RQ1: How are both genre-specific writing motivation and writing quality changing in three genres?

Analytic procedures: Essay quality data and motivation data were modeled first with an intercept-only model and second with a linear model. Model fit was assessed using the following important evidence: the χ^2 index; the comparative fit index (CFI) with a cutoff value close to .95 (Hu & Bentler, 1999); and the root mean square error of approximation (RMSEA) with values below .08 indicating acceptable model fit (Hu & Bentler, 1999).

Results: The linear model was selected as it is the most parsimonious model for narrative quality growth. The intercept-only model was selected as it is the most parsimonious model for narrative motivation growth. The linear model was selected as it is the most parsimonious model for informative quality growth. The linear model was selected as it is the most parsimonious model for informative motivation growth. The linear model was selected as it is the most parsimonious model for opinion quality growth. The intercept-only model was selected as it is the most parsimonious model for opinion motivation growth. The model fit indices are shown in Table 1 and individual trajectories are shown in Figure 1.

	RMSEA	CFI	χ^2	df	SRMR
Narrative Quality Growth Models					
Intercept-only	0.204	0.768	39.993	8	0.209
Linear	0.137	0.935	14.019	5	0.119
Narrative Motivation Growth Models					
Intercept-only	0.058	0.982	10.553	8	0.161
Linear	0.061	0.988	6.783	5	0.093
Informative Quality Growth Models					
Intercept-only	0.088	0.963	13.999	8	0.079
Linear	0.064	0.988	6.944	5	0.043
Informative Motivation Growth Models					
Intercept-only	0.056	0.971	10.428	8	0.162
Linear	0.072	0.987	7.512	5	0.112
Opinion Quality Growth Models					
Intercept-only	0.175	0.803	31.465	8	0.168
Linear	0.081	0.973	8.172	5	0.119
Opinion Motivation Growth Models					
Intercept-only	0.000	1.000	5.796	8	0.038
Linear	0.000	1.000	4.681	5	0.039

