PROC TABULATE

<Table 1>

	G3							
	N	Mean	Std	Min	Max	Q1	Median	Q3
romantic								
no	263	10.84	4.39	0.00	20.00	9.00	11.00	14.00
yes	132	9.58	4.86	0.00	18.00	8.00	11.00	13.00

<Table 2>

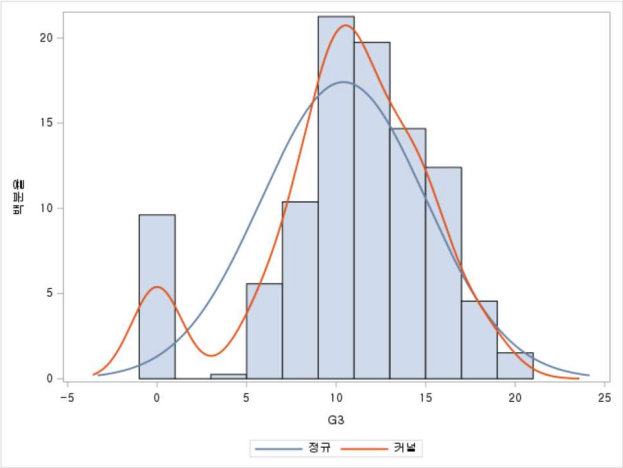
	famrel									
	1		2		3		4		5	
	G3		G3		G3		G3		G3	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
romantic										
no	3	6.67	13	9.85	47	10.47	122	10.98	78	11.17
yes	5	13.00	5	10.00	21	9.10	73	9.33	28	9.89

<Table 3>

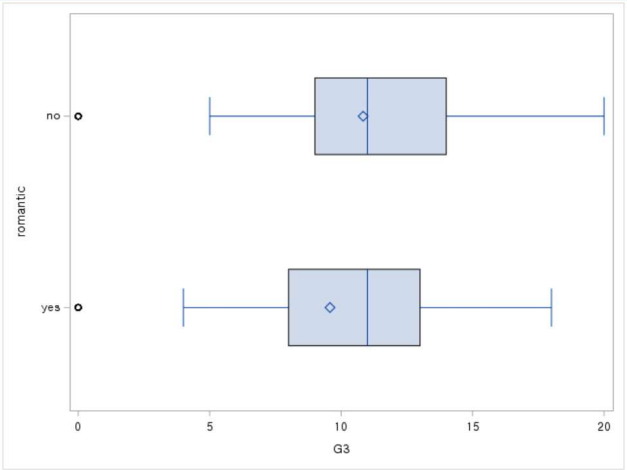
		famrel				
		1	2	3	4	5
		G3	G3	G3	G3	G3
		Mean	Mean	Mean	Mean	Mean
sex	romantic					
F	no	6.67	8.86	10.61	10.92	10.52
	yes	12.00	11.50	9.60	8.16	10.13
M	no	.	11.00	10.33	11.03	11.64
	yes	13.67	9.00	7.83	11.10	9.58

PROC SGPLOT

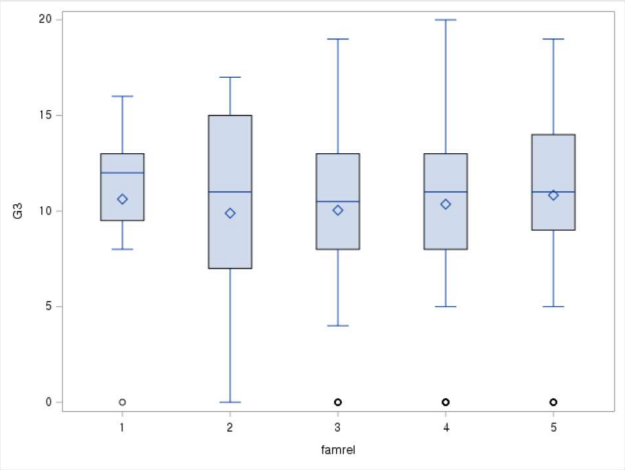
<Figure 1> Histogram, density plot, and kernel density curve for final grade (G3)



<Figure 2>



<Figure 3>



PROC GLM

1. Linear regression analysis

<Table 4> Simple linear regression analysis results

.

