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Perceptions of a caring school climate and mental well-being: a one-way street? Results from a random intercept cross-lagged panel model

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ABSTRACT

We investigated the between- and within-person longitudinal relationship between perceptions of a caring school climate and mental well-being, and the role of socioeconomic position (SEP) for these constructs among high school students in Norway ($N = 1508$; 60.7% girls). Using a random intercept cross-lagged panel model, we found positive concurrent associations between perceptions of a caring school climate and mental well-being at both between and within levels, and positive cross-lagged effects at the within-person level from mental well-being to later perceptions of a caring school climate across all time points. SEP was positively associated with mental well-being at time one, and at all time points with perceptions of a caring school climate. The findings suggest that mental well-being is a significant contributor to how Norwegian adolescents subsequently perceive their school context, and underscore the importance of school staff being particularly attentive toward students who struggle with mental health, as well as those with lower SEP.



Introduction


The school is increasingly recognized as an important arena for adolescent social, emotional, and psychological health and development (Eccles & Roeser, 2011; OECD, 2021). School climate represents the “quality and character of school life” (Cohen et al., 2009, p. 180), and the socioemotional dimension of school climate has been found to be of particular importance in facilitating positive emotional and psychological functioning of children and adolescents (Aldridge & McChesney, 2018; Wang et al., 2020). While concurrent associations have been established, the knowledge on whether and how adolescents’ perceptions of socioemotional support at school and mental well-being bidirectionally affect each other over time is scarce (Aldridge & McChesney, 2018) and the existing studies also vary in what age period is in focus. Studying the longitudinal development of students’ experiences of the socioemotional school climate and mental well-being, as well as their relationship over time, can contribute valuable knowledge for

efforts in school climate development with respect to psychological functioning. In this study, we examine the within-person bidirectional relationship between perceptions of the socioemotional school climate and mental well-being among Norwegian adolescents across upper secondary school, ages 16–19 years.

Theoretical and empirical background

In social-ecological theory, the school represents a key microsystem for adolescents’ development (Bronfenbrenner, 1977). The school microsystem can be thought of as an ecosystem consisting of physical, digital, and social systems or dimensions. The theoretical importance of the socioemotional dimension of the school climate is partly grounded in its potential role in satisfying the basic human need to belong (Baumeister & Leary, 1995), which in turn facilitates the promotion of thriving and well-being. In general, socioemotional support in an educational environment refers to characteristics like “warmth, safety, connectedness, and quality of interactions with

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teachers and peers” (Wang et al., 2020, p. 3). Indeed, studies have used a range of different measures of socioemotional indicators of the school climate in studies of adolescent well-being, including school connection, school belonging, teacher-student relationships, and peer relationships (Aldridge & McChesney, 2018; Wang & Degol, 2016), with most studies finding concurrent and positive associations.

Further, the theory of relational development systems (RDS) (Lerner et al., 2005) posits that human development involves the bidirectional exchanges between the individual and their context. Adolescence is a period of major changes and development emotionally, socially, and psychologically of which a lot of it plays out within the school. Following RDS theory, the school context and the student are in a dynamic relationship of mutual, hopefully beneficial, influence. The individual student is part of the school’s socioemotional climate, and when they contribute actively with their resources to a supportive school climate, a process of positive development can occur. The fact that the vast majority of empirical research informing us about potentially reciprocal processes between perceptions of the socioemotional school climate and mental well-being is based on cross-sectional data limits an accurate and comprehensive understanding of change and development in these constructs (Aldridge & McChesney, 2018; Wang & Degol, 2016). Moreover, these developmental and social-cognitive processes can have different characteristics or bear different weight depending on the age period in question (Wang et al., 2020). Research among middle school students indicates, for example, that students’ positive perceptions of their school climate tend to decline across the middle school years (Wang & Dishion, 2012; Way et al., 2007). The declining satisfaction with school climate seen among middle school students may be exacerbated in high school, perhaps particularly for students who are already struggling socially, emotionally, or academically. As postulated by the stage-environment fit theory (Eccles et al., 1993), a mismatch between adolescents’ developmental needs and stages on the one hand, and the school environment characteristics on the other hand, could increase challenges with psychological adjustment. Whereas these aspects have been studied in younger adolescents, fewer studies exist on similar school related developmental processes in older adolescents. For example, the system transition from middle to high school can be socially challenging for many students as they go from smaller groups with few and close teachers, to larger groups with more teachers, and may also

have to form new friendships and social connections (Queen, 2002). In many contexts (and certainly in Norway), starting high school may entail traveling long distances every day or even moving away from parents and living independently for the first time. This system transition happens alongside the mentioned developmental transition that includes major physical, cognitive, social, and emotional changes that could further challenge a smooth transition to a higher school level (Queen, 2002). Understanding the longitudinal development of adolescents’ experiences of the socioemotional school climate and mental well-being as well as their relationship over time during the high school period, can contribute valuably to inform efforts to build conducive high school climates with respect to psychological functioning.

The few studies that have addressed the reciprocal temporal relation between perceived socioemotional school climate and mental well-being report inconsistent findings, some showing bidirectional and others unidirectional associations. In addition, they vary in design and in what age period is in focus, with a predominant weight on early to mid-adolescence. One study of young adolescents, ages 9–14 years found positive bidirectional associations between self-reported school belonging and school related well-being across a follow-up period of 6 weeks (Tian et al., 2016). In their study, using a cross-lagged panel model with three time points, Jose et al. (2012) found positive reciprocal relationships between school connectedness and psychological well-being across much of the adolescent period, ages 10–15 (time 1) to 13–18 (time 3). In contrast, Way et al. (2007), using cross-domain latent growth curve, found largely unidirectional and positive effects from perceptions of the socioemotional school climate to later psychological adjustment among students in early adolescence, ages 11–13.