Table 1 Model fit index

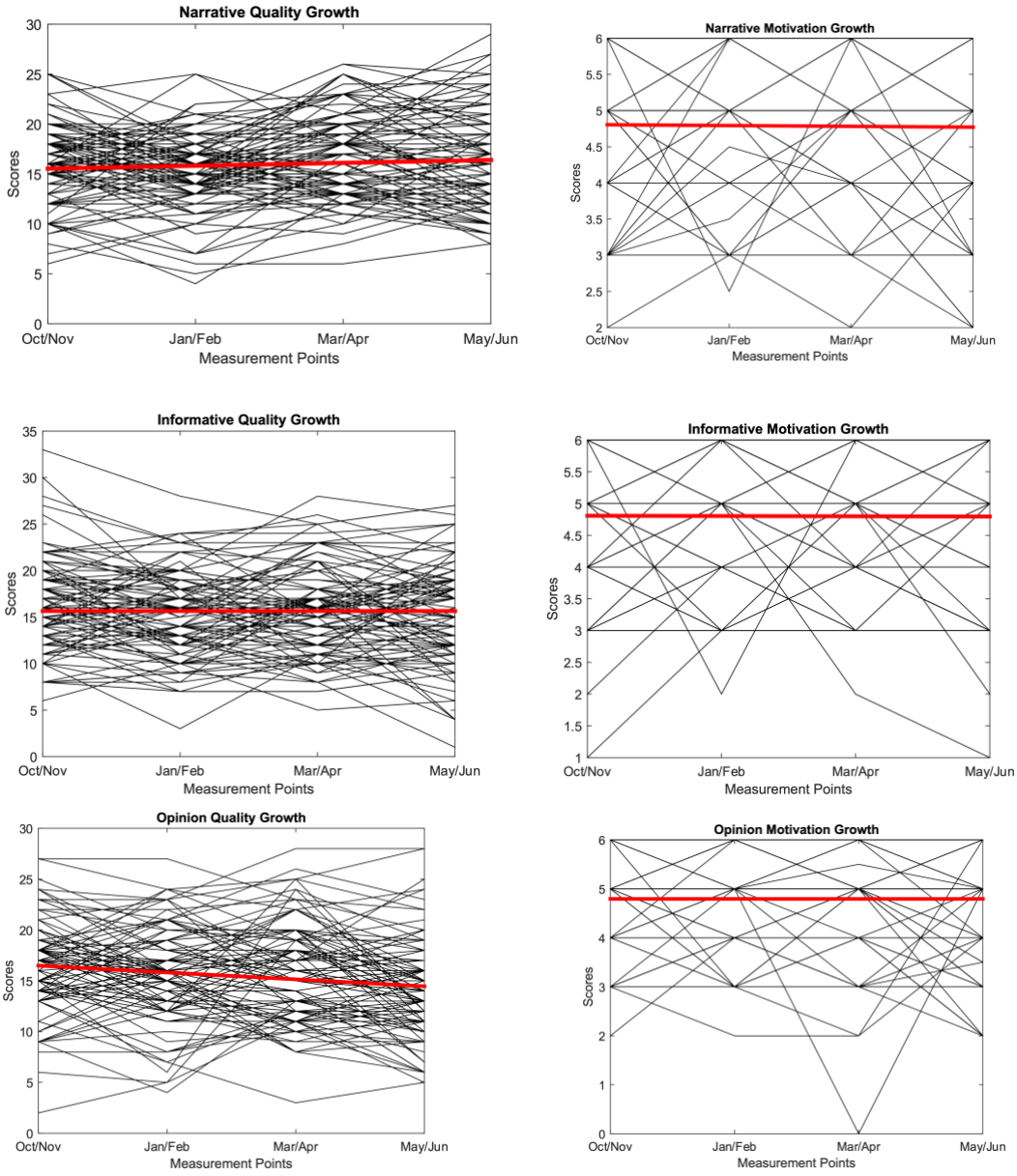

Figure 1 Individual trajectories and best fitting model

RQ2: What is the nature of the longitudinal relation between students' writing motivation and their writing quality?

Analytic procedures: The covariance matrix permits an estimation of the correlation in rates of growth between writing motivation and writing performance, and this correlation is interpreted as a measure of the consistency of growth (Ma, 2005; MacCallum et al., 1997). A series of conditional models were run by adding the covariance between latent factors of essay quality and motivation data. The path diagrams for each genre were shown in Figure 2-4. The correlation/ covariance estimates were shown in Table 2.

Results: Some covariance paths were significant. For example, motivation intercept and quality intercept were significant for all genres. The positive covariance indicated that students who were motivated at the start of the school year also tend to write a good quality essay in all genres. Motivation intercept and quality slope of opinion genre were negative significantly, indicating that students who were motivated in writing opinion essays at the start of school year tend to show a stronger decline in writing a high-quality opinion essay. It was also interesting to find that there was a positive covariance (though not significant) between narrative motivation slope and quality intercept, indicating that students who were good at writing narrative essays the start of the school year kept growing their narrative motivation later at school, while negative covariance between informative/opinion motivation slope and quality intercept, indicating that students who were high achievers in informative/opinion essays at the start of schooling year tend to show a decrease in writing motivation.

