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Research article

The moderating role of psychological capital in the relationship between school-related stress and outcomes of academic achievement and behavior problems among students with health impairments

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ABSTRACT

Numerous researches have examined the relationship between school-related stress and outcomes of academic achievement and behavior problems; however, a very few studies were conducted to assess the moderating role of psychological capital in this relat.ionship, especially focusing on students with health impairments. The current study was carried out to investigate the association of school-related stress and psychological capital with academic achievement and behavior problems in students with health impairments, as well as the possible moderating influence of psychological capital in the school-related stress and outcomes relationships. The study involved 233 students with health impairments in Addis Ababa. Instruments used for the study include the Demographic Questionnaire, Perceived School-Related Stress Scale, Psychological Capital Questionnaire, Strengths and Difficulties Questionnaire, and school record reviews. Descriptive statistics, structural equation modeling, and multi-group structural equation modeling were utilized to analyze the data. Results revealed that school-related stress was significantly and negatively associated with academic achievement and positively with behavior problems. Psychological capital was significantly and positively associated with academic achievement and negatively with behavior problems. Higher levels of psychological capital had a significant moderating role in the relationships between school-related stress and both outcomes of academic achievement and behavior problems. The finding suggests that PsyCap is a positive resource to counteract the detrimental impacts of school-related stress on the academic achievement and behavior problems of students with health impairments.

1. Introduction

Students with health impairments (SWHIs) may experience increased levels of school-related stress in comparison to students without health impairments [1]. Some of the most familiar health-related stressors faced by schoolchildren and adolescents include recurrent pain, difficulties performing regular activities and life roles, uncertain prognosis, restrictive treatment regimens, frequent medical visits, and hospitalizations [2]. Chronic health conditions may also present stressors that are related to loss of life freedoms

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associated with poor health and fear related to the increased likelihood of death [3]. Moreover, they often do face worrisome trouble keeping a balance between the demands of managing their chronic health condition and schooling requirements [4].

School-related stress has been shown to be inversely associated with a host of school-related outcomes, such as students' academic achievement [5], academic engagement [6], and school completion [7]. School-related stress has also been positively associated with behavior problems [8,9], mental health problems [10], and poor physical health [11]. In sum, school-related stress among students tends to have a harmful impact on various school outcomes. However, less research emphasis has been devoted thus far to the relationships between school-related stress and academic achievement and behavior problems in SWHIs. The study was prompted by the scarcity of research in the area of school-related stress and outcomes of academic achievement and behavior problems and the moderating influence of PsyCap in this relationship, focusing on SWHIs.

Psychological capital (PsyCap) is an individual's positive psychological state of development that comprises self-efficacy, hope, resilience, and optimism [12]. Each of the four positive psychological capacities fulfills the criteria for positive organizational behavior: being state-like and open to development, being grounded in theory and research with valid measures, and having a beneficial influence on attitudes, behaviors, and performance [13]. PsyCap, a core construct, has considerably more influencing power than its individual components of self-efficacy, hope, resilience, and optimism [14]. In the workplace, the core construct of PsyCap has been found to be positively related to job performance, commitment, satisfaction, and citizenship behaviors and inversely related to unfavorable organizational outcomes such as job stress, anxiety, deviance, distrust, and turnover intentions of employees [15]. PsyCap intervention has also proved to improve employees' performance [16].

In recent years, PsyCap has received considerable attention in academic settings, and researchers have begun to show increasing interest in studying its influence on student outcomes. A study found that PsyCap had a significant positive relationship with academic achievement [17]. Similarly, another study showed that PsyCap was a significant positive predictor of students' grade point average [18]. Students who scored higher academic achievement had significantly higher levels of PsyCap than students who achieved lower academic results [19]. Furthermore, PsyCap has been negatively related to behavior problems in students [20]. Studies have also shown that PsyCap is a strong and positive predictor of students' academic adjustment [21], academic engagement, and psychological wellbeing [22]. Greater levels of PsyCap have also been demonstrated to be significantly related to positive emotions [23], which in turn are linked to engagement in adaptive behaviors and fewer problem behaviors. posited that the positivity character of PsyCap can assist in facilitating positive affective conditions that promote the broadening of one's thought-action repertoires and may lead to immediate and long-term adaptive benefits [24].

PsyCap has been shown to be a significant moderator in the relationships between work-related stress and outcomes among employees in work environments [25–27]. So far, a few studies have been conducted on the moderating influence of the core construct of PsyCap in the relationships between stress and the school outcomes of students in academic settings. In a recently published study, the influence of the construct of PsyCap has been examined and found to be a moderator in the relationship between stress and academic achievement in general school students [28]. However, studies examining the stress-moderating effect of PsyCap as a core construct on the school-related outcomes of students, more specifically SWHIs, are lacking. Therefore, the general objective of the present study was to investigate the association between school-related stress and outcomes (i.e., academic achievement and behavior problems) while examining the role-moderating role of PsyCap in the relationships between school-related stress and outcomes among SWHIs. More specifically, the study was conducted to address the following research objectives: (i) to examine the association between school-related stress and school-related outcomes (i.e., academic achievement and behavior problems) among SWHIs; (ii) to examine the association between PsyCap and school-related outcomes among SWHIs; and (iii) to examine the potential moderating effect of

