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Perfectionism, mattering, stress, and self-regulation of home learning of UK gifted and talented students during the COVID-19 pandemic

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### **Abstract**

The COVID-19 pandemic forced the closure of schools in the UK and students had to study at home with limited access to the support they would have normally received. We designed this study to assess the experience of gifted and talented (GAT) students during this period and to identify factors related to their stress and self-regulation of learning. The factors we focused on were perfectionism and feelings of mattering. Three-hundred and eleven GAT students completed an online questionnaire when schools were closed and they were studying at home. Analyses revealed that striving for perfection was related to better effort regulation and better time and environment management. However, negative reactions to imperfection and feeling like they did not matter (anti-mattering) were related to higher academic stress, as well as worse effort regulation and worse time and environment management. The findings suggest aspects of both perfectionism and mattering may be important for GAT students' ability to study effectively during the COVID-19 pandemic.



1 research in this area found PS and PC, separately and in combination, to be related to the  
2 achievement, motivation, and wellbeing of GAT students (Grugan et al., 2020). Notably, the  
3 findings of the review suggested that PC was likely to be problematic for GAT students  
4 whereas PS were more mixed and under some circumstances may coincide with some  
5 benefits, notably higher academic achievement. These differences were typically more  
6 pronounced when the relationship between PS and PC were statistically controlled (e.g.,  
7 Chan, 2007). Surprisingly, to date, no study has examined the relationship between  
8 perfectionism, academic stress or self-regulation of learning either in typical circumstances or  
9 during extended periods of life stress and home study.

10         Mattering is a feeling of being depended on, important to others, and receiving due  
11 attention from others (Rosenberg & McCullough, 1981). It is thought to be fundamental to  
12 wellbeing and resilience, providing a psychological resource and buffer when confronted by  
13 adversity (Flett & Zangeneh, 2020). People can also feel like they don't matter. Rather than  
14 corresponding with the absence of feelings of mattering, anti-mattering is a feeling of being  
15 invisible, insignificant, and uncared for (Flett, 2018). Likewise, instead of simply signalling  
16 lower levels of an important psychological resource, feelings of anti-mattering are thought to  
17 have an additional psychological toll and underpin the development of loneliness, a sense of  
18 social disconnection, and being marginalised (Flett, 2018). In support of these ideas, recent  
19 research examining mattering and anti-mattering in students has found them to be related to  
20 loneliness, self-esteem, and distress in opposing directions (Besser et al., 2020; McComb et  
21 al., 2020).

22         Both mattering and perfectionism are thought to be important in regards to how  
23 people respond during times of life stress, including during the COVID-19 pandemic. The  
24 key issue central to both perfectionism and mattering in this regard is that the typical anxiety,  
25 worry, and stress associated with uncertainty and a lack of control will be heightened among

1 people who are more perfectionistic or fear they do not matter (Casale & Flett, 2020; Flett &  
2 Hewitt, 2020). As aptly stated by Flett and Hewitt (2020, p.84), “perfectionism is problematic  
3 at the best of times, but it is especially problematic during the worst of times”. The effects of  
4 low feelings of mattering and anti-mattering, too, will only be exacerbated by the sense of  
5 being alone that follows actual physical and social isolation (Casale & Flett, 2020). The  
6 current study is based on the assertion that these proposed effects will be evident in GAT  
7 students.

8         With this in mind, here we focus on the experiences of GAT students as they study at  
9 home with less support and greater uncertainty. We do so by assessing the degree of  
10 academic stress GAT students report. That is, their worry, preoccupation, and concern  
11 regarding grades and school (MacGeorge et al., 2005). We take academic stress as a signal of  
12 the psychological toll studying at home may be having on GAT students. In this regard, it is  
13 noteworthy that increased stress among students has been a common finding internationally  
14 during the COVID-19 pandemic (e.g., Giannopoulou, et al., 2021) and that research has also  
15 found students to report more stress following home-schooling during this period (e.g., Pieh  
16 et al., 2021). However, while research has been able to capture the experience of students  
17 generally, there have been few accounts of the experiences of GAT students during this  
18 period.

