PreReg

Preregistration for Quantitative Research in Psychology Template

Not all of the following are relevant for every study; registries will make fields required or not as relevant.

Title

T1 Title
The title should be focused and descriptive, using relevant key terms to reflect what will be done in the study. Use title case (https://apastyle.apa.org/style-grammar-guidelines/capitalization/title-case).
Satisfaction, Enthusiasm, and Well-Being of Student Teachers: A Question of Appreciation?

T2 Contributors, Affiliations, and Persistent IDs (recommend ORCID iD)
Provide in separate entries the full name of each contributor, each contributor's professional affiliation, and each contributor's persistent ID. See ORCID iD for an example of persistent ID (https://orcid.org/). Optional: include the intended contribution of each person listed (e.g. statistical analysis, data collection; see CRediT, https://casrai.org/credit/).
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T3 Date of Preregistration
This is assigned by the system upon preregistration submission.

T4 Versioning information
This is assigned by the system upon submission of original and subsequent revisions. Should be a persistent identifier, if not a DOI.

T5 Identifier
This unique identifier is assigned by the system upon submission.

T6 Estimated duration of project
Include a best estimate for how long the project will take from preregistration submission to project completion.
5 months

T7 IRB Status (Institutional Review Board/Independent Ethics Committee/Ethical Review Board/Research Ethics Board)
If the study will include human or animal subjects, provide a brief overview of plans for the treatment of those subjects in accordance with established ethical guidelines. If appropriate institutional approval has been obtained for the study, provide the relevant identifier here. If the study will be exempt from ethical board review, provide reasoning here.
No assessment by an ethics committee was made for the present study, as it was an anonymous online survey.

T8 Conflict of Interest Statement

Identify any real or perceived conflicts of interest with this study execution. For example, any interests or activities that might be seen as influencing the research (e.g., financial interests in a test or procedure, funding by pharmaceutical companies for research).

No conflicts of interest.

T9 Keywords

Include terms specific to your topic, methodology, and population. Use natural language and avoid words used in the title or overly general terms. If you need help with keywords, try a keyword search using your proposed keywords in a search engine to check results.

student teachers, appreciation, esteem, higher education

T10 Data accessibility statement and planned repository

We plan to make the data available (drop down; yes, no)
If "yes", please specify the planned data availability level (drop down):

- Data access via download; usage of data for all purposes (public use file)
- Data access via download; usage of data restricted to scientific purposes (scientific use file)
- Data access via download; usage of data has to be agreed and defined on an individual case basis
- Data access via secure data center (no download, usage/analysis only in a secure data center)
- Data available upon email request by member of scientific community
- Other (please specify)

Yes, data access via download, usage of data restricted to scientific purposes

T11 Optional: Code availability

We plan to make the code available (drop down; yes, no)
If "yes", please specify the planned code availability level (drop down):
(Use same descriptors of data in T10)
-Other (please specify)

Yes, code access via download, usage of data restricted to scientific purposes

T12 Optional: Standard lab practices
Standard lab practices is a (timestamped) document, software package, or similar, which specifies standard pipelines, analytical decisions, etc. which always apply to certain types of research in a lab. Specify here and refer to at the appropriate positions in the remainder of the template. Drop Downs: We plan to make the standard lab practices available (yes, no) If "yes", please specify the planned standard lab practices availability level: (Use same descriptors of data in T10)
no

Abstract

(150 words)

A1 Background

(See introduction I1)

The systematic review by Schneider & Preckel (2017) indicates the relevance of lecturers' respect and friendliness towards the students for student success. At German universities, subject and teacher training students attend joint courses and there are already findings that these groups are assessed differently in terms of their competence and that the latter group might feel devalued by the lecturers. (*60*)

A2 Objectives and Research questions

(See introduction I2)

We are interested in how teacher training students feel appreciated in comparison to subject students and examine contextual and individual predictors of appreciation. Further, we examine the effect of appreciation on well-being and criteria of study satisfaction. (*39*)

A3 Participants

(See methods M4)

N = 1255 teaching students of different subjects in bachelor and master courses. (*13*)

A4 Study method

(See methods M10-14)

Panel study with teacher students who rated perceived appreciation for each of their two subjects. Predictors and outcomes of these ratings are analyzed applying a multilevel-analysis with subjects nested in students. (*31*)

Introduction

(no word limit)

I1 Theoretical background

Provide a brief overview that justifies the research hypotheses.