Further, to understand distinctive developmental paths of adolescents, it is necessary to take a person-specific analytical approach, i.e., analyzing how individuals vary from themselves, not just how they vary from others. The few existing longitudinal studies just referred to did not apply analyses that could separate intra-individual processes from inter-individual processes. Refraining from separating these effects and rather treating them as one combined effect, assumes that individuals vary around one group mean, and as a consequence, potential differences that exist at the between- and within-individual levels are obscured (Hamaker et al., 2015). This may, at best, result in inaccurate estimates of change and relationships in the study constructs over time.

Socioeconomic position, perception of the socioemotional school climate, and mental well-being

As highlighted in an integrated systems perspective we recognize the potential role of social background in adolescents' perceptions of school climate and well-being. Research shows that family socioeconomic position (SEP) is related to (social and) mental health outcomes in adolescents (Bøe et al., 2012; Reiss, 2013). Concerning the direct relationship between various aspects of SEP and school experiences, the literature is inconsistent. In their study of trends in school belonging among Swedish adolescents, Högberg et al. (2021) found school belonging to be significantly worse for adolescents in the 10th (lower) percentile compared to the 90th (higher) percentile of the distribution of family social background (adolescent reported parental occupation recoded into international socio-economic index of occupational status scores). Way et al. (2007) found SEP (i.e., adolescents' report of parental educational level) to be positively associated with perceptions of peer support but inversely associated with perceptions of teacher support in 6th grade (age 11), and trajectories in perceptions of these socioemotional school climate indicators from 6th to 9th grade did not vary significantly with SEP.

Increasingly, adolescents' subjective perceptions of their social and economic status have been studied in relation to health outcomes, where a stronger association between subjective SEP and subjective adolescent health and life satisfaction compared to more objective measures of SEP has been found (Elgar et al., 2016; Svedberg et al., 2016). This could partly be due to the lack of ability of objective SEP measures to capture internalized experiences of social status (Goodman et al., 2001) which could be more influential for health than objective social conditions (Wilkinson, 1999). Hence, when studying subjective aspects of adolescents' life, it could be equally, if not more relevant to view them in light of subjective social background.

Most of the research on the role of SEP in adolescents' perceptions of school climate and their psychological functioning has focused on between-person relationships, leaving the within-person relationships unexplored. Separating between- and within-person components of SEP can provide a more nuanced understanding of the role that fluctuations in individual or family SEP have for positive adjustment.

The present study

Although the extant literature indicates that the socioemotional school climate is beneficial for adolescents'

well-being, we do not have sufficient knowledge to conclude on the extent to which the relationship is bidirectional in nature, how it develops across time at the intra-individual level, and what the role of SEP is, concerning the levels and developments of these constructs with focus on mid- to late adolescence. The main aim of this study is to investigate longitudinal reciprocal associations between perceptions of the socioemotional school climate and mental well-being as well as whether perceived family SEP predicts the changes in perceptions of socioemotional school climate and mental well-being at each time point, across the high school period. We operationalize socioemotional school climate as the perception of a caring school climate, defined as “the extent to which individuals perceive a particular setting to be interpersonally inviting, safe, supportive, and able to provide the experience of being valued and respected” (Newton et al., 2007, p. 70), which represents a comprehensive operationalization of the socioemotional school climate (Battistich et al., 1997).

Based on the existing theoretical and empirical knowledge, we postulated the following research questions and associated hypotheses:

Research question 1: To what extent is there an association between perceived caring school climate and mental well-being at the between-person level among Norwegian adolescents in high school?

Hypothesis 1: Perceived caring school climate and mental well-being will be moderately and positively (concurrently) associated at the between-person level across the high school period.

Research question 2: To what extent is there a concurrent and temporal bidirectional relationship between perceived caring school climate and mental well-being at the within-person level among Norwegian adolescents across the high school period?

Hypothesis 2a: Perceived caring school climate and mental well-being will be positively concurrently associated at the within-person level across the high school period.

Hypothesis 2b: Perceived caring school climate and mental well-being will have a positive and bidirectional temporal association at the within-person level across the high school period.

Research question 3: To what extent is there an association between SEP and mental well-being and perceived caring school climate at the between- and within- person level among Norwegian adolescents across the high school period?

Hypothesis 3a: Self-reported family SEP will be positively concurrently associated with mental well-being

and perceived caring school climate at the between-person level across the high school period.

Hypothesis 3b: Self-reported family SEP will be positively concurrently associated with mental well-being and perceived caring school climate at the within-person level across the high school period.