19         We also assessed self-regulation of learning, in particular, two types of resource  
20 management strategies – effort regulation and time and study environment management.  
21 Effort regulation refers to students’ ability to control effort and attention despite distractions  
22 whereas time and study environment management refers to a students’ ability to use the time  
23 and spaces they have to study effectively (Pintrich et al., 1993). Underlying the examination  
24 of these self-regulation strategies is evidence that they will be important in whether GAT  
25 students maintain their own learning during prolonged absences from school. Self-regulation

1 of learning is related to greater academic achievement, generally (e.g., Dent & Koenka,  
2 2016), and its importance is evident in research examining home schooling during the  
3 COVID-19 pandemic, specifically. In one recent study, for example, students' self-regulation  
4 was positively related to learning independence which in turn was related to lower rating of  
5 task difficulty and greater task enjoyment of school work during school closure (Blume et al.,  
6 2021). In another revealing recent study, students' cognitive emotion regulation strategies  
7 were related to general stress, which in turn is related to the quality of home-schooling  
8 relationships with parents (Aznar et al., 2021).

### 9 **The Present Study**

10 The aim of the present study was to examine the relationships between perfectionism,  
11 mattering, anti-mattering, academic stress, and self-regulation of home learning during the  
12 COVID-19 pandemic among GAT students in the UK. Based on previous research, we  
13 expected negative reactions to imperfection and anti-mattering to be related to higher stress  
14 and poor self-regulation of home learning, whereas we expected striving for perfection and  
15 anti-mattering to either be related to lower stress and better self-regulation of home learning,  
16 or be unrelated to these variables.

## 17 **Method**

### 18 **Procedure and Participants**

19 An advert for an online questionnaire was distributed to a network of secondary  
20 schools via the [blinded for peer review]. A sample of 720 students responded to the advert  
21 and completed the questionnaire. Of the respondents, 311 identified themselves as GAT  
22 students (the remaining students indicated they were not or did not know) and are the focus of  
23 this study. Note that in the UK the common terminology is used in schools is "more able and  
24 talented" and "more able learners" so these phrases were used. The GAT students were, on  
25 average, 14.93 years old (SD = 1.25; range = 13 to 18) and were in UK school year 8 ( $n =$

1 11), year 9 ( $n = 111$ ), year 10 ( $n = 88$ ), year 11 ( $n = 31$ ), and year 12 ( $n = 64$ ; 6 did not  
2 provide this information). They reported spending, on average, 4.69 hours per day studying  
3 ( $SD = 2.17$ ) with most involving using a screen ( $M = 4.24$ ,  $SD = 2.15$ ).

4 The questionnaire was opened on 02/06/20 and closed on 19/06/20 shortly after  
5 schools officially opened. Schools in the UK were officially closed due to the COVID  
6 pandemic on 20/03/2020 with learning primarily taking place at home from that point  
7 onwards. Secondary schools were officially reopened for year groups 10 and 12 (students  
8 who were 14 to 15 years old and 16 to 17 years old) on 15/06/20 with government advice  
9 remaining that schools continue to teach these students at home. The study was approved by a  
10 university research ethics committee. The response rate to the advert of the online  
11 questionnaire determined the sample size.

## 12 **Measures**

13 **Perfectionism.** Perfectionism was measured using the Multidimensional Inventory of  
14 Perfectionism - Education Version (Stoeber & Rennert, 2008) which differentiates striving  
15 for perfection as an indicator of PS (5 items; “At school...I strive to be as perfect as  
16 possible”) and negative reactions to imperfection as an indicator of PC (5 items; “At  
17 school...I get completely furious if I make mistakes”). The item instructions were modified  
18 so as to ask participants about their experiences when studying (“At school...” was replaced  
19 with “When studying...”). Participants responded on a scale from 1 (*strongly disagree*) to 5  
20 (*strongly agree*). The subscales have demonstrated reliability and validity in previous studies  
21 in an education setting (e.g., Stoeber & Rennert, 2008).

22 **Mattering and Anti-Mattering.** Feelings of mattering were measured using the  
23 Rosenberg General Mattering Scale (GMS; Marcus & Rosenberg, 1987) and the Anti-  
24 Mattering Scale (AMS; Flett, 2018). These provide separate scores for mattering (5 items;  
25 “How important do you feel you are to other people”) and anti-mattering (5-items; “How

1 much do you feel like you don't matter"). Participants were asked to indicate how they had  
2 felt over the past last month by responding on a scale from 1 (*not at all*) to 4 (*a lot*). The  
3 scales have demonstrated reliability and validity in previous studies (e.g., Besser et al., 2020).