The GLM Procedure

Dependent Variable: G3

Source	DF	Sum of Squares	Mean Square	F Value	Pr >
Model	1	21.817689	21.817689	1.04	0.308
Error	393	8248.091172	20.987509		
Corrected Total	394	8269.908861			

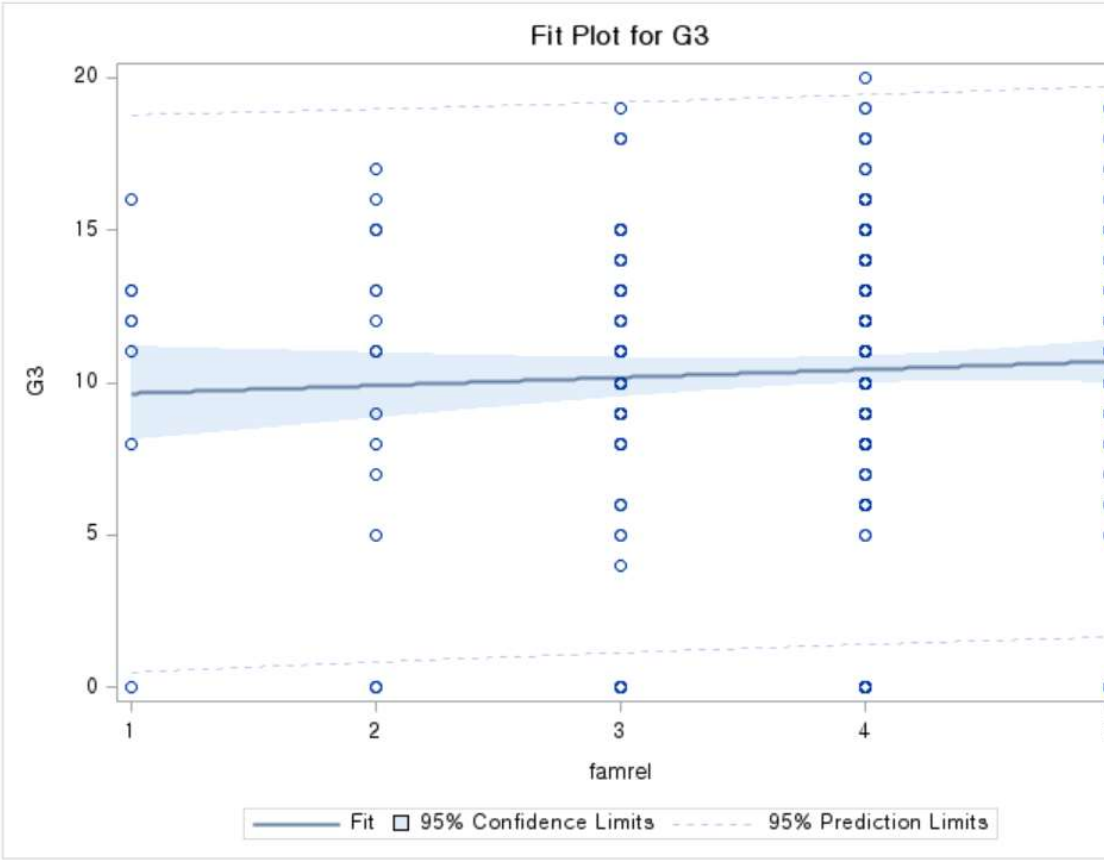
R-Square	Coeff Var	Root MSE	G3 Mean
0.002638	43.98588	4.581213	10.41519

Source	DF	Type I SS	Mean Square	F Value	Pr > F
famrel	1	21.81768866	21.81768866	1.04	0.3086

Source	DF	Type III SS	Mean Square	F Value	Pr > F
famrel	1	21.81768866	21.81768866	1.04	0.3086