Materials and methods

Participants

The data for this study were drawn from the COMPLETE project (Larsen et al., 2018), a cluster-randomized controlled trial in Norwegian high schools, running from August 2016 to June 2019 with the objective of improving the psychosocial learning environment and, in turn, increase the completion rate in high school. All high schools in four Norwegian counties were invited to participate. A total of 16 schools participated in the study and were randomly assigned to two intervention groups (six schools in each) and one control group (four schools). The schools varied in size, ranging from around 35 to 400 students enrolled in first year of high school at project onset, spread across urban (five schools), semi-urban (four schools) and rural (seven schools) areas. All students enrolled in the first year of high school in August 2016 in the participating schools were invited to take part in the project. The final sample included in the present study comprised 1508 high school students who attended a general education programme and were followed from first to third year of high school (ages 16–19). Data were collected through electronic questionnaires across three time points in the spring semesters of high school in March 2017, 2018, and 2019. Initial descriptive analysis of socio-demographic characteristics showed that the sample consisted of 39.3% ($n=592$) boys and 60.7% ($n=916$) girls, with a mean age of 17.00 ($SD = .91$) during the first data collection. The students answered a one-item question about their perceived family wealth (Iversen & Holsen, 2008) and, at time one, the distribution was 3.7% ($n=55$) responding their family was Not at all well off or Not well off, 20.2% ($n=305$) responding Somewhat well off, and 54.1% ($n=815$) responding Well off or Very well off. About 22% ($n=333$) did not answer the question. A total of 70.6% ($n=1065$) of adolescents were born in Norway to parents of Norwegian or foreign descent, 5.5% ($n=83$) were born outside of Norway and to parents of foreign descent, and 23.9% ($n=360$) did not answer the question.

Instruments

Mental well-being

To measure the students' mental well-being, we used an adapted short version of the Warwick-Edinburgh Mental Well-being Scale (SWEMWBS) (Clarke et al., 2011; Ringdal et al., 2018; Tennant et al., 2007). The short form consists of seven indicators, compared to the full version with 14 indicators. The participants were asked to rate how often they had “felt and thought like this” during the last fourteen days on a Likert-scale from 1 = *not at all* to 5 = *all the time*. Examples of items include “I've been feeling optimistic about the future” and “I've been feeling close to other people”.

Socioemotional support: Perceived caring school climate

In order to assess the extent to which individuals perceived their school climate to be socioemotionally supportive, we used an adapted short version of the Caring Climate Scale (CCS) (Newton et al., 2007). The short version, consisting of eight indicators, correlated significantly and almost perfectly with the long version ($r = .99$, $p < .01$), which indicates that they measure the same phenomenon. Because the CCS was originally developed for the physical activity setting, we made adaptations to the wording of the items to make it school-specific, e.g. “Kids” became “Students”, “Leaders” became “Teachers”. The students were asked what was typical for their school, peers, and teachers for each statement and responded on a scale from 1 = *completely disagree* to 5 = *completely agree*. Example items from the scale include: “The teachers care about students”, “Students feel that they are treated fairly”, and “Students feel welcomed every day”.

Socioeconomic position (SEP)

To measure SEP, we used a single-item measure of perceived family wealth (Iversen & Holsen, 2008), asking “How well off is your family?”. The participants responded on a five-point Likert-scale ranging from 1 = *not at all well off* to 5 = *very well off*. This measure is widely used in large scale surveys among adolescents (for example, see Elgar et al., 2016), and previous research has found it to be consistent with other subjective measures of SEP in predicting variation in self-reported mental and social health outcomes (Quon & McGrath, 2014).

Control variables

Sex. Participants' sex was retrieved from school registries. Boys were coded as 0, and girls were coded as 1.

Country of birth. Participants were asked in which country they were born. Born in Norway was coded as 0, and not born in Norway was coded as 1.

Intervention condition. To prevent possible underestimation of effects in our model that could be caused by the intervention design, we included the intervention condition (control group and two intervention groups) as a covariate in our model, similar to other studies (e.g., Ringlever et al., 2013; Tak et al., 2017). We used the control group as a reference group and created two dummy variables (one for each intervention group). The participants were either in one of the intervention groups (coded as 1 for each of the dummy variables/intervention conditions) or not (coded as 0).

Statistical analyses

We performed several preliminary analyses. First, omega reliability for each construct at all time points was investigated. Second, the association between mental well-being and caring school climate was examined using bivariate correlation analysis. Third, intraclass correlation (ICC) coefficients for the main study constructs (perceptions of a caring school climate, mental well-being, and SEP) were estimated at the school, intervention, and person levels. Last, the longitudinal measurement invariance test was performed by specifying increasingly stricter parameter constraints on the mental well-being and caring school climate scales through four levels of invariance: configural, metric, scalar, and strict (Chen, 2007; Wickrama et al., 2021). We used the effects-coding approach, where the latent factors' means and variances are constrained to 0.0 and 1.0, respectively (Little et al., 2006). There were no other constraints placed on the configural model. In the metric (weak invariance) model, all corresponding factor loadings were constrained to be equal across time. In the scalar (strong invariance) model, we added equality constraints to the corresponding indicator intercepts across time, and finally, the strict model was specified by including constraints on the residual variance of corresponding indicators across time. If the goodness-of-fit did not deteriorate significantly between models (i.e., $\Delta\text{CFI} < .01$; $\Delta\text{RMSEA} < .015$; and $\Delta\text{SRMR} < .03$) (Chen, 2007), the model with the highest level of

invariance was accepted, and the constraints were kept in place for further modeling. If the scales achieved strict longitudinal invariance, it was considered appropriate to create mean scores of the instruments to reduce the computational load of the model.

In the main analysis, we specified a random intercept cross-lagged panel model (RI-CLPM) of mental well-being and school climate with three time points, following the procedures described by Hamaker et al. (2015), Hamaker (2018), and Mulder & Hamaker (2021). Each factor of mental well-being and caring school climate was decomposed into a stable between-person part and a within-person part. In order to separate the trait-like differences between people and within-person fluctuations, one random intercept was specified for each construct. The intercepts indicate the stable, "trait" aspect of mental well-being and caring school climate across time. The three factors of both constructs were specified as indicators of each random intercept, with all factor loadings constrained to 1.