The systematic review by Schneider & Preckel (2017) indicates that lecturers' respect and friendliness, i.e. appreciative behaviors, towards the students are one key factor for student achievement, with an average effect of d = .47 across the studies reviewed.
At German universities, subject and teacher training students attend joint courses. Since these groups differ in terms of study structures and aims, it happens that they are assessed differently in terms of their competence (Ihme & Möller, 2015) and the latter group might feel devalued by the lecturers (Erdmann & Ratzlaff, 2017).
In addition to achievement, lecturers' appreciation of students might also be associated with other criteria of academic success, such as satisfaction and enthusiasm in the subjects studied, the intention to quit as well as psychological well-being, as findings in occupational contexts and for in-service teachers suggest (e.g. Gavish & Friedman, 2010; Sirlopú & Renger, 2020).

I2 Objectives and Research question(s)

Outline objectives and research questions that inform the methodology and analyses (below).

The current study focuses on perceived appreciation by lecturers in order to extend the findings for the population of teacher training students. We are interested in how this group feels appreciated in comparison to subject students and examine contextual and individual predictors of perceived appreciation (*RQ1*). Further, we examine the effect of perceived appreciation on well-being and criteria of academic success (*RQ2*).

RQ1:
What is the average level of perceived appreciation and which contextual conditions and personal characteristics have an effect on perceived appreciation? Predictors such as gender, final grade in school (Abiturnote) and intended degree (bachelor's, master's) as well as the subjects studied with regard to their subject group (STEM vs. other subject groups) and the relative proportion of student teachers in the respective subject are examined.

RQ2:
How does perceived appreciation influence course satisfaction and enthusiasm in the respective subject in the long term? Which effect does perceived appreciation have on general study satisfaction as well as stress factors such as emotional exhaustion and intention to quit studies?

I3 Hypothesis (H1, H2, …)

Provide hypothesis for predicted results. If multiple hypotheses, uniquely number them (e.g., H1, H2a, H2b,) and refer to them the same way at other points in the registration document and in the manuscript.

RQ1
H1a:
Subject group (STEM vs. other subject groups) is a significant predictor of perceived appreciation. Based on previous findings, we assume that perceived appreciation is lower in STEM subjects than in other subject groups.
H1b:
The proportion of student teachers in the subject (relative to all students in the subject) is a significant predictor of perceived appreciation. We assume that perceived appreciation is higher in subjects with a high proportion of student teachers.

RQ2
H2a:
Perceived appreciation (T_1) exhibits a positive relationship with course satisfaction (T_2), controlling for course satisfaction at T_1. (subject-specific variables)
H2b:
Perceived appreciation (T_1) exhibits a positive relationship with subject enthusiasm (T_2), controlling for subject enthusiasm at T_1. (subject-specific variables)

H3a:
Perceived appreciation (T_1) exhibits a positive relationship with general study satisfaction (T_2), controlling for general study satisfaction at T_1. (examined at level 2; student level)
H3b:
Perceived appreciation (T_1) exhibits a negative relationship with emotional exhaustion (T_2), controlling for emotional exhaustion at T_1. (examined at level 2; student level)
H3c:
Perceived appreciation (T_1) exhibits a negative relationship with intention to quit studies (T_2), controlling for intention to quit studies at T_1. (examined at level 2; student level)

I4 Exploratory research questions (if applicable; E1, E2, ...)

If planning exploratory analyses, provide rationale for them here. If multiple exploratory analyses, uniquely number them (E1, E2, ...) and refer to them in the same way in the registration document and in future publications.

E1
Individual person characteristics such as gender, final grade in school, and intended degree (bachelor's, master's) are included in our models as covariates as they might have an effect on perceived appreciation.
E2
We examine, whether individual person characteristics such as gender, final grade in school, and intended degree (bachelor's, master's) moderate the association between subject group and perceived appreciation as well as between proportion of student teachers in the subject and perceived appreciation.