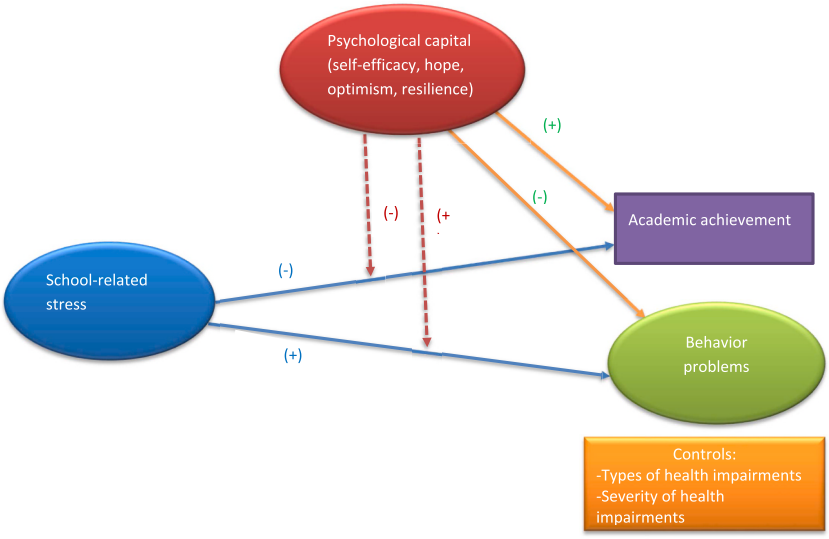

Fig. 1. Conceptual model.

PsyCap on the relationship between school-related stress and outcomes of academic achievement and behavior problems among SWHIs.

2. Theoretical framework

Two theoretical frameworks, the transactional stress theory [29] and the agentic perspective of social-cognitive theory [30,31], were used to provide a working model for understanding the relationships between predicting variables (i.e., school-related stress) and criterion variables (i.e., academic achievement and behavior problems) and the influence of PsyCap as a potential moderating variable in these relationships. The transactional theory views stress as a complex relationship between the person and his or her environment [29]. In this approach, the occurrence of stress depends on the student's cognitive evaluation of the circumstances in which the perceived demands outweigh his or her coping capabilities.

PsyCap is grounded in the agentic view of social-cognitive theory [30,31]. Social-cognitive theory is founded on a model of triadic reciprocal determinism in which personal factors, environmental situations, and behavioral events all function as interrelated and bidirectionally influencing each other. Agency is defined as a thoughtful act, with its main characteristic being the ability to initiate actions for particular purposes [32]. The crucial features of exercising personal agency are planning, forethought, self-evaluation, motivation, and self-regulation [32]. These components are also inherent in the positive construct of overall PsyCap. The four psychological resources (i.e., self-efficacy, hope, optimism, and resilience) have a common component of positivity among them [23]. In this sense, the underlying common element running through the four components of PsyCap is the "positive appraisal of circumstances and probability for success based on motivated effort and perseverance" [14].

On the basis of the theoretical and empirical evidence reviewed above, a conceptual model was developed, as illustrated in Fig. 1. It was anticipated that school-related stress would relate negatively to academic achievement and positively to behavior problems. It was also posited that PsyCap would be associated directly and positively with academic achievement and negatively with behavior problems. It was also anticipated that PsyCap would moderate the relationships between school-related stress and academic achievement and behavior problems. In other words, it is expected that PsyCap would counteract and/or reduce the detrimental impact of school-related stress on academic achievement and behavior problems. More specifically, for students with low levels of PsyCap, school-related stress is expected to have a strong impact on academic achievement and behavior problems. For students with high levels of PsyCap, school-related stress is expected to have little and/or no impact on academic achievement and behavior problems.

3. Methods

3.1. Participants

The study participants were SWHIs, that is, students with diabetes mellitus (DM) and heart disease (HD), attending primary, secondary, and preparatory schools in Addis Ababa. Eligible participants were recruited from registries of diabetes and heart disease outpatient clinics at Tikur Anbessa Specialized Hospital (TASH), Addis Ababa, Ethiopia. TASH is the oldest and largest hospital in the country and serves both as a tertiary teaching hospital and the last destination for health service referrals across the country. The main reasons for recruitment of the eligible samples from the hospital setting were to easily identify SWHIs from patient registries and contact them during their follow-up visits and clinic appointments at both diabetic and cardiac clinics of the hospital.

Inclusion Criteria: SWHIs were eligible for inclusion if they met the following criteria: age 12–19 years, grades from 5th to 12th, live and learn in Addis Ababa, must be diagnosed at least six months earlier than data collection with either DM or HD, and should attend and/or follow up at the outpatient diabetes and cardiac centers of the hospital, respectively. Exclusion criteria were: SWHIs less than 12 years old and older than 19 years old; having other recognized disabilities; newly diagnosed DM and/or HD for less than six months duration; and living and learning outside of Addis Ababa.

A total of 629 SWHIs, 299 with DM and 330 with HD, met the inclusion criteria. The sample size for the study was determined based on Chochran's formula [33] for sample size determination. The sample size calculated for the study was 238; with an adjustment of 10 % no response rate, the final calculated sample size was 262. Therefore, the total sample size determined for this study was 262 from both the DM and HD groups. A stratified random sampling method with proportionate allocation was used to get the required sample size. Strata were created based on the health impairment category, and samples within each stratum were further selected by simple random sampling. Accordingly, 125 participants with DM and 137 participants with HD, totaling 262 participants, were selected for the study. 239 (91 %) of the selected SWHIs participated in the study; 18 (7 %) were not reachable, 5 (2 %) refused to participate, and 6 (2.3 %) were removed from analysis due to missing and outlier data. The final data set for analysis consisted of 233 cases of SWHIs.