To specify the within-person component of mental well-being and school climate, we first regressed each factor on its own corresponding latent factor with factor loadings constrained to 1. These resulting factors were used to investigate within-person concurrent associations, carry-over stability coefficients, and cross-lagged coefficients. The error variances of the first-order latent factors were constrained to zero to ensure that all variation was captured by within- and between-person latent factor structures. Next, we tested whether stability carry-over paths or cross-lagged paths were invariant across measurement occasions by comparing a freely estimated RI-CLPM with models that had constraints on the autoregressive coefficients and cross-lagged coefficients using a chi-square difference test. Lastly, to investigate the effect of perceived family wealth (SEP; socioeconomic position) on the model's constructs, we created within- and between-person components of SEP following the specification described above. We modeled the within-person components of SEP as time-varying predictors of mental well-being and caring school climate at each time point in the RI-CLPM. Recent recommendations for interpretation of cross-lagged effects were followed which propose a small effect as 0.03, a medium effect as 0.07, and a large effect as 0.12 of standardized cross-lagged regression coefficients (Orth et al., 2022). These conventional values are determined by the 25th (small effect), 50th (medium effect), and 75th (large effect) percentile of the distribution of more than 1300 effect sizes from CLPM and RI-CLPM and are

notably much smaller in size compared to other well-known effect sizes (Orth et al., 2022).

The analyses were performed using SPSS version 25 and *Mplus* version 8 (Muthén & Muthén, 1998). While investigating the goodness-of-fit in all structural equation modeling, we relied on the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Although chi-square was included in the model fit evaluation, this statistic was not decisive due to sample size sensitivity (Hooper et al., 2008). We used the recommended cutoffs of CFI > .95, RMSEA < .05, and SRMR < .08, indicating good model fit, and CFI > .90 and RMSEA < .08, indicating acceptable model fit (Byrne, 2012; Hooper et al., 2008; Hu & Bentler, 1999).

Missing data

A total of 1508 students were invited to participate in the study in March 2017, and Table 1 shows the number of respondents and response rates across three time points. Full response rate refers to the number of respondents who replied to both scales in the study (caring school climate and mental well-being), while partial response rate indicates the number of respondents who replied to one scale but not both. The missing data pattern of mental well-being and school climate across the three time points were not missing completely at random (MCAR) according to Little's MCAR test: $\chi^2 = 10324.860$, $df = 9159$, $p < .001$. In longitudinal studies with several measurement points attrition is expected, but is not necessarily a threat to

validity when handled appropriately (Graham, 2009). The levels of missing data in our study were also not very high (see Table 1) considering the longitudinal nature of the study. Therefore we retained our constructs across each time point for subsequent analyses and used the recommended full information maximum likelihood (FIML) estimation to handle potential construct-level missingness.

Results

Preliminary analyses

Descriptive statistics, including omega reliability and correlation matrix of the study's variables, are presented in Table 2. The effect sizes of the correlations were based on the values from Cohen (1988), wherein $r > .10$ is small, $r > .30$ is moderate, and $r > .50$ is large. First, the results indicate significant and positive correlations, ranging from small to moderate effect sizes, between caring school climate and mental well-being at all time points. Second, we found positive and small associations between SEP and caring school climate, particularly at concurrent time points. Next, we observed small and positive relationships between SEP and mental well-being on all occasions. The associations within all three variables over time were positive and moderate to large. The omega reliability analyses indicate highly reliable measurement instruments of caring school climate and mental well-being at all time points ($\omega > .90$).

School level ICC across measurement points were 0.149 for perceptions of caring school climate, 0.162 for mental well-being, and 0.161 for SEP, indicating that there was less similarity within schools compared to between schools. Similarly, ICC for intervention condition across measurement points were 0.095 for perceptions of caring school climate and mental well-being, and 0.094 for SEP.

At the individual level, the ICC results of SEP showed that 66% of the variance was explained by

Table 1. Response rates across three measurement waves.

	T1	T2	T3
Number of invited students	1508	1478	1478
Number of respondents	1184	949	1016
Response rate	78.5%	64.2%	68.7%
Full response rate	73.1%	58.9%	61.7%
Partial response rate	5.4%	5.3%	7%

Table 2. Descriptive statistics, omega reliability, and bivariate correlation between perceptions of a caring school climate, mental well-being, and socioeconomic position over three waves.

	Descriptive statistics			Correlation matrix								
	N	ω	$M (SD)$	1	2	3	4	5	6	7	8	9
1. T1 CSC	1132	.93	3.84 (.72)	–								
2. T2 CSC	890	.94	3.77 (.75)	.48**	–							
3. T3 CSC	920	.94	3.79 (.77)	.45**	.54**	–						
4. T1 MWB	1123	.92	3.52 (.83)	.30**	.27**	.25**	–					
5. T2 MWB	893	.91	3.49 (.82)	.25**	.34**	.35**	.53**	–				
6. T3 MWB	989	.90	3.45 (.79)	.26**	.28**	.37**	.44**	.60**	–			
7. T1 SEP	1175	–	3.83 (.81)	.13**	.04	.04	.18**	.16**	.21**	–		
8. T2 SEP	937	–	3.78 (.84)	.09*	.11**	.13**	.15**	.16**	.25**	.67**	–	
9. T3 SEP	1014	–	3.69 (.79)	.09*	.05	.13**	.10**	.17**	.24**	.60**	.66**	–

Note. CSC = caring school climate, MWB = mental well-being, SEP = socioeconomic position. Min – max of all variables is 1 – 5. ** $p < .01$, * $p < .05$.

between-person differences, and 34% of the variance by fluctuations within individuals. Similarly, the ICC of caring school climate showed that 50% of the variance was explained by between-person differences, and 50% of the variance by fluctuations within individuals. For mental well-being the equivalent ICC estimates were 52% of the explained variance at the between-person level, and 48% of the explained variance was fluctuations within individuals. The individual level ICC results suggested substantial variation at both levels, warranting the separation of between- and within person effects in further analyses.

