Lineer Regresyon Analizi

Bir sürekli (sayısal) değişkenle, bir dizi bağımsız değişkenin (sürekli-süreksiz olmasına bakılmaksızın) arasındaki ilişkinin incelenmesinde lineer regresyon analizi kullanılır.

Bu analiz, korelasyon temelli olarak değişkenler arasındaki ilişki örüntülerini çözümlemeyi sağlar.

Bu analiz, karmaşık ilişki ağlarının incelenmesi için geniş olanaklar sağladığından, sosyal araştırmalarda yaygın bir biçimde kullanılmaktadır.

Regresyon analizi, bir dizi bağımsız değşikenin bir bağımlı değişkeni ne derece iyi yordadığını çözümler.

Bu analiz ile, bir bütün olarak kurulan modelin bağımlı değişkeni ne ölçüde yordadığını açıklanır.

Ayrıca, modeldeki her bir değişkenin tek tek bağımlı değişkeni ne kadar yordadığını açıklar.

## Varsayımlar

Lineer regresyon analizinin uygulanabilmesi için yeterli örneklem büyüklüğüne sahip olunması çok önemlidir. Bunun için N > 50 + 8m (m modelled kullanılan bağımsız değişken sayısı) koşulunun sağlandığından emin olunmalıdır.

Örneğin, 5 bağımsız değişkenin dahil edildiği bir analizde örneklem büyüklüğü en az 90 olmalıdır.

Bağımsız değişkenler arasında çoklu bağlantılılık olmadığı, ya da yok sayılacak kadar önemsiz olduğundan emin olunmalıdır. Bunun için bazı istatistiksel göstergeler değerlendirilmelidir.

Bağımsız ve bağımlı değişken arasında doğrusal bir ilişki olmalıdır.

# Analiz Sonuçlarının Yorumlanması

Öncelikle çoklu bağlantılılığın olup olmadığının denetlenmesi gerekir. Coefficients tablosundaki Tolerance > 0.10 ve VIF < 10 ise, çoklu bağlantılılık yok sayılabilir. Ayrıca, Condition Index değerleri de 30’dan küçük olmalıdır. Bu koşullar sağlandığında, çoklu bağlantılılığın olmadığı varsayımı sağlanmış olur.

Model Summary tablosundaki R Square, modelin bağımlı değişkeni ne oranla yordadığını gösterir. Bu değer 0-1 arası bir değer alır.

Küçük örnekleme dayalı regresyon analizinde Adjusted R Square değeri daha güvenilir sonuçlar verir.

Coefficients tablosundaki Beta değerleri, her bir bağımsız değişkenin katkısının kıyaslanmasını mümkün kılar. Beta değerlerinin mutlak değeri (0’a uzaklığı) arasındaki sıralamasına dayalı olarak değişkenlerin katkı kıyaslaması yapılabilir.

Aynı tablodaki p-değerleri her bir bağımsız değişkenin modelde olmasının istatistiksel olarak anlamlı olup olmadığını test etmek için incelenmelidir.

Çoklu Lineer Regresyon Analizi – 1

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| --- | --- | --- | --- | --- | --- | --- |
| **Correlations** | | | | | | |
|  | | Satisfaction with your life | Marital status | How many children do you have | Self positioning in political scale | How important is God in your life |
| Pearson Correlation | Satisfaction with your life | 1.000 | -.040 | -.001 | .115 | .060 |
| Marital status | -.040 | 1.000 | -.469 | -.046 | .002 |
| How many children do you have | -.001 | -.469 | 1.000 | .079 | .134 |
| Self positioning in political scale | .115 | -.046 | .079 | 1.000 | .150 |
| How important is God in your life | .060 | .002 | .134 | .150 | 1.000 |
| Sig. (1-tailed) | Satisfaction with your life | . | .000 | .416 | .000 | .000 |
| Marital status | .000 | . | .000 | .000 | .340 |
| How many children do you have | .416 | .000 | . | .000 | .000 |
| Self positioning in political scale | .000 | .000 | .000 | . | .000 |
| How important is God in your life | .000 | .340 | .000 | .000 | . |

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| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .132a | .018 | .017 | 2.206 |

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| a. Predictors: (Constant), How important is God in your life, Marital status, Self positioning in political scale, How many children do you have |

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| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 5260.290 | 4 | 1315.073 | 270.255 | .000b |
| Residual | 294410.768 | 60503 | 4.866 |  |  |
| Total | 299671.058 | 60507 |  |  |  |