The ages of participants ranged from 12 to 19, with a mean of 15.5 years (SD = 2.32). The sample consisted of 110 (47.2 %) males and 123 (52.8 %) females. In terms of grade level of the participants, 114 (48.9 %) were in the upper cycle of primary school (grades 5–8), 58 (24.9 %) were in secondary school (grades 9–10), and 61 (26.2 %) were in college preparatory schools (grades 11–12). Students with DM and HD accounted for 49.4 % and 50.6 % of the sample, respectively. With respect to the perceived severity level of their health impairments, 32.6 % of the participants had mild conditions, 48.5 % had moderate severity, and 18.9 % had severe impairments.

3.2. Measures

3.2.1. Demographic questionnaire

The demographic questionnaire was prepared by the researcher to collect demographic information about the participants. The demographic questionnaire included items pertaining to participants' age, sex, grade, religion, family income, and type and perceived severity of health impairment.

3.2.2. Perceived school-related stress scale

To assess school-related stress, the adapted Perceived School-Related Stress Scale was used [34]. The perceived school-related stress scale has 16 items assessing students' stressful situations at school. The perceived school-related stress scale includes 4 sub-scales: difficulties with peers at school (5 items; e.g., difficulties with your friends at school), worries about school achievement (5 items; e.g., being worried about grades), schoolwork pressure (3 items; e.g., thinking that schoolwork has been too demanding), and parent and/or teacher conflicts (3 items; e.g., difficulties with your teachers).

Respondents reported the extent of stress in each situation indicated in the measure over the last month. The items were rated on a 6-point scale ranging from 0 (no stress) to 5 (severe stress). A total school-related stress score was obtained by summing the reported scores for each of the 16 items, with higher scores indicating high school-related stress. In the original scale, the internal consistency reliability coefficients of the sub-factors ranged from.61 to.80, and the Cronbach's alpha value for the overall school-related stress scale was.83 [34]. In the present study, the internal consistency reliability of the overall scale was.90, and Cronbach's alpha values for the subscales ranged from.78 for schoolwork pressure to.88 for difficulties with peers.

3.2.3. Psychological capital questionnaire

The Psychological Capital Questionnaire with twenty-four items (PCQ-24) [14] was adapted and used to assess students' PsyCap in the present study. The items in PCQ were rated on a six-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). PCQ comprises of four subscales, with each subscale consisting of six items, namely (1) self-efficacy (e.g., I feel confident to represent my class in meetings with teachers and management), (2) hope (e.g., I can think of many ways to reach my current academic goals), (3) resilience (e.g., I feel I can handle many things at a time related to my academics), and (4) optimism (e.g., I always look on the bright side of things regarding my academics). The total scores of the four subscales are summed together to generate the overall PsyCap score. The possible overall PsyCap score ranges from 24 to 144, with higher scores signifying greater PsyCap. Items 13, 20, and 23 are negatively worded and were reverse scored.

A study found Cronbach's alpha coefficient of.93 for the overall PCQ and internal consistency coefficients of the four sub-scales were found to be.92,0.87,0.83, and.77 for self-efficacy, hope, resilience, and optimism, respectively [35]. In the present study, the alpha values for each of the four subscales (0.87 for self-efficacy,0.88 for hope,0.87 for resilience, and.86 for optimism) as well as the overall PsyCap measure (0.92) demonstrated good reliability.

3.2.4. Semester average score

Average marks secured by students' for one school semester were used to assess academic achievement. These scores were collected from the students' school records. Higher scores indicate higher academic achievement.

3.2.5. The strengths and difficulties questionnaire

The Strengths and Difficulties Questionnaire (SDQ), in self-reported form, was utilized to measure the behavior problems of students [36]. SDQ consists of 25 items and inquires about the presence of positive and negative behavior attributes over the previous 6 months. The 25 items are further divided into five sub-scales, with each sub-scale comprising five items. These sub-scales include: (1) Emotional Symptoms Scale (e.g., "I worry a lot."), (2) Conduct Problems Scale (e.g., "I fight a lot. I can make other people do what I want." (3) Hyperactivity Scale (e.g., "I'm restless; I cannot stay still for long."); (4) Peer Problems Scale (e.g., "Other children or young people pick on me or bully me."); and (5) Prosocial Behavior Scale (e.g., "I am helpful if someone is hurt, upset, or feels ill."). Every item was rated on a 3-point scale with 0 (not true), 1 (somewhat true), and 2 (certainly true), such that the possible total scores of each sub-scale ranged from 0 to 10 points.

All items added, except the items about prosocial behavior, generated a total difficulty score with a range of 0–40. Responses for negatively phrased items were rated from 0 to 2, and responses for positively phrased items were scored inversely from 2 to 0. In this approach, higher scores show higher behavior problems. In the study, the internal consistency reliability of the self-report SDQ was.82 for the total difficulties scale,0.75 for emotional symptoms,0.72 for conduct problems,0.69 for hyperactivity,0.61 for peer problems, and.65 for prosocial behavior [36]. In the current study, the total difficulties scale ($\alpha = 0.84$), emotional symptoms ($\alpha = 0.74$.), conduct problems ($\alpha = 0.72$), hyperactivity ($\alpha = 0.74$), peer problems ($\alpha = 0.73$), and prosocial behavior ($\alpha = 0.74$) showed good internal consistency reliability [36].

3.2.6. Control variables

Types of health impairments and severity of health impairments were included as controls for all outcomes. Prior studies suggest that academic achievement [37] and behavior problems [38] vary across different health impairment groups. Studies also found that increased severity of health impairments was significantly associated with lower academic achievement [39] and higher behavioral problems [40]. Accordingly, type of health impairments was included as a dummy variable (0 = "DM," 1 = "HD") and severity of health impairments as an ordinal variable (1 = "mild," 2 = "moderate," and 3 = "severe"). Thus, informed by past research results, the

type and severity of health impairments were included as control variables in the present study.

