, instead, suggest cross-cultural differences that may in turn be explained using frequently studied cultural dimensions.

1.3. Overview

We conducted two preregistered studies to (a) *replicate* the presence of competitiveness projection in educational settings, (b) *extend* research on perceived academic competitiveness by assessing fear of failure and general self-efficacy as additional dispositional predictors, and (c) examine whether these three associations *generalize* across cultural contexts. Accordingly, Study 1 aims to not only *replicate* the established positive association between trait competitiveness and perceived academic competitiveness (Elliot et al., 2018) using a larger sample of nearly 700 undergraduate students based in the United States, but also *extend* this work by examining its unique predictive utility alongside two other foundational achievement motivation constructs: fear of failure (a hypothesized positive predictor; e.g., see Michou et al., 2013) and general self-efficacy (a hypothesized negative predictor; e.g., see Anderman & Midgley, 1997).

Study 2 utilizes data retrieved from the OECD's 2018 PISA Dataset of approximately half a million 15-year-old secondary school students from 73 countries to examine how the Study 1 findings *generalize*. Accordingly, Study 2 quantifies the degree to which the hypothesized associations for trait competitiveness, fear of failure, and general self-efficacy vary across different cultural contexts, enabling a broader consideration of universality beyond purely WEIRD (White, Educated, Industrialized, Rich, Democratic) samples (Henrich et al., 2010). Additionally, we explore potential two-way interactions between the three

dispositional predictors in Study 1 and re-examine these three interactions in Study 2.

In both studies, no manipulations were used, all variables analyzed are reported, and all data were collected before analyses were conducted. In Study 1, all participants provided informed consent, and the work was approved by the local research ethics committee; in Study 2, participant consent was overseen by the PISA team. Preregistration documents, data files, and R code are available on OSF: (https://osf.io/gk28u/). Main findings are presented in this manuscript; see *Supplementary materials* for full results and regression equations.

2. Study 1: undergraduates based in the United States

To (a) *replicate* and (b) *extend* prior work, we first aimed to test the following three preregistered hypotheses using a sample of undergraduate students based in the United States: "Trait competitiveness is a positive predictor of perceived competitiveness" (H1), "Fear of failure is a positive predictor of perceived competitiveness" (H2), and "Self-efficacy is a negative predictor of perceived competitiveness" (H3).

2.1. Method

2.1.1. Sample

We used data collected from undergraduates enrolled in a psychology course at a mid-sized university in the United States.[1] As stated in the preregistration, we retained all students with non-missing values on the focal variables. The final sample consisted of 685 students who participated in the online study in exchange for extra credit during one of three consecutive years that the course was offered (*ns* = 235, 208, and 242). Sample characteristics: 41.9 % Male; 43.2 % White; 73.6 % at least one college-educated parent; $M_{age} = 19.57 \pm 1.43$. The sample was sufficient to detect a small-sized effect with power of 0.75 (two-tailed $\alpha = 0.05$).[2]

2.1.2. Variables

All measures used a 1 (*strongly disagree*) to 5 (*strongly agree*) response scale. *Perceived classroom competitiveness* was measured using Murayama and Elliot's (2012) five-item scale (e.g., "In this class, it seems that students are competing with each other;" $\alpha = 0.87$, $M = 2.38 \pm 0.91$). *Trait competitiveness* was measured using Spence and Helmreich's (1983) five-item scale (e.g., "It is important for me to perform better than others on a task;" $\alpha = 0.77$, $M = 3.34 \pm 0.79$). *Fear of failure* was measured using Thrash and Elliot's (2003) nine-item scale (e.g., "I often avoid a task because I am afraid that I will make mistakes;" $\alpha = 0.81$, $M = 2.92 \pm 0.70$). *General self-efficacy* was measured using Chen et al.'s (2001) eight-item scale (e.g., "I am confident that I can perform effectively on many different tasks;" $\alpha = 0.91$, $M = 3.90 \pm 0.70$).[3]

2.2. Results

2.2.1. Overview of preregistered analyses

All models were analyzed using hierarchical (i.e., sequential) linear regression as implemented by R (R Core Team, 2021) within the RStudio environment (RStudio Team, 2021). We first regressed perceived classroom competitiveness separately onto trait competitiveness, fear of failure, and general self-efficacy. We then regressed perceived classroom competitiveness simultaneously onto the same three predictors to assess their unique predictive contributions. All models were fit while first excluding and then including a preregistered set of five control variables: age, gender, race, parental education, and cohort year. All outcome, predictor, and control variables were mean-centered and scaled by one standard deviation.[4]

2.2.2. Main preregistered analyses

Consistent with H1, the higher a student's trait competitiveness, the more competitiveness they perceived in the classroom. Consistent with H2, the higher a student's fear of failure, the more competitiveness they perceived in the classroom. Contrary to H3, students' general self-efficacy did not significantly predict perceived classroom competitiveness. Findings remained very consistent across the four types of regression models (i.e., separate/simultaneous excluding/including covariates; see Table 1 for the main findings).

2.2.3. Additional (non-preregistered) analyses

We conducted additional analyses to explore potential moderators of the associations observed in the main analyses. Specifically, we tested whether fear of failure or general self-efficacy moderate competitiveness projection, and whether general self-efficacy moderates the positive association between fear of failure and perceived classroom competitiveness. To do so, we regressed perceived competitiveness onto two predictors at a time, along with their respective product term. All interaction models were fit while first excluding and then including the same set of control variables as above.

The results indicated that neither fear of failure nor general self-efficacy moderated competitiveness projection. The fear of failure × self-efficacy interaction, however, was significant: Low general self-efficacy strengthened the positive association between fear of failure and perceived classroom competitiveness (see Fig. 1 for the main findings; see *Supplementary materials* for simple slopes).

