



# Satisfying Students' Psychological Needs During the COVID-19 Outbreak in German Higher Education Institutions

Ziwen Teuber<sup>1\*</sup>, Hao Jia<sup>2</sup> and Thomas Niewöhner<sup>1</sup>

<sup>1</sup>Educational Psychology, Department of Psychology, Bielefeld University, Bielefeld, Germany, <sup>2</sup>Department of Educational Psychology, University of Minnesota, St. Paul, MN, United States

## OPEN ACCESS

### Edited by:

Ariel Mariah Lindorff,  
University of Oxford, United Kingdom

### Reviewed by:

Hiroko Oe,  
Bournemouth University,  
United Kingdom  
Joni Tzuchen Tang,  
National Taiwan University of Science  
and Technology, Taiwan

### \*Correspondence:

Ziwen Teuber  
zteuber@uni-bielefeld.de

### Specialty section:

This article was submitted to  
Educational Psychology,  
a section of the journal  
Frontiers in Education

**Received:** 12 March 2021

**Accepted:** 25 May 2021

**Published:** 07 June 2021

### Citation:

Teuber Z, Jia H and Niewöhner T  
(2021) Satisfying Students'  
Psychological Needs During the  
COVID-19 Outbreak in German Higher  
Education Institutions.  
Front. Educ. 6:679695.  
doi: 10.3389/feduc.2021.679695

The COVID-19 outbreak has been a worldwide challenge for the higher education community. Under lockdown measures, meeting students' needs and encouraging their engagement in academic work have never been more urgent and challenging. In this study, we investigated the relationship between students' satisfaction with institutional strategies, students' optimism and pessimism, satisfaction with basic psychological needs, engagement in academic work, intention to drop out from studies, depression, and well-being. We conducted an online self-report study on  $N = 477$  German college and university students (77.25% females, mean age = 23.96 years,  $SD = 4.78$ ). The results of structural equation models showed that students' satisfaction with institutional strategies was positively related to their basic psychological need satisfaction and engagement. Students' optimism was positively associated with need satisfaction and engagement, whereas pessimism was negatively associated with them. Furthermore, students' academic engagement was negatively linked to dropout intentions, whereas psychological need satisfaction was linked to depression and well-being. The findings of this study suggest that acknowledging students timely about the institutional strategies of examinations and courses and supporting students to engage academic activities are important institutional tasks during crisis.

**Keywords:** stress and coping, self-determination, depression, dropout intentions, optimism and pessimism

## INTRODUCTION

Since March 2020, the COVID-19 outbreak has appeared to turn our world upside down. To slow down the spread, social activities have been minimized in numerous countries. The undertaken restrictions usually include social distancing and the closure of many public places such as restaurants, libraries, and educational institutions. A large number of empirical studies have emerged to investigate the psychological impact of lockdown restrictions and quarantine on people's mental health, and findings indicate that these methods are linked to a higher prevalence of isolation, depression, stress reactions, post-traumatic stress symptoms, negative emotions (e.g., anger, fear, and confusion), and insomnia (see Serafini et al., 2020, for an overview).

The psychologically debilitating effect of lockdown restrictions can be explained by, for example, the theory of Self-Determination (Deci and Ryan, 2000), which postulates that human beings strive for autonomy, competence, and relatedness. Satisfying these needs is vital to individuals'

psychological well-being and can fuel motivation and behaviors. Recent empirical work provides evidence implying that through lockdown restrictions, these basic psychological needs cannot be adequately met (e.g., Schwinger et al., 2020), and in turn, it increases the risk of mental health problems.

In Germany, one of the countries with the most infected cases in Europe, tertiary educational institutions have been closed since the first lockdown in March 2020. Higher education institutions have been adopting (mostly) unprecedented instructional strategies trying to transit smoothly and maintain a beneficial educational environment for students. Such strategies include using interactive online teaching, communicating with students concerning further proceeding of examinations, and providing students with flexible forms of consulting. However, it is still unclear whether those strategies are useful in creating an environment in alignment with students' psychological needs and whether they can facilitate student engagement, minimize their intentions to drop out, and lower the risk of mental health problems.

In this study, we investigated the relationship between student's satisfaction with institutional strategies during the COVID-19 outbreak, students' optimism and pessimism, satisfaction with basic psychological needs, engagement with academic work, intention to drop out from studies, as well as psychological well-being and ill-being. In this way, we aim to provide practical implications for higher education institutions to better help students manage this challenge. We used the well-established Job Demands-Resources Theory and Tinto's Student Departure Model as guiding framework models.

## Psychological Need Satisfaction

Within Self-Determination Theory (SDT; 2000), Ryan and Deci proposed the concept of basic psychological needs, namely, needs for autonomy, needs for competence, and needs for relatedness. Autonomy donates the experience of volition and self-initiation. When satisfied, individuals perceive a sense of ownership of their own behavior and a sense of psychological liberty and freedom of internal will. Competence refers to the experience of mastery and effectiveness. It can be satisfied if individuals capably engage in activities to utilize and extend their knowledge and skills. Finally, the need for relatedness concerns the experience of warmth, bonding, care, or sense of belonging to groups. This need can be met if individuals feel connected to and appreciated by significant others (Vansteenkiste et al., 2020). Satisfying these psychological needs is essential for individual growth, adjustment, integrity, and well-being (Ryan and Deci, 2000).

Across Eastern and Western research communities, meeting students' basic psychological needs has been generally acknowledged as a relevant aspect in promoting students' emotion and motivation (e.g., Milyavskaya and Koestner, 2011; Vansteenkiste et al., 2020), academic success (e.g., Wang et al., 2019), psychological well-being (see meta-analysis, Yu et al., 2018), beneficial parenting style (e.g., Schiffrin et al., 2014; Cordeiro et al., 2018), and instructional quality (e.g., Wilson et al., 2012). Thus, many prominent theories in developmental

and educational psychology are developed with the consideration of students' basic psychological need satisfaction.

Prior to the COVID-19 outbreak, students had more opportunities to receive direct feedback from their lecturers (the need for competence), to discuss and learn with their peers within and after courses (the need for relatedness), to choose the way how and where they wanted to learn (e.g., the use of libraries, learning with friends at home; the need for autonomy), and to engage in university and social activities (the need for relatedness), etc. Since the social restrictions were implemented, students have been taking online courses instead. In addition, students have very limited access to social and university activities. In a recent study, Schwinger et al. (2020) investigated the effect of lockdown methods on citizens' basic psychological need satisfaction in Germany and found that there were significant declines in the fulfillment of the need for autonomy. The study also showed that autonomy satisfaction was most strongly affected by the lockdown measures and thus associated with the reduction in well-being and the increase in mental health problems such as anxiety and depression.

In the current study, we focus on German college and university students' basic psychological needs and investigate whether institutional strategies can foster students' need satisfaction and ultimately contribute to their academic and psychological adjustment during the COVID-19 crisis.

## Job/Student Demands-Resources Theory

As previously mentioned, several prominent theories contribute to research on students' academic and psychological adjustment, with the consideration of the concept of basic psychological needs. One of them is the theory of Job Demands-Resources (Bakker and Demerouti, 2014). Using this model, personal characteristics and environmental protective and risk factors can be identified.

The Job Demands-Resources theory is a popular and heuristic model for the investigation of the condition and prerequisite of strain and work engagement as well as the associated occupational and psychological outcomes. In the heart of the Job Demands-Resources theory lies the assumption that although job demands are health-impairing, personal and job resources are functional in dealing with these demands, reducing job demands and their associated psychological costs, and stimulating one's personal growth and development. Hence, there is a so-called *motivational process* in which resources foster one's commitment to the work task at hand. In the long term, engagement fuels occupational performance and success. The authors rationalized the motivational effect of resources by arguing that resources fulfill basic psychological needs (i.e., needs for autonomy, needs for relatedness, and needs for competence; Bakker, 2011; Deci and Ryan, 2000). Previous findings in occupational contexts show that satisfaction with basic psychological needs is one of the most powerful protective factors in the occupational context (meta-analysis: Nahrgang et al., 2011). In other words, the fulfillment of psychological needs can buffer the detrimental effect of work stressors and facilitate work commitment. In the long term, it

contributes to psychological well-being and job performance (Bakker and Demerouti, 2014).

