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# Perceptions of teacher-student relationships predict reductions in adolescent distress via increased trait mindfulness

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Equipping adolescents with the skills to reduce distress is a priority in education, because distress is common during this period and often a precursor to serious emotional disorders. Fostering trait mindfulness, which is associated with lower levels of perceived distress, could be an effective way to reduce distress, but little is known about how to maximise trait mindfulness, or the underlying mechanisms by which these abilities help buffer distress. This study aimed to examine the associations between teacher-student relationships and adolescents' levels of trait mindfulness and perceived distress. We hypothesised that teacher-student relationships and trait mindfulness would directly predict reductions in perceived distress, and that trait mindfulness would partially mediate the relationship between teacher-student relationships and perceived distress. A quantitative, cross-sectional design was used to test these hypotheses. Participants were 124 UK secondary school students aged between 13 and 15 years old. They completed measures including the Five Facet Mindfulness Questionnaire, the distress subscale of the Perceived Stress Scale 10, and the Teacher-Student Relationship subscale of the Student Engagement Instrument. We found that positive teacher-student relationships significantly predicted higher levels of trait mindfulness and lower levels of perceived distress. Trait mindfulness fully mediated the relationship between teacher-student relationships and perceived distress. The findings indicate that by nurturing positive relationships between staff and students, schools can foster students' trait mindfulness skills, in turn helping reduce perceived distress.

## KEYWORDS

adolescent, youth mental health, student, teacher, relationship, distress, trait mindfulness, stress reduction

## 1 Introduction

Outside their homes, adolescents spend most of their time at school, and relationships with significant individuals in this environment are critical for development (Osher et al., 2020). The academic and psychological benefits of positive teacher-student relationships (TSRs) are well documented in primary-aged children but less is known about these relationships in secondary schools (Hughes and Cao, 2018). Nevertheless, research and theory suggest that the quality of relationships with teachers can thwart or foster adolescents' academic achievement and psychological wellbeing (Osher et al., 2020). Further, positive relationships with teachers could provide students with effective strategies, coping skills and support required to navigate school-based stress, a growing concern in adolescence (Anniko et al., 2018; Leonard et al., 2015). Beyond acting as a source of support, emotionally close relationships with teachers could also foster students' development of trait mindfulness (TM) (Warren et al., 2020). Higher levels of TM, that is an individual's innate ability to focus

awareness on the present moment without being distracted (Abujaradeh et al., 2020), are associated with lower levels of perceived distress in adolescents (Kechter et al., 2019). Yet, within secondary schools, little is known about how TSRs evolve and influence psychological development (Hughes and Cao, 2018), and there is limited evidence about how TSRs and TM work together and/or independently to reduce perceived distress in adolescence. The current study aimed to fill this gap by investigating the relationship between TSRs, TM and perceived distress.

## 1.1 Teacher-student relationships as protective assets

Within a bioecological systems framework (Bronfenbrenner and Morris, 2006), supportive, positive relationships in an individual's microsystem are proposed to play an important role in fostering psychological wellbeing during adolescence (Osher et al., 2020). During adolescence, an individual's microsystem typically comprises family, peers and school (Osher et al., 2020). The current study focused on the school microsystem and the influence of TSRs as protective assets. As well as providing formal education, schools support the mental health and social-emotional wellbeing of their pupils, including equipping them with the skills to manage everyday stress (Public Health England working with the Department for Education, 2021; Zenner et al., 2014). This focus on wellbeing is more salient in secondary schools, as the prevalence of mental health disorders (particularly emotional disorders) and distress/stress (often a precursor to emotional disorders) increases during adolescence (Anniko et al., 2018; Newlove-Delgado et al., 2023). Teachers may be particularly important as nonparental, adult role models (Eccles and Roeser, 2011) providing a stable source of emotional support and positive affect, and the tools that adolescents need to manage perceived distress (Leonard et al., 2015). However, little is known about how TSRs influence psychological development during adolescence (Hughes and Cao, 2018), with most research focusing on standalone aspects of TSRs such as support (Banks and Smyth, 2015) and positive affect (Luo et al., 2020), or operationalising TSRs as part of broader multidimensional constructs such as school connectedness (García-Moya et al., 2019a). The current study conceptualises TSRs as those which meet an individual's psychological needs for autonomy, competence and belonging (Ryan and Deci, 2000; Osher et al., 2020).