4 **Academic Stress.** Academic stress was measured using the 3-item scale from  
5 MacGeorge et al. (2005; "I am spending a lot of time thinking about how this term could  
6 negatively affect my educational and career goals", "I am worrying a great deal about the  
7 effect this term will have on my future", and "I find myself very concerned about the grades I  
8 am likely to receive in the future"). Participants were asked to respond to each item in  
9 relation to the current school term by responding on a scale from 1 (*strongly agree*) to 7  
10 (*strongly disagree*; reversed for purpose of analyses). The scale has demonstrated reliability  
11 and validity in previous research (e.g., Hystad et al., 2009).

12 **Self-Regulation of Learning.** Self-regulation of learning was measured using the  
13 effort regulation (4 items; "I often feel so lazy or bored when I study that I quit before I finish  
14 what I planned to do" [reversed item]) and time and study environment (8 items; "I have a  
15 regular place set aside for studying") subscales from the Motivated Strategies for Learning  
16 Questionnaire (Pintrich et al., 1993). Participants were asked to respond to each item in  
17 relation to their experiences during COVID-19 on a scale from 1 (*not at all true of me*) to 7  
18 (*very true of me*). The MSLQ has demonstrated reliability and validity in previous studies  
19 (see Duncan & McKeachie, 2005).

## 20 **Preliminary Analyses**

21 We inspected the data for missing values. Because very few item responses were  
22 missing ( $i = 16$ ), missing responses were replaced with the mean of the item responses of the  
23 corresponding scale (Graham, Cumsille, & Elek-Fisk, 2003). Next, we computed  
24 MacDonald's omega to assess internal reliability of the measures, which were all satisfactory  
25 (see Table 1). Then, following recommendations by Tabachnick and Fidell (2007), we

1 screened for univariate ( $z$ -score  $> 3.29$ ) and multivariate outliers (Mahalanobis distance  $>$   
2  $24.32$ ,  $df = 7$ ,  $p < .001$ ). Three multivariate outliers were removed.

3 We also assessed the factor structure of the instruments using both confirmatory  
4 factor analysis (CFA) and exploratory structural equation modelling (ESEM). In both cases  
5 we used robust maximum likelihood estimation with the addition of oblique target rotation in  
6 the ESEM. Fit was evaluated using chi-square ( $\chi^2/df$ ), comparative fit index (CFI), Tucker-  
7 Lewis index (TLI), standard root mean square residual (SRMR), root mean square error of  
8 approximation (RMSEA). Standard recommendations for adequate fit were used;  $\chi^2/df \leq 3$ ,  
9  $CFI \geq .90$ ,  $TLI \geq .90$ ,  $SRMR \leq .10$ ,  $RMSEA \leq .10$  (Marsh et al., 2004). Factor loadings were  
10 considered meaningful when  $\geq .32$  (Worthington & Whittaker, 2006).

11 Instruments displayed adequate fit in CFAs with all items loading on intended factors  
12 ( $> .30$ ). This was similar for ESEMs with one exception. The ESEM for the self-regulation  
13 scale produced less than adequate fit, meaningful cross-loadings (two items from the effort  
14 regulation subscale) and items not loading meaningfully on target factor (three items from the  
15 time and study environment subscale). However, the more stringent CFA supported the factor  
16 structure of the self-regulation scales and produced meaningful loadings of items so this was  
17 not considered problematic. The results of these analyses are reported in the supplementary  
18 materials. Analyses were conducted using SPSS 28.0 (IBM) and Mplus 8.1 (Muthén &  
19 Muthén, 2017).

## 20 Results

### 21 Descriptive Statistics and Bivariate Correlations

22 There was no evidence of ceiling or floor effects for the instruments. Striving for  
23 perfection was positively correlated with academic stress, effort regulation, and time and  
24 environment management, whereas negative reactions to imperfection was positively  
25 correlated with anti-mattering and academic stress but negatively correlated with mattering,

1 effort regulation, and time and environment management. Mattering was negatively  
2 correlated with academic stress and positively correlated with effort regulation, and time and  
3 environment management whereas anti-mattering displayed the opposite set of correlations.  
4 These analyses are presented in Table 1.

### 5 **Regression Analyses**

6 In order to examine the degree to which perfectionism and mattering were related to  
7 academic stress, effort regulation, and time and environment management, and what their  
8 unique relationships were, a series of multiple regressions were conducted. The results are  
9 presented in Table 2. Note that, in multiple regression, regression coefficients are the  
10 relationship between one variable and the dependent variable (e.g., negative reactions to  
11 imperfection and academic stress) when statistically controlling for the relationship between  
12 the other variables (e.g., negative reactions to imperfection and strivings for perfection).