Recently, the Job Demands-Resources Model has been successfully adapted to school (Salmela-Aro and Upadyaya, 2014; Teuber et al., 2020; Teuber et al., 2021a; Teuber et al., 2021b) and higher educational (Gusy et al., 2016; Niewöhner et al., 2021) contexts, which was also renamed as Student Demands-Resources Model (for an overview, see Teuber, 2021). Previous findings show that across Eastern and Western education systems, students' personal strengths such as optimism (Teuber, 2021), self-efficacy (Salmela-Aro and Upadyaya, 2014; Teuber et al., 2020; Teuber, 2021), and grit (Teuber et al., 2021b; Tang et al., 2021) decrease negative emotional responses to academic stressors and foster students' engagement in academic work (i.e., the state of energy, dedication, and absorption; (Schaufeli et al., 2002; Salmela-Aro and Upadaya, 2012) and ultimately contribute to academic success and decrease the risk of school dropout (e.g., Bask and Salmela-Aro, 2013).

In the present study, we focus on optimism and pessimism (Carver and Scheier, 2014) as personality traits that may affect students' adaption to the current challenging situation. According to Carver and Scheier (Scheier and Carver, 1987; Scheier et al., 1994; Carver and Scheier, 2014), optimism is defined as global positive outcome expectations and can be understood as a bias in perceptions and expectations in favor of the positive features of life positive outcome expectations. On the contrary, pessimism represents global negative outcome expectations and can be seen as a bias in perceptions and expectations in favor of the negative features of life. A large body of research demonstrates that optimism positively affects students' dedication, learning behaviors, and persistence in higher education (e.g., Gallagher et al., 2017; Icekson et al., 2020; Rand et al., 2020), whereas pessimism is prognostic of impaired psychological functioning, disengagement, and dropout of higher education (e.g., Roso-Bas et al., 2016; Shields et al., 2016; Boileau et al., 2020).

Across Eastern and Western cultures, various authors suggest that although optimism and pessimism are strongly correlated, they cannot be seen as two opposites of a continuum but two distinct factors (Dember et al., 1989; Chang et al., 1997; Nicholls et al., 2008; Hinz et al., 2017; Jovančević and Miličević, 2020). We assumed that optimism and pessimism both influence students' perception of their learning environment in either positive or negative direction and affect their experience of self-determination as well as learning behavior in the adversity.

## Tinto's Framework of Student Departure

Preventing students' dropout from studies and maximizing their academic retention are of high priority for higher education institutions because dropout is usually associated with high individual, institutional, and societal costs. To predict students' intention of dropping out and to understand their decision to depart, Tinto's (1975), Tinto's (2006) Framework of Student Departure has been well-established and widely employed.

Similar to Student Demands-Resources Model, Tinto's model also incorporates individual characteristics and environment. The

central idea of Tinto's framework is that given students' pre-entry attributes (e.g., family background, skills and abilities, and prior experiences) and their initial commitment to the institution and its academic goals, students' integration into academic and social systems of the higher education institution is in direct relation to their decisions to remain in or depart from the institution at which they study. In other words, the more students are academically and socially committed, the more likely are they to persist. Academic integration includes engagement in various academic activities such as attending courses and discussing with peers about projects within and outside courses. Social integration involves interactions with peers or other faculty members that enhance the bond between students and their institutions. From Tinto's perspective (2006), on the one hand, students' capacity to academically and socially integrate is crucial for academic success, on the other hand, education institutions have the responsibility to provide students with a supportive and beneficial environment that aids students' integration and success. Empirical evidence underlines the importance of the fit between students and their institution in reducing the probability of academic dropout (for an overview, see Lotkowski et al., 2014).

The idea of Tinto can also be linked to the fulfillment of basic psychological needs (Hagenauer et al., 2018). For example, interacting with other faculty members reflects the fulfillment of the need for competence and the need for relatedness, whereas identifying with institutional norms reflects the fulfillment of the need for autonomy. Tinto's model has been applied particularly among first-year college and university students (e.g., Alexandros et al., 2017) because the first year is a critical stage of transition due to the change of environment (Tinto, 2006). From our point of view, the current pandemic situation is also a critical stage in higher education. In line with Tinto's perspective, we believe that higher education institutions' strategies need to match students' psychological needs during the COVID-19 outbreak.

Whereas Tinto's framework focuses on departure decisions, in the current study, we consider students' dropout intention as a more proximate outcome. One reason for doing so is that intentions reflect the motivations that drive and motivate actual behavior (Ajzen, 1991; Ajzen, 2001). Thus, many scholars regard intentions as the best single predictor of planned human behaviors (e.g., Vallerand et al., 1997; Souitaris et al., 2007). In higher educational contexts, dropout intentions are understood as withdrawal cognitions such as thoughts of departing from the current study and seeking an alternative major (Mashburn, 2000). This construct has been found to be a significant predictor of actual dropout in the research literature (e.g., Mashburn, 2000; Litalien and Guay, 2015). Moreover, it is empirically difficult to reach students who have dropped out of studies (e.g., Heublein and Wolter, 2011). Both aspects can rationalize the choice of dropout intentions instead of the actual dropout.

## Studying in the Time of COVID-19

Recently, several empirical studies have emerged to investigate the impact of the COVID-19 outbreak in German higher educational contexts. Findings from several studies (Hajek and Kernecker, 2020; Lörz et al., 2020; Seyfeli and ElsnerWannemacher, 2020;

Hahn et al., 2021; Rahman et al., 2021) revealed that students were experiencing more academic and psychological difficulties during “digital” semesters. They were concerned about the quality of online course delivery, unsure about the courses’ contents, and untrusted the guidance received from lecturers distantly. Furthermore, many students reported technical difficulties, financial problems, social isolation, and motivation and concentration problems, which are associated with a higher risk of delaying studies or even dropping out of studies. For example, one of two students thought about extending their studies, and one-fifth of students worried that they would not be able to complete their studies under the current conditions (Traus et al., 2020). While studies by Studitemps GmbH and Maastricht University (2021) found no decrease in satisfaction with the study situation since the beginning of the pandemic, Marczuk et al. (2021) found a significant decrease in study satisfaction due to diminished social integration. The authors of both studies expected a long-term increase in dropouts due to the COVID-19 pandemic, although neither study found an increased actual dropout in the 2020 summer and winter semesters.

As previously mentioned, German higher educational institutions have put many efforts to transit their courses and other support offers to ensure students’ study progress. Although several studies have addressed students’ academic and financial stressors during the COVID-19 and their relationships with their academic and psychological outcomes, little is known about what role do institutional strategies play during online semesters in students’ fulfillment of basic psychological needs, academic engagement, dropout intentions, mental health problems (e.g., depression), and well-being (e.g., life satisfaction). According to Student Demands-Resources Model and Tinto’s Framework of Student Departure, students’ academic and psychological outcomes are affected by the interplay between individual characteristics and study environment. Hence, by taking the potential influence of individual characteristics (e.g., optimism and pessimism) on students’ adjustment into consideration, this study may be able to identify students at a higher risk of maladjustment during the critical time and provide some guidance for institutional strategies that can target desired outcomes effectively.