## 1.2 School: a common source of stress

The current study is informed by transactional cognitive stress theory (Lazarus and Folkman, 1984), which posits that there are two components of a stress response which occur when an individual is faced with a potential 'stressor'. The first of these responses is perceived distress—the result of primary stress appraisal involving the evaluation of the potential 'stressor' as neutral, positive or stressful. This evaluation is based on a combination of an individual's internal beliefs, expectations and goals, and the perceived threat posed by the 'stressor' to these. The second component of the stress response is perceived coping—the result of a secondary appraisal process where the individual evaluates the availability of internal and

external coping resources to enable them to cope with the demands of the 'stressor'.

Adolescents encounter stressors from different microsystem contexts, notably the home, for example conflicts with parents, and school (Núñez-Regueiro and Núñez-Regueiro, 2021). Considering the school environment, common academic stressors such as high-stakes exams, homework and perceived pressure from teachers and parents are associated with increased distress during adolescence (Wuthrich et al., 2020). While not all adolescents experience school-based distress, a significant proportion do – notably girls, those in exam years, those from lower socioeconomic backgrounds, and those with higher trait anxiety (García-Moya et al., 2023; Wuthrich et al., 2020). This suggests there is some commonality in the way adolescents appraise the reality of school as stressful, but that it is the interaction between individual factors and the 'stressor' which determines whether distress is actualised and if so, whether individuals have access to sufficient coping resources (Lazarus and Folkman, 1984). Evidence demonstrates that teachers are important for coping during secondary stress appraisal—supporting students and teaching skills such as revision and time management techniques to equip them to cope with academic stressors (Haugan et al., 2021; Leonard et al., 2015; Wuthrich et al., 2020). Less is known about the influence of TSRs on perceived distress—the focus of the current study. However, given that internal expectations and goals (those which drive primary stress appraisal and distress responses) are often the biggest source of stress during adolescence (Banks and Smyth, 2015), and that these internal expectations are likely to be (at least partially) the result of the internalisation of external influences from key individuals within an adolescent's microsystem, including teachers (Leonard et al., 2015), we theorise that TSRs will be associated with distress in adolescents.

## 1.3 Trait mindfulness

Trait mindfulness (also known as dispositional mindfulness) refers to an individual's innate tendency to be aware and focus attention on what is happening in the present, in a nonreactive and nonjudgemental manner, and without distraction by other external events or internal thoughts (Abujaradeh et al., 2020; Carpenter et al., 2019). Specifically, it is believed to be comprised of four facets during adolescence: acting with awareness, describing, nonjudging, and nonreactivity (Abujaradeh et al., 2020). Considering the theoretical influence of TM on distress, awareness is believed to enable an individual to monitor one's present experience and notice a stressor – an essential step in primary stress appraisal (Lazarus and Folkman, 1984). Monitor and Acceptance Theory (MAT) also posits that a nonjudging and nonreactive mental mindset enables individuals to observe and accept potential stressors without them eliciting distress (Lindsay and Creswell, 2017). Empirical evidence supports this view and has found that TM is associated with positive psychological outcomes including reductions in perceived distress during adolescence (Abujaradeh et al., 2020; Kechter et al., 2019). There is growing interest in how schools can maximise these dispositional abilities for the wellbeing of their students (Colaianne et al., 2020). However, there is limited evidence about how trait mindfulness develops and how it can be fostered, particularly within educational contexts (Roeser and Eccles, 2015). Theoretical and empirical

perspectives suggest that recurring experiences and needs-supportive relationships with key individuals, especially peers and family, influence the development of TM (Moreira et al., 2018; Osher et al., 2020; Warren et al., 2021). Less is known about the influence of TSRs on TM (Roeser and Eccles, 2015). However, given teachers' influence on adolescents' social-emotional and psychological development (Osher et al., 2020), and the indirect association between mindful teaching (which is perceived as calm, clear and kind) and TM in adolescence via increased students' perceptions of how well their school met their basic psychological needs for autonomy, belonging and competence (Colaianne et al., 2020), we hypothesised that TSRs which also meet these needs would predict increases in TM.