3.3. Procedures

Permission to undertake the study was obtained from the Institution Ethics Committee of the College of Health Sciences of Addis Ababa University at TASH. Participants were contacted during their medical follow-up visits and appointments in the outpatient centers. Initially, the purpose, importance, and use of the study were clearly communicated to participants and their parents, and then informed consent was obtained. Participants were informed that they have the right to participate, decline to participate, or withdraw from the study at any point in time. Participants were also assured of the anonymity and confidentiality of the collected information. After informed consent was obtained, all the instruments were administered individually to each participant. For the sake of data collection, the researcher recruited three research assistants, and thorough training was given to them on how to administer and collect the data. Careful supervision was conducted by the researcher throughout the data collection process.

3.4. Data analyses

The gathered data for the study was coded, entered, and analyzed using the Statistical Package for Social Sciences (SPSS) version 23.0 and Analysis of Moment Structures (AMOS) version 23.0 software programs. Descriptive statistics, including frequencies, percentages, mean, and standard deviation, were computed to summarize the demographic characteristics of the participants and the variables of the study. Structural Equation Modeling (SEM) with AMOS was conducted to determine the association between predictor variables (i.e., school-related stress and PsyCap) and outcome variables (i.e., academic achievement and behavior problems). AMOS is the most commonly used SEM analysis software program for research [41] and is considered user-friendly and relatively easy to specify models compared to other software programs used for SEM analysis, such as LISREL, Mplus, and EQS [42].

The study was conducted following the two-step approach recommended in SEM analysis [43]. Confirmatory factor analysis (CFA) was first performed to assess the goodness of fit and construct validity (i.e., convergent and discriminant validity) of the measurement model of the study. Five common fit indices and evaluation criteria, including a Normed Chi-square (χ^2/df) value lower than 3 [44], a Goodness of Fit Index (GFI) value greater than 0.9 [45]), a Root Mean Square Error of Approximation (RMSEA) value less than.06, a Tucker-Lewis Index (TLI), and a Comparative Fit Index (CFI) value greater than.95 [46], were employed to evaluate the goodness-of-fit of the measurement as well as structural models. In the study, convergent validity was indicated by an item factor loading ≥0.5 and significant t-values ($p < 0.01$), average variance extracted (AVE) value ≥ 0.5 and construct reliability (CR) ≥ 0.7 [45,47,48]. Discriminant validity was attained when the AVE value exceeded the squared correlation value between any two factors [49]. Both standardized (β value) and unstandardized (t and p-values) structural path estimates were used for structural model analysis.

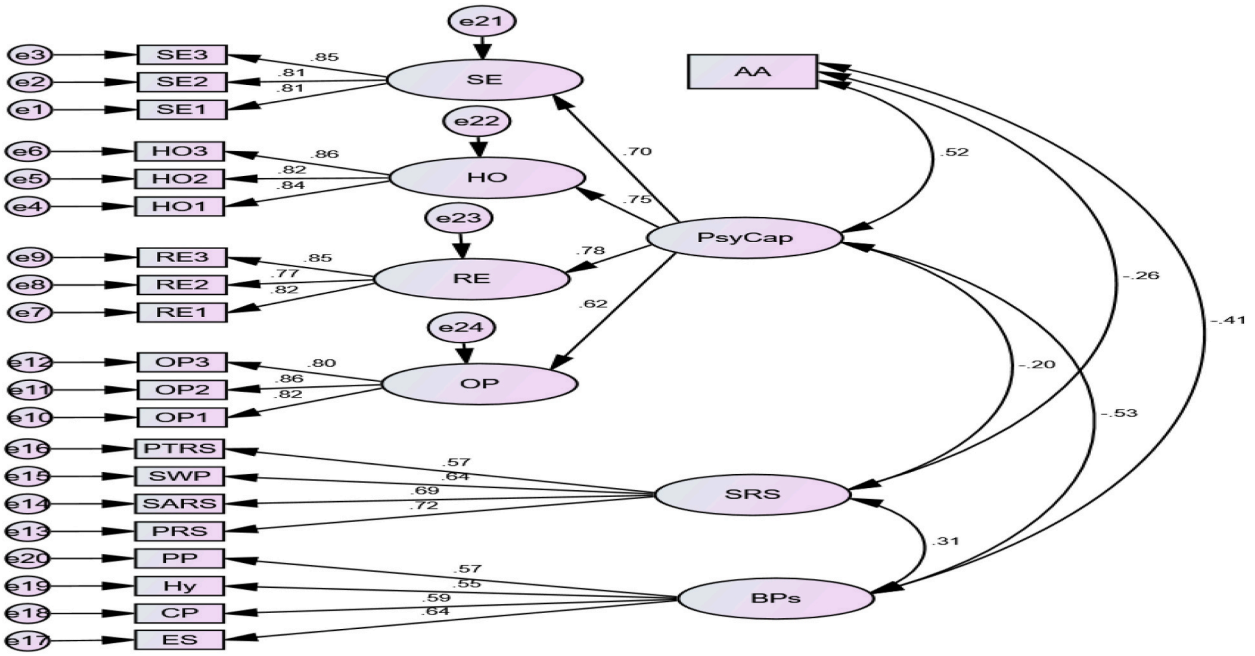

Fig. 2. Measurement Model.
Note: SE = self-efficacy; Ho = hope; RE = resilience; OP = optimism; AA = academic achievement; PsyCap = psychological capital; PTS = peer related stress; SARS = school achievement related stress; SWP = school work pressure; PTRS = parent and teacher related stress; SRS = school-related stress; ES = emotional symptoms; CP = conduct problems; Hy = hyperactivity; PP = peer problems; BPs = behavior problems.