13 *Academic stress:* Negative reactions to imperfection ( $\beta = -.37$ ,  $B = .64$ ,  $p = .001$ ) and  
14 anti-mattering were positively related to academic stress ( $\beta = .15$ ,  $B = .35$ ,  $p = .040$ ). there  
15 were no other statistically significant relationships. In total, 16% of the variance was  
16 explained in the model ( $R^2 = .16$ ,  $p < .001$ ; adjusted  $R^2 = .15$ ). In a separate model, we also  
17 examined if an interaction between striving for perfection and negative reactions was also  
18 related to stress, but this was not the case.

19 *Effort regulation:* Striving for perfection was positively related to effort regulation ( $\beta$   
20  $=.36$ ,  $B = .47$ ,  $p = .001$ ) whereas negative reactions to imperfection ( $\beta = -.30$ ,  $B = -.25$ ,  $p =$   
21  $.002$ ). and anti-mattering were negatively related to effort regulation ( $\beta = -.41$ ,  $B = -.26$ ,  $p =$   
22  $.001$ ). The relationship between mattering and effort regulation was not statistically  
23 significant. In total, 19% of the variance was explained in the model ( $R^2 = .19$ ,  $p < .001$ ;  
24 adjusted  $R^2 = .18$ ). Again, in a separate model, we examined if an interaction between striving

1 for perfection and negative reactions to imperfection was related to effort regulation, but this  
2 was not the case.

3 *Time and environment management:* Striving for perfection was positively related to  
4 time and environment management ( $\beta = .30$ ,  $B = .35$ ,  $p = .001$ ) whereas negative reactions to  
5 imperfection ( $\beta = -.22$ ,  $B = -.24$ ,  $p = .002$ ) and anti-mattering were negatively related to effort  
6 regulation ( $\beta = -.33$ ,  $B = -.47$ ,  $p = .001$ ). The relationship between mattering and time and  
7 environment management was not statistically significant. In total, 19% of the variance was  
8 explained in the model ( $R^2 = .19$ ,  $p < .001$ ; adjusted  $R^2 = .18$ ). Like with the other two  
9 dependent variables, in a separate model, an interaction between striving for perfection and  
10 negative reactions to imperfection was not related to time and environment management.

### 11 **Discussion**

12 The aim of the present study was to examine the relationships between perfectionism,  
13 mattering, anti-mattering, academic stress, and self-regulation of home learning during the  
14 COVID-19 pandemic among GAT students in the UK. As we expected, PC and anti-  
15 mattering were related to higher stress and worse self-regulation of home learning. In  
16 addition, as expected, PS were related to better self-regulation of home learning but not  
17 academic stress, and mattering was not related to any of the dependent variables.

18 The findings regarding PS are broadly in line with research in this area that indicates  
19 that this aspect of perfectionism partly underpins the motivation exhibited by GAT students.  
20 This aspect of perfectionism has been found to be related to more favourable attitudes  
21 towards academic achievement and higher academic aspirations, as well as a greater sense of  
22 academic competence in these students (Grugan et al., 2021). It is possible that PS underpin a  
23 greater ability to concentrate and persist with academic tasks, and that this persistence is  
24 evident in GAT students are in charge of their own learning. This may partly explain why PS  
25 has been found to be related to better academic performance, generally, and in GAT students.

1 In context of the present study, the finding suggests GAT students higher in PS may be better  
2 able to avoid distractions and use time and space effectively than those lower in PS.

3 A note of caution regarding the benefits of perfectionism comes in the form of the  
4 findings regarding PC, though, a dimension that is typically positively related to PS as was  
5 the case in the current study. This dimension of perfectionism was related to higher levels of  
6 stress and worse home study self-regulation. These findings are, again, aligned to research  
7 more broadly for GAT students (Grugan et al., 2021). However, given that many of the  
8 external factors that help regulate learning (e.g., support, feedback, assessment) are not  
9 present when students are studying at home, we speculate that PC could potentially be more  
10 problematic in a home learning context. Regardless, given the emerging picture of the  
11 correlates of PC in GAT students, reducing PC appears an important focus. Recent research  
12 that suggests that mindfulness may be one way to do so (Olton-Weber et al., 2020).

