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Rings Do not Come from Spring

Richard Beck

Nathaniel Gurnee

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Rings Do not Come from Spring Richard Beck & Nathaniel Gurnee George Fox University

Abstract

"Ring by Spring" is a common phrase used by undergraduate students at George Fox University to describe the phenomenon where students are engaged before receiving their degree. This research paper aims to understand the factors that lead to students becoming involved in long-term relationships on campus at George Fox. Our research was gathered via a survey of 238 undergraduate students and then analyzed using regression modeling to determine which, if any, factors contributed to students engaging in long-term relationships of more than 6 months. After conducting research, we concluded that three factors were primarily significant in determining the likelihood of a long-term committed relationship: political affiliation, honors college enrollment, and hometown type, with political affiliation having the most economic significance of the three.

Keywords: Ring by Spring, Long-Term Relationships, Undergraduate Student Relationships, Committed Relationships, Politics and Relationships

JEL Codes: C1, I2, R2

Part 1: Introduction

In a time where the median age in which one typically gets married is between 28 and 30 (U.S. Census Bureau), there is still an institution in which we find a large number of young people getting married as early as 20 or 21: George Fox University. Our paper wishes to explain any possible causation between certain behaviors, attitudes and beliefs and how they impact the relationship status of undergraduate Fox students. We believe that this information could lead to valuable insights for administrators into how they can better serve the student body and provide support for seriously dating, engaged, or newlywed undergraduate students who are juggling a full class load and a blossoming love life. If George Fox's promise to its students is to "Be Known", then it would follow that the administration should want to care, support, and *know* its students who are partaking in serious or marital relationships. Our research could provide administrators with pretext and knowledge of how the phenomenon of "ring by spring" occurs on campus, and what factors are leading to students engaging in more serious intimate relationships.

Although according to our study the majority of students are single, our research has revealed that around 9% of students sampled were married or engaged, which is still relatively substantial as that would translate to around 240 undergraduate students at any point in time being engaged or married, certainly not an insignificant number. Our data appeared normally distributed for most other questions, which means that we can confidently assume that the central limit theorem applies to our data and that we can assuredly make claims about the student population as a whole.

After adjusting the variables, we wished to include in our data, we found that there were five variables that really impacted our models: students' hometown type, whether or not they were a

part of the honors college, the number of years lived on campus, and their political affiliation. Of these variables, being a part of the honors college and political affiliation were the most important in determining the relationship "score" of students. Other variables that we predicted to be statistically significant but are not were students' major, how often they prayed, whether or not they were waiting for sex, and how often they attended church. We also found that racial identity, along with hourly wage at work, did not affect the dependent variable at all.

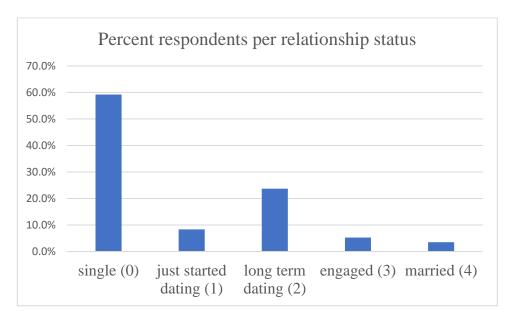
Part 2: Summary Statistics

The data provided came from students at George Fox University. Some respondents were asked by the writers of this paper to fill out the survey. The rest responded to a request in the Daily Bruin. The survey was sent out to students on one day of the Daily Bruin, and then responses greatly increased that day (Wednesday) and continued through the weekend. The survey closed the next week by Wednesday.

As for summary statistics they are as follows. This survey received 233 responses, but with not every area being filled out that number drops to 208 responses. However, we used 228 responses. In the event they failed to fill out one a question, giving them a 0 in each of the categories of that question. The fact that over 200 responses were acquired is good for the validity of the test. The initial hope was for 100 responses, and thus this survey doubled the requirement and thus can reasonably be assumed to provide a snapshot of the student body as whole.