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	9.380048911	1.04109449	9.01	<.0001
famrel	0.262439461	0.25739803	1.02	0.3086

<Figure 5> Simple linear regression analysis



2. ANOVA analysis

<Table 5> ANOVA analysis: GLM procedure

The GLM Procedure

Dependent Variable: G3

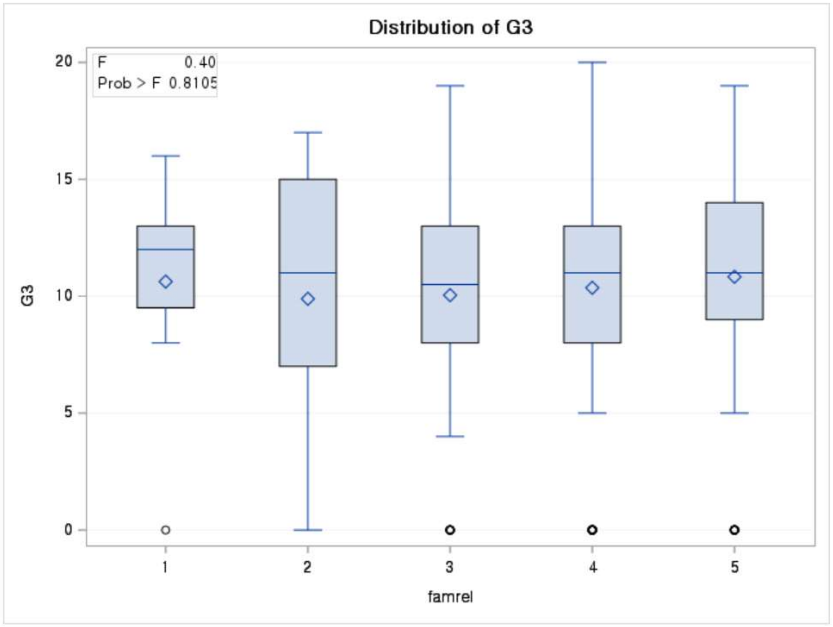
Source	DF	Sum of Squares	Mean Square	F Value	Pr >
Model	4	33.573245	8.393311	0.40	0.81(
Error	390	8236.335616	21.118809		
Corrected Total	394	8269.908861			

R-Square	Coeff Var	Root MSE	G3 Mean
0.004060	44.12325	4.595521	10.41519

Source	DF	Type I SS	Mean Square	F Value	Pr > F
famrel	4	33.57324482	8.39331121	0.40	0.8105

Source	DF	Type III SS	Mean Square	F Value	Pr > F
famrel	4	33.57324482	8.39331121	0.40	0.8105

<Figure 6> ANOVA analysis plot



<Table 6> Post-hoc analysis using TUKEY method

Comparisons significant at the 0.05 level are indicated by ***.			
famrel Comparison	Difference Between Means	Simultaneous 95% Confidence Limits	
5 – 1	0.2052	-4.4126	4.8230
5 – 4	0.4712	-1.0486	1.9910
5 – 3	0.7861	-1.1707	2.7429
5 – 2	0.9413	-2.2694	4.1520
1 – 5	-0.2052	-4.8230	4.4126
1 – 4	0.2660	-4.2772	4.8092
1 – 3	0.5809	-4.1266	5.2883
1 – 2	0.7361	-4.6155	6.0877
4 – 5	-0.4712	-1.9910	1.0486
4 – 1	-0.2660	-4.8092	4.2772
4 – 3	0.3149	-1.4589	2.0886
4 – 2	0.4701	-2.6324	3.5726
3 – 5	-0.7861	-2.7429	1.1707
3 – 1	-0.5809	-5.2883	4.1266
3 – 4	-0.3149	-2.0886	1.4589
3 – 2	0.1552	-3.1832	3.4936
2 – 5	-0.9413	-4.1520	2.2694
2 – 1	-0.7361	-6.0877	4.6155
2 – 4	-0.4701	-3.5726	2.6324
2 – 3	-0.1552	-3.4936	3.1832