2.3. Discussion

In Study 1, in line with our hypotheses, trait competitiveness and fear of failure positively predicted perceived academic competitiveness; contrary to our initial hypothesis, general self-efficacy was not a significant predictor. Additionally, the positive association between fear of failure and perceived academic competitiveness was stronger among students high in general self-efficacy; competitiveness projection was not moderated by either fear of failure or general self-efficacy.

In Study 2, we aimed to replicate the two preregistered hypotheses supported in Study 1, as well as the significant exploratory trait competitiveness × fear failure interaction (this time preregistered), using a large-scale cross-national sample of secondary school students. Using this sample, we also sought to re-examine the predicted negative association between general self-efficacy and perceived academic competitiveness and retest whether fear of failure or self-efficacy moderates competitiveness projection.

The large-scale cross-national sample used in Study 2 allowed us to not only increase statistical power, but also assess the generalizability of the findings in three ways: by shifting the focus from undergraduate to secondary school students; by assessing perceived *school* competitiveness rather than perceived *classroom* competitiveness; and by explicitly examining the cross-national stability of the findings. We also sought to investigate whether differences in perceived school competitiveness across countries could be explained using six commonly studied cultural

[1] Data were collected in the context of a larger project; none of the focal variables reported herein have been reported to date.

[2] The sensitivity analysis was based on 10,000 one-level datasets with the same number of students as in the actual sample. We drew the predictor variable and residuals from separate normal distributions Normal(0, 1) and specified a shared effect for the predictor as $\beta = 0.10$ (i.e., a small-sized effect).

[3] Students reported general self-efficacy at the end of the first week of class, trait competitiveness and fear of failure at the beginning of the following week, and perceived classroom competitiveness later that second week; items and constructs were completed in the same order by each student.

[4] As indicated in the preregistration, we used Cook's distance to identify highly influential observations. No influential cases were observed. See *Supplementary materials* for details.

Table 1
Trait competitiveness, fear of failure, and general self-efficacy predicting perceived academic competitiveness.

Model	Study 1: perceived class competitiveness				Study 2: perceived school competitiveness			
	B		95 % CI		*B*		95 % CI	
			LL	*UL*			*LL*	*UL*
Trait competitiveness								
Separate	0.21	***	0.14	0.29	0.20	***	0.18	0.21
Separate$_{cv}$	0.18	***	0.10	0.25	0.19	***	0.17	0.20
Simultaneous	0.22	***	0.14	0.29	0.14	***	0.13	0.15
Simultaneous$_{cv}$	0.18	***	0.10	0.25	0.13	***	0.12	0.14
Fear of failure								
Separate	0.14	***	0.06	0.21	0.11	***	0.10	0.12
Separate$_{cv}$	0.14	***	0.06	0.21	0.11	***	0.10	0.12
Simultaneous	0.12	**	0.04	0.21	0.10	***	0.09	0.11
Simultaneous$_{cv}$	0.13	**	0.05	0.21	0.11	***	0.10	0.12
General self-efficacy								
Separate	−0.04		−0.12	0.03	0.18	***	0.17	0.20
Separate$_{cv}$	−0.04		−0.11	0.04	0.17	***	0.16	0.19
Simultaneous	−0.02		−0.10	0.06	0.15	***	0.14	0.17
Simultaneous$_{cv}$	−0.01		−0.09	0.08	0.15	***	0.14	0.16

Notes: Separate = models excluding non-focal dispositions; *Simultaneous* = models including non-focal dispositions; subscripted *cv* = models including control variables; *LL* = CI lower limits; *UL* = CI upper limits; *** $p < .001$, ** $p < .01$.