Method

M1 Time point of registration
Drop Down Options: Registration prior to creation of data; Registration prior to any human observation of the data; Registration prior to accessing the data; Registration prior to analysis of the data; Other (please specify; might include if T1 longitudinal data has been analyzed, but T2 has not yet been analyzed)
Registration prior to analysis of the data

M2 Proposal: Use of pre-existing data (re-analysis or secondary data analysis)
Will pre-existing data be used in the planned study? If yes, indicate if the data were previously published and specify the source of the data (e.g., DOI or APA style reference of original publication). Specify your level of knowledge of the data (e.g., descriptive statistics from previous publications), whether or not this is relevant for the hypotheses of the present study, and how it is assured that you are unaware of results or statistical patterns in the data of relevance to the present hypotheses.
The data are not yet publicly available and the descriptive statistics are known. However, no analyses have yet been performed with regard to the current research questions.

Sampling Procedure and Data Collection

M3Sample size, power and precision
(1) Relevant sample sizes: e.g., single groups, multiple groups, and sample sizes (or sample ranges) found at each level of multilevel data. (2) Provide power analysis (e.g. power curves) for fixed-N designs. For sequential designs, indicate your 'stopping rule' such as the points at which you intend to be viewing your data and in any way analyzing them (e.g., t-tests and correlations, but even descriptively such as with histograms).
(1) Between-level (students): $K = 1255$; Within-level (subjects): $N = 2510$

M4 Participant recruitment, selection, and compensation

Indicate (a) methods of recruitment (e.g., subject pool advertisement, community events, crowdsourcing platforms, snowball sampling); (b) selection and inclusion/exclusion criteria (e.g., age, visual acuity, language facility); (c) details of any stratification sampling used; (d) planned participant characteristics (Gender, Race/Ethnicity, Sexual Orientation and Gender Identity, SES, education level, age, disability or health status, geographic location); (e) compensation amount and method (e.g., same payment to all, pay based on performance, lottery).

(a) The sample of teacher training students was recruited by an advertising campaign. More specifically, students were informed about the project several times via email and through their lecturers.
(b) Inclusion criterion: Matriculation in a teaching degree program at Kiel University
(c) —
(d) Representative sample of teacher training students at Kiel University
(e) Among all participants who had completely filled out the survey, 100 vouchers of € 10 each were raffled. As this is a panel study, 20 additional vouchers of € 50 each were raffled off to participants who had already taken part 3 times or more. This lottery took place at each measurement occasion.

M5 How will participant drop-out be handled?

Indicate any special treatment for participants who drop out (e.g., they are deleted from the data file entirely; there is follow-up in a manner different from the main sample) or whether participants are replaced.

There is no special treatment for participants who drop out.

M6 Masking of participants and researchers

Indicate all forms of masking and/or allocation concealment (e.g., administrators, data collectors, raters, confederates are unaware of the condition to which participants were assigned).

As this is a panel study, no masking was done.

M7 Data cleaning and screening

Indicate all steps related to data quality control, e.g., outlier treatment, identification of missing data, checks for normality, etc.

a) In the course of data cleaning, all cases with missing values on all variables are excluded.
b) All participants who started the survey but completed less than 10% of the items are excluded.
c) Individuals not affiliated with a teaching degree are excluded.
d) To identify extreme response tendencies, two variables are calculated in which the number of most frequent consecutive extra responses ("left-crossers," "right-crossers") from each person are summed. The sum of the left- and right-crossers is calculated and checked for outliers via boxplot diagram. These outliers are excluded from the analysis sample.
e) Subjects with duplicate subject codes are excluded. There are several decision rules for this:
   (1) If the survey was completed once and interrupted once, the data set with the completed survey is retained;
   (2) The case with the smaller number of missing values is retained;
   (3) The data from the chronologically earlier participation is retained.

M8 How will missing data be handled?

Indicate (a) case deletions; (b) averaging across scale items (to handle missing items for some); (c) test of missingness (MAR, MCAR, MNAR assumptions; (d) imputation procedures (FIML vs. MI); (e) Intention to treat analysis and per protocol analysis (as appropriate).