## The Present Study

The present study addresses students’ perception of higher education institutional strategies and their personality as well as their relationship with psychological need satisfaction, academic engagement, intentions to drop out from studies, depression, and life satisfaction. We seek to contribute to the literature on students’ academic and psychological adjustment within German higher education contexts and to provide practical implications for higher education institutions in crisis situations. Based on the theoretical and empirical foundation, we hypothesized that

H1: Students’ satisfaction with institutional strategies is positively correlated to satisfaction with basic psychological needs (i.e., needs for autonomy, needs for relatedness, and needs for competence) as well as students’ academic engagement.

H2: Students’ optimism is positively related to need satisfaction and engagement, whereas students’ pessimism is negatively related to need satisfaction and engagement.

H3: Students’ need satisfaction and engagement are positively related to well-being and negatively related to ill-being (i.e., depression in our study) and intention to drop out from higher education.

H4: (explorative hypothesis): Students’ need satisfaction and academic engagement mediate the relationship between satisfaction with institutional strategies/personality and academic and psychological outcomes. We will explore this hypothesis based on cross-sectional data admitting that mediation hypotheses cannot be tested relying on non-experimental cross-sectional data and that the results cannot be causally interpreted.

## METHODS

### Data Collection and Participants

Between June 2020 and February 2021, we conducted an online survey. Participants were asked to report their satisfaction with institutional strategies, satisfaction with their basic psychological needs, academic engagement, dropout intentions, life satisfaction, and depression, as well as demographic information. The participants were informed about the aim and the nature of this study. The participation was voluntary. Before starting with the survey, participants were asked to provide their informed consents. Ethical considerations were addressed by obtaining formal approval from the ethical committee of Bielefeld University.

Totally, 543 students participated in this online survey. After data cleaning, the sample consisted of  $N = 477$  (78.25% females) German university and college students. Their mean age was 23.96 years ( $SD = 4.78$ ). Among them, 257 students were pursuing a bachelor’s degree, 159 a master’s degree, and 10 a doctoral degree. The majority ( $n = 372$ ) of the participants were university students. Around 80% of the participants ( $n = 400$ ) had German citizenship. The participants were students from a variety of disciplines (90 human sciences; 72 sports; 83 mathematics or nature sciences; 63 medicine; four agricultural-, forest-, and nutrition sciences; 37 engineering; one arts or art science; 70 else; 57 no response). About 55% of the sample studied in North Rhine-Westphalia and 22% in Schleswig-Holstein.

## Measures

### Satisfaction With Institutional Strategies

In a psychological class, we interviewed 30 university students about the most important aspects/concerns regarding their studies during the COVID-19 pandemic. All students cared about their study progress and stated that information about courses and exams was most important to them. Although many supports were offered such as online consulting, the majority of interviewed students reported that such support was too time-consuming to use. Based on these reports, we summarized and operationalized satisfaction with institutional strategies into four items: 1) “My university/college informs me timely about further proceedings regarding courses”; 2) “My university/college informs me timely about the further procedure regarding the exams”; 3) “Overall, I feel that the measures are appropriate at my

university/college"; and 4) "Overall, I am satisfied with the measure in my university/college". Ratings were made on a 4-point rating scale ranging from 1 = *not satisfied at all* to 4 = *very satisfied*. We tested its factorial structure using confirmatory factor analysis (CFA) and found a one-factor model fitted the data very well [ $\chi^2 = 0.69$ ,  $df = 1$ ,  $p = 0.41$ , CFI = 1.00, SRMR = 0.00, RMSEA = 0.00, 90% CI for RMSEA (0.00, 0.11)]. McDonald's Omega was 0.80 in this study.

### Satisfaction With Basic Psychological Needs

Satisfaction with needs for autonomy, relatedness, and competence was measured using the German version (Heissel et al., 2018) of the corresponding subscales of the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015). Each of the three basic needs was measured by four items. Example items are "I feel a sense of choice and freedom in the things I undertake" for autonomy satisfaction, "I feel that the people I care about also care about me" for relatedness satisfaction, and "I feel confident that I can do things well" for competence satisfaction. Responses were made on a 5-point Likert scale (1 = *completely disagree*, 5 = *completely agree*). The result of CFA showed that a three-factor model fitted the data well [ $\chi^2 = 119.36$ ,  $df = 51$ ,  $p < 0.001$ , CFI = 0.97, SRMR = 0.04, RMSEA = 0.06, 90% CI for RMSEA (0.04, 0.07)]. In the present study, McDonald's Omega was 0.75 for autonomy, 0.89 for competence, and 0.84 for relatedness.

### Academic Engagement

We used the German ultra-short version (UWES-3-SF; Gusy et al., 2019) of the Utrecht Work Engagement Inventory Student Form (UWES-SF; Schaufeli et al., 2002) to assess students' academic engagement. The original UWES-SF contains 14 items representing vigor, dedication, and absorption. The UWES-3-SF selects the most characteristic item of each facet and was validated in a large German university student sample (Gusy et al., 2019). These items are "I feel strong and vigorous when I'm studying or going to class" for vigor, "My study inspires me" for dedication, and "I feel happy when I am studying intensely" for absorption. All items were scored as 0 = *never* to 6 = *always*. In the current study, a unidimensional factorial structure fitted the data well [ $\chi^2 = 1.08$ ,  $df = 1$ ,  $p = 0.30$ , CFI = 1.00, SRMR = 0.03, RMSEA = 0.01, 90% CI for RMSEA (0.00, 0.13)]. McDonald's Omega was 0.78.

### Optimism and Pessimism

Optimism and pessimism were measured using the German version (Glaesmer et al., 2008) of the revised Life-Oriented Tests (LOT-R; Scheier et al., 1994). An example item for optimism is "In uncertain times, I usually expect the best", and an example item for pessimism is "I hardly ever expect things to go my way." Responses were made on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). In line with previous findings, optimism and pessimism were strongly correlated ( $r = -0.75$ ) but still distinct [ $\chi^2 = 26.21$ ,  $df = 8$ ,  $p < 0.01$ , CFI = 0.97, SRMR = 0.04, RMSEA = 0.07, 90% CI for RMSEA (0.04, 0.10)] in the present study. As suggested by previous scholars (e.g., Hinz et al., 2017; Jovančević and Miličević, 2020), we included optimism and pessimism as two correlated first-order factors in the further analysis. McDonald's Omega was 0.80 for optimism and 0.72 for pessimism.

### Intention to Drop Out

Students' intention to drop out of studies was measured using a scale by Rump et al. (2017). This scale contained four items (e.g., "I sometimes think about dropping out of my studies"). Among them, one item was reversed-worded (i.e., "It is very unlikely that I will drop out of my studies"). All items were coded on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). In this study, a one-factor CFA model showed excellent fit indices [ $\chi^2 = 3.44$ ,  $df = 2$ ,  $p = 0.18$ , CFI = 0.99, SRMR = 0.01, RMSEA = 0.04, 90% CI for RMSEA (0.00, 0.11)]. In this study, the internal consistency estimate of this scale was high (McDonald's Omega = 0.87).

### Depression

We considered depression as an indicator of impaired mental health in the present study. We used the validated German version (Löwe et al., 2004) of the widely used nine-item depression module from the Patient Health Questionnaire (PHQ-9; Kroenke and Spitzer, 2002) to assess depression. The PHQ-9 is a clinical diagnostic questionnaire. The participants were asked to evaluate the frequency of depressive symptoms in the past two weeks (e.g., "Trouble falling or staying asleep, or sleeping too much"). The items were rated on a 4-point scale ranging from 0 = *not at all* to 3 = *nearly every day*. The sum score of this scale represents the risk or severity of depression. We used the sum score in the further data analysis.