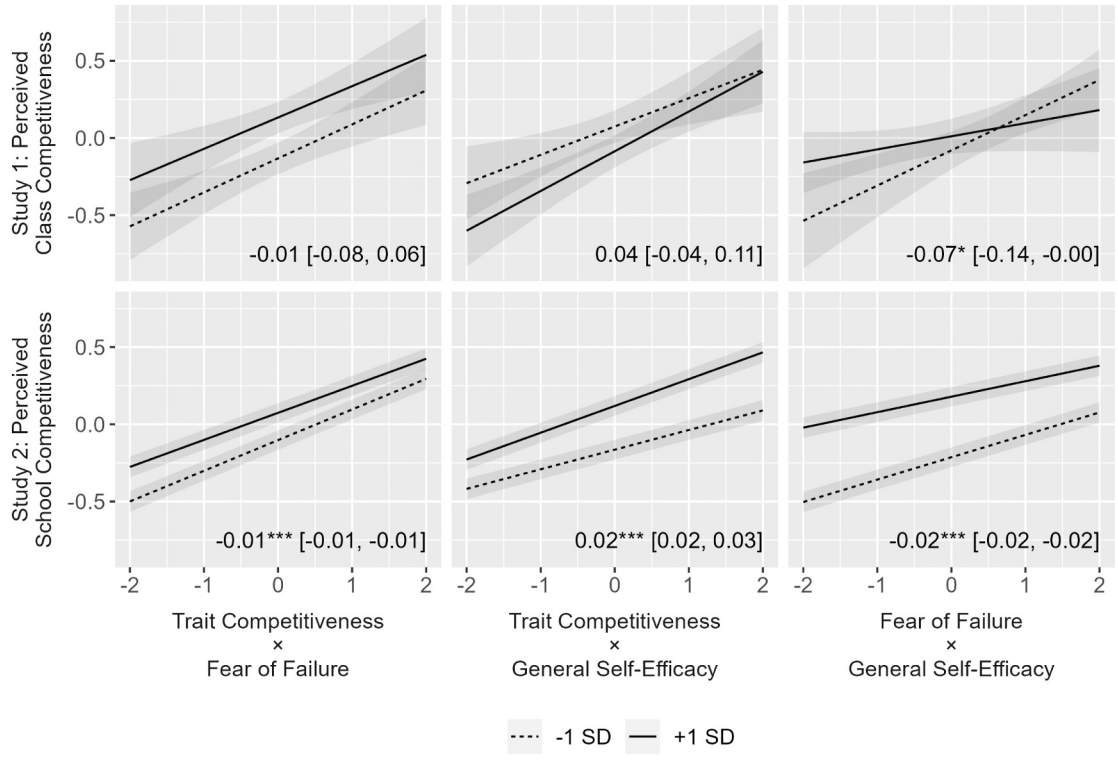

Fig. 1. Student-level interactions predicting perceived academic competitiveness.
Note: Regression lines and estimates come from models excluding control variables; models including control variables produce very similar results. Shaded areas represent 95 % confidence intervals; *** $p < .001$, ** $p < .01$, * $p < .05$.

dimensions (Hofstede et al., 2010; see below for details), and whether these indices could explain variability in the hypothesized student-level associations across countries.

3. Study 2: secondary school students from multiple countries

To (a) *replicate*, (b) *extend*, and (c) *generalize* prior work, we again tested the following three preregistered student-level hypotheses from Study 1: "Trait competitiveness is a positive predictor of perceived competitiveness" (H1), "Fear of failure is a positive predictor of perceived competitiveness" (H2), and "Self-efficacy is a negative predictor of perceived competitiveness" (H3). We also tested the following three preregistered two-way interactions explored in Study 1: Fear of failure (H4) or self-efficacy (H5) moderate the link between trait and perceived competitiveness (patterns unspecified), and "Fear of failure positively predicts perceived competitiveness more strongly at low self-efficacy than at high self-efficacy" (as observed in Study 1; H6).

Additionally, we sought to evaluate whether perceived school

competitiveness and its association with the three student-level predictors depend on Hofstede et al.'s (2010) six cultural dimensions (see preregistration for detailed country-level hypotheses): individualism (extent to which people prioritize themselves and their families over more distant social ties), masculinity (extent to which the gender roles filled by men and women are distinct rather than overlapping), uncertainty avoidance (extent to which uncertain situations are considered threatening and risk is avoided), long-term orientation (extent to which people prioritize virtues associated with future rewards over those related to the past or present), power distance (extent to which people accept discrepant power structures and obey authority), and indulgence (extent to which people are socially permitted to fulfill basic human motivations).

3.1. Method

3.1.1. Sample

We used data from the OECD's 2018 PISA Dataset to test these hypotheses.[5] As stated in the preregistration, we retained all students with non-missing values on the focal variables. The final sample consisted of 440,866 students from 19,989 secondary schools across 73 countries. Student-level sample characteristics: 49.0 % male; 85.2 % native to test country; 57.9 % at least one college-educated parent; $M_{age} = 15.79 \pm 0.29$. Country-level sample characteristics: national population 54.36 ± 169.62 (millions); GDP 26.25 ± 22.76 (2010 USD, thousands); unemployment rate 6.68 % ± 4.34; poverty ratio 1.01 % ± 1.49 (2011 PPP USD 1.90/day); government expenditure on education 4.50 % ± 1.33; income inequality 0.35 ± 0.08 (Gini coefficient). The sample was sufficient to detect a small-sized effect for student-level predictors with power of 0.99+, and country-level predictors with power of 0.73 (when 54 countries available) and 0.81 (when 65 countries available; two-tailed $\alpha = 0.05$).[6]

3.1.2. Variables

3.1.2.1. Student-level variables. All student-level measures used a 1 (*strongly disagree*) to 4 (*strongly agree*) response scale. *Perceived competitiveness* was measured using four items from Murayama and Elliot's (2012) scale used in Study 1 (e.g., "[In my school] it seems that students are competing with each other;" $\bar{\alpha} = 0.82 \pm 0.04$, $M = 2.56 \pm 0.72$, $ICC_{country} = 0.06$ [0.05, 0.09], $ICC_{country|school} = 0.03$ [0.03, 0.05]).[7] *Trait competitiveness* was measured using three items from Spence and Helmreich's (1983) scale used in Study 1 (e.g., "It is important for me to perform better than others on a task;" $\bar{\alpha} = 0.76 \pm 0.05$, $M = 2.84 \pm 0.71$). *Fear of failure* was measured using three items from Conroy et al.'s (2002) five-item scale (e.g., "When I am failing, I worry about what others think of me;" $\bar{\alpha} = 0.80 \pm 0.03$, $M = 2.57 \pm 0.80$). *General self-efficacy* was measured using five items from Wagnild and Young's (1993) scale (e.g., "I feel that I can handle many things at a time;" $\bar{\alpha} = 0.77 \pm 0.05$, $M = 3.01 \pm 0.52$).[8]

3.1.2.2. Country-level variables. Six cultural dimensions were indexed using the most recent (2015) estimates from Hofstede et al.'s (2010) Values Survey Module Data Matrix: individualism, masculinity, uncertainty avoidance, long-term orientation, power distance, and indulgence.[9]

3.2. Results

3.2.1. Overview of preregistered analyses

Across all analyses, we used multilevel models with students (level-1) nested within schools (level-2) nested within countries (level-3). All models were fit using restricted maximum likelihood estimation as implemented by the lmerTest package (Kuznetsova et al., 2017) in R (R Core Team, 2021) within the RStudio environment (RStudio Team, 2021).

3.2.1.1. Student-level hypotheses. As in Study 1, we first regressed perceived school competitiveness separately onto trait competitiveness, fear of failure, and general self-efficacy. We then regressed perceived school competitiveness simultaneously onto the same three student-level predictors to assess their unique predictive contributions. Next, we regressed perceived competitiveness onto two of these predictors at a time, along with their respective product term, to assess student-level interactions.