59.2% of participants are single, 8.3% have just started dating, 23.7% are seriously dating (longer than 6 months), 5.3% are engaged and about 3.5% are married. This survey recorded those who responded with NA as single. The relationship statuses were ranked 0-4 respectively. (See graph 1)





74.7% of the respondents are female, and the rest are male. This is expected seeing as there are more females at George Fox than males, but this percentage appears to be higher than the true ratio.

83.7% of students are white or Caucasian, and the next group is Latinx at 6.9% and then multiracial or biracial at 6%. This is higher than the true percentage at George Fox, so it is unfortunate that there was not more ethnic representation. However, we made this a dummy variable: white or non-white, so there would be the most variation in the regression.

Two-thirds of the respondents are from a suburban setting. The other third is about twothirds from rural and one-third from urban settings. This variable was self-defined by each participant, so there could be variation and discrepancies in what each participant would define as suburban, but the number of respondents should overcome any individual biases.

38% of respondents were seniors, which is expected seeing as the writers are seniors, and thus asked their friends to fill out the survey, tipping the percentages in favor of seniors, which is

not the true ratio at George Fox. The next group are sophomores at 22%, juniors at 20%, and freshmen at 16%. The remainder are unique situations like freshman with junior standing. These will be included as the year that they started school, i.e. a freshman regardless of standing.

82% of respondents are not in the honors program. It must be noted that 22 of the 41 "yes" respondents were seniors. This means that although the data is statistically significant, the results will be skewed to be more significant for seniors. In addition, having so many seniors will increase the likelihood of them dating due to the extra time they will have had on campus, so the coefficient that results from honors might be higher than its real-life impact on dating status.

38% have lived on campus for 2 years, the standard requirement of George Fox, while 28% have lived for 1 year, and 20% for three years. Keep in mind that freshmen will only have lived on campus for 1 year, sophomores the chance at 2, juniors 3, etc. This is why we will not include *yearatfox* because it could be colinear with *campus*.

46% are identify as politically conservative, 31% are progressive, and 24% are other. This was self-reported.

Minimum wage was distributed around \$12 an hour. If a respondent did not put their wage, it was filled in as \$0.00.

75% of students say they are waiting for marriage to have sex. This might influence their desire to get married.

A little over 60% of students attend religious gatherings at least once a week. On the other extreme, 5% say they never do. This category was ranked from 0, never, to 4, more than once a week. This was because there were so few respondents in "once a year" that they were included with "a few times a year" under the 1 score.

37% of respondents pray, meditate, or study the Bible at least once a day. 27% two or more times a week. And 12% rarely or never do. Again, this had a similar scale: 0 equaled never, while 5 equaled daily.

There are multiple flaws and weaknesses in this survey. For starters, because most of the responses reported were courtesy of people who are naturally disposed to open up the Daily Bruin, instead of just deleting it upon delivery as is the case with one of the writers of this paper, the data is potentially skewed to only include those who are likely to open the Daily Bruin. This does not necessarily mean that the sample is not valid, it just indicates that this sample could potentially under-represent students who do not open the Daily Bruin. In addition, most of those responding yes to being in the Honors program were seniors, which is probably due to most of them knowing one of the writers (Richard) and thus filling it out because he asked them. Thus, Honors might only be a statistically significant variable if one is a senior. So, this data is potentially skewed so that only students who open the Daily Bruin and only seniors are affected by the binary variable Honors. But that is not all.

Another pitfall was the obvious of not having sampled every single student within the population of George Fox University. This paper is working with about 200 complete responses, which is not the entire student body of George Fox, and thus this paper is limited to drawing statistical inferences about the general population of students from a handful of them, but since we can trust the central limit theorem to minimize the effect of using a sample size smaller than the population, we can infer that our results are reliable.