(1) If individual data such as item ratings are missing for a participant, then the scale is only formed if at least half plus one additional item have been crossed.
(2) If participants drop out in the longitudinal sample, it is checked whether the drop-outs are systematic or whether MAR can be assumed.
(3) If MAR applies, then the data is analyzed using FIML to prevent bias due to listwise deletion.

M9 Other information (optional)

For example, training of raters/participants or anything else not yet specified.

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Conditions and design

M10 Type of study and study design

Indicate the type of study (e.g., experimental, observational, cross-sectional vs. longitudinal, single case, clinical trial) and planned study design (e.g., between vs. within subjects, factorial, repeated measures, etc.), number of factors and factor levels, etc..

Type of study: Panel study, two measurement occasions

Planned Study Design: Multilevel-analysis with students as clusters (Level 2) and their subjects (two per student) on Level 1

M11 Randomization of participants and/or experimental materials

If applicable, describe how participants are assigned to conditions or treatments, how stimuli are assigned to conditions, and how presentation of tests, trials, etc. is randomized. Indicate the randomization technique and whether constraints were applied (pseudo-randomization). Indicate any type of balancing across participants (e.g., assignments of responses to hands, etc.).

No randomization was performed in the present study

M12 Measured variables, manipulated variables, covariates

This section shall be used to unambiguously clarify which variables are used to operationalize the hypotheses specified above (item I3). Please (a) list all measured variables, and (b) explicitly state the functional role of each variable (i.e., independent variable, dependent variable, covariate, mediator, moderator). It is important to (c) specify for each hypothesis how it is operationalized, i.e., which variables will be used to test the respective hypothesis and how the hypothesis will be operationally defined in terms of these variables. The description here shall be consistent with the statistical analysis plans specified under AP5 (below).

(a)
Control Variables:
Gender, final school grade (Abiturnote), intended degree (bachelor's, master's)
Level 2 Variables:
Appreciation (T_1), intention to quit (T_1, T_2), satisfaction with studies (T_1, T_2), emotional exhaustion (T_1, T_2)
Level 1 Variables:
Appreciation (T_1), Satisfaction with courses (T_1, T_2), subject enthusiasm (T_1, T_2), subject group (STEM vs. non-STEM; dummy), proportion of teacher training students in the respective subject (ranging from 0 to 1)

(b) and (c)
To test the hypotheses of research questions 1 and 2, multilevel regression models are set up stepwise.

RQ1
H1a
Dependent variable: appreciation (Level 1)
Independent variables: subject group (STEM vs. other subject groups) (Level 1)
Covariates (*E1*): gender, final grade in school, intended degree (Level 2)
Cross-Level-Interaction (*E2*), i.e. covariates on the effect between IV and DV
H1b
Dependent variable: appreciation (Level 1)
Independent variables: proportion of teacher training students (Level 1)
Covariates (*E1*): gender, final grade in school, intended degree (Level 2)
Cross-Level-Interaction (*E2*), i.e. covariates on the effect between IV and DV

RQ2
H2a
Dependent variable: course satisfaction (T_2)
Independent variable: appreciation (T_1), course satisfaction (T_1)
Covariates (*E1*): gender, final grade in school, intended degree
H2b
Dependent variable: subject enthusiasm (T_2)
Independent variable: appreciation (T_1), subject enthusiasm (T_1)
Covariates (*E1*): gender, final grade in school, intended degree
H3a
Dependent variable: general study satisfaction (T_2)
Independent variable: appreciation (T_1), general study satisfaction (T_1)
Covariates (*E1*): gender, final grade in school, intended degree
H3b
Dependent variable: emotional exhaustion (T_2)
Independent variable: appreciation (T_1), emotional exhaustion (T_1)
Covariates (*E1*): gender, final grade in school, intended degree
H3c
Dependent variable: intention to quit studies (T_2)
Independent variable: appreciation (T_1), intention to quit studies (T_1)
Covariates (*E1*): gender, final grade in school, intended degree

M13 Study Materials

Please describe any relevant study materials. This could include, for example, stimulus materials used for experiments, questionnaires used for rating studies, training protocols for intervention studies, etc.

The study is based on an online survey. The original items related to the variables or constructs under investigation are presented below. A translation is given in the square brackets.

Gender
Sind Sie weiblich oder männlich? [Are you female or male?]