3.2.1.2. Country-level hypotheses. As above, we first regressed perceived school competitiveness separately onto individualism, masculinity, uncertainty avoidance, long-term orientation, power distance, and indulgence. We then regressed perceived school competitiveness simultaneously onto the same six country-level predictors to assess their unique predictive contributions. Next, we regressed perceived competitiveness onto one student-level predictor and one country-level predictor at a time, along with their respective product term, to assess cross-level interactions. Given that this last set of analyses was relatively exploratory, we considered the 18 cross-level interactions examined to belong to the same family of tests, and preregistered the use of a sequential Bonferroni procedure (Cramer et al., 2016).

3.2.1.3. Control variables. As in Study 1, all analyses were conducted while first excluding and then including the preregistered set of student-level and country-level control variables. Four student-level control variables from the PISA Dataset were used to complement those used in Study 1: age, gender, native to test country, and parental education. Six country-level control variables were obtained to account for economic-based differences between countries: national population, GDP, unemployment rate, poverty ratio, and government expenditure on education were retrieved from the World Bank Database, and income inequality was retrieved from the World Income Inequality Database.

3.2.1.4. Centering, scaling, and random effects. The three student-level predictors were school-mean centered to parallel perceived *school* competitiveness and avoid misleading comparisons between students from different schools and countries; the outcome and student-level control variables were grand-mean centered; and all country-level

[5] A separate study focusing on a distinct set of research questions and hypotheses was preregistered at the same time as the present work; both studies include perceived competitiveness from the 2018 PISA Dataset. This data was not accessed or analyzed prior to either preregistration; both preregistrations can be reviewed on the OSF project page.

[6] Sensitivity analyses were based on 10,000 two-level datasets with the same number of students (level-1) and countries (level-2) as in the actual samples; school-level clustering was ignored to reduce computation demands. We based variance parameters on observed estimates, drew predictor variables from a normal distribution Normal(0, 1), and specified shared effects for predictors as $\beta = 0.10$ (i.e., a small-sized effect).

[7] $\bar{\alpha}$ refers to pooled internal consistency, with equal weighting across countries; $ICC_{country}$ refers to the level-3 intraclass correlation coefficient (i.e., variation explained by between-country differences); $ICC_{country|school}$ refers to the level-2 intraclass correlation coefficient (i.e., variation explained by between-school differences); numbers in brackets represent 95 % confidence intervals.

[8] Items and constructs were completed in the same order by each student; the number of items and points for each scale was set by the PISA team.

[9] Country-level data was not available for all countries with student-level data: individualism, masculinity, uncertainty avoidance, and power distance values were available for 54 countries; long-term orientation and indulgence values were available for 65 countries.

variables were mean centered, with equal weighting across countries. The student-level predictors and outcome variable were scaled by the mean of school-specific standard deviations (i.e., weighted by the number of respondents per school); the student-level control variables were scaled by one standard deviation; and all country-level variables were scaled by one standard deviation, with equal weighting across countries. Across all analyses, random intercepts were specified at both the school and country levels, random slopes for the three student-level predictors were specified at the country level when included as fixed effects, and all random covariances were set to zero.

3.2.2. Preregistered analyses

3.2.2.1. Student-level predictors. Consistent with H1, and replicating Study 1, the higher a student's trait competitiveness, the more competitiveness they perceive at school. Consistent with H2, and replicating Study 1, the higher a student's fear of failure, the more competitiveness they perceive at school. Contrary to H3, and the nonsignificant finding from Study 1, the higher a student's general self-efficacy, the more competitiveness they perceive at school. Findings remained very consistent across the four types of regression models (i.e., separate/simultaneous without/with controls; see Table 1 for the main findings).

3.2.2.2. Student-level interactions. Addressing H4, low fear of failure strengthened the positive association between trait competitiveness and perceived school competitiveness. Addressing H5, high general self-efficacy strengthened the positive association between trait competitiveness and perceived school competitiveness. Consistent with H6, and