Extending the evidence base, this study investigated the relationships between TSRs (as perceived by adolescents rather than teachers), perceived distress and TM in students (13–15 years old) in UK secondary schools. Based on bioecological systems theory (Bronfenbrenner and Morris, 2006) and the theoretically important role of supportive, positive relationships with individuals in the microsystem to foster psychological wellbeing and social-emotional development (Osher et al., 2020), we hypothesised that there would be statistically significant correlations between TSRs and levels of TM (H1) and between TSRs and distress in adolescents (H2). We also hypothesised that there would be statistically significant correlations between TM and distress in adolescents (H3) given awareness, a key step in primary stress appraisal, is also a key facet of TM (Lazarus and Folkman, 1984; Abujaradeh et al., 2020). Further, given the theoretical influence of TSRs on the development of TM (Warren et al., 2021), and the influence of TM on distress (Kechter et al., 2019), we hypothesised that TM would mediate the relationship between TSRs and distress (H4).

## 2 Method

### 2.1 Participants

Participants were recruited via two schools in the North West of England (UK), using purposive, convenient sampling. The final sample included 124 participants (79 girls, 34 boys, 11 other/prefer not to say) aged between 13 and 15 years (mean age 14.10). Students with pre-existing mental health conditions such as anxiety or depression were asked not to take part. The reasons for this were twofold. First, to mitigate potential distress and ethical issues associated with recruiting participants with mental health conditions. Second, as these disorders are associated with increased perceived stress, the inclusion of students with pre-existing mental health difficulties could bias results and reduce generalisability of the findings to the typical population (Anniko et al., 2018). *A priori* power calculations were performed based on analysing the relationship between TSR and distress as mediated by TM. Calculations were based on four predictor variables—TM, TSR, gender, and year group [used as a proxy for age as school distress is often associated with year group and proximity to exams rather than biological age (Wuthrich et al., 2020)], a power of 0.8, a significance level of 0.05 and a medium effect size. The expected effect size was based on evidence of a large effect size for the relationship between distress and mindfulness (Kechter et al., 2019), and a small effect size for the relationship between teacher student relationships and stress (Banks and Smyth, 2015). These calculations indicated that a

minimum sample of 84 participants was needed. The study aimed to overrecruit to mitigate the risk of high attrition associated with survey research (Hochheimer et al., 2016).

## 2.2 Materials

### 2.2.1 Five facet mindfulness questionnaire (FFMQ)

The 15-item FFMQ is a short form version of the 39-item FFMQ (Baer et al., 2008) and is psychometrically validated for use with adolescents (Abujaradeh et al., 2020) to assess TM. Using a five-point scale, ranging from 1 = *never or rarely true*, to 5 = *very often or always true*, participants scored items based on what best describes what is generally true for them. The scale assesses the four facets of awareness, describing, nonreactivity and nonjudging, which can be summed to provide a composite measure of total TM used in this study. Scores are summed and higher overall scores indicate higher levels of total TM. Previous studies have found good internal reliability for use with adolescents as a total scale (Cronbach's alphas ranged from 0.82 to 0.85) (Abujaradeh et al., 2020). In the current study, Cronbach's alphas indicated good internal reliability for the total scale ( $\alpha = 0.86$ ).

### 2.2.2 Perceived stress scale (PSS-10)

The PSS-10 measures stressful feelings and thoughts over the previous month (Cohen et al., 1983) and is psychometrically validated for use in adolescents (Kechter et al., 2019). The PSS-10 comprises two subscales which measure coping and distress. Participants in this study answered the distress subscale comprising six items and rated feelings of distress using a five-point scale ranging from 0 = *never* to 4 = *very often*. Scores were summed and higher total scores indicated higher levels of perceived distress. In previous studies, Cronbach's alphas for the distress subscale ranged from 0.72 to 0.80, demonstrating acceptable internal consistency and reliability (Kechter et al., 2019; Liu et al., 2020). In this study, Cronbach's alpha for the distress subscale was 0.93, indicating very good reliability.