Intended degree
In welchem Studium befinden Sie sich momentan? Ich studiere momentan…

(1) In einem 2-Fächer Bachelor mit dem Profil Lehramt
(2) Im Master of Education
(3) Sonstiges

[Which degree programme are you currently studying? I am currently studying...
(1) In a 2-subject Bachelor's degree with the teaching profession profile
(2) In the Master of Education
(3) Other]

Final school grade
Welche Note hatten Sie in Ihrem Hochschulreifezeugnis? Tragen Sie in das Textfeld bitte den Notenschnitt Ihres Abschlusszeugnisses ein. (open ended question)

[What grade did you have on your higher education entrance qualification? Please enter the grade point average of your leaving certificate in the text field.]

Appreciation
In den fachwissenschaftlichen Lehrveranstaltungen in meinem Hauptfach X…

(1) …werden Lehramtsstudierende von den Lehrenden nach meiner Wahrnehmung und Erfahrung ebenso wertgeschätzt wie Fachstudierende.
(2) …finden die spezifischen Interessen und Bedarfe von Lehramtsstudierenden Berücksichtigung.
(3) …gelten Lehramtsstudierende unter den Lehrenden als geringer kompetent als Fachstudierende
(4) …erhalten Fachstudierende für ihre Leistungen mehr Anerkennung von den Lehrenden als Lehramtsstudierende

(1 = trifft überhaupt nicht zu, 2 = trifft eher nicht zu, 3 = trifft eher zu, 4 = trifft völlig zu)

[In the subject-specific courses in my major subject X...

(1) ...in my perception and experience, student teachers are valued just as much as subject students.
(2) ...the specific interests and needs of student teachers are taken into account.
(3) ...student teachers are considered by lecturers to be less competent than subject students.
(4) ...subject students receive more recognition for their achievements from lecturers than student teachers.

(1 = not at all true, 2 = rather not true, 3 = rather true, 4 = completely true)]

Intention to quit
Die nachfolgenden Aussagen beziehen sich auf Ihr Studium. Wie beurteilen Sie die folgenden Aussagen?

(1) Ich habe schon öfter daran gedacht, das Lehramtsstudium abzubrechen.
(2) Ich denke ernsthaft daran, das Lehramtsstudium ganz aufzugeben.
(3) Wenn ich nochmals wählen könnte, würde ich mich für ein anderes Studium entscheiden.

(1 = trifft überhaupt nicht zu, 2 = trifft eher nicht zu, 3 = trifft eher zu, 4 = trifft völlig zu)

[The following statements relate to your studies. How would you rate the following statements?

(1) I have often thought about dropping out of teacher training.
(2) I am seriously thinking of giving up teacher training altogether.
(3) If I could choose again, I would choose another degree programme.

(1 = not at all true, 2 = rather not true, 3 = rather true, 4 = completely true)]

General study satisfaction
Die nachfolgenden Aussagen beziehen sich auf Ihr Studium. Wie beurteilen Sie die folgenden Aussagen?

(1) Insgesamt bin ich mit meinem jetzigen Studium zufrieden.
(2) Ich finde mein Studium wirklich interessant.
(3) Ich habe richtig Freude an dem, was ich studiere.

(1 = trifft überhaupt nicht zu, 2 = trifft eher nicht zu, 3 = trifft eher zu, 4 = trifft völlig zu)

[The following statements relate to your studies. How would you rate the following statements?

(1) Overall, I am satisfied with my current studies.
(2) I find my studies really interesting.
(3) I really enjoy what I am studying.

(1 = not at all true, 2 = rather not true, 3 = rather true, 4 = completely true)]

Emotional exhaustion
Die nachfolgenden Aussagen beziehen sich auf Ihr Studium. Wie beurteilen Sie die folgenden Aussagen?

(1) Ich fühle mich von meinem Studium oft erschöpft.
(2) Ich fühle mich von meinem Studium insgesamt überlastet.
(3) Ich merke öfter im Studium, wie lustlos ich bin.
(4) Manchmal bin ich am Ende eines Unitages richtig deprimiert.