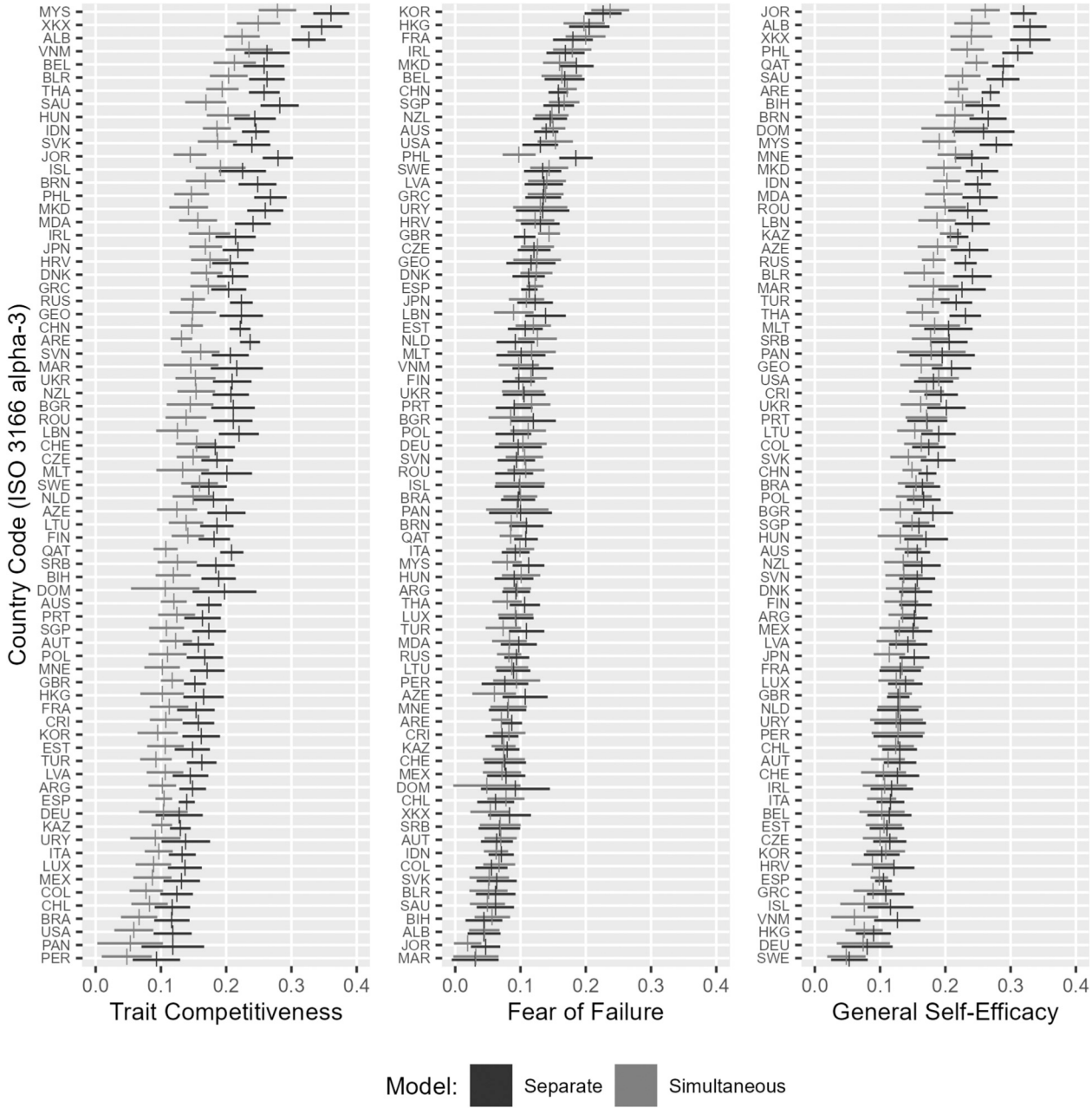

Fig. 2. Predicting perceived school competitiveness by country.
Notes: *Separate* = models excluding non-focal dispositions; *Simultaneous* = models including non-focal dispositions; vertical lines = regression coefficients; horizontal lines = 95 % CIs. Individual two-level models without control variables were estimated for each country and model type (control variable models are very similar; see *Supplementary materials*).

replicating Study 1, low general self-efficacy strengthened the positive association between fear of failure and perceived school competitiveness (see Fig. 1 for the main findings; see *Supplementary materials* for simple slopes).

3.2.2.3. Country-level variability. Significant associations between perceived school competitiveness and all three predictors were observed in over 95 % countries for each type of model (see Fig. 2 for main findings). Excluding random slopes increased the average estimated prediction error, suggesting meaningful variation in the association between perceived school competitiveness and trait competitiveness ($\Delta AIC = 870$), fear of failure ($\Delta AIC = 359$), and general self-efficacy ($\Delta AIC = 1618$; difference scores from separate models excluding control variables). To explain the observed variation across countries, six cultural dimensions are tested as moderators of the three focal student-level associations.

3.2.2.4. Country-level predictors. First, none of the six cultural dimensions that we examined predicted perceived school competitiveness in a direction consistent with our preregistered hypotheses. Uncertainty avoidance and long-term orientation did predict perceived school competitiveness, but in a direction inconsistent with our hypotheses; the significance of these findings, however, depended on the specific model used (i.e., separate/simultaneous without/with covariates). Altogether, we deemed these findings inconclusive.

3.2.2.5. Country-level interactions. Most of the observed variation in slopes across countries (Fig. 2) remained unexplained; only one of the 18 preregistered cross-level interactions that we examined was significant. As predicted, high power distance strengthened the positive association between general self-efficacy and perceived school competitiveness; all other interactions were non-significant (see *Supplementary materials* for simple slopes and Bonferroni procedure).

4. General discussion

In the present research, we examined three achievement motivation constructs as dispositional predictors of perceived academic competitiveness. Across two studies, we observed three sets of findings. First, in line with our hypotheses, trait competitiveness and fear of failure positively predicted perceived academic competitiveness in both studies; contrary to our initial hypothesis, general self-efficacy was also a positive predictor, but only in the second study. Second, these associations varied systematically across students: competitiveness projection was stronger among students low in fear of failure and high in general self-efficacy (in the second study), and the positive association between fear of failure and perceived academic competitiveness was stronger among students high in general self-efficacy (in both studies). Third, the three focal associations varied a small amount from one country to the next but remained largely unrelated to the six cultural dimensions analyzed in the second study. Altogether, these results suggest that students higher in trait competitiveness, fear of failure, and general self-efficacy perceive more competitiveness in the learning environment, and that they do so regardless of the cultural context.

Prior research has observed that undergraduates project their competitiveness onto other students in the classroom (Elliot et al., 2018). Here, we not only found this to replicate using a larger sample of undergraduates in the classroom, but also documented that competitiveness projection occurs among students at the broader (secondary) school level across 73 different countries. Moreover, we observed that dispositions other than trait competitiveness shape students' competitiveness perceptions, and that these too generalize cross-culturally. Indeed, given the presence of significant results in over 95 % of the countries analyzed, the modest variability in the results across countries, and the lack of moderation by cultural dimension, the three focal associations appear largely generalizable among the developed nations assessed in the second study. While care is necessary when interpreting null results, the relative stability observed across these three dispositions provides preliminary evidence that these associations may be grounded in basic human nature rather than culturally driven socialization processes.