The survey was also limited by time and the number of questions it could reasonably ask. In order to ensure that participants were willing to fill out the entire survey, the number of questions was reduced from over 20 to 14, and thus different factors about each participant were

lost. This could lead to hidden variable bias, where unknowingly the writers have omitted a determinant of X and not known it. one such example is that of height. The survey did not ask the height of the participant, and this might be a determinant of how likely one is to be dating.

It is also worth noting that our study has very little external validity. Our survey results really only apply to George Fox and its students. While the results could be interesting for other Christian liberal arts colleges to consider, the reality is that we cannot readily apply these findings to just any other university, or even any other Christian university.

In summary, this survey suffers from the potential of hidden variable bias, the fact that it does not include the entire population in its findings, and that the participants only represent certain subgroups of George Fox, especially the divide between those who open the daily bruin and those who do not. This is not a cause for stopping the study however, because the high number of responses and the knowledge that it was around for more than just a day, which allowed more types of people to fill it out, mean that the sample is relevant and sufficient to be used for these purposes.

Part 3: Methodology and Predictions

The underlying theoretical relationship between the *y* variable (*relationship status*) and the x variables, above mentioned, is that as one of the x variables either increases in magnitude or in existence, i.e. a dummy variable being "yes" or "no," the value of *y* will subsequently increase or decrease by the value of the coefficient of x times the variable, in the case of a linear regression. The result is a "score" between 0 and 4, with 0 being single, 1 represents dating less than 6 months, 2 represents dating more than 6 months, 3 represents engaged and 4 represents married. Thus, the sum of all coefficients determines the total score of a student's relationship status in a linear regression model. The coefficients on each regressor are the change on *y*

(relationship status) that a change in x exerts. More specifically, the x variables will measure levels of an estimator, like wage, or an individual's participation in a specific demographic or not. This is demonstrated as follows.

Variables such as "how often do you participate in prayer," "how often do you attend religious services," or "hourly wage" are all x variables of magnitude or quantity, and thus they will be assigned numbers ranging from 0-5, and in the case of *wage* it is the hourly wage received. A "0" is the least infrequent or the lowest wage, while "5" is the highest frequency or wage. Those variables that do not have a score will be dummy variables. The hope is that individuals who read this study will easily be able to perform their own predictions with the provided regression line.

We will use linear regression. Linear progression provides both the highest statistical significance and ease of self-evaluation for students who want to estimate their own likelihood of having a significant other. We ran a probit regression on the *relationship status2&3* and the adjusted r-squared was .01 or below. The probit responses did confirm the linear regression results, and also made *wait sex* and *wage* significant (models 2 and 3) Thus, linear regression gave us the best results with the most economic and statistical significance. The theoretical model is as follows:

 $Y_{relationship\ status} = \beta_1(female) + \beta_2(caucasian) + \beta_3(rural) + \beta_4(suburban) + \beta_5(humanities)$ + $\beta_6(sciences) + \beta_7(business) + \beta_8(art) + \beta_9(othermajor) + \beta_{10}(honors) + \beta_{11}(campus) +$ $\beta_{12}(conservative) + \beta_{13}(progressive) + \beta_{14}(hourlywage) + \beta_{15}(wait\ sex) + \beta_{16}(attend) +$ $\beta_{17}(prayer)$

The x variables that are variables of magnitude are *campus*, *hourlywage*, *attend*, *and prayer*. The remainders are dummy variables. Once again, *yearatfox* was omitted so as to avoid multicollinearity between itself and *campus*. We also removed all *meet* variables because they are perfectly collinear with *relationship status* because everyone who has met a significant other already *has* a significant other.

Part 4: Results & Interpretation

(Model 33) If there is one result that is fascinating about this study, it is that there is almost nothing to report. Firstly, Running the above regression in Model 33 yields an F-stat of 2.95, which is enough to make it statistically significant at the 5% level, and the adjusted R-squared is 0.066, which is low. However, only three variables were significant at the 5% level, *Honors, campus, and progressive* with p-values of 0.0063, 0.038, and 0.015 respectively. Their betas were 0.611, 0.154, and -0.513 respectively. This means that being in *honors* and the longer you live on campus both move your relationship status away from being single while being politically progressive moves you towards being single. An omitted variable test with these variables, along with suburban (significant at the 10% level) yields an f-stat of 4.18, which means these factors are statistically significant. Omitting the majors yielded an f-stat of 0.38, which means the model was significant without them. Thus, we decided to remove them from future regressions so as to get a clearer view of the impact of the statistically significant estimators.