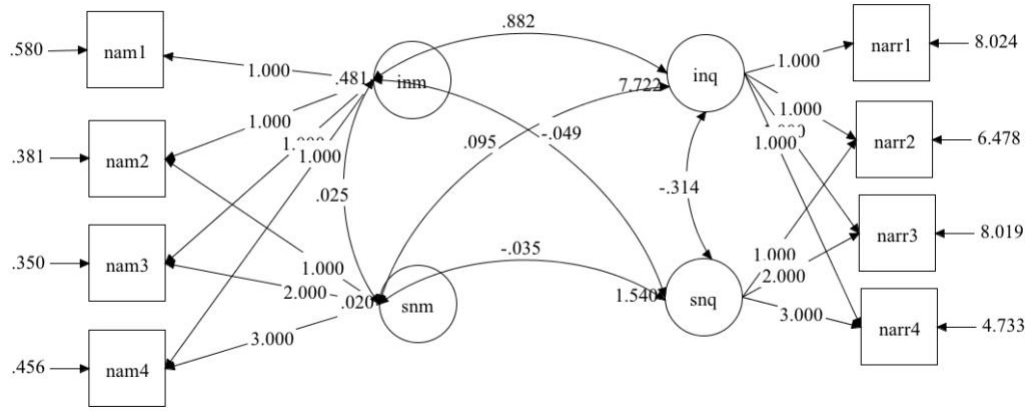

Figure 2 Path diagrams of the longitudinal association in narrative

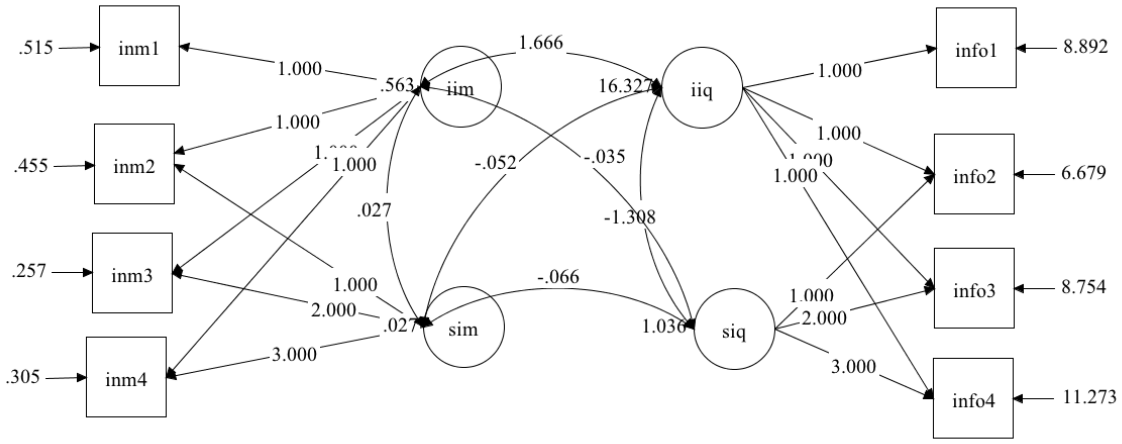

Figure 3 Path diagrams of the longitudinal association in informative

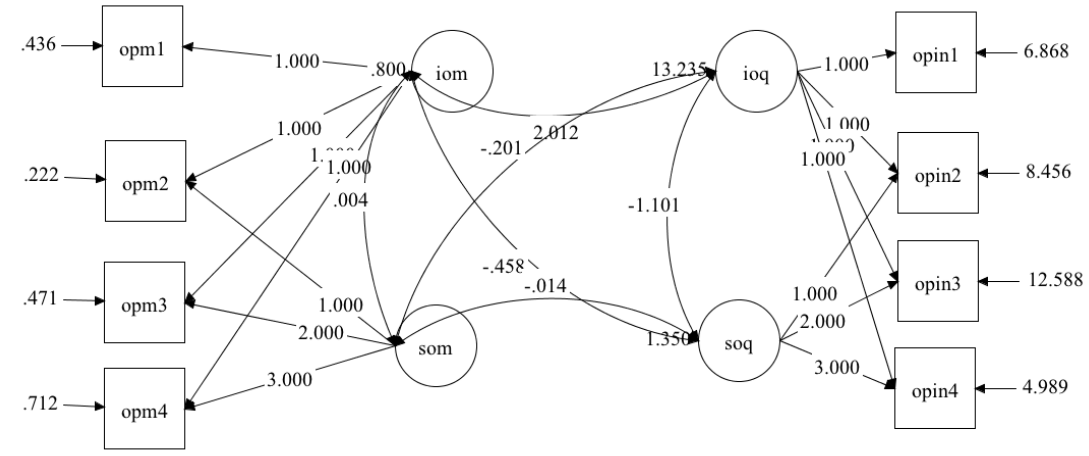

Figure 4 Path diagrams of the longitudinal association in opinion

Table 2 Estimated correlation/ covariance matrix for the latent variables in three genres

Estimated correlation/ covariance matrix for the Latent Variables (Narrative)

	Qual intercept	Qual slope	Motiv intercept	Motiv slope
Qual intercept	7.722*** (2.205)	-0.091 (0.198)	0.458** (0.147)	0.243 (0.399)
Qual slope	-0.314 (0.746)	1.540*** (2.483)	-0.057 (0.181)	-0.199 (0.381)
Motiv intercept	0.882*** (0.316)	-0.049 (0.156)	0.481*** (0.150)	0.261 (0.789)
Motiv slope	0.095 (0.142)	-0.035 (0.059)	0.025 (0.056)	0.020 (0.032)

Estimated correlation/ covariance matrix for the Latent Variables (Informative)

	Qual intercept	Qual slope	Motiv intercept	Motiv slope
Qual intercept	16.327*** (3.967)	-0.318 (0.213)	0.550*** (0.145)	-0.078 (0.208)
Qual slope	-1.308 (1.147)	1.036* (0.451)	-0.046 (0.201)	-0.394 (0.328)
Motiv intercept	1.666*** (0.462)	-0.035 (0.153)	0.563*** (0.125)	0.221 (0.431)
Motiv slope	-0.052 (0.134)	-0.066 (0.052)	0.027 (0.043)	0.027 (0.024)

Estimated correlation/ covariance matrix for the Latent Variables (Opinion)

	Qual intercept	Qual slope	Motiv intercept	Motiv slope
Qual intercept	13.235*** (3.271)	-0.260 (0.182)	0.618*** (0.099)	-7.358 (5.321)
Qual slope	-1.101 (0.975)	1.350** (0.519)	-0.441** (0.162)	-1.632 (6.737)
Motiv intercept	2.012*** (0.484)	-0.458* (0.186)	0.800*** (0.137)	0.590 (5.398)
Motiv slope	-0.201 (0.152)	-0.014 (0.058)	0.004 (0.036)	0.001*** (0.001)

Note. The lower triangle contains the covariances. The diagonal line contains variances. The upper triangle contains the correlations. Standard errors are in parentheses.