(1 = trifft überhaupt nicht zu, 2 = trifft eher nicht zu, 3 = trifft eher zu, 4 = trifft völlig zu)

[The following statements relate to your studies. How would you rate the following statements?

(1) I often feel exhausted by my studies.

(2) I feel overloaded by my studies overall.
(3) I often notice how disengaged I am during my studies.
(4) Sometimes I feel really depressed at the end of a day studying.

(1 = not at all true, 2 = rather not true, 3 = rather true, 4 = completely true)]

Satisfaction with lectures
Wie beurteilen Sie die folgenden Aussagen in Bezug auf die fachwissenschaftlichen Lehrveranstaltungen in Ihrem Hauptfach: X?

(1) Meistens gehe ich gerne zu den fachwissenschaftlichen Lehrveranstaltungen in diesem Fach.
(2) Ich werde den Großteil der fachwissenschaftlichen Lehrveranstaltungen in diesem Fach in gutter Erinnerung behalten.
(3) Insgesamt bin ich mit den fachwissenschaftlichen Lehrveranstaltungen in diesem Fach zufrieden.
(4) Ich lerne in den fachwissenschaftlichen Lehrveranstaltungen in diesem Fach viel dazu.

(1 = trifft überhaupt nicht zu, 2 = trifft eher nicht zu, 3 = trifft eher zu, 4 = trifft völlig zu)

[How would you rate the following statements in relation to the subject-specific courses in your major subject: X?

(1) Most of the time, I like to go to the academic courses in this subject.
(2) I will have good memories of the majority of the courses in this subject.
(3) Overall, I am satisfied with the academic courses in this subject.
(4) I learn a lot in the subject-specific courses in this subject.

(1 = not at all true, 2 = rather not true, 3 = rather true, 4 = completely true)

Subject enthusiasm:
Wie beurteilen Sie folgende Aussagen in Bezug auf Ihr Hauptfach: X?

(1) Dieses Fach ist mir persönlich wichtig.
(2) Ich bin von diesem Fach begeistert.
(3) Ich finde dieses Fach spannend.

(1 = trifft überhaupt nicht zu, 2 = trifft eher nicht zu, 3 = trifft eher zu, 4 = trifft völlig zu)

[How would you rate the following statements in relation to your main subject: X?

(1) This subject is important to me individually.
(2) I am enthusiastic about this subject.
(3) I find this subject exciting.

(1 = not at all true, 2 = rather not true, 3 = rather true, 4 = completely true)

Further information // the STePS scale manuals are available online at:
(1) https://www.qualitaetsoffensive-lehrerbildung.uni-kiel.de/de/dateien-upload/steps-2018-skalenhandbuch (second measurement occasion; T_1)
(2) https://www.qualitaetsoffensive-lehrerbildung.uni-kiel.de/de/dateien-upload/steps-2019-skalenhandbuch (third measurement occasion; T_2)

M14 Study Procedures

Please describe here any relevant information about how the study will be conducted, e.g., the number and timing of measurement time points for longitudinal research, the number of blocks or runs per session of an experiment, laboratory setting, the group size in group testing, the number of training sessions in interventional studies, questionnaire administration for online assessments, etc.

We draw on data from a panel study comprising 4 measurement time points so far. The subject of our study are the second and third measurement points.

M15 Other information (optional)

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Analysis plan

(NOTE: If this varies by hypothesis, repeat analysis plan for each)

AP1 Criteria for post-data collection exclusion of participants, if any

Describe all criteria that will lead to the exclusion of a participant's data (e.g. performance criteria, non-responding in physiological measures, incomplete data). Be as specific as possible.

See M7 for details.

AP2 Criteria for post-data collection exclusions on trial level (if applicable)

Describe all criteria that will lead to the exclusion of a trial or item (e.g. statistical outliers, response time criteria). Be as specific as possible.

See M7 for details.

AP3 Data preprocessing

Describe all data manipulations that are performed in preparation of the main analyses, e.g. calculation of variables or scales, recoding, any data transformations, preprocessing steps for imaging or physiological data (or refer to publicly accessible standard lab procedure, cf. T12).

<u>Recoding items and calculating scales</u>
All scales were built on the premise that the participant had answered at least half plus one item.