Because of this fact, the next regressions omitted all majors. In addition, the *conservative* and *progressive* variables are both significant when regressed against each other, i.e. omitting *progressive* in one and *conservative* in the other. The new regressions were these:

 $Y_{relationship\ status\ 2} = \beta_1(female) + \beta_2(caucasian) + \beta_3(rural) + \beta_4(suburban) + \beta_{10}(honors) +$ $\beta_{11}(campus) + \beta_{12}(conservative) + \beta_{13}(independent) + \beta_{14}(hourlywage) + \beta_{15}(wait\ sex) +$ $\beta_{16}(attend) + \beta_{17}(prayer)$

 $Y_{relationship\ status\ 3} = \beta_1(female) + \beta_2(caucasian) + \beta_3(rural) + \beta_4(suburban) + \beta_{10}(honors) +$ $\beta_{11}(campus) + \beta_{12}(progressive) + \beta_{13}(independent) + \beta_{14}(hourlywage) + \beta_{15}(wait\ sex) +$ $\beta_{16}(attend) + \beta_{17}(prayer)$

(Model 43, Yrelationship status 2, Tabel 1) This new regression raised the adjusted r-squared to 0.070, and the f-stat to 3.18. Honors, campus, and conservative were relevant at the 95% level with betas of 0.588, 0.155, and 0.494 respectively. This refined regression did not change the slopes of the betas that were significant at the five percent level. Although this model is looking at the 5% level, Suburban was significant at the 10% level, but it had a p-value of 0.0650, and a coefficient of 0.435. Thus, we deemed *suburban* is close enough to a 95% confidence interval to justify including it in the results. *Independent* was also significant at the 10% level, with a p-value of 0.0614 and a coefficient of 0.389. However, *independent* was not significant when regressed against *conservative* (model 44) so we determined its coefficient does not have economic significance. The constant is also not statistically significant, even at the 10% level, so there is no baseline statistical person that would have a predictable relationship status.

(Table 1)

estimator	Y2 beta	percentile
honors	0.588	95%
campus	0.155	95%
conservative	0.494	95%
suburban	0.435	90%
adj r-squared	0.070	
f-stat	3.18	

(Model 44, *Yrelationship status 3*, Table 2) We ran the regression again, but this time omitted *conservative* and instead included *progressive*. The adjusted r-squared increased to 0.083, and the f-stat increased to 3.588. *Progressive* is the only negative signed coefficient with a beta of -0.601. The other statistically significant coefficients at the 95% level were *honors*, *campus*, *and suburban* with betas of 0.622, 0.159, and 0.452 respectively. There were no coefficients significant at the 10% level. Once again, the constant was not statistically significant, which means that there is no baseline statistical person with a standard relationship status. That is to say: there is no way to determine the *relationship status* of someone if they answered 0 to all the estimators.

(Table 2)

estimator	Y3 beta	percentile
honors	0.622	95%
campus	0.159	95%
progressive	-0.601	95%
suburban	0.452	95%
adj r-squared	0.083	
f-stat	3.588	

It should be noted that the adjusted r-squares are relatively low for each of these regressions. They are all below 0.090, which means that over 91% of the variation in the data is not being explained by the estimators that we used. Thus, although there were statistically significant coefficients, the entire regression is only explaining about 7-8.3% of the *relationship status* of the students. There are factors that we are missing in our regression, and so it could be beneficial in the future to try and determine what these factors are.