3. Two-way ANOVA analysis

<Table 7> Two-way ANOVA analysis: GLM procedure

The GLM Procedure

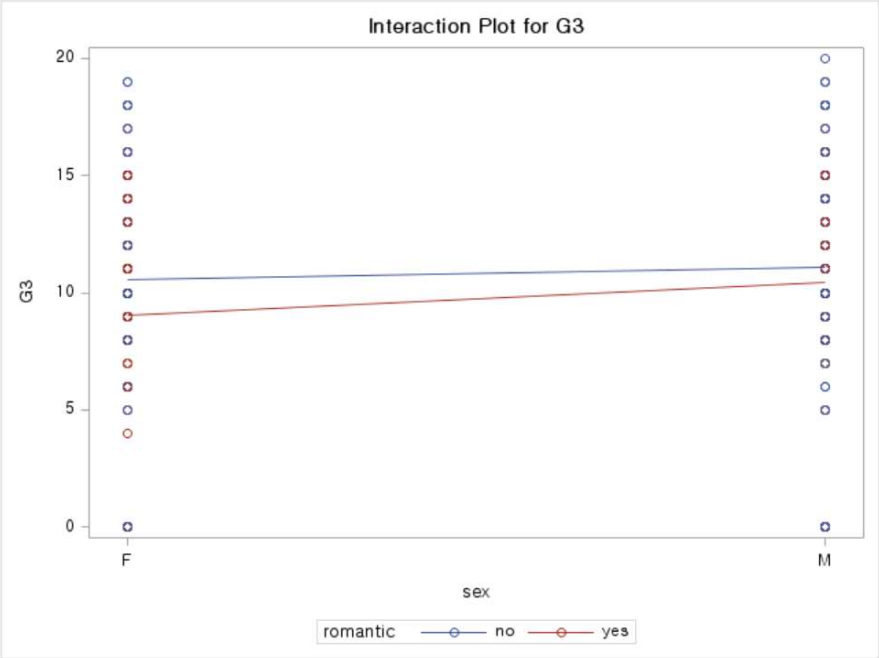
Dependent Variable: G3

Source	DF	Sum of Squares	Mean Square	F Value	Pr >
Model	3	222.810218	74.270073	3.61	0.013
Error	391	8047.098642	20.580815		
Corrected Total	394	8269.908861			

R-Square	Coeff Var	Root MSE	G3 Mean
0.026942	43.55762	4.536608	10.41519

Source	DF	Type III SS	Mean Square	F Value	Pr > F
sex	1	82.5243462	82.5243462	4.01	0.0459
romantic	1	106.8302075	106.8302075	5.19	0.0232
sex*romantic	1	15.1277954	15.1277954	0.74	0.3918

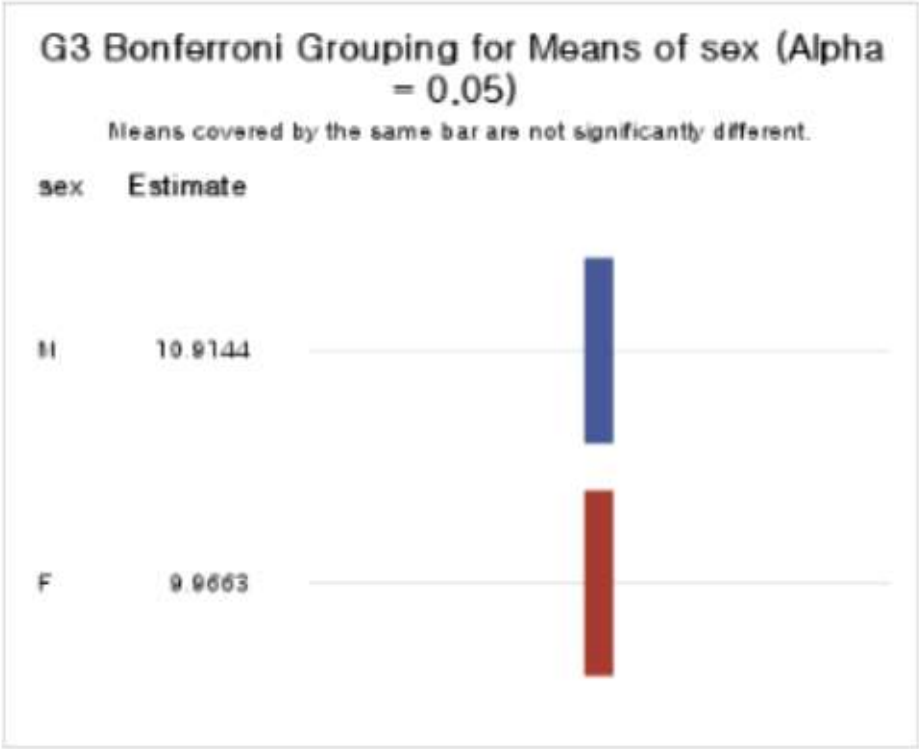
<Figure 7> Interaction plot from two-way ANOVA analysis