Measurement invariance

The instruments of caring school climate and mental well-being achieved strict longitudinal measurement invariance (see Table 3 for details). Thus, we created mean scores of each latent factor to ease the computational burden of the RI-CLPM.

Random intercept cross-lagged panel model of perceptions of a caring school climate and mental well-being

The RI-CLPM of caring school climate and mental well-being across three measurement occasions with SEP as a within-person time-varying predictor and sex, country of birth, and intervention conditions as control variables produced excellent model fit: $\chi^2 = 28.234$, $df = 11$, $p < .01$, RMSEA = .033, 90% CI [.018, .048], CFI = .993, SRMR = .026. Of note, model fit, coefficient estimates, and standard errors were very similar in unadjusted and adjusted models.

Next, we investigated if the autoregressive and cross-lagged effects were invariant across measurement waves, by constraining the autoregressive and cross-lagged regression coefficients to be equal across time. The model fit did not significantly deteriorate compared to the freely estimated model ($\Delta\chi^2 = 8.77$,

$\Delta df = 5$, $p = .119$): $\chi^2 = 37.004$, $df = 16$, $p < .01$, RMSEA = .030, 90% CI [.017, .043], CFI = .991, SRMR = .038. Thus, we decided that the equality assumption of the carry-over stability and cross-lagged effects across measurement occasions was tenable. The standardized estimates and confidence intervals of the RI-CLPM of caring school climate, mental well-being, and SEP are presented in Figure 1. See the Online Supplemental Materials for standardized and unstandardized estimates and standard errors from the model.

Hypothesis 1: Perceived caring school climate and mental well-being will be moderately and positively (concurrently) associated at the between-person level.

At the between-person level, we found significant and positive correlations between the study's random intercepts. The relationship between perceptions of a caring school climate and mental well-being was large, which implies that adolescents with high mental well-being generally perceive their school climate as very caring and vice versa.

Hypothesis 2a: Perceived caring school climate and mental well-being will be positively concurrently associated at the within-person level.

In support of hypothesis 2a there were small and positive concurrent associations at the within-person level at all time points between perceptions of a caring school climate and mental well-being. Within-person parameter estimates in the RI-CLPM are interpreted as deviations from the person-specific mean (based on scores from all time points) at a given time point. A *positive* within-person association means that a score in a specific construct that is above (or below) the person-specific mean of that construct is associated with a score that is also above (or below) the person-specific mean of another construct. A *negative* within-person association means that a score in a specific construct that is above (or below) the person-specific mean of that construct is associated with a score that is below (or above) the person-specific mean of

Table 3. Longitudinal measurement invariance of perceptions of a caring school climate and mental well-being.

	χ^2	Df	RMSEA [90% CI]	CFI	SRMR	Δ RMSEA	Δ CFI	Δ SRMR
<i>Caring school climate</i>								
Configural	756.225	225	.041 [.038, .044]	.971	.027			
Metric	770.359	239	.040 [.037, .043]	.971	.030	.001	.000	.003
Scalar	792.761	253	.039 [.036, .042]	.970	.030	.001	.001	.000
Strict	818.448	269	.038 [.035, .041]	.970	.032	.001	.000	.002
<i>Mental well-being</i>								
Configural	943.751	165	.057 [.054, .061]	.946	.033			
Metric	957.137	177	.055 [.052, .059]	.945	.036	.002	.001	.003
Scalar	998.426	189	.055 [.051, .058]	.943	.036	.000	.002	.000
Strict	1031.527	203	.053 [.050, .057]	.942	.040	.002	.001	.004

Note. χ^2 = Chi square statistic, Df = degrees of freedom, RMSEA = root mean square error of approximation, CI = confidence interval, CFI = comparative fit index, SRMR = standardized root mean square residual.

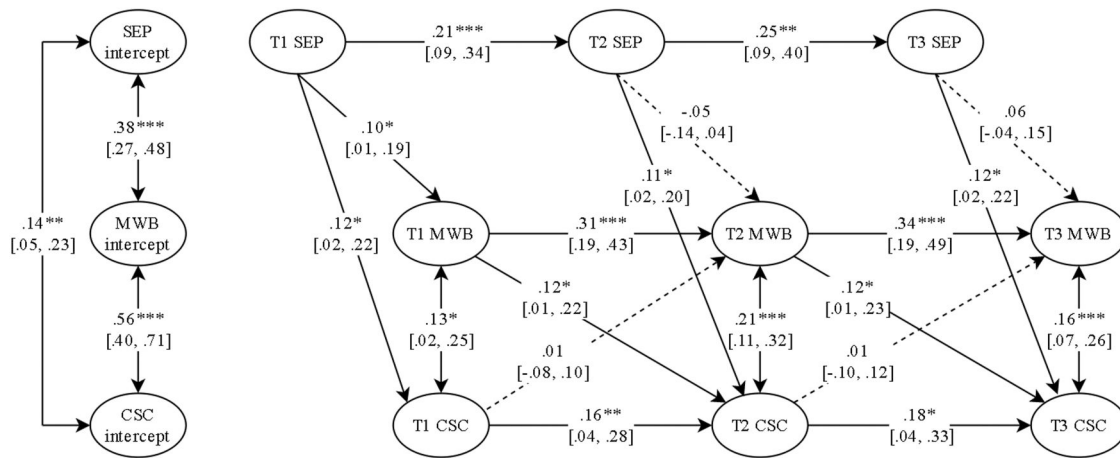


Figure 1. Simplified representation of mental well-being, caring school climate, and socioeconomic position RI-CLPM.