### Satisfaction With Life

For the assessment of well-being, we used the validated German version (Janke and Glöckner-Rist, 2012) of the Satisfaction with Life Scale (SWLS; Diener et al., 1985), which was developed to quantify one's affective and cognitive judgment of his or her overall well-being. The SWLS consisted of five items (e.g., "In most ways, my life is close to my ideal"). All items were coded on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). In the present study, this scale showed a one-factor structure [ $\chi^2 = 16.89$ ,  $df = 5$ ,  $p < 0.01$ , CFI = 0.99, SRMR = 0.02, RMSEA = 0.07, 90% CI for RMSEA (0.04, 0.11)]. McDonald's Omega was 0.89.

### Control Variables

We controlled for participants' gender and desired degree. Gender was dummy coded (0 = *cursive*, 1 = *cursive*). Desired degree was coded as 1 = *bachelor's degree*, 2 = *master's degree*, and 3 = *doctoral degree*.

### Analytical Strategy

Data analyses were conducted in Mplus 8 (Muthén and Muthén, 2019). We examined the item distribution and multivariate outliers. Skewness and Kurtosis of all variables were between -1.16 and 1.95. Hence, all variables were approximately normal-distributed. Descriptive analyses included means, standard deviations, and latent intercorrelations. Missing data analysis indicated that for all variables, data were missing between 1.7 and 8% of the cases. Furthermore, the result of Little's test suggested that the data had a missing completely at random mechanism.

Before testing the hypotheses, we ran a global CFA model including all constructs of interest. Despite of depression (sum score, manifest variable), all other constructs were measured using

**TABLE 1** | Mean values, standardized deviations, and latent intercorrelations.

Scale	<i>M</i> ( <i>SD</i> )	Latent intercorrelations									
		1	2	3	4	5	6	7	8	9	
1	IN.STR	2.93 (0.63)									
2	AUT	3.30 (0.70)	0.29**								
3	COM	3.58 (0.80)	0.27**	0.82**							
4	REL	4.10 (0.70)	0.18*	0.53**	0.50**						
5	OPT	3.69 (0.88)	0.25**	0.57**	0.59**	0.55**					
6	PES	2.43 (0.81)	-0.23**	-0.53**	-0.54**	-0.56**	-0.74**				
7	ENG	2.87 (1.06)	0.38**	0.60**	0.61**	0.33**	0.39**	-0.35**			
8	DROP	1.84 (0.97)	-0.17*	-0.44**	-0.50**	-0.21**	-0.33**	0.33**	-0.60**		
9	SWLS	4.96 (1.27)	0.16*	0.59**	0.59**	0.58**	0.64**	-0.68**	0.37**	-0.47**	
10	PHQ	7.93 (5.87)	-0.28**	-0.54**	-0.5**	-0.49**	-0.53**	0.55**	-0.41**	0.36**	-0.54**

Note.  $p < .01$ .  $p < .001$ . *M*, mean values; *SD*, standardized deviation; *IN.STR*, satisfaction with institutional strategies; *AUT*, needs for autonomy; *COM*, needs for competence; *REL*, needs for relatedness; *OPT*, optimism; *PES*, pessimism; *ENG*, academic engagement; *DROP*, intention to drop out of studies; *SWLS*, satisfaction with life; *PHQ*, depression.

multiple indicators (latent factors). After the global CFA model was established, we tested our assumptions using structural equation modeling (SEM) techniques. The robust maximum likelihood–full information estimator was used to deal with non-normality and missing values. In SEM models, we used multiple indicators for all factors except for depression (the sum score was used instead) and control variables. In all models, we controlled for gender and desired academic degree.

For testing the mediating hypotheses, we added multiple mediators to the SEM. Bootstrapping procedure in *Mplus* was used to test the significance of the mediation effects. In the current study, 5,000 bootstrapping samples were generated from the original data set by random sampling.

For the evaluation of the model fit, we oriented on the recommendation by Hu and Benlter (1999). Good model fit can be assumed if chi-square value is not significant, comparative fit index (CFI) is above 0.95, root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) under 0.05. Acceptable model fit can be assumed if CFI is above 0.90, RMSEA and SRMR are close to or under 0.08.

## RESULTS

### Descriptive Statistics

**Table 1** presents scale mean values and standardized deviations of all variables as well as latent correlations (based on the results of the global CFA model). The global CFA model showed good fit indices:  $\chi^2 = 894.78$ ,  $df = 515$ ,  $p < 0.001$ , CFI = 0.95, SRMR = 0.05, RMSEA = 0.04, 90% CI for RMSEA (0.03, 0.04).

### Testing the Hypotheses

**Figure 1** illustrates the SEM model showing good fit indices [ $\chi^2 = 1,025.14$ ,  $df = 577$ ,  $p < 0.001$ , CFI = 0.94, SRMR = 0.05, RMSEA = 0.04, 90% CI for RMSEA (0.04, 0.05)]. The results indicated that satisfaction with institutional strategies was positively related to satisfaction with the need for autonomy ( $\beta = 0.18$ ,  $p < 0.01$ ) and the need for competence ( $\beta = 0.16$ ,  $p < 0.01$ ) as well as student engagement ( $\beta = 0.31$ ,  $p < 0.001$ ). No significant relationship between satisfaction with institutional strategies and satisfaction