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| a. Dependent Variable: Satisfaction with your life |
| b. Predictors: (Constant), How important is God in your life, Marital status, Self positioning in political scale, How many children do you have |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Correlations | |
| B | Std. Error | Beta | Zero-order | Partial |
| 1 | (Constant) | 6.272 | .036 |  | 175.432 | .000 |  |  |
| Marital status | -.055 | .005 | -.054 | -11.827 | .000 | -.040 | -.048 |
| How many children do you have | -.053 | .006 | -.041 | -8.954 | .000 | -.001 | -.036 |
| Self positioning in political scale | .104 | .004 | .108 | 26.506 | .000 | .115 | .107 |
| How important is God in your life | .037 | .003 | .049 | 11.944 | .000 | .060 | .049 |

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| **Coefficientsa** | | | | |
| Model | | Correlations | Collinearity Statistics | |
| Part | Tolerance | VIF |
| 1 | (Constant) |  |  |  |
| Marital status | -.048 | .775 | 1.290 |
| How many children do you have | -.036 | .760 | 1.316 |
| Self positioning in political scale | .107 | .974 | 1.027 |
| How important is God in your life | .048 | .957 | 1.045 |

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| **Collinearity Diagnosticsa** | | | | | | | |
| Model | Dimension | Eigenvalue | Condition Index | Variance Proportions | | | |
| (Constant) | Marital status | How many children do you have | Self positioning in political scale |
| 1 | 1 | 4.015 | 1.000 | .00 | .01 | .01 | .01 |
| 2 | .641 | 2.502 | .00 | .21 | .32 | .00 |
| 3 | .184 | 4.673 | .01 | .58 | .56 | .20 |
| 4 | .113 | 5.970 | .00 | .03 | .03 | .47 |
| 5 | .047 | 9.228 | .99 | .17 | .08 | .32 |

Çoklu Lineer Regresyon Analizi - 2

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| --- | --- | --- | --- | --- | --- | --- |
| **Correlations** | | | | | | |
|  | | What age did you complete your education | Marital status | Self positioning in political scale | Religious person | Sex |
| Pearson Correlation | What age did you complete your education | 1.000 | .019 | -.020 | .000 | -.012 |
| Marital status | .019 | 1.000 | -.039 | .031 | -.008 |
| Self positioning in political scale | -.020 | -.039 | 1.000 | -.098 | -.009 |
| Religious person | .000 | .031 | -.098 | 1.000 | -.088 |
| Sex | -.012 | -.008 | -.009 | -.088 | 1.000 |
| Size of town | .092 | .008 | -.057 | .074 | .013 |
| Sig. (1-tailed) | What age did you complete your education | . | .000 | .000 | .462 | .005 |
| Marital status | .000 | . | .000 | .000 | .041 |
| Self positioning in political scale | .000 | .000 | . | .000 | .024 |
| Religious person | .462 | .000 | .000 | . | .000 |
| Sex | .005 | .041 | .024 | .000 | . |
| Size of town | .000 | .038 | .000 | .000 | .002 |

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| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .096a | .009 | .009 | 10.615 |

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| a. Predictors: (Constant), Size of town, Marital status, Sex, Self positioning in political scale, Religious person |

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| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 47770.268 | 5 | 9554.054 | 84.787 | .000b |
| Residual | 5120465.380 | 45441 | 112.683 |  |  |
| Total | 5168235.649 | 45446 |  |  |  |

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| a. Dependent Variable: What age did you complete your education |
| b. Predictors: (Constant), Size of town, Marital status, Sex, Self positioning in political scale, Religious person |

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| **Coefficientsa** | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Correlations | |
| B | Std. Error | Beta | Zero-order | Partial |
| 1 | (Constant) | 19.675 | .271 |  | 72.737 | .000 |  |  |
| Marital status | .089 | .023 | .018 | 3.897 | .000 | .019 | .018 |
| Self positioning in political scale | -.069 | .022 | -.015 | -3.202 | .001 | -.020 | -.015 |
| Religious person | -.198 | .089 | -.011 | -2.228 | .026 | .000 | -.010 |
| Sex | -.302 | .100 | -.014 | -3.019 | .003 | -.012 | -.014 |
| Size of town | .394 | .020 | .092 | 19.560 | .000 | .092 | .091 |

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| **Coefficientsa** | | | | |
| Model | | Correlations | Collinearity Statistics | |
| Part | Tolerance | VIF |
| 1 | (Constant) |  |  |  |
| Marital status | .018 | .998 | 1.002 |
| Self positioning in political scale | -.015 | .986 | 1.014 |
| Religious person | -.010 | .977 | 1.024 |
| Sex | -.014 | .992 | 1.009 |
| Size of town | .091 | .992 | 1.008 |