Note. Standardized estimates presented with 95% confidence interval in brackets. CSC = caring school climate, MWB = mental well-being, SEP = socioeconomic position.

another construct (Hamaker et al., 2015; Mund et al., 2021). The *positive* concurrent associations between MWB and CSC in our study are thus interpreted as scores above (or below) the person-specific mean of mental well-being at a given time point being associated with scores above (or below) the person-specific mean of perceptions of a caring school climate at the same time point (see Figure 1 paths T1 MWB <-> T1 CSC, T2 MWB <-> T2 CSC, and T3 MWB <-> T3 CSC).

We found significant and positive carry-over stability (autoregressive) effects on the within-person level in SEP, mental well-being, and caring school climate (Figure 1, construct specific paths T1 → T2, and T2 → T3). This indicates that occasions when individuals scored above their person-specific mean were likely to be followed by occasions on which they also scored above their person-specific mean, and similarly, scores that were lower than their person-specific mean were more likely to be followed by occasions on which they scored below their person-specific mean scores. For instance, adolescents scoring above their person-specific mean on mental well-being at the age of 17 were more likely to score above their person-specific mean on mental well-being at the age of 18.

Hypothesis 2b: Perceived caring school climate and mental well-being will be positively bidirectionally associated at the within-person level.

Our hypothesis 2b of a within-person temporal bidirectional relationship between mental well-being and perceptions of a caring school climate was not supported. Rather, we observed a unidirectional relationship at the within-person level with positive cross-lagged effects from mental well-being to school climate at all time points (Figure 1, paths T1 MWB

→ T2 CSC = 0.12, $p < 0.05$; T2 MWB → T3 CSC = 0.12, $p < 0.05$). These effects are considered large according to recent recommendations for interpretation of cross-lagged effects which propose a small effect as 0.03, a medium effect as 0.07, and a large effect as 0.12 (Orth et al., 2022). The results imply that mental well-being scores above (or below) the person-centered mean were associated with caring school climate scores that were also above (or below) the person-centered mean for caring school climate at a subsequent time point. In other words, adolescents with “unusually high” levels of mental well-being at one time point as compared with their person-specific mean were more likely to perceive their school climate as more caring than “usual” one year later. And in contrast, individuals with “unusually low” levels of mental well-being at one time point as compared with their person-specific mean were more likely to perceive their school climate as less caring than “usual” one year later. In contrast, we found no significant cross-lagged effects from perceptions of a caring school climate to mental well-being.

Hypothesis 3a: SEP will be positively concurrently associated with mental well-being and perceived caring school climate at the between-person level.

Regarding the role of SEP, we hypothesized that mental well-being and SEP, and perceptions of a caring school climate and SEP would be significantly associated at the between-person level (hypothesis 3a). In line with this hypothesis we found a moderate positive association between the mental well-being intercept and the SEP intercept. This indicates that individuals with a high SEP in general also reported high mental well-being and vice versa. Also in line with our hypothesis, we found a small correlation

between the intercepts of SEP and caring school climate implying that adolescents with a high SEP also perceived their school climate as caring and vice versa.

Hypothesis 3b: SEP will be positively concurrently associated with mental well-being and perceived caring school climate at the within-person level.

Further, we hypothesized that SEP would be positively and concurrently associated with mental well-being and with perceptions of a caring school climate at the within-person level (Hypothesis 3b). For caring school climate, the hypothesis was supported. We found that at the within-person level, a systematic positive and concurrent effect from SEP to caring school climate was observed on all measurement occasions. This indicates that adolescents who at any given time point reported SEP scores that were above their person-specific mean also felt that their school climate was more caring at the same time point than what they on average reported (their person-specific mean). The opposite was true with individuals who perceived their family SEP to be lower than their average reported level. When it comes to mental well-being, the picture is less clear with SEP scores above or below the person-specific mean being associated with changes in mental well-being at the first time point only (Figure 1, path T1 SEP → T1 MWB), implying that adolescents who perceived their family SEP at time 1 to be higher than their person-specific mean also reported higher than their person-specific mean of mental well-being at time 1—and the opposite effect when SEP was perceived to be lower than their person-specific mean.

Regarding the role of control variables, unadjusted and adjusted models produced almost identical model fit and coefficient estimates and standard errors, indicating no substantial effect of country of birth, sex or intervention condition on the model and associations investigated.

Discussion

As argued by a range of developmental scholars (e.g. Lerner & Bornstein, 2021), the need to approach research on adolescence as person-specific is important to obtain a more complete understanding of developmental processes during adolescence. With the acknowledgement of the importance of the school context in this developmental phase, the overall aim of this study was to increase our understanding of between- and within-individual relationships between perceptions of the socioemotional school climate and

mental well-being in late adolescence. This was done by investigating the longitudinal reciprocal relationship between the two constructs across three years of high school. Further, aligning with an integrated systems perspective, we addressed the role of subjective SEP for each of mental well-being and perceptions of a caring school climate across the three time points.

The strong and positive association ($r .56$) at the between-person level between perceptions of a caring school climate and mental well-being align with existing literature in early- mid- and late adolescence on associations between related constructs, like socioemotional class climate and reduced socioemotional distress (Wang et al., 2020), and school connectedness and well-being (Aldridge & McChesney, 2018; Jose et al., 2012) thus indicating that adolescents who tend to perceive their school climate as caring also tend to feel mentally well, concurrently, a finding that was consistent across our study period which covers most of high school.