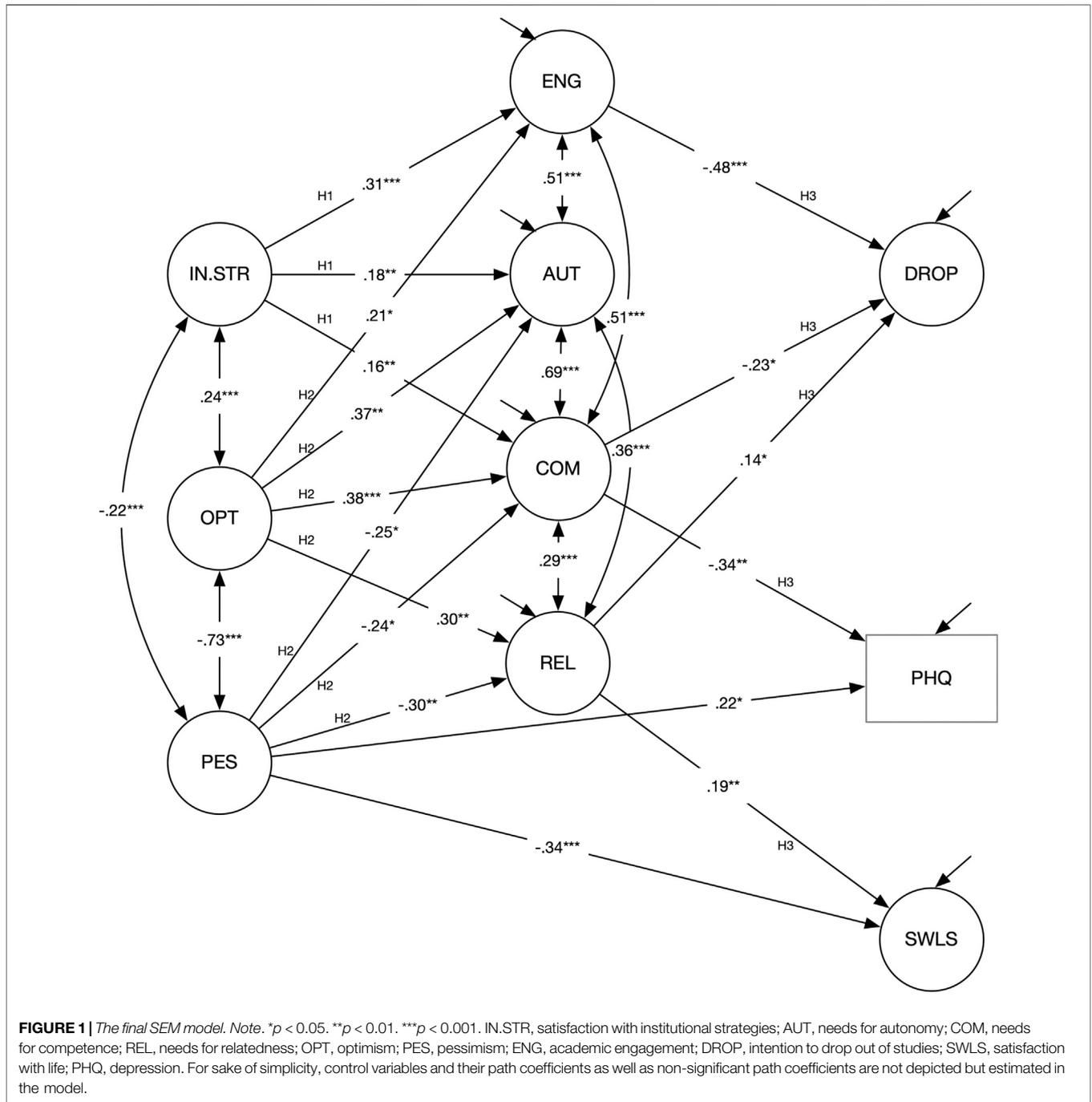
with the need for relatedness was found ( $\beta = 0.04$ ,  $p = 0.41$ ). Whereas optimism was positively related to all three components of basic psychological need satisfaction ( $\beta = 0.30$ – $0.38$ , all  $ps < 0.01$ ), pessimism was negatively associated with the fulfillment of all basic psychological needs ( $\beta = -0.30$  to  $-0.24$ , all  $ps < 0.05$ ) but not significantly associated with engagement ( $\beta = -0.13$ ,  $p = 0.22$ ). Students who reported higher values on academic engagement ( $\beta = -0.48$ ,  $p < 0.001$ ) and higher values on the fulfillment of the need for competence ( $\beta = -0.23$ ,  $p < 0.05$ ) reported lower values on intentions to drop out from studies. Unexpectedly, there was a positive association between the fulfillment of the need for relatedness and dropout intentions ( $\beta = 0.14$ ,  $p < 0.05$ ). The regression coefficient between autonomy need satisfaction and dropout intentions did not reach significance ( $\beta = 0.01$ ,  $p = 0.96$ ). Among all three psychological needs, only the fulfillment of the need for competence ( $\beta = -0.34$ ,  $p < 0.01$ ) was associated with lower levels of depression, whereas only the fulfillment of the need for relatedness was positively associated with life satisfaction ( $\beta = 0.18$ ,  $p < 0.01$ ). Furthermore, higher levels of pessimism were related to higher levels of depression ( $\beta = 0.24$ ,  $p < 0.01$ ) and lower levels of life satisfaction ( $\beta = -0.34$ ,  $p < 0.001$ ).

To test the presumed mediating effects, academic engagement, autonomy, competence, and relatedness were added as multiple mediators to the SEM. We found only one significant indirect effect [ $B = -0.15$ ,  $SE = 0.05$ ,  $p < 0.01$ , 95% CI ( $-0.254$ ,  $-0.081$ )]. Namely, students' satisfaction with institutional strategies was positively linked to their academic engagement, which in turn was negatively related to dropout intentions. Other presumed mediating effects did not reach significance.

Overall, 42.4% variance in autonomy, 33.8% in relatedness, 45% in competence, 25.9% in academic engagement, 57.5% in satisfaction with life, and 40% in dropout intention could be explained by the presumed factors.

## DISCUSSION

The purpose of the present study was to examine the relationship between students' satisfaction with institutional strategies during the COVID-19 pandemic, personality (i.e., optimism and



pessimism), the fulfillment of basic psychological needs, academic engagement, dropout intentions, ill-being, and well-being. Data analyses were based on a sample of 477 German higher education students.

In line with our assumptions, students' satisfaction with institutional strategies was positively related to their satisfaction with needs for autonomy and needs for competence. The regression coefficient from satisfaction with institutional strategies on the fulfillment of needs for relatedness was not significant after controlling for students' optimism and

pessimism. This may be due to the way we operationalized satisfaction with institutional strategies. The items focused on the communication of the institution staff about the procedure of examinations and courses. Thus, there were no aspects related on the emotional support of lecturers or peers.

Regarding optimism and pessimism, students who reported higher levels of optimism also reported higher levels of satisfaction with all three basic psychological needs as well as higher levels of academic engagement, whereas students who reported higher levels of pessimism reported lower levels of basic

psychological need satisfaction. This is in line with Student Demands-Resources assumptions (Salmela-Aro and Upadaya, 2014; Teuber, 2021) as well as recent empirical findings (e.g., Teuber et al., 2021a; Teuber et al., 2021b) indicating that personality traits (e.g., optimism and pessimism) play an important role in academic and psychological adjustment also in critical situations such as the COVID-19 outbreak (e.g., Martin-Krumm et al., 2020). Our findings suggest that optimistic students are more resistant to social distancing and its associated consequences. In comparison, pessimistic students are more likely to suffer from affective problems and tend to be less satisfied with their life. These students may profit more from institutional support programs such as online psychological consulting during the pandemic.

With respect to the relationship between psychological need satisfaction and dropout intentions, we found that among the three basic psychological needs, only the fulfillment of the need for competence was negatively related to students' intention to drop out of studies. An explanation for this result is that we assessed general psychological need satisfaction. The relationships may be more likely to be revealed if domain-specific psychological needs were estimated, such as psychological need satisfaction in the educational context.

As hypothesized by Student Demands-Resources Model, students who reported higher levels of academic engagement reported lower levels of dropout intentions. Under lockdown measures, being actively engaged in academic work and learning may be a significant contributor to students' academic success and may lower the probability of dropping out of studies.

Against our assumption and previous findings, there was a significant positive relationship between the fulfillment of relatedness and dropout intentions. Hence, the fulfillment of the need for relatedness appears to play a different role. Previous studies (Lörz et al., 2020; Seyfeli and ElsnerWannemacher, 2020; Winde et al., 2020) suggest lower levels of students' motivation and engagement in German higher educational contexts in the time of COVID-19. Yet, based on descriptive statistics, the average value on relatedness fulfillment was relatively high ( $M = 4.1$  on a 5-point scale) in the present study. According to that question, it is possible that we did not estimate one's relatedness to his or her institutional members but to family members. Due to social restrictions, relatedness to fellow students and other faculty members may decrease, while relatedness to family members (e.g., parents, partners, and other relatives) may increase in a compensating manner. According to the results found in a study conducted by Elmer et al. (2020), university students in Switzerland were worried about their health and family members. As aforementioned, Germany is one of the countries with the most infected cases in Europe, and the death rate is continuously increasing. Against this background, we speculate that in German higher education contexts, the significance of study and relationships to family members may have changed for students in higher education after witnessing increasing cases of death due to the coronavirus. It would be worthwhile to assess this factor in different contexts or using different questionnaires.

Among the presumed mediating effects, only the relationship from satisfaction with institutional strategies

through academic engagement to dropout intentions reached significance. While applying Student Demands-Resources Theory to higher educational contexts, several authors (Gusy et al., 2016; Teuber et al., 2020) found that supportive aspects in the learning environment can foster one's academic engagement and contributes to positive academic outcomes. Our results suggest that during the pandemic, supportive institutional strategies may encourage students' engagement in academic work and reduce intentions to drop out of their studies.

## Practical Implications

The findings of the present study provide several important implications for practice. The findings of this study indicate that during the COVID-19 pandemic, students' optimism is a significant personal strength in the coping process, whereas pessimism may be a risk factor that has a detrimental effect on students' adaption. According to Tinto's Framework of Student Departure (1975), academic and social integrations of students play an important role in students' decision on dropping out of college. Although academic and social activities are limited under COVID measures, higher educational institutions may be able to effectively encourage their students' academic engagement and contribute to their psychological need satisfaction through informing students timely about further proceedings regarding courses and examinations.