To examine the potential moderating effects of PsyCap in the association between school-related stress and school-related outcomes, multi-group SEM analysis was employed. Multi-group SEM analysis allows for the determination of the moderating effects in a specified model and the statistical significance of any observed heterogeneity in the outcomes of two sub-groups of data, as well as the path coefficients. The types and severity levels of health impairments were considered potential confounders and controlled during the SEM analysis.

4. Results

4.1. Measurement model

The analysis followed two-step approaches, whereby the measurement model was tested before examining the structural model [43]. Accordingly, confirmatory factor analysis (CFA) was first undertaken with AMOS 23.0 to determine the adequacy of the overall measurement model and construct the validity of the variables. The CFA results of the initial measurement model indicated that the model poorly fit the data: ($\chi 2 = 3750.269$, $df = 1707$, $\chi 2/df = 2.197$, RMSEA = 0.072, GFI = 0.604, TLI = 0.616, and CFI = 0.630).

To improve model fit, an item-parceling strategy was used for each construct. After adjustments were made to the initial measurement model to improve model fit, the second CFA was carried out to determine goodness-of-fit. During the second CFA, psychological capital was considered a second-order construct with 12 parceled indicators, and the four sub-scales of perceived school-related stress scale and total difficulties scale were taken as observed indicators of the latent constructs (see Fig. 2). The findings of the second measurement model showed substantial improvement and fitted to the data in every respect of the parameters applied: ($\chi 2 = 207.059$, $df = 180$, $\chi 2/df = 1.150$, RMSEA = 0.025, GFI = 0.922, TLI = 0.984, and CFI = 0.986). Therefore, the model has been successfully verified to fit the data appropriately.

Finally, the convergent validity of the model was indicated by an item factor loading ≥0.5 and significant t-values ($p < 0.01$), AVE ≥0.5, and CR ≥ 0.7 [45,47,48]. The analysis results also confirmed the discriminant validity of the variables in the measurement model, where the AVE for each latent variable was greater than the squared correlations involving the variables. Taken together, evidence supports the goodness-of-fit, convergence, and discriminant validity of the measurement model.

4.2. Structural model

The analysis results of the initial structural model produced a good model fit ($\chi 2 = 246.758$, $df = 215$, $\chi 2/df = 1.148$, RMSEA = 0.025, GFI = 0.917, TLI = 0.981, CFI = 0.984). The structural model of the study is presented in Fig. 3. Once the model fit indices of the structural model were met, the coefficient parameter estimates of the structural paths were examined.

As shown in Table 1, after controlling for the type and perceived severity of health impairments, the results of SEM analysis indicated that school-related stress was significantly and negatively associated with academic achievement ($\beta = -0.16^*$, $p < 0.05$) and

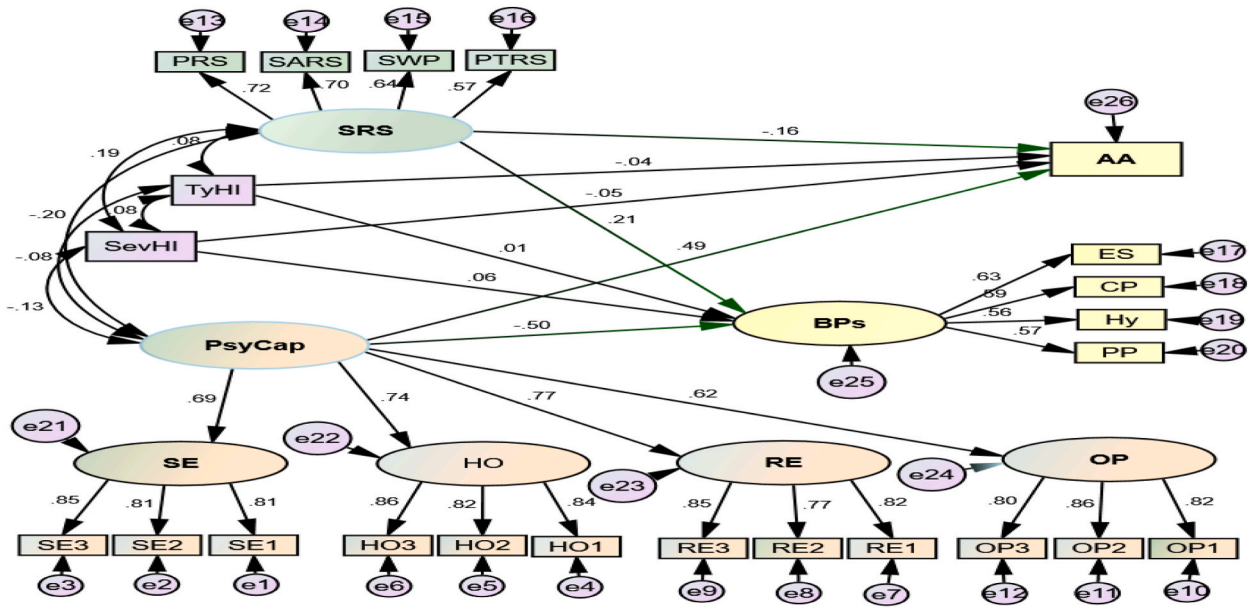

Fig. 3. Structural Model. Note: TyHI = Type of Health Impairment; SevHI = Severity of Health Impairment Note: SE = self-efficacy; Ho = hope; RE = resilience; OP = optimism; AA = academic achievement; PsyCap = psychological capital; PTS = peer related stress; SARS = school achievement related stress; SWP = school work pressure; PTRS = parent and teacher related stress; SRS = school-related stress; ES = emotional symptoms; CP = conduct problems; Hy = hyperactivity; PP = peer problems; BPs = behavior problems.