The economic significance of these coefficients is as crucial to understand as the statistical significance. It is important to note that the betas of the estimators are not percentages or likelihoods, they are, in the case of the linear regressions, the impact a variable has on the relationship score one would receive. For instance, the beta of *honors* is 0.588 or 0.622 (models 43 and 44), which means that if someone is in *honors* their predicted relationship score increases by 0.588. If there was a person who lived on campus for four years, was in honors, was conservative, and is from a suburban area, their relationship score would be

$$(0.588 + 4*0.155 + 0.494 + 0.435) = 2.137$$

which would put them in long term dating. Similarly, if someone had those same estimators but were instead progressive, their score would be

$$(0.622 + 4*0.159 - 0.601 + 0.452) = 1.109$$

which would put them at just newly dating. If they were on *campus* for three years, their score would decrease to below 1, which would make them single.

Overall, the most economically significant variables were *suburban*, *honors*, *progressive*, and *conservative*. Each of these variables increased or decreased the *relationship status* score by about 0.5 of a point except for *campus*. However, although *campus*' coefficient was approximately 0.160, with four years of living on campus, it can have as much economic impact on *relationship status* as being in *honors*. But the variables mentioned are not the entire story of ring by spring due to the low adjusted r-squared.

Conclusion

As was previously said, half of the story by ring by spring is that there is no story. Over half of our estimators had no statistical significance. This means that there is apparently no statistical incentive to pray or to attend religious gatherings more, so as to improve one's chances of finding a girlfriend or boyfriend. This could further influence how people view the value of religious events and potentially disincentivize them from attending such events or practicing them throughout the day. On the other hand, this is a huge win for people who think that God might be against them finding a partner, apparently there is nothing religion can do to help you. Take that as either an expansion of your free will or depressing because now there is no deity to blame for your lack of dates.

Wage, ethnicity, gender, and major are also irrelevant to your relationship score. This means that there should be almost no disadvantages spawning from socioeconomic status; the

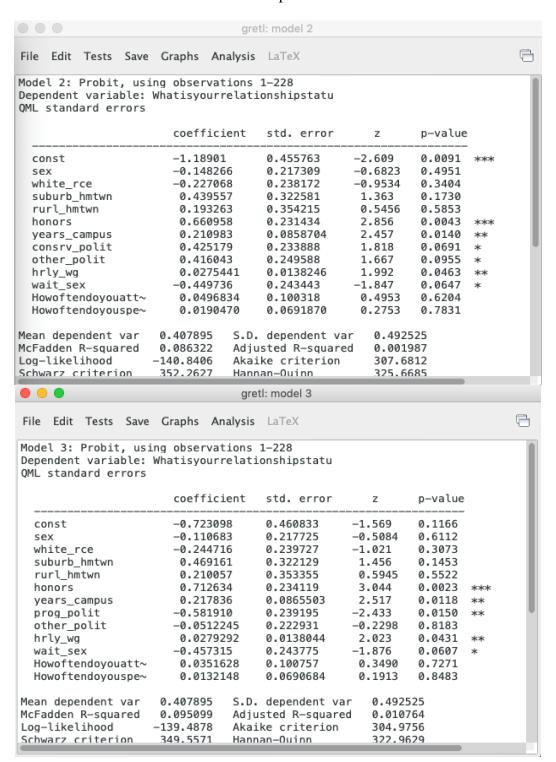
determinants of dating status are--except for suburban--on campus related traits, or they are opinions. Therefore, do not wait around for an increase in your wage to ask that special person out, instead, go for it now, money has nothing to do with whether or not they will date you in the long-run.