## Limitations

Despite these strengths, several limitations of this study should be taken into consideration. Firstly, this study had a cross-sectional design. Theoretically, individuals' traits such as optimism and pessimism can also be affected by the satisfaction with psychological needs and academic commitment. Hence, with our cross-sectional data, we were not able to examine the possible reciprocal relationships between these variables. Although our hypotheses were theoretical founded and empirically supported, longitudinal studies should be conducted to draw causal conclusions. Experience sampling methods can be another good alternative. Secondly, data analyses were based on self-report data. Common method variance may partly explain some of the results. We suggest including different informants such as other faculty members. Thirdly, the data was conducted through an online survey, and we were not able to identify whether the data had a clustered structure (e.g., students from the same institution). Furthermore, the large number of the sample consisted of university students and students who were pursuing a bachelor's degree. Although we controlled these variables, we were not able to examine the effect of different institutional types and target academic degrees. In the future, it may be beneficial to conduct data more systematically.

## CONCLUSION

In this study, we examined the relationship between students' satisfaction with institutional strategies, personality traits,

satisfaction with basic psychological needs, academic engagement, dropout intentions, depression, and life satisfaction in German higher education institutions. The findings highlight the importance of satisfying students' basic psychological needs during the COVID-19 outbreak. The results of this study suggest that students' optimism is a personal resource. Furthermore, meeting students' competence needs and encouraging their academic engagement may reduce dropout intentions.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation.

## REFERENCES

- Ajzen, I. (2001). Nature and Operation of Attitudes. *Annu. Rev. Psychol.* 52 (1), 27–58. doi:10.1146/annurev.psych.52.1.27
- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behav. Hum. Decis. Process.* 50 (2), 179–211. doi:10.1016/0749-5978(91)90020-t
- Alexandros, C., Ahmed, E., and Rupert, W. (2017). Analysis of Tinto's Student Integration Theory in First-Year Undergraduate Computing Students of a UK Higher Education Institution. *Int. J. Comp. Edu. Dev.* 19 (2/3), 97–121. doi:10.1108/IJCED-10-2016-0019
- Bakker, A. B. (2011). An Evidence-Based Model of Work Engagement. *Curr. Dir. Psychol. Sci.* 20 (4), 265–269. doi:10.1177/0963721411414534
- Bakker, A. B., and Demerouti, E. (2014). "Job Demands-Resources Theory," in *Wellbeing*. Editor C. L. Cooper (Chichester, UK: John Wiley & Sons), 11–28. doi:10.1002/9781118539415.wbwell019
- Bask, M., and Salmela-Aro, K. (2013). Burned Out to Drop Out: Exploring the Relationship between School Burnout and School Dropout. *Eur. J. Psychol. Educ.* 28 (2), 511–528. doi:10.1007/s10212-012-0126-5
- Boileau, L., Gaudreau, P., Gareau, A., and Chamandy, M. (2020). Some Days Are More Satisfying Than Others: A Daily-Diary Study on Optimism, Pessimism, Coping, and Academic Satisfaction: Some Days Are More Satisfying. *Br. J. Educ. Psychol.* 91, 42–46. doi:10.1111/bjep.12346
- Carver, C. S., and Scheier, M. F. (2014). Dispositional Optimism. *Trends Cogn. Sci.* 18 (6), 293–299. doi:10.1016/j.tics.2014.02.003
- Chang, E. C., Maydeu-Olivares, A., and D'Zurilla, T. J. (1997). Optimism and Pessimism as Partially Independent Constructs: Relationship to Positive and Negative Affectivity and Psychological Well-Being. *Personal Individual Differences* 23 (3), 433–440. doi:10.1016/s0191-8869(97)80009-8
- Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., et al. (2015). Basic Psychological Need Satisfaction, Need Frustration, and Need Strength across Four Cultures. *Motiv. Emot.* 39 (2), 216–236. doi:10.1007/s11031-014-9450-1
- Cordeiro, P. M. G., Paixão, M. P., Lens, W., Lacante, M., and Luyckx, K. (2018). Parenting Styles, Identity Development, and Adjustment in Career Transitions. *J. Career Dev.* 45 (1), 83–97. doi:10.1177/0894845316672742
- Deci, E. L., and Ryan, R. M. (2000). The "What" and "Why" of Goal Pursuits: Human Needs and the Self-Determination of Behavior. *Psychol. Inq.* 11 (4), 227–268. doi:10.1207/s15327965pli1104\_01
- Dember, W. N., Martin, S. H., Hummer, M. K., Howe, S. R., and Melton, R. S. (1989). The Measurement of Optimism and Pessimism. *Curr. Psychol.* 8 (2), 102–119. doi:10.1007/bf02686675
- Diener, E., Emmons, R. A., Larsen, R. J., and Griffin, S. (1985). The Satisfaction with Life Scale. *J. Personal. Assess.* 49 (1), 71–75. doi:10.1207/s15327752jpa4901\_13
- Elmer, T., Mephram, K., and Stadtfeld, C. (2020). Students under Lockdown: Comparisons of Students' Social Networks and Mental Health before and

## ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Ethics Committee of Bielefeld University. The patients/participants provided their written informed consent to participate in this study.

## AUTHOR CONTRIBUTIONS

ZT conceptually designed the study, carried out analyses, interpreted the results, and drafted and revised the manuscript. HJ contributed to data analyses and interpretation of the results and reviewed and revised drafts of the manuscript. TN reviewed and revised drafts of the manuscript.

- during the COVID-19 Crisis in Switzerland. *PLoS ONE* 15 (7), e0236337. doi:10.1371/journal.pone.0236337
- Gallagher, M. W., Marques, S. C., and Lopez, S. J. (2017). Hope and the Academic Trajectory of College Students. *J. Happiness Stud.* 18 (2), 341–352. doi:10.1007/s10902-016-9727-z
- Glaesmer, H., Hoyer, J., Klotsche, J., and Herzberg, P. Y. (2008). Die deutsche Version des Life-Orientations-Tests (LOT-R) zum dispositionellen Optimismus und Pessimismus. *Z. für Gesundheitspsychologie* 16 (1), 26–31. doi:10.1026/0943-8149.16.1.26
- Gusy, B., Lesener, T., and Wolter, C. (2019). Measuring Well-Being with the Utrecht Work Engagement Scale - Student Form. *Eur. J. Health Psychol.* 26 (2), 31–38. doi:10.1027/2512-8442/a000027
- Gusy, B., Wörfel, F., and Lohmann, K. (2016). Erschöpfung und Engagement im Studium. *Z. für Gesundheitspsychologie* 24 (1), 41–53. doi:10.1026/0943-8149/a000153
- Hagenauer, G., Gläser-Zikuda, M., and Moschner, B. (2018). University Students' Emotions, Life-Satisfaction and Study Commitment: a Self-Determination Theoretical Perspective. *J. Further Higher Edu.* 42 (6), 808–826. doi:10.1080/0309877x.2017.1323189
- Hahn, E., Kuhlee, D., and Porsch, R. (2021). "Institutionelle und individuelle Einflussfaktoren des Belastungserlebens von Lehramtsstudierenden in der Corona-Pandemie [Institutional and individual factors influencing student teachers' experience of stress in the Corona pandemic," in *Das Bildungssystem in Zeiten der Krise. Empirische Befunde, Konsequenzen und Potenziale für das Lehren und Lernen [The Education System in Times of Crisis. Empirical Findings, Consequences and Potentials for Teaching and Learning]*. Editors C. Reintjes, R. Porsch, and G. im Brahm (Münster: Waxmann), 221–237.
- Hajek, P., and Kernecker, T. (2020). CoV19-Maßnahmen. Online-Befragung Studierende. Peter Hajek Public Opinion Strategies. Available at: [https://www.bmbwf.gv.at/dam/jcr:71063eaf-86d1-4d80-8d31-d023cddbcd0e/Pr%C3%A4sentation\\_Studierende\\_Corona\\_Krise.pdf](https://www.bmbwf.gv.at/dam/jcr:71063eaf-86d1-4d80-8d31-d023cddbcd0e/Pr%C3%A4sentation_Studierende_Corona_Krise.pdf) (Accessed May 27, 2021).
- Heissel, A., Pietrek, A., Flunger, B., Fydrich, T., Rapp, M. A., Heinzl, S., et al. (2018). The Validation of the German Basic Psychological Need Satisfaction and Frustration Scale in the Context of Mental Health. *Eur. J. Health Psychol.* 25 (4), 119–132. doi:10.1027/2512-8442/a000017
- Heublein, U., and Wolter, A. (2011). Studienabbruch in Deutschland. Definition, Häufigkeit, Ursachen, Maßnahmen. *Z. Für Pädagogik* 57 (2), 214–236.
- Hinz, A., Sander, C., Glaesmer, H., Brähler, E., Zenger, M., Hilbert, A., et al. (2017). Optimism and Pessimism in the General Population: Psychometric Properties of the Life Orientation Test (LOT-R). *Int. J. Clin. Health Psychol.* 17 (2), 161–170. doi:10.1016/j.ijchp.2017.02.003
- Hu, L. T., and Bentler, P. M. (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria versus New Alternatives. *Struct. Equation Model. A Multidisciplinary J.* 6 (1), 1–55. doi:10.1080/1070519990540118