13 In line with idea that anti-mattering is not merely the absence of mattering, we also  
14 found this factor to be important to GAT students' at-home study experiences and did so  
15 when taking into account feelings of mattering. It is perhaps unsurprising that when GAT  
16 students report greater feelings of loneliness and insignificance, they also report more stress  
17 and poorer self-regulation of learning. While there is a great deal of research examining  
18 perfectionism in GAT students, to our knowledge, this is the first to examine mattering in this  
19 group. The findings are especially novel in this regard, and point to the possibility that  
20 feelings of anti-mattering have more to tell us about the experiences of GAT students. For  
21 now, the findings indicate that parents, teachers, and school leaders may need to consider  
22 ways in which to protect GAT students from feeling invisible, uncared for, and insignificant.  
23 The recent writing of Flett (2018) is an excellent starting point in this regard and places  
24 feelings of mattering at the centre of mentally healthy schools.

25 **Limitations and Future Research**

1           The present study has several limitations. First, the study adopted a cross-sectional  
2 design. Although this approach allowed us to capture students' experiences during lockdown,  
3 it did not permit us to examine changes that occurred before or after lockdown. As we seek to  
4 understand the long-term consequences of the pandemic for students' learning, it would be  
5 interesting for future research to track changes in these relationships over time. Secondly, we  
6 relied on students' self-reported stress and regulation. Objective measures (e.g., actual study  
7 time) or reports from others such as parents would help triangulate reports from students.  
8 Third, for the sake of brevity, we measured only a small number of indicators of student  
9 experience and self-regulations skills. Future work should consider including other indicators  
10 to gain a fuller picture of how different factors like mattering affect students when studying  
11 independently (e.g., other self-regulation strategies). Finally, it remains unclear whether  
12 lockdown has negatively affected actual student attainment. Measures of student attainment  
13 are required to do this and extend examination of the influence of perfectionism and  
14 mattering, especially if further lockdowns occur.

## 15 **Conclusion**

16           We examined the experiences of GAT students during lockdown and explored several  
17 factors that could be related to their stress and self-regulation of learning. We found that PS,  
18 PC, and anti-mattering were important. PC and feelings of anti-mattering, in particular,  
19 appear to be problematic and were related to greater academic stress and worse self-  
20 regulation of learning.

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**Data availability statement**

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Data and code are available here: <https://doi.org/10.25421/yorks.j.19122479.v1>.

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Table 1

*Descriptive Statistics, Omega, and Pearson's Correlations*

Variable	1	2	3	4	5	6	7
1. Striving for perfection							
2. Negative reactions to imperfection	.54**						
3. Mattering	.01	-.30***					
4. Anti-mattering	.06	.42***	-.52***				
5. Academic stress	.15*	.38***	-.12*	.27***			
6. Effort regulation	.21***	-.16**	.18**	-.32***	-.23***		
7. Time and environment management	.16**	-.18**	.16**	-.36***	-.29***	.66***	
Response format	1-5	1-5	1-4	1-4	1-7	1-7	1-7
<i>M</i>	3.74	3.05	2.69	2.24	5.18	4.79	4.73
SD	0.93	1.01	0.62	0.76	1.75	1.20	1.09
Omega	.89	.85	.81	.84	.91	.78	.80

Note.  $N = 308$ . \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , two-tailed.

Table 2

*Summary of Multiple Regression Analyses*

Model	Adjusted		$\beta$	B	BCa 95% CI
	$R^2$	$R^2$			
<i>DV: Academic Stress</i>					
$F(4, 303) = 14.82, p < .001.$	.16	.15			
Striving for perfection			-.06	.11	[-.36, .13]
Negative reactions to imperfection			.37	.64***	[.39, .88]
Mattering			.07	.19	[-.15, .51]
Anti-mattering			.15	.35*	[-.00, .68]
<i>DV = Effort regulation</i>					
$F(4, 303) = 17.99, p < .001.$	.19	.18			
Striving for perfection			.36	.47***	[.30, .63]
Negative reactions to imperfection			-.25	-.30***	[-.46, -.13]
Mattering			-.04	-.07	[-.32, .18]
Anti-mattering			-.26	-.41***	[-.59, -.23]
<i>DV = Time and environment management</i>					
$F(4, 303) = 18.15, p < .001.$	.19	.18			
Striving for perfection			.30	.35***	[.20, .50]
Negative reactions to imperfection			-.22	-.24**	[-.37, -.10]
Mattering			-.08	-.13	[-.34, .07]
Anti-mattering			-.33	-.47***	[-.64, -.31]

Note.  $N = 308$ . \* $p < .05$ , \*\* $p < .01$ ,  $p < .001$  \*\*\*, two-tailed. BCa = Bias Corrected

accelerated [1,000 resamples], DV = dependent variable.