<Figure 8> Bonferroni's multiple comparison for means of sex

Alpha	0,05
Error Degrees of Freedom	391
Error Mean Square	20,58081
Critical Value of t	1,96605
Minimum Significant Difference	0,8988
Harmonic Mean of Cell Sizes	196,9418

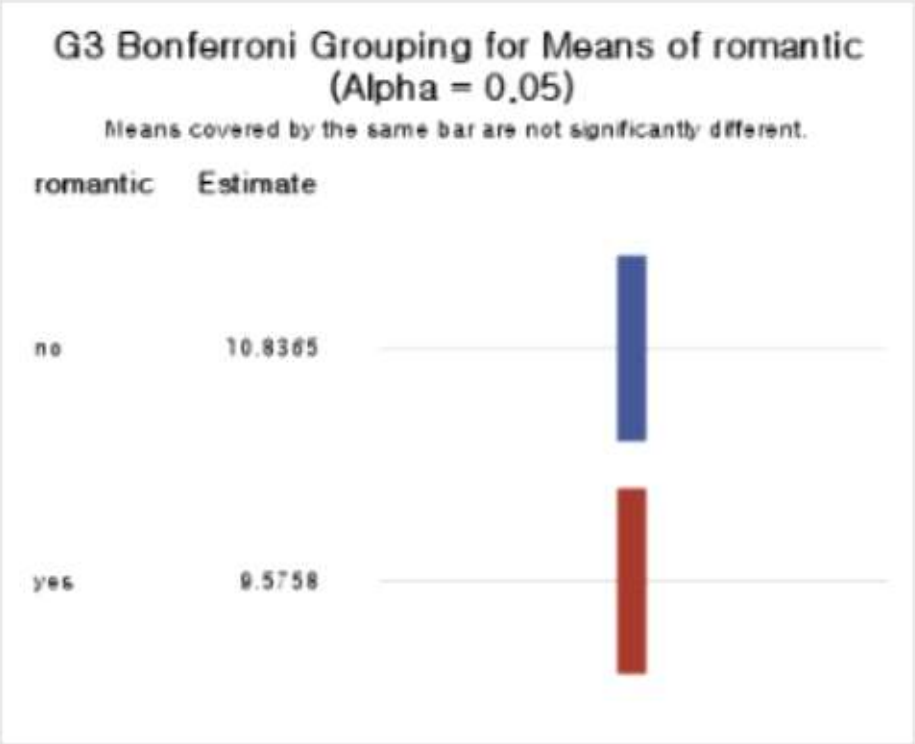
Note: Cell sizes are not equal.



<Figure 9> Bonferroni's multiple comparison for means of romantic status

Alpha	0,05
Error Degrees of Freedom	391
Error Mean Square	20,58081
Critical Value of t	1,96605
Minimum Significant Difference	0,9514
Harmonic Mean of Cell Sizes	175,7772

Note: Cell sizes are not equal.