Table 1
Structural model analysis results.

No	Paths	Standardized Estimate (β)	t value	p value
1	SRS → AA	−0.16	−2.27*	0.016
2	SRS → BPs	0.21	2.31*	0.021
3	PsyCap → AA	0.49	5.90***	0.000
4	PsyCap → BPs	−0.50	−4.65***	0.000
5	TyHI → AA	−0.04	−0.70	−0.702
6	TyHI → BPs	0.007	0.09	0.926
7	SevHI → AA	−0.053	−0.89	−0.895
8	SevHI → BPs	0.058	0.77	0.440

Note: *p < 0.05, ***p < 0.001 (two-tailed test).

positively with behavior problems (β = 0.21*, $p < 0.05$). Conversely, PsyCap was significantly and positively associated with academic achievement (β = 0.49***, $p < 0.001$) and negatively with behavior problems (β = −0.50***, $p < 0.001$). The assessment of the results of the structural model showed that the proposed conceptual model was supported by the data. The pathways from control variables of type and severity of health impairments to outcomes of academic achievement and behavior problems were all found to be statistically not significant.

4.3. Multi-group SEM analysis

Multi-group SEM analysis was performed to find out whether relationships hypothesized in the model differ or not based on the value of the moderator. The joint criteria of CFI>0.95 and RMSEA<0.06 were employed to evaluate the adequacy of the model fit of both multi-group measurement and structural models [46]. In the present study, the moderating variable of PsyCap was primarily metric in nature. Therefore, the median-splitting method was used to convert the metric scale into a non-metric or categorical scale. The median value of PsyCap for the whole sample of SWHIs was 3.75. Accordingly, two groups were produced on the basis of the median value of PsyCap in the whole sample data. The first group data file included respondents who scored PsyCap lower than the median and were labeled as low PsyCap groups (n = 117), and the second group data file had respondents who scored higher than the median and were labeled as high PsyCap groups (n = 116).

Prior to testing for the potential moderating influence of PsyCap in the relationship between school-related stress and outcomes, measurement model invariance was assessed following the recommended procedures of previous researcher [45]. Assessment of the measurement model across the two groups showed excellent fit for the model ($\chi2 = 40.62$; df = 50; CFI = 1.000; RMSEA = 0.000), indicating that the model was configurally invariant. Both the chi-squared difference ($\Delta\chi2$) statistic [45,50,51] and the CFI difference (ΔCFI) test [52,53] were used jointly for the comparison of competing nested SEM models. The factor loadings in the equally constrained model resulted in a good model fit (a $\chi2 = 43.77$, df = 56, CFI = 1.000, RMSEA = 0.000). Accordingly, the comparison between the constrained and unconstrained models indicated that the change in CFI (ΔCFI = 0.00) was greater than −.01 and $\chi2$ difference test ($\chi2 = 3.15$, Δdf = 6, $p = .79$) was non-significant, supporting metric invariance between the two groups.

After configural and metric invariance was ascertained, multi-group structural analysis was performed to estimate the potential moderating influence of PsyCap in the associations between school-related stress and outcome variables of academic achievement and behavior problems. To perform multi-group analysis, first the unconstrained model was estimated, where all path parameters were allowed to be varied across groups. Second, the constrained model was estimated, where all path parameters were set to be equal across the two groups. In the third stage, the values in the model fit between the equally constrained model and the unconstrained model were compared using the chi-square difference test. If a significant difference ($p < 0.05$) occurs between the two models, a moderating influence can be inferred [45]. Similarly, a difference in CFI less than or equal to −0.01 between the constrained and baseline models indicates a significant moderating effect.

Accordingly, two separate models were run for the two groups of PsyCap. The goodness-of-fit for low levels of the PsyCap group model ($\chi2 = 34.07$, df = 38, CFI = 1.000; RMSEA = 0.000) and high levels of the PsyCap group model ($\chi2 = 31.84$, df = 38, CFI = 1.000; RMSEA = 0.000) showed excellent fit, indicating that the model fits the data for both groups very well. Thus, the next investigation was to find out whether their parameter estimates of the paths were significantly different for the two groups. According to the result of the multi-group analysis, the $\chi2$ value of the unconstrained model was 65.92 with 76 degrees of freedom, and the $\chi2$ value of all the paths across the moderator groups for the equally constrained model was 98.99 with 86 degrees of freedom; thus, the difference between the two models was 33.07 with 6 degrees of freedom. The $\chi2$ value of 33.07 with 6 degrees of freedom at the.001 significance level is 22.46, indicating that there was a significance difference between the two models. The CFI also decreased from 1.00 to 0.948 (ΔCFI = −0.052), showing the deterioration of the model fit. Taken together, the models significantly differ across the two groups, indicating a significant moderating effect of PsyCap.