### 2.2.3 Teacher-student relationships (TSR)

Participants answered nine-items which make up the TSR subscale of the 35-item Student Engagement Instrument (SEI) which measures students' cognitive, affective and psychological engagement with school (Appleton et al., 2006). The TSR subscale measures how students feel about their relationship with their teachers. Items are scored on a five-point scale, from 1 = *strongly disagree*, to 5 = *strongly agree*. The mean score provides an indication of how students feel about their relationships with their teachers, and higher scores indicate better quality of relationship. The TSR scale has good internal reliability ( $\alpha = 0.88$ ), good measurement invariance across school years, and good convergent and discriminant variability (Appleton et al., 2006; Betts et al., 2010). Cronbach's alpha for the current study was 0.91.

## 2.3 Procedure

All procedures were approved by The University of Manchester Ethics board. Between April and July 2022, 52 secondary schools in

the North West of England were invited to participate by email. Two schools opted-in. Parental consent was obtained through opt-out consent procedures, and participant assent was collected in adherence with guidance from the British Psychological Society (BPS, 2021) Code of Human Research Ethics.

Participants in both schools completed the survey during the summer term of 2022 after end of year exams had taken place. School 1 ( $n = 84$ ) completed the survey online in June 2022. School 2 ( $n = 40$ ) completed paper copies of the survey in July 2022. In both versions, the order of measures was counterbalanced to mitigate against potential order effects and participant fatigue. The survey was administered by teachers and completed by all participants during school hours.<sup>1</sup>

## 2.4 Analytic strategy

Using SPSS version 25, data from 133 participants was screened for missing items and anomalies. Descriptive statistics were run to identify construct means and to check the data met parametric assumptions. For all hypotheses, Pearson's correlations between TM, perceived distress and TSRs were run to identify initial relationships. T-tests and one-way between participants MANOVAs were used to explore significant differences based on gender and year group. For H1, H2 and H3 linear multiple regression was used to investigate the relationship between the predictor variable (TSR in H1 and H2, TM in H3), and outcome variables (TM in H1, and distress in H2 and H3). To test H4, whether TM (mediator variable) mediated the relationship between TSR (predictor variable) and distress (outcome variable), a linear multiple regression analysis was run using the SPSS PROCESS macro for SPSS (Hayes, 2022). Year group and gender were added as covariates in all models.

## 3 Results

### 3.1 Data screening

Data from 133 participants was screened for missing items and checked for impossible scores. Data from nine participants was excluded listwise as whole sections of the questionnaire were incomplete indicating implied withdrawal, leaving a final sample of 124. A further 10 questionnaires had between one and two missing items, accounting for 14 items of data missing from the whole dataset.

<sup>1</sup> At the time of data collection in 2022 when social distancing guidelines were still in place in the UK, The University of Manchester recommended remote data collection where possible.

TABLE 1 Mean (SD) scores for study variables.

Variable	All ( $n = 124$ )	Gender		Year group	
		Girl ( $n = 79$ )	Boy ( $n = 34$ )	Y9 ( $n = 71$ )	Y10 ( $n = 53$ )
Trait mindfulness	40.7 (9.9)	38.8 (8.9)	45.6 (9.4)	39.5 (9.5)	42.3 (10.4)
Perceived distress	14.9 (6.1)	17.0 (4.8)	9.6 (5.4)	15.2 (5.9)	14.4 (6.3)
TSR	3.0 (0.8)	3.0 (0.8)	3.2 (0.6)	2.8 (0.8)	3.2 (0.7)

These were included based on the assumption that the items were missing at random and mean substitutions were used to estimate and impute these missing values as they accounted for less than 5 % of the data and were therefore unlikely to yield significantly different results (Tabachnick and Fidell, 2014). When asked what gender they identified with, 11 participants selected 'other' ( $n = 4$ ) or 'prefer not to say' ( $n = 7$ ). This data was suppressed pairwise because these categories were not adequately powered for meaningful analysis and could yield inaccurate results. This approach is also consistent with the Office of National Statistics Code of Practice (2018) to assure quality in data, given that low counts could lead to participant identification and breach of confidentiality.

## 3.2 Descriptive statistics

Skew and kurtosis figures for the main variables (TM, distress, TSR) were between  $-1$  and  $1$  suggesting normal distribution and homogeneity of variance (Meyers et al., 2006). Measures of central tendency were calculated for all variables under analysis (Table 1). Bivariate Pearson's correlations (Table 2) identified significant zero-order relationships between all variables under investigation.