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| **Collinearity Diagnosticsa** | | | | | | | |
| Model | Dimension | Eigenvalue | Condition Index | Variance Proportions | | | |
| (Constant) | Marital status | Self positioning in political scale | Religious person |
| 1 | 1 | 5.152 | 1.000 | .00 | .01 | .00 | .00 |
| 2 | .345 | 3.867 | .00 | .93 | .01 | .01 |
| 3 | .204 | 5.026 | .00 | .01 | .18 | .00 |
| 4 | .156 | 5.741 | .00 | .01 | .18 | .66 |
| 5 | .117 | 6.641 | .00 | .01 | .34 | .06 |
| 6 | .027 | 13.942 | .99 | .04 | .28 | .26 |

Çoklu Lineer Regresyon Analizi – 3

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| **Correlations** | | | | | | |
|  | | How important is God in your life | Self positioning in political scale | Religious person | Sex | What age did you complete your education |
| Pearson Correlation | How important is God in your life | 1.000 | .148 | -.552 | .069 | .011 |
| Self positioning in political scale | .148 | 1.000 | -.120 | -.009 | -.031 |
| Religious person | -.552 | -.120 | 1.000 | -.084 | .007 |
| Sex | .069 | -.009 | -.084 | 1.000 | -.011 |
| What age did you complete your education | .011 | -.031 | .007 | -.011 | 1.000 |
| Important in life: Family | -.105 | -.019 | .076 | -.040 | -.011 |
| Sig. (1-tailed) | How important is God in your life | . | .000 | .000 | .000 | .004 |
| Self positioning in political scale | .000 | . | .000 | .018 | .000 |
| Religious person | .000 | .000 | . | .000 | .049 |
| Sex | .000 | .018 | .000 | . | .004 |
| What age did you complete your education | .004 | .000 | .049 | .004 | . |
| Important in life: Family | .000 | .000 | .000 | .000 | .004 |

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| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .562a | .316 | .316 | 2.486 |

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| a. Predictors: (Constant), Important in life: Family, What age did you complete your education, Self positioning in political scale, Sex, Religious person |

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| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 160484.911 | 5 | 32096.982 | 5195.258 | .000b |
| Residual | 347655.135 | 56272 | 6.178 |  |  |
| Total | 508140.046 | 56277 |  |  |  |

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| a. Dependent Variable: How important is God in your life |
| b. Predictors: (Constant), Important in life: Family, What age did you complete your education, Self positioning in political scale, Sex, Religious person |

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| **Coefficientsa** | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Correlations |
| B | Std. Error | Beta | Zero-order |
| 1 | (Constant) | 10.955 | .064 |  | 170.395 | .000 |  |
| Self positioning in political scale | .109 | .005 | .084 | 23.814 | .000 | .148 |
| Religious person | -2.701 | .018 | -.535 | -151.386 | .000 | -.552 |
| Sex | .137 | .021 | .023 | 6.500 | .000 | .069 |
| What age did you complete your education | .005 | .001 | .017 | 4.928 | .000 | .011 |
| Important in life: Family | -.486 | .028 | -.061 | -17.573 | .000 | -.105 |

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| **Coefficientsa** | | | | | |
| Model | | Correlations | | | |
| Partial | Part | Tolerance | VIF |
| 1 | (Constant) |  |  |  |  |
| Self positioning in political scale | .100 | .083 | .984 | 1.016 |
| Religious person | -.538 | -.528 | .973 | 1.028 |
| Sex | .027 | .023 | .991 | 1.009 |
| What age did you complete your education | .021 | .017 | .999 | 1.001 |
| Important in life: Family | -.074 | -.061 | .993 | 1.007 |

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| **Collinearity Diagnosticsa** | | | | | | | |
| Model | Dimension | Eigenvalue | Condition Index | Variance Proportions | | | |
| (Constant) | Self positioning in political scale | Religious person | Sex |
| 1 | 1 | 5.399 | 1.000 | .00 | .00 | .00 | .00 |
| 2 | .192 | 5.308 | .00 | .05 | .04 | .01 |
| 3 | .167 | 5.680 | .00 | .32 | .52 | .02 |
| 4 | .117 | 6.794 | .00 | .40 | .15 | .39 |
| 5 | .103 | 7.225 | .00 | .01 | .10 | .24 |
| 6 | .021 | 15.851 | 1.00 | .22 | .18 | .34 |