The results from the within-level analyses showed significant and positive concurrent associations between perceptions of a caring school climate and mental well-being at all time points, meaning that when an adolescent perceived the school climate as more caring than indicated by their average reporting, this was coupled with a higher than own average report of mental well-being.

Within-person bidirectional temporal relationships between perceptions of a caring school climate and mental well-being

We did not find support for a bidirectional temporal relationship between perceptions of a caring school climate and mental well-being. Rather, a unidirectional temporal relationship was observed with large and positive cross-lagged effects from mental well-being to perceptions of a caring school climate from T1 to T2 and from T2 to T3. The lack of a bidirectional temporal relationship is partly in contrast to previous studies examining bidirectional relationships of similar constructs. Jose et al. (2012) followed adolescents of different ages (10–15 years) across three years and found a bidirectional association between social connectedness at school and well-being. In stronger contrast to our findings, Way et al. (2007) found largely unidirectional effects from aspects of a caring climate to psychological well-being. The contrasting results across these studies could be attributed to differences in the age groups being studied. For example, Way et al. (2007), found school climate to predict later well-being in young adolescents—the

opposite of our finding in an older age group. This could be related to increased stability in well-being in older age groups. Jose et al. (2012) examined different age cohorts in psychological well-being across three years (three time points) and found stability in well-being to be markedly stronger in the oldest cohort (14–17 years) than in younger cohorts (10–14 years and 12–16 years). If mental well-being is more established in older adolescents, it could be less amenable to influence by for example changes in perceptions of the socioemotional school environments in this age period. Further, it is possible that the difference in results could be due to the different measures used to capture socioemotional school climates. As argued above, the construct of a caring school climate falls under the broader concept of socioemotional support, cutting across school climate dimensions of school connectedness and social relationships. Our measure is specific and likely only partly overlaps with the measures of socioemotional support in the school context used in the referred studies. We have not identified any previous study directly examining perceptions of a caring school climate as it is defined through the works of Newton et al. (2007), and this restricts a direct comparison of results.

More importantly, the present study represents a difference and an advancement in its analytical approach. Through the RI-CLPM, our study separates between- from within-individual effects, which gives a more precise estimation of within-individual relationships. Failure to do this separation can result in parameter estimates becoming confounded by the between-individual effects (Hamaker et al., 2015), as confirmed by studies comparing results from a CLPM with a RI-CLPM (Burns et al., 2020; Etherson et al., 2022). In essence, patterns seen between individuals are not necessarily observed within individuals across time, and therefore results from CLPM studies cannot be directly compared to those of RI-CLPM. The differences in results between the present study of within-person processes and other longitudinal studies of between-person processes could likely be due to the difference in statistical approach.

From a theoretical point of view, our finding of a positive cross-lagged effect from mental well-being to perceptions of a caring school climate lends support to the position that when individuals feel well-adjusted, they are also more likely to subsequently perceive their environments as welcoming and friendly (Lyubomirsky et al., 2005). This could, in turn, partly be explained by research finding that people who communicate positive attitudes become more

attractive for people to befriend and provide support to (Salovey et al., 2000). Our findings of a unidirectional effect (only) do not discard the value and importance of providing a caring school climate for students but rather suggest support to the notion that how adolescents feel about themselves can determine how they *perceive* their various contexts concurrently and subsequently. In addition, this perception could reflect how the context *receives* them. Previous research has suggested that across the adolescence period students who are well-functioning may benefit more from the school through, e.g., closer interactions with teachers (Krane et al., 2016). Further, research has shown that students struggling with mental health or with challenging home circumstances have found comfort and motivation for school through caring teachers (Krane et al., 2017). As such, facilitating a caring school climate is perhaps particularly important to buffer or reduce perceptions of less caring school climates in students who struggle with lower mental well-being.

As postulated by stage-environment fit theory, to achieve positive adolescent functioning in the school setting, the developmental levels and the characteristics of the school climate have to match (Eccles et al., 1993). The adolescent period in particular, involves a range of developmental changes cognitively, socially and physically, including, for example, heightened self-consciousness that could jeopardize student engagement and thriving at school (Goodenow, 1993). Further, in mid- to late adolescence, young people are increasingly oriented toward more independence and autonomy, and to forming their own social identity and position (Wang et al., 2020). To match these developmental needs, schools may have to both facilitate appropriate levels of scaffolded student-led learning, and at the same time ensure safe and caring social settings for adolescents to create (new) social bonds. This underscores the importance of deliberate efforts on the part of the school to ensure school environments are sensitive to the fact that adolescents fluctuate in their perceptions of the school climate and in their mental well-being, and to foster acceptance, respect, inclusion, support and belonging. Considering our findings, working systematically to create a psychosocial learning environment that is caring can be effective with the aim of giving particular attention to students who are experiencing poorer mental well-being.

The absence of an opposite cross-lagged effect in our results—from perceptions of a caring school climate to mental well-being—could be related to mental

well-being being a construct that is influenced by a range of conditions at the personal level or within and outside the school context not captured in this study. This study did not take into account academic aspects like self-efficacy or achievement, which could also impact mental well-being in the high school period (Accordino et al., 2000; Kristensen et al., 2023). Further, in view of Bronfenbrenner's social-ecological model, several systems impact on human development. For example, research show the continued importance of secure attachment between parents and adolescents for healthy adolescent development (Moretti & Peled, 2004).