## 3.3 Gender and year group differences

A series of t-tests found a significant medium-to-large difference on TM scores, with boys scoring significantly higher than girls ( $M = 38.8$ ,  $SD = 8.9$ ) ( $t = 3.65$ ,  $df = 111$ ,  $p < 0.001$ ,  $d = 0.75$ ). There was no significant difference between TM scores in Year 9 (aged 13–14 years old) and Year 10 (aged 14–15 years old) ( $t = -1.61$ ,  $df = 122$ ,  $p = 0.110$ ,  $d = 0.29$ ). There were significant and large gender differences in distress ( $t = -7.16$ ,  $df = 111$ ,  $p < 0.001$ ,  $d = 1.47$ ), with girls reporting significantly higher levels of distress than boys. There was no significant difference of year group on distress ( $t = 0.754$ ,  $df = 122$ ,  $p = 0.453$ ,  $d = 0.14$ ). There was a medium significant difference between year groups on TSR score with Year 10 pupils scoring significantly higher than Year 9 pupils ( $t = -3.20$ ,  $df = 122$ ,  $p = 0.002$ ,  $d = 0.58$ ). There were no significant gender differences on TSR score ( $t = 1.32$ ,  $df = 111$ ,  $p = 0.192$ ,  $d = 0.27$ ).

## 3.4 Teacher-student relationships predict trait mindfulness

Our analyses support H1 and indicate that increases in positive TSRs predicted large increases in levels of TM, after controlling for gender and year group. TSR predicted 25.2% of variance in TM scores



[ $F(1, 111) = 38.75, p < 0.001, \text{adjusted } R^2 = 0.25$ ], and once gender and year group were added as covariates, the model predicted 31.1% of variance in TM [ $F(3, 109) = 17.87, p < 0.001, \text{adjusted } R^2 = 0.31$ ]. TSR and gender were both large and significant unique predictors of TM [TSR ( $B = 6.18 (1.07), p < 0.001$ ); gender ( $B = -5.79 (1.71), p = 0.001$ )]. See [Table 3](#), Models 1a and 1b.

### 3.5 Teacher-student relationships predict reductions in perceived distress

Our findings support H2 and demonstrate that increases in positive perceptions of TSRs were associated with lower levels of distress after controlling for gender and year group. TSR significantly predicted 6.1% of variance in distress [ $F(1, 111) = 8.27, p = 0.005, \text{adjusted } R^2 = 0.06$ ]. When gender and year group were added as covariates the model predicted 33.6% of variance in distress [ $F(3, 109) = 19.92, p < 0.001, \text{adjusted } R^2 = 0.34$ ]. Positive TSRs had a medium significant inverse effect on distress [ $B = -1.58 (0.64), p = 0.015$ ], and there was a large significant effect of gender on distress [ $B = 7.09 (1.02), p < 0.001$ ]. Year group had no significant influence on distress. See [Table 3](#), Model 2a and 2b.

### 3.6 Trait mindfulness predicts lower levels of perceived distress

We found support for H3 and our findings demonstrate that there is an inverse relationship between TM and distress. TM

predicted 42.9% of variance in distress [ $F(1, 111) = 85.125, p < 0.001, \text{adjusted } R^2 = 0.43$ ], and when gender and year group were added as covariates, the model predicted 55.7% of variance in distress [ $F(2, 109) = 47.98, p < 0.001, \text{adjusted } R^2 = 0.56$ ]. Gender [ $B = 5.12 (0.88), p < 0.001$ ] and TM [ $B = -0.33 (0.04)$ ] had significant unique effects on distress. There was no significant effect of year group on distress after controlling for TM and gender. See [Table 3](#), Model 3a and 3b.