A broad take-home message from our research is that perceptions of academic competitiveness are predicted not only by the actual situation, as previous work suggests (e.g., perceived teacher goal emphases; Bae & DeBusk-Lane, 2018; Cho et al., 2018; Karakus, 2016; Madjar et al., 2018; Schiefele, 2017), but also by the dispositions that students carry with them from one class to the next. The present work indicates that trait competitiveness, while a central and consistent predictor, is not the only dispositional achievement motivation construct that shapes students' perceptions of academic competitiveness. Rather, fear of failure and general self-efficacy uniquely and interactively contribute to students' competitive appraisals of their learning environments. Future work would do well to expand the focus of this work to other central constructs in the achievement motivation literature such as achievement values (Wigfield & Eccles, 2000), achievement attributions (Weiner, 1985), and implicit theories of intelligence (Dweck, 1999).

The present research also indicates that trait competitiveness, fear of failure, and general self-efficacy are *robust* predictors of perceived academic competitiveness. Although we found evidence for each association across the vast majority of countries included in the PISA dataset (over 95 %), we also observed that the size of these associations varied modestly across national boundaries. Importantly, the six cultural dimensions considered in the present research—individualism, masculinity, uncertainty avoidance, long-term orientation, power distance, and indulgence—did not account for this variability. Thus, future research will need to examine alternative country-level moderators. For example, national income inequality has been found to explain cross-cultural differences in both trait and perceived competitiveness at school (Sommet et al., 2022) and may, therefore, also account for differences in the association between these two competitiveness constructs.

In addition to varying on a global level, the three focal associations may vary on a more local level (e.g., the classroom) as well. In the present research, we considered the possibility that perceived academic competitiveness is a function of not only the situation but also the person ($B = f(S,P)$; Lewin, 1951). Our findings indicate that the person does indeed play a role, but the precise ways that local situations and motivational dispositions work together to shape competitiveness perceptions awaits further analysis. Situations and dispositions may operate *independently* (e.g., normative grading structures and general self-efficacy uniquely promote competitiveness perceptions), *interactively* (e.g., teachers' competition-relevant messages foster competitiveness perceptions in general, but students high in fear of failure perceive competitiveness even when those messages are vague), or *sequentially* (e.g., competitiveness perceptions shaped by dispositional competitiveness prompt competitive behaviors that cue competitiveness for others).

4.1. Practical implications

Given the prevalence and consequences of competitiveness perceptions at school (Ames & Archer, 1988), developing a more nuanced understanding of its multifaceted underpinnings is critical. For example, practitioners may ultimately need to accept that perceptions of academic competitiveness may not be as easily changed as originally thought (Ames, 1992), given their grounding in stable achievement motivation constructs (as documented herein; for congruent evidence, see Gillespie et al., 2003; Olson et al., 2001). An important emphasis may thus become teaching students how to regulate and cope with their perception that their academic environment is competitive, although, definitive conclusions and recommendations require additional work examining the precise ways that situations and dispositions work

together to influence competitiveness perceptions.

4.2. Limitations

Several limitations of our research should be acknowledged. The results for general self-efficacy in the second study not only diverged from our initial predictions but also from those in the first study. These differences could be due to the age of participants, the specific measures used, or the target contexts assessed (classroom vs. school). Further work is needed to replicate this unexpected result and investigate its underlying causes. Additionally, the generalizability observed herein only extends to the developed countries included in the PISA dataset; the associations may differ in developing countries. Lastly, students higher in trait competitiveness, fear of failure, and general self-efficacy may opt into more competitive academic environments and perceive more competitiveness as a result. Given the cross-sectional nature of the present work, determinations on the precise causal mechanisms await further research.

4.3. Conclusions

In conclusion, we believe the present research provides valuable insight into the factors that prompt certain students to perceive competitiveness in the learning environment. Perceiving a learning environment as competitive depends on more than just the structural components that are perceived; students' dispositions play an important role as well. In addition, our research indicates that these dispositional influences are not limited to trait competitiveness, but instead involve a broader array of achievement motivation constructs, including fear of failure and general self-efficacy. Finally, our research suggests that these associations generalize cross-culturally, indicating that the predictive utility of trait competitiveness, fear of failure, and general self-efficacy does not depend on the broader cultural context. Rather, whether any given student across the globe perceives competitiveness in their learning environment depends, in large part (at the population level), on their individual-level motivational dispositions, unconstrained by national boundaries.

CRediT authorship contribution statement

David L. Weissman: Conceptualization, Methodology, Software, Formal Analysis, Data Curation, Writing - Original Draft Preparation; Visualization; Andrew J. Elliot: Conceptualization, Methodology, Writing - Reviewing and Editing, Supervision; Nicolas Sommet: Conceptualization, Methodology, Writing - Reviewing and Editing.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Appendix A. Supplementary materials

Supplementary materials for this article can be found online at https://doi.org/10.1016/j.paid.2022.111801.

References

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*(3), 260–267. https://doi.org/10.1037/0022-0663.80.3.260

Anderman, E. M., & Midgley, C. (1997). Changes in achievement goal orientations, perceived academic competence, and grades across the transition to middle-level schools. *Contemporary Educational Psychology, 22*(3), 269–298. https://doi.org/10.1006/ceps.1996.0926

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review, 64*(6, Pt.1), 359–372. https://doi.org/10.1037/h0043445

Atkinson, J. W., & Feather, N. T. (1966). *A theory of achievement motivation* (Vol. 66). New York: Wiley.