The effect of SEP on perceived caring school climate and mental well-being

Our finding of a moderately strong and significant positive association between SEP and mental well-being at the between-person level aligns with previous research (Reiss, 2013). At the within-person level, the findings are less clear, with changes in SEP being associated with changes in mental well-being only in the first grade of upper secondary school. This finding is somewhat surprising, given the growing literature suggesting the important role of subjective SEP in mental health (Elgar et al., 2016). However, as emphasized by Way et al. (2007) it is important to know when and how SEP can play a role, and our study differentiates from the vast majority of existing literature by examining within-person effects of subjective SEP. It is possible, and the present study suggests, that the relationship between subjective forms of SEP and mental well-being at the within-person level is not as clear as at the between-person level in adolescence. The lack of associations at the within-person level in later time points could be an indication that variation in perceived family wealth (which the SEP measure is based on) becomes less important for adolescent well-being with age as the adolescent becomes more economically independent for example through taking on after school paid work.

Although somewhat weaker than for mental well-being, the between-person relationship between SEP and perceptions of a caring school climate was also significant, aligning with some previous research (Högberg et al., 2021; Way et al., 2007). At the within-person level, results showed significant and moderate to large (Orth et al., 2022) positive effects of SEP on perceptions of a caring school climate across the time points. As reviewed above, the existing literature on this relationship across time is scarce. Way

et al. (2007) did not find that SEP influenced the trajectory of students' perceptions of the socioemotional school climate, but their study concerned younger adolescents (11–13 years) and applied parental educational status as proxy for SEP, which differed from our measure of subjective SEP. For both mental well-being and perceptions of a caring school climate, the relationship with SEP was different at the between-level compared to the within-level, underscoring the importance of separating the two to better understand the effects of SEP on intra-individual development. To enhance our understanding of the role of SEP for the *relationship* between mental well-being and perception of a caring school climate, future research should aim to include SEP as a moderator of the relationship. This was not possible in our study due to the combination of the complexity of such a model and the relatively limited sample size.

Limitations

The results of our study should be interpreted considering study limitations. First, all measures are based on self-report and originate from only one source, which could introduce response bias and common method bias. However, by separating within- from between-effects, systematic error variance may be captured by the trait-like components, and the correlation and regression coefficients on the within-person level are therefore more likely to represent the true variance and not be inflated due to between-person variance. Second, due to convergence challenges in a model with latent variables, we had to resort to composite measures in the main models which do not necessarily present equivalent results to those of latent variables. Third, the measure of SEP could be argued to be limited in validity as it is based on one item only. However, as emphasized above, this measure is widely considered a good approach to assess relative wealth among the adolescent population and is shown to have comparatively strong associations with, for example, self-reported health (Pfortner et al., 2015), making it suitable for research such as this study. However, it is important to consider that the associations we find in our study with SEP could be a result of the specific meaning of SEP in the Norwegian context—a wealthy country with relatively low socioeconomic differences. Fourth, although we argue that our measure for socioemotional school climate is a comprehensive measure, it may not tap equally well into all aspects of the socioemotional support dimension of school climate. Fifth, considering the discussion above,

additional measures of the school context could shed further light on the role of the school in a broader sense for mental well-being development, and this calls for further studies at the within-adolescent level. Finally, although the study covered most of the three-year period of upper secondary education through three measurement points, additional assessment points during the period would increase our understanding of within-adolescent changes and relationships in the study constructs.

Implications and conclusion

Our study is the first to examine the bidirectional relationship between perceptions of a caring school climate and mental well-being *within* adolescents in high school. The present study offers a valuable contribution to our understanding of person-specific longitudinal developments and relationships between adolescents' perceptions of a caring school climate and their mental well-being, as well as the role of SEP in each of these constructs. By applying a RI-CLPM, we enhance the knowledge of both between-individual relationships and of within-individual fluctuations in, and relationships of, perceptions of a caring school climate and mental well-being. The findings support the existence of concurrent relationships of these constructs at the between-person level over time. The within-person findings further underscore the importance of paying attention to adolescents' mental well-being and SEP in how they may interpret their school climate in terms of care.

Our findings may have implications for how we design interventions directed at school environments and psychological well-being for this age group. First, our results show that both perceptions of the school climate as caring and mental wellbeing vary within individuals, which indicate that these phenomena are not merely stable and trait-like but do in fact to some extent fluctuate within adolescents across the high school period. In turn both constructs could be possible to influence, for example through intervention efforts directed at mental health and school support. Second, school-based interventions would potentially benefit from aligning with the principles of multitier approaches (Weare & Nind, 2011) which emphasize the need for both universal approaches as well as selected and indicated approaches to adjust to needs of individual students. Because perceptions of a caring school climate and mental well-being are positively associated at the group level, universal approaches are relevant to set focus on promoting positive mental

health and school climates. Further, since regardless of levels, intra-individual fluctuations in mental well-being are associated with subsequent intra-individual fluctuations in perceptions of a caring school climate, more targeted approaches that capture these fluctuations for individual students can buffer the potential negative effect of low mental well-being on school related experiences. As our findings suggest, when adolescents struggle with mental health, they may be vulnerable to subsequently perceiving their school context as less caring, and as such, teachers and school staff have a particular role and opportunity to buffer both this effect and that of SEP, for example, through building relationships with each student and having a strong focus on strengthening the socioemotional school climate. This is not only individual teachers' responsibility but must be an integral part of the school culture. There is need for continued and focused public health and school policies that holistically promote mental well-being and caring socioemotional school climates, and that are based on adolescents' own perspectives of what is needed in ensuring positive school experiences for all.

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Data availability statement

Data can be accessed upon request from the corresponding author.

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