### 3.7 The mediating role of trait mindfulness in the relationship between TSR and distress

A linear multiple regression analysis with TSR as the predictor variable, distress as the outcome variable, TM as the mediator variable, and gender and year group as covariates, found that the total effect of the TSR on distress was moderate and statistically significant [ $B = -1.60 (0.64), p = 0.014$ ]. TSR significantly predicted TM after controlling for gender and year group with a large effect size (path a) [ $B = 6.31 (1.02), p < 0.001$ ]. See [Figure 1](#). TM significantly and inversely predicted distress with a large effect size (path b) [ $B = -0.33 (0.05), p < 0.001$ ]. The direct effect of TSR on distress (path c) was not significant [ $B = 0.51 (0.64), p = 0.426$ ], but the indirect effect of TSR on distress was [ $B = -2.11 (0.53), 95\% \text{ C.I. } (-3.26, -1.20)$ ]. See [Figure 2](#). These findings support H4 and suggest that TM fully mediates the relationship between TSR and distress in adolescents.

## 4 Discussion

The findings of this study support all four hypotheses. Positive TSRs strongly predicted higher levels of TM (H1), and higher levels of TM predicted lower levels of distress (H3). TSRs also had a medium inverse effect on levels of distress (H2). Mediation analysis found that TM fully mediated this relationship (H4). Adolescents in the current study who had better perceptions of their relationships with teachers, also had higher levels of TM, consistent with

TABLE 2 Bivariate Pearson's correlations for study variables ( $n = 124$ ).

Variable	1	2	3
1. Trait mindfulness	-		
2. Perceived distress	-0.66*	-	
3. TSR	0.51*	-0.26*	-

\*Correlation is significant at the 0.01 level (2-tailed).

TABLE 3 Multiple regression models investigating H1, H2, and H3.

Model	Predictor variable	Outcome variable	Covariates	Unstandardised coefficient $B$ (SE)	Standardised coefficient Beta	$p$
1a	TSR	Trait mindfulness		6.62 (1.06)	0.51	<0.001
1b	TSR	Trait mindfulness	Gender	-5.79 (1.71)	-0.27	0.001
			Year group	0.05 (1.63)	0.00	0.978
2a	TSR	Distress		-2.09 (0.73)	-0.26	0.005
2b	TSR	Distress	Gender	7.09 (1.02)	0.54	<0.001
			Year group	0.09 (0.98)	0.01	0.928
3a	Trait mindfulness	Distress		-0.40 (0.04)	-0.66	<0.001
3b	Trait mindfulness	Distress	Gender	5.12 (0.88)	0.39	<0.001
			Year group	0.29 (0.78)	0.02	0.711

theoretical perspectives that TM develops within a relational and bioecological systems framework (Osher et al., 2020), and supporting the view that microsystem ecologies can both thwart and foster the development of these skills (Warren et al., 2021). While this is the first study to directly explore the relationship between TSRs and TM (to the researchers' knowledge), the findings are consistent with previous research into other key developmental relationships, notably family and peers, which have been found to have small-to-moderate, positive effects on levels of TM, suggesting that relationships across both home and school during adolescence are important for the development of TM (Moreira et al., 2018; Warren et al., 2020, 2021). The effect of positive TSRs on TM was large demonstrating the importance of positive and supportive TSRs in fostering TM in adolescents and supporting theoretical perspectives about the crucial role of teachers as nonparental, adult role models during this developmental period (Eccles and Roeser, 2011; Osher et al., 2020). However, this is a nascent research area and evidence about the developmental trajectory of TM is limited (Roeser and Eccles, 2015). This study did not control for peer and family relationships, therefore it is not possible to draw conclusions about which microsystem relationships (peers, family, and teachers) are most important for the development of TM during adolescence, nor about the influence of family-based stressors on feelings of distress. Given the heterogeneity in how TM and TSR have been

conceptualised and measured in the evidence base, it is also difficult to draw meaningful comparisons between studies (Artola Bonanno, 2024; Tomlinson et al., 2017; Warren et al., 2023).

Higher levels of TM predicted lower levels of distress supporting theoretical perspectives in both Cognitive Stress Theory (Lazarus and Folkman, 1984) and Monitor and Acceptance theory (Lindsay and Creswell, 2017) about the influence of TM in stress appraisal and response, with higher levels enabling individuals to monitor and maintain their attention on the present moment, noticing, acknowledging and accepting potential stressors as a natural part of everyday life, without experiencing distress. The current study also supports previous research which has investigated the influence of TM on perceived distress in younger adolescents (Kechter et al., 2019).