***p< .001 ** p< .01 *p< .05

RQ3: Is the longitudinal relation between writing motivation and writing quality the same for three genres (narrative, informative, and opinion)?
Analytic procedures: Only the significant pathways that were shown in Table 2 were further examined across different genres (see Table 3). The Model Constraint option was added to test the difference. Also, the correlation between the two outcomes in three genres for different measurement points were also calculated (see Figure 5).
Results: For example, in Table 3, the covariance between motivation intercept and quality slope between informative and opinion was significant. In Figure 5, it can be seen that the association between the two outcomes at the start of school year was stronger in opinion, informative, narrative, in this order. There was generally decreasing relationships between two outcomes in later time points in all genres. Until the end of school year, the association estimates were strong in narrative, informative, opinion, in this order.

Table 3 Difference in two significant pathways across different genres

	Narr - Info	Info - Opin	Narr - Opin
Motiv intercept ↔Qual intercept	-0.795 (0.459)	-0.284 (0.399)	-1.079* (0.436)
Motiv intercept ↔Qual slope	-0.011 (0.182)	0.421* (0.198)	0.410* (0.210)

***p< .001 ** p< .01 *p< .05

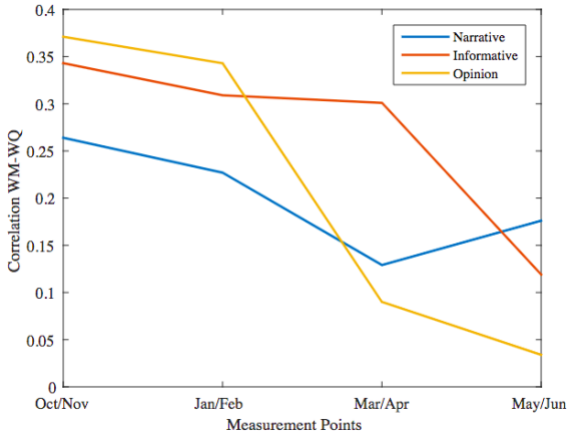

Figure 5 Genre differences in the correlation between the two outcomes as a function of time

RQ4: What are the effects of four sociodemographic variables on the longitudinal association?
Analytic procedures: The four sociodemographic variables were added in the three longitudinal models to examined if they contributed to the effects on latent factors.
Results: For example, gender significantly affected the narrative and opinion quality intercept, and also significantly affected the informative quality slope. The results were shown in Table 4.

Effects of covariates on the latent factors (Narrative)					
		Qual intercept	Qual slope	Motiv intercept	Motiv slope
	Grade	0.102 (0.128)	0.342** (0.110)	-0.073 (0.121)	-0.141 (0.301)
	Gender	0.300** (0.112)	0.075 (0.124)	0.235 (0.155)	0.058 (0.268)
	ELL	0.258* (0.104)	0.085 (0.080)	0.313 (0.184)	-0.054 (0.214)
	Disab	0.383** (0.130)	-0.120 (0.089)	0.014 (0.105)	0.250 (0.302)
Effects of covariates on the latent factors (Informative)					
		Qual intercept	Qual slope	Motiv intercept	Motiv slope
	Grade	0.049 (0.107)	0.286 (0.165)	-0.101 (0.123)	-0.213 (0.214)
	Gender	0.096 (0.117)	0.415* (0.191)	0.261* (0.131)	-0.115 (0.224)
	ELL	0.277*** (0.083)	-0.037 (0.153)	0.120 (0.158)	0.297 (0.299)
	Disab	0.153 (0.126)	0.131 (0.145)	0.121 (0.119)	-0.039 (0.186)
Effects of covariates on the latent factors (Opinion)					
		Qual intercept	Qual slope	Motiv intercept	Motiv slope
	Grade	1.391 (0.881)	0.546 (0.390)	0.003 (0.216)	-0.067 (0.062)
	Gender	2.777*** (0.786)	-0.486 (0.321)	0.327 (0.216)	-0.079 (0.064)
	ELL	2.805** (0.904)	0.254 (0.547)	0.294 (0.636)	0.151 (0.144)
	Disab	4.934* (2.108)	0.027 (0.709)	0.319 (0.402)	-0.078 (0.119)

***p< .001 ** p< .01 *p< .05

Table 4 Effects of covariates on the latent factors in three genres