- Ickson, T., Kaplan, O., and Slobodin, O. (2020). Does Optimism Predict Academic Performance? Exploring the Moderating Roles of Conscientiousness and Gender. *Stud. Higher Edu.* 45 (3), 635–647. doi:10.1080/03075079.2018.1564257
- Janke, S., and Glöckner-Rist, A. (2012). Deutsche version der satisfaction with life scale (SWLS) [The German version of the satisfaction with life scale]. *Zusammenstellung Sozialwissenschaftlicher Items Und Skalen (ZIS)*. doi:10.6102/zis147
- Jovančević, A., and Miličević, N. (2020). Optimism-pessimism, Conspiracy Theories and General Trust as Factors Contributing to COVID-19 Related Behavior - A Cross-Cultural Study. *Pers Individ Dif* 167, 110216. doi:10.1016/j.paid.2020.110216
- Kroenke, K., and Spitzer, R. L. (2002). The PHQ-9: A New Depression Diagnostic and Severity Measure. *Psychiatr. Ann.* 32 (9), 509–515. doi:10.3928/0048-5713-20020901-06
- Litalien, D., and Guay, F. (2015). Dropout Intentions in PhD Studies: A Comprehensive Model Based on Interpersonal Relationships and Motivational Resources. *Contemp. Educ. Psychol.* 41, 218–231. doi:10.1016/j.cedpsych.2015.03.004
- Lörz, M., Marczuk, A., Zimmer, L., Multrus, F., and Buchholz, S. (2020). Studieren unter Corona-Bedingungen: Studierende bewerten das erste Digitalsemester. *DZHW Brief* 5|2020, 1–8. doi:10.34878/2020.05.dzhw\_brief10.1628/978-3-16-157969-1
- Lotkowski, V. A., Robbins, S. B., and Noeth, R. J. (2014). The Role of Academic and Non-academic Factors in Improving College Retention. ACT policy report. Available at: [https://www.act.org/content/dam/act/unsecured/documents/college\\_retention.pdf](https://www.act.org/content/dam/act/unsecured/documents/college_retention.pdf) (Accessed May 27, 2021) American College Testing ACT Inc.
- Löwe, B., Kroenke, K., Herzog, W., and Gräfe, K. (2004). Measuring Depression Outcome with a Brief Self-Report Instrument: Sensitivity to Change of the Patient Health Questionnaire (PHQ-9). *J. Affective Disord.* 81 (1), 61–66. doi:10.1016/S0165-0327(03)00198-8
- Marczuk, A., Multrus, F., and Lörz, M. (2021). Die Studiensituation in der Corona-Pandemie. Auswirkungen der Digitalisierung auf die Lern- und Kontaktsituation von Studierenden. Hannover: DZHW Brief. doi:10.34878/2021.01.dzhw\_brief
- Martin-Krumm, C., Tarquinio, C., and Tarquinio, C. (2020). L'optimisme et COVID-19 : une ressource pour soutenir les personnes en situation de confinement? *Ann. Médico-psychologiques, revue psychiatrique* 178 (7), 728–737. doi:10.1016/j.amp.2020.06.004
- Mashburn, A. J. (2000). A Psychological Process of College Student Dropout. *J. Coll. Student Retention: Res. Theor. Pract.* 2 (3), 173–190. doi:10.2190/u2qb-52j9-ghgp-6lee
- Milyavskaya, M., and Koestner, R. (2011). Psychological Needs, Motivation, and Well-Being: A Test of Self-Determination Theory across Multiple Domains. *Personal. Individual Differences* 50 (3), 387–391. doi:10.1016/j.paid.2010.10.029
- Muthén, L. K., and Muthén, B. O. (2019). *Mplus 8*. Los Angeles, CA: Muthén & Muthén.
- Nahrgang, J. D., Morgeson, F. P., and Hofmann, D. A. (2011). Safety at Work: A Meta-Analytic Investigation of the Link between Job Demands, Job Resources, Burnout, Engagement, and Safety Outcomes. *J. Appl. Psychol.* 96 (1), 71–94. doi:10.1037/a0021484
- Nicholls, A. R., Polman, R. C. J., Levy, A. R., and Backhouse, S. H. (2008). Mental Toughness, Optimism, Pessimism, and Coping Among Athletes. *Personal. Individual Differences* 44 (5), 1182–1192. doi:10.1016/j.paid.2007.11.011
- Niewöhner, T., Hoerdler, L., Roxel, A., Meindl, M., and Teuber, Z. (2021). Zielorientierung, Burnout und Engagement im Hochschulkontext: Integration von Zielorientierung in das Study Demands-Resources-Modell. *Präv Gesundheitsf.* 1–6. doi:10.1007/s11553-021-00840-1
- Rahman, M. H. A., Uddin, M. S., and Dey, A. (2021). Investigating the Mediating Role of Online Learning Motivation in the COVID-19 Pandemic Situation in Bangladesh. *J. Comput. Assist. Learn.* doi:10.1111/jcal.12535
- Rand, K. L., Shanahan, M. L., Fischer, I. C., and Fortney, S. K. (2020). Hope and Optimism as Predictors of Academic Performance and Subjective Well-Being in College Students. *Learn. Individual Differences* 81, 101906. doi:10.1016/j.lindif.2020.101906
- Roso-Bas, F., Pades Jiménez, A., and García-Buades, E. (2016). Emotional Variables, Dropout and Academic Performance in Spanish Nursing Students. *Nurse Edu. Today* 37, 53–58. doi:10.1016/j.nedt.2015.11.021
- Rump, M., Esdar, W., and Wild, E. (2017). Individual Differences in the Effects of Academic Motivation on Higher Education Students' Intention to Drop Out. *Eur. J. Higher Edu.* 7 (4), 341–355. doi:10.1080/21568235.2017.1357481
- Ryan, R. M., and Deci, E. L. (2000). The Darker and Brighter Sides of Human Existence: Basic Psychological Needs as a Unifying Concept. *Psychol. Inq.* 11 (4), 319–338. doi:10.1207/s15327965pli1104\_03
- Salmela-Aro, K., and Upadaya, K. (2014). School Burnout and Engagement in the Context of Demands-Resources Model. *Br. J. Educ. Psychol.* 84 (1), 137–151. doi:10.1111/bjep.12018
- Salmela-Aro, K., and Upadaya, K. (2012). The Schoolwork Engagement Inventory. *Eur. J. Psychol. Assess.* 28 (1), 60–67. doi:10.1027/1015-5759/a000091
- Schaufeli, W. B., Martínez, I. M., Pinto, A. M., Salanova, M., and Bakker, A. B. (2002). Burnout and Engagement in University Students. *J. Cross-Cultural Psychol.* 33 (5), 464–481. doi:10.1177/0022022102033005003
- Scheier, M. E., and Carver, C. S. (1987). Dispositional Optimism and Physical Well-Being: The Influence of Generalized Outcome Expectancies on Health. *J. Personal.* 55 (2), 169–210. doi:10.1111/j.1467-6494.1987.tb00434.x
- Scheier, M. F., Carver, C. S., and Bridges, M. W. (1994). Distinguishing Optimism from Neuroticism (And Trait Anxiety, Self-Mastery, and Self-Esteem): A Reevaluation of the Life Orientation Test. *J. Personal. Soc. Psychol.* 67 (6), 1063–1078. doi:10.1037/0022-3514.67.6.1063
- Schiffrrin, H. H., Liss, M., Miles-McLean, H., Geary, K. A., Erchull, M. J., and Tashner, T. (2014). Helping or Hovering? the Effects of Helicopter Parenting on College Students' Well-Being. *J. Child. Fam. Stud.* 23 (3), 548–557. doi:10.1007/s10826-013-9716-3
- Schwinger, M., Trautner, M., Kärchner, H., and Otterpohl, N. (2020). Psychological Impact of corona Lockdown in Germany: Changes in Need Satisfaction, Well-Being, Anxiety, and Depression. *Int. J. Environ. Res. Public Health.* 17 (23), 9083. doi:10.3390/ijerph17239083
- Serafini, G., Parmigiani, B., Amerio, A., Aguglia, A., Sher, L., and Amore, M. (2020). The Psychological Impact of COVID-19 on the Mental Health in the General Population. *QJM: Int. J. Med.* 113 (8), 531–537. doi:10.1093/qjmed/hcaa201
- Seyfeli, F., Elsner, L., and Wannemacher, K. (2020). Vom Corona-Shutdown zur Blended University? *Expertinnenbefragung Digitales Sommersemester* (Baden: Tectum Verlag). doi:10.5771/9783828876484
- Shields, G. S., Toussaint, L. L., and Slavich, G. M. (2016). Stress-related Changes in Personality: A Longitudinal Study of Perceived Stress and Trait Pessimism. *J. Res. Personal.* 64, 61–68. doi:10.1016/j.jrp.2016.07.008
- Souitaris, V., Zerbini, S., and Al-Laham, A. (2007). Do entrepreneurship Programmes Raise Entrepreneurial Intention of Science and Engineering Students? the Effect of Learning, Inspiration and Resources. *J. Business Venturing* 22 (4), 566–591. doi:10.1016/j.jbusvent.2006.05.002
- Studitemps GmbH, and Maastricht University (2021). Studieren und Geldverdienen unter Pandemiebedingungen - Analyse zur Jobsituation und finanziellen Ausstattung der Hochschülerinnen und Hochschüler in Deutschland/Vergleich Sommersemester 2019 und Sommersemester 2020 - Sonderauswertung der Studienreihe "Fachkraft 2030. Available at: <https://studitemps.de/wp-content/uploads/2020/11/studitemps-whitepaper-jobwelt.pdf> (Accessed May 28, 2021).
- Tang, X., Upadaya, K., and Salmela-Aro, K. (2021). School Burnout and Psychosocial Problems Among Adolescents: Grit as a Resilience Factor. *J. Adolescence* 86, 77–89. doi:10.1016/j.adolescence.2020.12.002
- Teuber, Z. (2021). *Academic And Psychological Adjustment in Chinese Students: The Role of Student Resources*. Bielefeld, Germany: Bielefeld University. Doctoral dissertation. doi:10.4119/unibi/2951455
- Teuber, Z., Möer, J., Webel, L., and Seifert, A. (2020). Burnout und Engagement: Eine Pilotstudie zum Transfer des Job-Demands-Resources-Modells in den deutschen Schulkontext. *Präv Gesundheitsf.* 15 (3), 269–274. doi:10.1007/s11553-019-00752-1
- Teuber, Z., Nussbeck, F. W., and Wild, E. (2021a). School Burnout Among Chinese High School Students: the Role of Teacher-Student Relationships and Personal Resources. *Educ. Psychol.* 1–18. doi:10.1080/01443410.2021.1917521
- Teuber, Z., Nussbeck, F. W., and Wild, E. (2021b). The Bright Side of Grit in Burnout-Prevention: Exploring Grit in the Context of Demands-Resources Model Among Chinese High School Students. *Child. Psychiatry Hum. Dev.* 52, 464–476. doi:10.1007/s10578-020-01031-3