In order to clearly assess in which path the moderation occurred, post-hoc separate analyses were performed by constraining one path at a time to obtain the chi-square difference between the constrained model and the unconstrained model. Accordingly, multi-group analysis was carried out (controlling for type and severity of health impairment) with equal constraints on two paths of the research interest (i.e., the paths between school-related stress and academic achievement and school-related stress and behavior problems). First, the path from school-related stress to academic achievement was assessed. Results of the b1 constrained model (SRS to AA) showed acceptable fit ($\chi2 = 80.98$, df = 77, CFI = 0.988, RMSEA = 0.015). The chi-square difference result ($\Delta\chi2$ *(1) = 15.06*, p

< 0.001) and the difference in fit index ($\Delta CFI = -0.012$) between the unconstrained model and the constrained model showed a significant difference (decline in fit). This indicates that a high level of PsyCap moderates the relationship between school-related stress and academic achievement.

Next, the path from school-related stress to behavior problems was estimated. As it can be seen in Table 2, the result of the b2 equally constrained model showed a significantly worse fit than the unconstrained model. The $\chi 2$ value of the unconstrained model was 65.92 with 76 degrees of freedom, and the $\chi 2$ value of the b2 (SRS to BPs) constrained model was 80.59 with 77 degrees of freedom. The $\chi 2$ difference test ($\Delta\chi 2$ *(1)* $= 14.67$, $p < 0.001$) and the difference in CFI test ($\Delta CFI = -0.011$) between the two models were significant. The significant difference in chi-square value and CFI result for the path from school-related stress to behavior problems between the constrained and unconstrained models for the two groups indicated that the path was moderated by PsyCap.

Moreover, a path-by-path difference comparison for each group was further executed through a pairwise comparison with the coefficients (See Table 3). The multi-group analysis of standardized path coefficients (β) indicated that under conditions of low levels of PsyCap, the relationship between school-related stress and academic achievement was significant and negative ($\beta = -0.542$, $p < 0.001$). In contrast, under the conditions of high levels of PsyCap, the relationship between school-related stress and academic achievement was positive and non-significant ($\beta = 0.078$, $p = 0.465$). The results of the multi-group analysis also demonstrated that the association between school-related stress and behavior problems ($\beta = 0.595$, $p < 0.001$) was positive and significant in low PsyCap groups. On the contrary, the influence of school-related stress on behavior problems ($\beta = -0.076$, $p = 0.576$) was negative and non-significant for the high-level PsyCap group.

5. Discussion

As expected, the result obtained from the SEM analysis indicated that school-related stress had a significant negative association with academic achievement in SWHIs. This implies that higher school-related stress results in lower academic achievement. Several explanations can be offered for this finding. One possible explanation may be that stress tends to impede the students ability to cope productively [54], such as using a study plan, employing helpful time and task management techniques, and effective learning strategies, which can affect academic achievement negatively. Another explanation may be that stress could affect student engagement in learning [55]. This finding is in line with the results of previous studies that have linked school-related stress with lower academic achievement [7,56].

Consistent with predictions, the present finding demonstrated that school-related stress was significantly related to behavior problems among SWHIs. That means higher school-related stress results in a higher incidence of behavior problems. One possible reason for this finding may be that students who are under so much pressure from school-related demands and challenges tend to engage in emotional and behavioral problems as a sort of destructive-maladaptive coping mechanism [8]. Another possible reason for this result could be that managing health-related challenges may already be difficult for adolescents with medical conditions. When combined with school-related stress (e.g., limitations in school activities, falling behind in schoolwork, and missed school days), they may become frustrated and act out or become withdrawn and quiet [57]. This finding is consistent with other studies [8,9] that found a significant positive association between school-related stress and behavior problems.

In the current study, PsyCap was significantly and positively related to academic achievement in SWHIs. It means that an increased level of PsyCap is related to increased academic achievement. One plausible explanation for this association might be that students with greater PsyCap possess strong psychological resources to handle school demands and difficulties adequately, which in turn helps to increase academic achievement [19]. PsyCap could also facilitate the drive for purposeful, agentic behavior toward effectively performing goals and tasks that leads to improved performance [15]. The present result is similar to the findings of previous research that has found a positive association between PsyCap and academic achievement [17–19].

In addition, the current study demonstrated a significant negative relationship between students' PsyCap and behavior problems. This result indicates that a higher level of PsyCap is associated with a lower risk of behavior problems. This result is comparable to a prior study that found that PsyCap had a significant and negative relationship with behavior problems [20].

As anticipated, the results demonstrated that higher levels of PsyCap moderated the association between school-related stress and academic achievement in SWHIs. This reveals that the association between school-related stress and academic achievement is very minimal for students with higher levels of PsyCap, while the association between school-related stress and academic achievement is stronger for students with lower levels of PsyCap. The reason could be that the higher levels of PsyCap may help students consider school stressors as challenges instead of harmful threats. Second, possessing greater levels of PsyCap may help to increase task

Table 2
Multi-group SEM analysis results.

Model Description	Model Fit Indices				Model Differences			
	$\chi 2$	*df*	CFI	RMSEA	$\Delta\chi 2$	Δdf	p	ΔCFI
Low PsyCap	34.07	38	1.000	0.000				
High PsyCap	31.84	38	1.000	0.000				
Unconstrained Model	65.92	76	1.000	0.000				
Constrained Model	98.99	82	0.948	0.030	33.07	6	0.000	.-0.052
b1 (SRS to AA) constrained model	80.98	77	0.988	0.015	15.06	1	0.000	−0.012
b2 (SRS to BPs) constrained model	80.59	77	0.989	0.014	14.67	1	0.000	−0.011

Table 3
Standardized parameter estimates for low and high levels of PsyCap (unconstrained model).