Positive TSRs had a medium inverse effect on perceived distress in adolescents consistent with previous research that positive TSRs were associated with reductions in perceived academic stress in adolescents (Luo et al., 2020), and with evidence that aspects of positive TSRs, namely positive interactions with teachers and teacher support are associated with reductions in perceived distress (Banks and Smyth, 2015; Wuthrich et al., 2021). These findings support bioecological systems theoretical perspectives (Bronfenbrenner and Morris, 2006) about the crucial role of relationships within an individual's key microsystems, for healthy, psychological development.

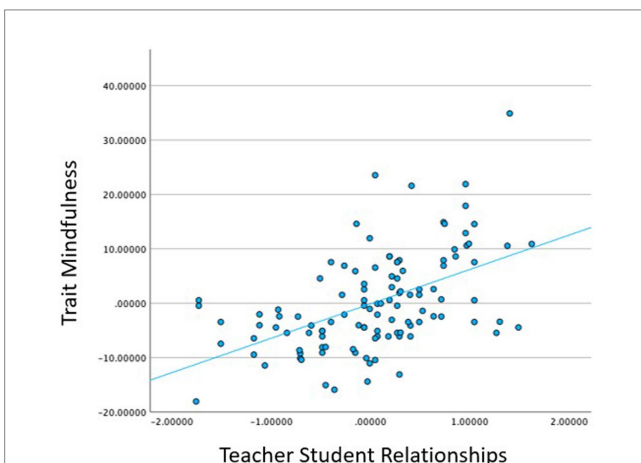


FIGURE 1 Scatter plot to show the direct relationship between teacher student relationships and trait mindfulness, controlling for gender and year group.

### 4.1 Implications for schools

This study provided new insights into how adolescents who perceive they have positive relationships with their teachers are less likely to experience distress during primary stress appraisal when faced with a potential 'stressor'. Our findings suggest that trait mindfulness is an underlying mechanism by which positive relationships with teachers may help buffer experiences of distress. A key implication for schools is that fostering an environment that promotes positive, emotionally close and supportive relationships between teachers and students is important as students who have more affective and engaging relationships with their teachers are more likely to have higher levels of TM, which in turn provides them with the skills they need to manage primary stress appraisals and reduce associated distress. This could be an important strategy for minimizing distress for all students, but particularly those in high stakes exam years. Such a strategy could include a focus on classroom behaviours such as building rapport and immediacy with students

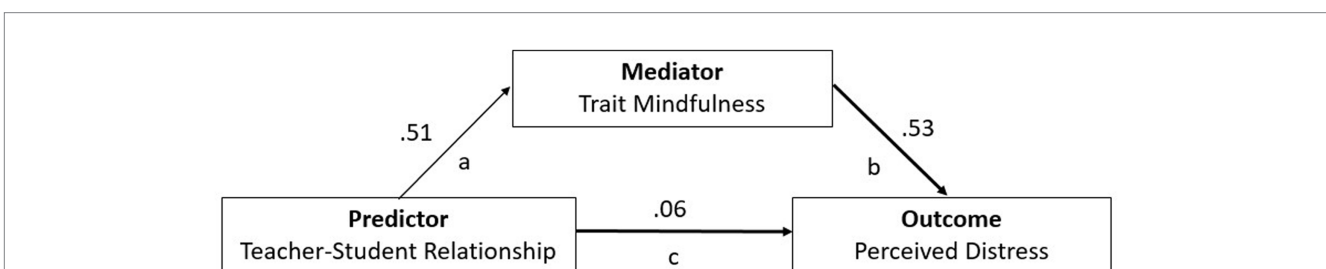


FIGURE 2 The mediating influence of trait mindfulness in the relationship between TSR and perceived distress.

by, for example, including students in the creation of classroom rules, providing clear feedback and using eye contact and gestures to express warmth and encourage classroom participation – factors which can be in turn promote positive TSRs (Jiang, 2022; Pourgharib and Shakki, 2024).

## 4.2 Strengths and limitations

A strength of the current study is that it investigated the relationships between TSRs, TM and distress in an under-researched population, creating new knowledge about the associations between these variables in adolescents aged between 13 and 15 years. However, the schools in the sample were not representative of mainstream secondary schools in the UK and were recruited through purposive sampling which may introduce bias to the findings. Both were in affluent areas of the North West of England and students in both schools achieve above the national average in national examinations. This has implications for the generalisability of the findings, especially to an international audience given cultural differences in TSRs (Fabris et al., 2023).