Bae, C. L., & DeBusk-Lane, M. (2018). Motivation belief profiles in science: Links to classroom goal structures and achievement. *Learning and Individual Differences, 67*, 91–104. https://doi.org/10.1016/j.lindif.2018.08.003

Bardach, L., Oczlon, S., Pietschnig, J., & Lüftenegger, M. (2019). Has achievement goal theory been right? A meta-analysis of the relation between goal structures and personal achievement goals. *Journal of Educational Psychology.*. https://doi.org/10.1037/edu0000419

Birney, R. C., Burdick, H., & Teevan, R. C. (1969). *Fear of failure*. Van Nostrand-Reinhold Company.

Brown, S. P., Cron, W. L., & Slocum, J. W. (1998). Effects of trait competitiveness and perceived intraorganizational competition on salesperson goal setting and performance. *Journal of Marketing, 62*(4), 88–98. https://doi.org/10.2307/1252289

Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods, 4*(1), 62–83. https://doi.org/10.1177/109442810141004

Chirkov, V. I., & Ryan, R. M. (2001). Parent and teacher autonomy-support in Russian and US adolescents: Common effects on well-being and academic motivation. *Journal of Cross-Cultural Psychology, 32*(5), 618–635.

Cho, E., Lee, M., & Toste, J. R. (2018). Does perceived competence serve as a protective mechanism against performance goals for struggling readers? Path analysis of contextual antecedents and reading outcomes. *Learning and Individual Differences, 65*, 135–147. https://doi.org/10.1016/j.lindif.2018.05.017

Choi, N. (2005). Self-efficacy and self-concept as predictors of college students' academic performance. *Psychology in the Schools, 42*(2), 197–205. https://doi.org/10.1002/pits.20048

Conroy, D. E. (2017). Achievement motives. In A. J. Elliot, C. S. Dweck, & D. S. Yeager (Eds.), *Handbook of competence and motivation: Theory and application* (2nd, pp. 25–42). The Guilford Press.

Conroy, D. E., Willow, J. P., & Metzler, J. N. (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

Cramer, A. O. J., van Ravenzwaaij, D., Matzke, D., Steingroever, H., Wetzels, R., Grasman, R. P. P. P., Waldorp, L. J., & Wagenmakers, E.-J. (2016). Hidden multiplicity in exploratory multiway ANOVA: Prevalence and remedies. *Psychonomic Bulletin & Review, 23*(2), 640–647. https://doi.org/10.3758/s13423-015-0913-5

Deutsch, M. (1949). A theory of co-operation and competition. *Human Relations, 2*(2), 129–152. https://doi.org/10.1177/001872674900200204

Dweck, C. S. (1999). Self-theories: Their role in motivation, personality, and development. In *Psychology Press*. https://doi.org/10.4324/9781315783048

Elliot, A. J., & Dweck, C. S. (Eds.). (2005). *Handbook of competence and motivation*. Guilford Press.

Elliot, A. J., & Hulleman, C. S. (2017). Achievement goals. In A. J. Elliot, C. S. Dweck, & D. S. Yeager (Eds.), *Handbook of competence and motivation: Theories and applications* (2nd ed., pp. 43–60). Guilford Press.

Elliot, A. J., Jury, M., & Murayama, K. (2018). Trait and perceived environmental competitiveness in achievement situations. *Journal of Personality, 86*(3), 353–367. https://doi.org/10.1111/jopy.12320

Giel, L. I. S., Noordzij, G., Noordegraaf-Eelens, L., & Denktaş, S. (2020). Fear of failure: A polynomial regression analysis of the joint impact of the perceived learning environment and personal achievement goal orientation. *Anxiety, Stress, & Coping, 33*(2), 123–139. https://doi.org/10.1080/10615806.2019.1695603

Gillespie, N. A., Cloninger, C. R., Heath, A. C., & Martin, N. G. (2003). The genetic and environmental relationship between Cloninger's dimensions of temperament and character. *Personality and Individual Differences, 35*(8), 1931–1946. https://doi.org/10.1016/S0191-8869(03)00042-4

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences, 33*(2–3), 61–83.

Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist, 52*(12), 1280–1300. https://doi.org/10.1037/0003-066X.52.12.1280

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind* (3rd ed.). McGraw Hill Professional.

Høigaard, R., Kovač, V. B., Øverby, N. C., & Haugen, T. (2015). Academic self-efficacy mediates the effects of school psychological climate on academic achievement. *School Psychology Quarterly, 30*(1), 64–74. https://doi.org/10.1037/spq0000056

Jerusalem, M., & Schwarzer, R. (1992). Self-efficacy as a resource factor in stress appraisal processes. In *Self-efficacy: Thought control of action* (pp. 195–213). Hemisphere Publishing Corp.

Jiang, Y., Song, J., Lee, M., & Bong, M. (2014). Self-efficacy and achievement goals as motivational links between perceived contexts and achievement. *Educational Psychology, 34*(1), 92–117. https://doi.org/10.1080/01443410.2013.863831

Karakus, M. (2016). *Understanding the mastery-avoidance goals construct: An investigation among middle school students in two domains*. Ph.D. Temple University http://search.proquest.com/pqdtglobal/docview/1798461077/abstract/3B8A68CFEEA2488CPQ/.

King, R. B., Mcinerney, D. M., & Nasser, R. (2017). Different goals for different folks: A cross-cultural study of achievement goals across nine cultures. *Social Psychology of Education: An International Journal, 20*(3), 619–642. https://doi.org/10.1007/s11218-017-9381-2

King, R. B., McInerney, D. M., & Watkins, D. A. (2012). Competitiveness is not that bad… at least in the east: Testing the hierarchical model of achievement motivation in the Asian setting. *International Journal of Intercultural Relations, 36*(3), 446–457. https://doi.org/10.1016/j.ijintrel.2011.10.003

Krueger, J. I. (2000). The projective perception of the social world. In J. Suls, & L. Wheeler (Eds.), *Handbook of social comparison* (pp. 323–351). US: Springer. https://doi.org/10.1007/978-1-4615-4237-7_16.

Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest package: Tests in linear mixed effects models. *Journal of Statistical Software, 82*(13). https://doi.org/10.18637/jss.v082.i13

Lewin, K. (1951). In D. Cartwright (Ed.), *Field Theory in Social Science: Selected Theoretical Papers*.

Lewin, K., Dembo, T., Festinger, L., & Sears, P. S. (1944). Level of aspiration. In *ersonality and the behavior disorders* (pp. 333–378). Ronald Press.

Madjar, N., Cohen, V., & Shoval, G. (2018). Longitudinal analysis of the trajectories of academic and social motivation across the transition from elementary to middle school. *Educational Psychology, 38*(2), 221–247.

Marsh, H. W., Martin, A. J., Yeung, A. S., & Craven, R. G. (2017). Competence self-perceptions. In A. J. Elliot, C. S. Dweck, & D. S. Yeager (Eds.), *Handbook of competence and motivation: Theory and application* (2nd, pp. 85–115). The Guilford Press.

McGregor, H. A., & Elliot, A. J. (2005). The shame of failure: Examining the link between fear of failure and shame. *Personality and Social Psychology Bulletin, 31*(2), 218–231. https://doi.org/10.1177/0146167204271420

Meece, J. L., Anderman, E. M., & Anderman, L. H. (2006). Classroom goal structure, student motivation, and academic achievement. *Annual Review of Psychology, 57*(1), 487–503. https://doi.org/10.1146/annurev.psych.56.091103.070258

Michou, A., Mouratidis, A., Lens, W., & Vansteenkiste, M. (2013). Personal and contextual antecedents of achievement goals: Their direct and indirect relations to students' learning strategies. *Learning and Individual Differences, 23*, 187–194. https://doi.org/10.1016/j.lindif.2012.09.005

Murayama, K., & Elliot, A. J. (2012). The competition–performance relation: A meta-analytic review and test of the opposing processes model of competition and performance. *Psychological Bulletin, 138*(6), 1035–1070. https://doi.org/10.1037/a0028324

Olson, J. M., Vernon, P. A., Harris, J. A., & Jang, K. L. (2001). The heritability of attitudes: A study of twins. *Journal of Personality and Social Psychology, 80*(6), 845–860. https://doi.org/10.1037/0022-3514.80.6.845

R Core Team. (2021). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.R-project.org/.

RStudio Team. (2021). RStudio: Integrated development for R. RStudio. https://rstudio.com/.

Ryan, R. M., & Deci, E. L. (2019). Brick by brick: The origins, development, and future of self-determination theory. In *, 6. Advances in motivation science* (pp. 111–156). Elsevier. https://doi.org/10.1016/bs.adms.2019.01.001.

Schiefele, U. (2017). Classroom management and mastery-oriented instruction as mediators of the effects of teacher motivation on student motivation. *Teaching and Teacher Education, 64*, 115–126. https://doi.org/10.1016/j.tate.2017.02.004

Schunk, D. H., & DiBenedetto, M. K. (2021). Self-efficacy and human motivation. In A. J. Elliot (Ed.), *8. Advances in Motivation Science*. Elsevier.

Sheldon, K. M., Abad, N., & Omoile, J. (2009). Testing self-determination theory via nigerian and indian adolescents. *International Journal of Behavioral Development, 33*(5), 451–459. https://doi.org/10.1177/0165025409340095

Sommet, N., Weissman, D. L., & Elliot, A. J. (2022). Income inequality predicts competitiveness and cooperativeness at school. *Journal of Educational Psychology*. https://doi.org/10.1037/edu0000731

Spence, J. T., & Helmreich, R. L. (1983). In *Achievement-related motives and behaviors. Achievement and achievement motives: Psychological and sociological approaches* (pp. 7–74).

Thrash, T. M., & Elliot, A. J. (2003). Inspiration as a psychological construct. *Journal of Personality and Social Psychology, 84*(4), 871–889. https://doi.org/10.1037/0022-3514.84.4.871

Urdan, T. (2010). The challenges and promise of research on classroom goal structures. In J. L. Meece, & J. S. Eccles (Eds.), *Handbook of research on schools, schooling and human development*. Routledge. https://doi.org/10.4324/9780203874844.ch7.

Urdan, T., Midgley, C., & Anderman, E. M. (1998). The role of classroom goal structure in students' use of self-handicapping strategies. *American Educational Research Journal, 35*(1), 101–122. https://doi.org/10.3102/00028312035001101

Vansteenkiste, M., Zhou, M., Lens, W., & Soenens, B. (2005). Experiences of autonomy and control among Chinese learners: Vitalizing or immobilizing? *Journal of Educational Psychology, 97*(3), 468.

Wagnild, G. M., & Young, H. M. (1993). Development and psychometric evaluation of the Resilience Scale. *Journal of Nursing Measurement, 1*(2), 165–178.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review, 92*(4), 548.

Wigfield, A., & Eccles, J. S. (2000). Expectancy–value theory of achievement motivation. *Contemporary Educational Psychology, 25*(1), 68–81.

Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology, 96*(2), 236–250. https://doi.org/10.1037/0022-0663.96.2.236

Yu, S., Levesque-Bristol, C., & Maeda, Y. (2018). General need for autonomy and subjective well-being: A meta-analysis of studies in the US and East Asia. *Journal of Happiness Studies, 19*(6), 1863–1882.

Zusho, A., & Clayton, K. (2011). Culturalizing achievement goal theory and research. *Educational Psychologist, 46*(4), 239–260. https://doi.org/10.1080/00461520.2011.614526