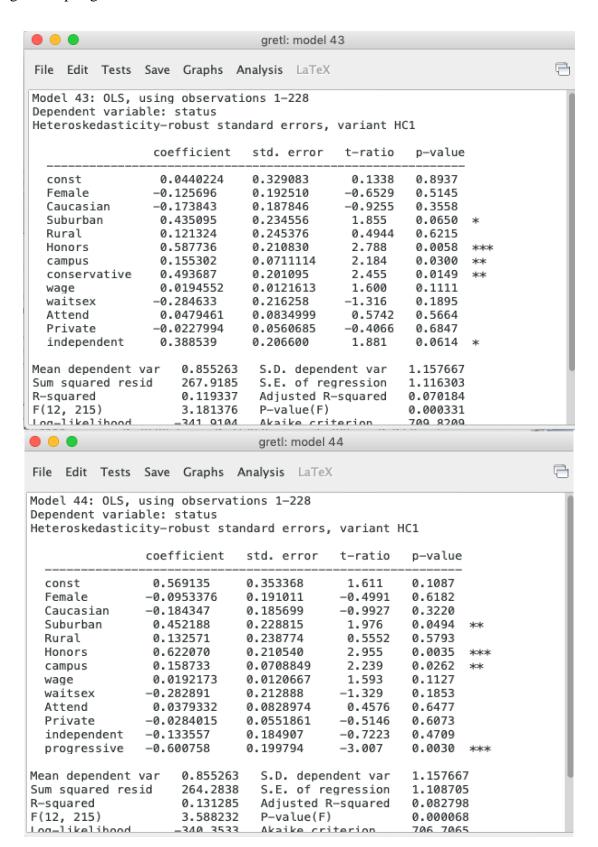
Finally, we recommend that the administration of George Fox University consider educating students on the impact of political views in their dating lives. Helpful resources could include training programs on how to navigate political differences with a significant other so as to maintain both healthy self-reflection and empathy towards another person's views.

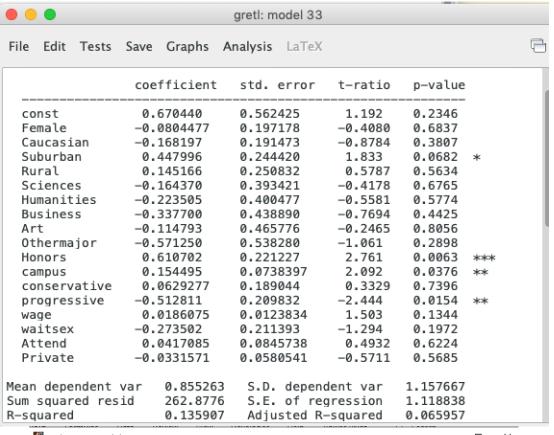
Specifically, to the Honors Program, the administration could potentially highlight the positive impact Honors has on its students' dating status' and could thus use that as a way to better inform prospective students as to the pros and cons of the program they might join. Finally, it would be beneficial to help guide students' expectations around religious activities and dating. God does not owe us significant others, and it would be foolish to demand such a thing, the statistics do not support it.

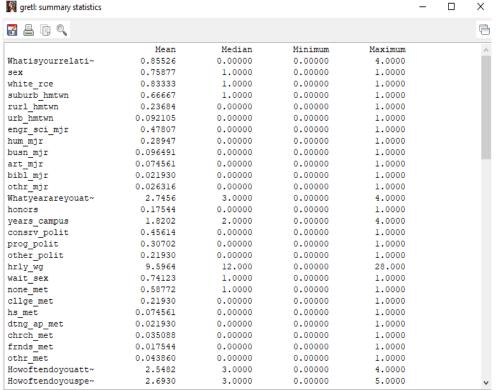
Ring by spring is a sometimes funny, sometimes controversial topic at George Fox. Some hate it, some love to hate it, and some actually live it, or at least the results. The statistics say that almost nothing negatively influences your relationship status, but some things certainly help. In a good way, take it personal, very little is potentially holding you back from having a significant other, so go out there and try, or do not, there is no constant statistical person, it is a wide world with lots of rings in it.

Graphs









References

U.S. Census Bureau. (2019). *Median Age at First Marriage*. Retrieved December 01, 2020, from https://data.census.gov/cedsci/table?q=marriage&tid=ACSDT1Y2019.B12007&hidePreview=false.