<Table 8> Two-way ANOVA analysis results

Level of sex	Level of romantic	N	G3	
			Mean	Std Dev
F	no	129	10.5503876	4.20743620
F	yes	79	9.0126582	5.11532056
M	no	134	11.1119403	4.54990779
M	yes	53	10.4150943	4.35640096

4. Repeated measure ANOVA

<Table 9> Sphericity tests

Sphericity Tests				
Variables	DF	Mauchly's Criterion	Chi-Square	Pr > ChiS
Transformed Variates	2	0.9977492	0.8787902	0.64
Orthogonal Components	2	0.7822685	95.767307	<.00

<Table 10> F statistics for the Hypothesis of no time effect: within-subjects effect

MANOVA Test Criteria and Exact F Statistics for the Hypothesis of no time Effe H = Type III SSCP Matrix for time E = Error SSCP Matrix S=1 M=0 N=194					
Statistic	Value	F Value	Num DF	Den DF	Pr >
Wilks' Lambda	0.95721152	8.72	2	390	0.00
Pillai's Trace	0.04278848	8.72	2	390	0.00
Hotelling-Lawley Trace	0.04470118	8.72	2	390	0.00
Roy's Greatest Root	0.04470118	8.72	2	390	0.00

<Table 11> F statistics for the Hypothesis of no time*(sex romantic) effect: within-subject effect

MANOVA Test Criteria and Exact F Statistics for the Hypothesis of no time*sex Effect
H = Type III SSCP Matrix for time*sex
E = Error SSCP Matrix

S=1 M=0 N=194

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.99422329	1.13	2	390	0.3231
Pillai's Trace	0.00577671	1.13	2	390	0.3231
Hotelling-Lawley Trace	0.00581028	1.13	2	390	0.3231
Roy's Greatest Root	0.00581028	1.13	2	390	0.3231

MANOVA Test Criteria and Exact F Statistics for the Hypothesis of no time*romantic Effect
H = Type III SSCP Matrix for time*romantic
E = Error SSCP Matrix

S=1 M=0 N=194

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.97446067	5.11	2	390	0.0064
Pillai's Trace	0.02553933	5.11	2	390	0.0064
Hotelling-Lawley Trace	0.02620868	5.11	2	390	0.0064
Roy's Greatest Root	0.02620868	5.11	2	390	0.0064

<Table 12> F statistics for the Hypothesis of no time*sex*romantic effect

MANOVA Test Criteria and Exact F Statistics for the Hypothesis of no time*sex*romantic Effect
H = Type III SSCP Matrix for time*sex*romantic
E = Error SSCP Matrix

S=1 M=0 N=194

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.98971407	2.03	2	390	0.1332
Pillai's Trace	0.01028593	2.03	2	390	0.1332
Hotelling-Lawley Trace	0.01039283	2.03	2	390	0.1332
Roy's Greatest Root	0.01039283	2.03	2	390	0.1332

<Table 13> Tests of hypotheses for between subjects' effects

The GLM Procedure
Repeated Measures Analysis of Variance
Tests of Hypotheses for Between Subjects Effects

Source	DF	Type III SS	Mean Square	F Value	Pr >
sex	1	143.28852	143.28852	3.54	0.060
romantic	1	127.83261	127.83261	3.16	0.076
sex*romantic	1	10.25973	10.25973	0.25	0.615
Error	391	15838.62881	40.50800		

<Table 14> Univariate tests of hypotheses for within subject effects

The GLM Procedure
Repeated Measures Analysis of Variance
Univariate Tests of Hypotheses for Within Subject Effects

						Adj Pr > F	
Source	DF	Type III SS	Mean Square	F Value	Pr > F	G - G	H-F
time	2	64.316563	32.158281	12.76	<.0001	<.0001	<.00
time*sex	2	8.101861	4.050930	1.61	0.2010	0.2050	0.20
time*romantic	2	35.987130	17.993565	7.14	0.0008	0.0019	0.00
time*sex*romantic	2	13.028717	6.514358	2.59	0.0760	0.0869	0.08
Error(time)	782	1970.268945	2.519526				

Greenhouse-Geisser Epsilon	0.8212
Huynh-Feldt-Lecoutre Epsilon	0.8242