Path	PsyCap Low				PsyCap High			
	Estimate (β)	SE	t-value	Sig.	Estimate (β)	SE	t-value	Sig.
BPs < —TyHI	0.136	0.062	1.269	0.204	−145	0.045	−1.194	0.232
BPs < —SevHI	0.070	0.043	0.656	0.512	132	0.033	1.068	0.286
BPs < — SRS	0.595	0.089	3.777	0.000	−0.076	0.049	−0.560	0.576
AA < — SRS	−0.542	1.818	−4.674	0.000	0.078	1.767	0.731	0.465
AA < — TyHI	0.072	1.343	0.848	0.397	−166	1.567	−1.813	0.070
AA < — SevHI	−0.007	0.952	−0.081	0.935	−118	1.171	−1.250	0.211

engagement, commitment, and satisfaction with life [23], which in turn may aid in resisting stressful situations in the school environment and thereby decreasing the harmful consequences of school-related stress on students' school achievement. This finding is in line with the existing research [28], which indicated that an increased level of PsyCap helps to decrease the harmful impacts of stress on academic achievement.

The multi-group SEM analysis results further demonstrated that PsyCap moderated the association between school-related stress and behavior problems. That is, the relationship between school-related stress and behavior problems is very much weaker for students with higher levels of PsyCap and stronger for students with lower levels of PsyCap. One reason for this finding is that PsyCap seems to play an integral part in facilitating positive appraisal of negative life events and circumstances [12,14,58]. The result is in accordance with previous study findings [27], which reported that the association between stress and behavior problems was moderated by a person's level of PsyCap. This result extends the findings from employees in the work setting to students, more specifically to SWHIs in the school situation.

The results of this research have a number of theoretical, practical, and policy implications. This study contributes to the existing research literature by investigating the relationships among school-related stress, PsyCap, and school-related outcomes of academic achievement and behavior problems in a sample of SWHIs. This research work has also contributed knowledge to theory by testing the applicability of the transactional model of stress [29] and the agentic perspective of social-cognitive theory [30] to explain the associations of school-related stress and PsyCap with outcomes of academic achievement and behavior problems in students with special needs (i.e., SWHIs) in a school environment. The study contributes to filling the gaps in the literature by assessing PsyCap as a potential moderator of stress from organizational studies on employees to student populations, particularly using samples of SWHIs in the educational context. Furthermore, the influence of school-related stress and PsyCap on school outcomes was tested in a different cultural setting, as the study was conducted with SWHIs in the Ethiopian context.

The findings of the present study have several implications for practitioners. Early identification and intervention targeting stress management skills may help in alleviating stress and optimizing school-related outcomes for SWHIs. Additionally, schools should also design and deliver comprehensive school intervention programs that promote PsyCap in students. PsyCap is a personal characteristic that can be changed and improved [12,29]. Studies have reported that individuals's PsyCap levels can be increased through short-term training interventions [16,59] and also through online sessions [35].

The findings of this study provide vital information for policy and program development. Stress-preventing and relieving interventions could be integrated into the academic curriculum to better support these students in the school environment. In addition, PsyCap can be enhanced along with the existing school curriculum. Therefore, teachers should look for various approaches to including PsyCap development in their lessons, instruction, and academic programs.

6. Conclusions

School-related stress in SWHIs associates negatively with academic achievement and positively with behavior problems, even after controlling the type and severity of health impairments. The findings highlight the importance of developing school-based stress prevention and intervention programs targeting SWHIs to reduce school-related stress and its harmful influence on academic achievement and behavior problems. PsyCap has a significant positive relationship with academic achievement and a negative relationship with behavior problems. Higher levels of PsyCap significantly moderates the association between school-related stress and outcomes of academic achievement and behavior problems in SWHIs. Therefore, it can be inferred that increased PsyCap can be considered a personal strength that needs to be optimized further to resist and/or minimize the negative effects of school-related stress on academic achievement and behavior problems.

7. Limitations and future directions

A few limitations of the present study deserve emphasis. First, results were obtained with a particular sample of SWHIs (i.e., DM and HD) who were drawn from only one site. For that reason, the results could not be generalized to the whole school population of SWHIs. Future studies may aim to use a more representative sample across different contexts and health impairment groups, such as students with asthma, seizure disorders, renal disease, and cancer. Second, the study used a cross-sectional survey design and, therefore, did not determine the causal directions of the associations amongst the variables in the study. To determine the causal relationship, a longitudinal or true experimental study is suggested in the future. The use of a self-report questionnaire for data gathering is the third

limitation of this study. Respondents might either over report or under report the issues under investigation. Therefore, future research should include reports of these constructs from multiple informants (e.g., parents, teachers, peers) and methods (e.g., interviews, direct observations) in order to triangulate data from different perspectives. The median split of the moderator is another limitation of the current study. Breaking up the metric scale into a categorical scale is highly arbitrary and may lead to spurious findings. SEMs with an interaction term are preferable. Therefore, future research could examine the moderating role of PsyCap using the latent moderated structural equations method built into Mplus or R software.

Data availability statement

Data associated with the study has been deposited into a publicly available repository. It can be accessed online at https://osf.io/e7npj/?view_only=fb0bb892ca9641ada8db95f3316561da.

Ethics statement

The study protocol was approved by the Institutional Ethics Committee of Tikur Anbessa Specialized Hospital (Ref No: IMD/175/6/10). Permission to conduct the study was also obtained from the respective school principals. Informed consent was obtained from all participants involved in the study.

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CRediT authorship contribution statement

Birhanu Nebiyou Muluneh: Writing – review & editing, Writing – original draft, Validation, Supervision, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Tekalign Deksissa Bejji:** Writing – review & editing, Validation, Software, Resources, Methodology, Formal analysis, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2024.e29730.

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