- Tinto, V. (1975). Dropout from Higher Education: A Theoretical Synthesis of Recent Research. *Rev. Educ. Res.* 45 (1), 89–125. doi:10.3102/00346543045001089
- Tinto, V. (2006). Research and Practice of Student Retention: What Next? *J. Coll. Student Retention: Res. Theor. Pract.* 8 (1), 1–19. doi:10.2190/4ynu-4tmb-22dj-an4w
- Traus, A., Höffken, K., Thomas, S., Mangold, K., and Schröder, W. (2020). *Stu.di.Co. - Studierenden digital in Zeiten von Corona: Erste Ergebnisse der bundesweiten Studie Stu.di.Co.* Hildesheim: Universitätsverlag Hildesheim.
- Vallerand, R. J., Fortier, M. S., and Guay, F. (1997). Self-determination and Persistence in a Real-Life Setting: Toward a Motivational Model of High School Dropout. *J. Personal. Soc. Psychol.* 72 (5), 1161–1176. doi:10.1037/0022-3514.72.5.1161
- Vansteenkiste, M., Ryan, R. M., and Soenens, B. (2020). Basic Psychological Need Theory: Advancements, Critical Themes, and Future Directions. *Motiv. Emot.* 44 (1), 1–31. doi:10.1007/s11031-019-09818-1
- Wang, Y., Tian, L., and Scott Huebner, E. (2019). Basic Psychological Needs Satisfaction at School, Behavioral School Engagement, and Academic Achievement: Longitudinal Reciprocal Relations Among Elementary School Students. *Contemp. Educ. Psychol.* 56, 130–139. doi:10.1016/j.cedpsych.2019.01.003
- Wilson, A. J., Liu, Y., Keith, S. E., Wilson, A. H., Kermer, L. E., Zumbo, B. D., et al. (2012). Transformational Teaching and Child Psychological Needs Satisfaction, Motivation, and Engagement in Elementary School Physical Education. *Sport Exerc. Perform. Psychol.* 1 (4), 215–230. doi:10.1037/a0028635
- Winde, M., Werner, S. D., Gumbmann, B., and Hieronimus, S. (2020). Hochschulen, Corona und jetzt? Future Skills – Diskussionspapier. 4, , 2020 Available at: <https://www.stifterverband.org/download/file/fid/9313>.
- Yu, S., Levesque-Bristol, C., and Maeda, Y. (2018). General Need for Autonomy and Subjective Well-Being: A Meta-Analysis of Studies in the US and East Asia. *J. Happiness Stud.* 19 (6), 1863–1882. doi:10.1007/s10902-017-9898-2

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Teuber, Jia and Niewöhner. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.