Some caution should also be applied when drawing definitive conclusions about the level of mediation as certain pathways in the mediation analysis were somewhat underpowered. Specifically, the power for the total effect of TSR on distress was 0.57, while the power for the direct effect of TSR on perceived distress was 0.10. There may not have been enough participants to detect a direct effect of TSR on perceived distress. Further, this study was cross-sectional and it is not possible to draw firm conclusions about the direction of the relationships under investigation. For example, while multiple regression analysis found that positive TSRs predicted higher levels of TM, these relationships could be bidirectional. Timing of the research could also have influenced results. Participants completed the survey towards the end of the summer term of the academic year, and after end of year exams had taken place. Previous research has evidenced that levels of distress can vary throughout the academic year, rising with proximity to exams (Wuthrich et al., 2021), and that teachers may use fear appeals during these periods focused on potential consequence of failure (Putwain et al., 2021). Based on these factors, relationships between TSRs and distress may vary throughout the year.

## 4.3 Future directions

Future research could include a larger, more diverse sample from a range of different countries. Research with a larger sample size to adequately power all pathways is also needed to confirm whether TM fully or partially mediates the relationship between TSR and distress. Further, as this study excluded participants with pre-existing mental health conditions and gender minority students (from analyses which controlled for gender), future studies may wish to analyse these subgroups as there may be important differences in the relationships between TSRs, TM and distress. For example, adolescents with gender minority status are more likely than their cisgender peers to experience mental health difficulties (White, 2023), and additional stressors related to their minority group status (Jardas et al., 2023). This could mean that supportive TSRs are more important for these groups in reducing distress, but further research

is needed to confirm this. Researchers may also wish to measure and control for the role of family relationships and some features of family background (such as socioeconomic status, economic challenges, parental expectations or previous trauma) as TSRs may be of particular importance for certain groups of adolescents. For example, those who have experienced trauma during childhood may struggle to develop relationships with adults at school (Johnson, 2018), but positive TSRs may compensate for some of these negative effects (Wilson-Ching and Berger, 2024).

Another area of future research could be to investigate the mediating effect of TSR on the relationship between TM and distress as a student who is more mindful in class, may be more attentive in lessons and less distracted, which could in turn influence TSRs, with teachers showing more positive affect towards students with this disposition (Nurmi and Kiuru, 2015). Longitudinal research is needed to further elucidate the three-way relationships between TM, distress and TSRs, and how they influence each other and develop throughout adolescence. Finally, future research may wish to build on the findings of this study by measuring different aspects of teacher-student relationships (such as closeness, conflict, and length of relationship), and by analysing the influence of each of the four facets of TM (Abujaradeh et al., 2020), and the role of different stressors on distress during adolescence. This could provide greater insights for schools that want to implement strategies to improve TSRs and foster TM in their students with a view to reducing student distress.

## 5 Conclusion

The current study provides new knowledge about the relationships between TSRs, TM and distress in adolescents. The findings suggest that TSRs play an important role in fostering TM, which is in turn important in managing stress appraisals. This has implications for schools as distress in adolescence is common across countries and across educational settings (Wuthrich et al., 2020). The findings could be used to inform whole-school approaches to stress reduction focused on nurturing and promoting positive, affective relationships between teachers and students, which could foster younger adolescents' trait mindfulness skills, in turn reducing perceived distress. Building positive relationships with pupils should be an integral part of teaching not an optional extra (García-Moya et al., 2019b).

## Data availability statement

The datasets presented in this article are not publicly available due to privacy and ethical restrictions. Any queries about the dataset should be addressed to Kathryn Mills-Webb at [kathryn.mills-webb@manchester.ac.uk](mailto:kathryn.mills-webb@manchester.ac.uk).

## Ethics statement

The studies involving humans were approved by University of Manchester Ethics committee. The studies were conducted in accordance with the local legislation and institutional requirements.

Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

## Author contributions

KM-W: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Software, Writing – original draft, Writing – review & editing. AH: Supervision, Writing – review & editing.

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## Conflict of interest

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

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