- Appreciation, 4 items (Item 3 & 4 recoded)
- Intention to quit studies, 3 items (none recoded)
- Satisfaction with studies, 3 items (none recoded)
- Emotional exhaustion, 4 items (none recoded)
- Satisfaction with lectures, T_1: 3 items (none recoded); T_2: 4 items (none recoded)
- Subject enthusiasm, 3 items (none recoded)

- STEM-subject: dummy-coded variable; = 1 if subject is biology, chemistry, geography, mathematics, informatics, physics, else = 0.

AP4 Reliability analysis (if applicable)

Specify the type of scale reliability that will be estimated, whether it is internal consistency (e.g. Cronbach's alpha, omega), test-retest reliability, or some other form (e.g., a confirmatory factor analysis incorporating multiple factors as sources of variance). In a study involving measure development, researchers should specify criteria for removing items from measures a priori (e.g., largest factor loading magnitude, smallest drop in alpha-if-item removed).

Cronbach's alpha will be used to estimate the scales' reliability.

AP5 Statistical models (provide for each hypothesis if varies).

Specify the statistical model (e.g. t test, ANOVA, LMM) that will be used to test each of your hypotheses. Give all necessary information about model specification (e.g., variables, interactions, planned contrasts) and follow-up analyses. Include model selection criteria (e.g., fit indices), corrections for multiple testing, and tests for statistical violations, if applicable. Wherever unclear, describe how effect sizes will be calculated (e.g., for d-values, use the control SD or the pooled SD).

We will use a multilevel-framework to investigate our research questions (see M10). We follow an established approach to estimate multilevel regression models.

RQ1 (E1, E2, H1a, H1b)
First, an intercept-only model will be estimated to gain information about the variance in perceived appreciation between students (Level 2) and within students (Level 1)

Second, we will extend the intercept-only model by (a) the subject group and (b) the proportion of teacher training students in the respective subject to examine their relationship to perceived appreciation. Level 2 predictors (gender, final school grade, intended degree) are included as covariates.

Third, we will extend the model by integrating a random slope to gather information about random effects of the covariates (cross-level-interactions).

RQ2 (H2a, H2b, H3a, H3b, H3c)

- To test the relationship between perceived appreciation and satisfaction with lectures as well as subject enthusiasm, we will estimate a multi-level-model which is simultaneal computed for Level 1 (subjects) and Level 2 (students). To control for baseline satisfaction and enthusiasm, we include ratings from the first measurement occasion as predictors.
- The same procedure will be established for the test of hypotheses H3a-c. However, general study satisfaction, emotional exhaustion, and intention to quit studies are only available for Level 2. Thus, these analyses will be limited to test relationships on Level 2 (students).

AP6 Inference criteria

Specify the criteria used for inferences (e.g., p values, Bayes factors, effect size measures) and the thresholds for accepting or rejecting your hypotheses. If possible, define a smallest effect size of interest. If inference criteria differ between hypotheses, specify separately for each hypothesis and respective statistical model by explicitly referring to the numbers of the hypotheses. Describe which effect size measures will be reported and how they are calculated.

Within the framework of our hypothesis tests, we are guided by the usual alpha error level of 5%. We will report effect sizes using Cohen's *d*.

AP7 Exploratory analysis (optional)

Describe any exploratory analyses to be conducted with your data. Include here any planned analyses that are not confirmatory in the sense of being a direct test of one of the specified hypotheses.

E1 (see I4). We do not have any explicit hypotheses about the way in which gender, final school grades and the intended degree might influence perceived appreciation, so we investigate the relationship of these variables with perceived appreciation explorative.
E2 (see I4). Likewise, we do not have hypotheses whether and how the covariates might moderate the effects examined. Thus, we will explore the effects of our covariates by examining the cross-level interactions.

AP8 Other information (optional)

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Other information optional

(NOTE: If needed, multiple lines with other information can be included)

O1 Other information (optional)
If there is any additional information that you feel needs to be included in your preregistration, please enter it here. Literature cited, disclosures of any related work such as replications or work that uses the same data, or other context that will be helpful for future readers would be appropriate here.
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References

R1 References

Enter your references below. Use a consistent format (e.g., https://apastyle.apa.org/style-grammar-guidelines/references/examples)

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