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THE EFFECT OF BIRTH ORDER ON ACHIEVEMENT[1] (A STUDY ON A TURKISH SAMPLE)

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ABSTRACT

Birth order studies have received an increasing academic interest since Adler (1920). During the last several decades a number of researchers have investigated the influence of birth order, contributing to the intelligence, career preferences and success. The purpose of the present paper is to summary the key findings from a study on the correlations between birth order and the participants' achievement of certain indicators in a Turkish sample. Briefly, the statistical analysis concluded that birth order was significantly correlated with achievement on the ASGT scores. Secondly, the analysis of variance revealed that there were statistically significant differences between the ASGT scores of participants by gender and birth order. Finally, the regression analysis suggested that family size was found to be an insignificant predictor of the participants' achievement scores.

Key Words: *birth order, number of siblings, achievement, sex differences, Turkey.*

1. INTRODUCTION

Birth order studies have received an increasing academic interest since Adler (1920) who had theorized the relationship between birth order, sibling size, sex and individuality (Bredin and Rodney, 2002). He emphasized not only the effect of actual birth order but also the psychological birth position. According to him, if the eldest is a defective person, psychological birth order may play an important role and, the second child is likely to adopt the role of first-born (Shulman and Mosak, 1977).

During the last several decades, a number of researches, based on Adler's theory, have investigated the influence of birth order, contributing to the intelligence, career preferences and success (Eckstein et al., 2010; Leong, 2002). Also there is a popular belief on the effects of birth position. For example, in a study conducted by Herrera et al. (2003), the participants were found to believe that first-borns were most intelligent, middle children were the most envious, last-borns were most creative, and only children were the most disagreeable. Consistent with these results, Galton (1874) discovered that 48% of respondents thought that first-born was typically more successful than later-born (Martin, 2006).

Unlike the common belief, the empirical findings have reported conflicting results of the effects of birth order. Some studies have found that sibling position is a significant factor in attainment. For example, Carette, Anseel and Yperen (2011) suggested that first-born respondents have showed more preference for mastery goals, whereas second-born participants were found to be more performance oriented. Such a result seems to be confirmed by the findings of a study among more than 1.000 young participants in New Zealand by Fergusson, Horwood and Boden (2006). The researchers stated that the intra-family factors initiated by birth order may lead to a long-term impact on the individual in respect of later educational performance and success. Similarly, under Adler's Birth Order Position model, Horner et al. (2012) indicated that being the oldest child had an impact on better school performance compared only to the last-born. Consistent with these findings, a study conducted by Hotz and Pantano (2011) showed that later born children may exhibit lower effort in the school, thus having lower school attainment levels. Moreover, based on their analysis, Spiker et al (2001) concluded that there was a strong connection between birth order and nonverbal IQ results in their sample. Finally, Bjerkedal et al (2007) used the intelligent test score of Norwegian males from the period of 1984–2004 to examine the relationship between sibling position and achievement. The results provided strong empirical support in favor of a negative influence of increasing birth order on the scores.

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However, some other studies have yielded little contrary evidence in the literature to refute the conclusion that birth order is associated with attainment. For instance, Ha and Tam (2011), who tested the link between sibling order and academic success among 120 Malaysians, noted that there was no statistical connection between the variables. Moreover, a study among university students by Joseph (2009) suggested that birth order had no influence on educational attainment in his sample. A study by Bredin and Rodney (2002) is another supportive example. They showed that birth position had an insignificant effect on the parameters of academic achievement in college students.

Family size (i.e. the number of siblings) mostly has been considered as an explanatory variable in the empirical birth order studies. The majority of the research on sibling size and achievement points toward an insignificant relationship. For example, a study by Haan (2010) provides support for the hypothesis that family size is not associated with attainment. Using a sample from 9 preschool programs and daycare centers in Oregon, Liang (1991) found no meaningful correlation between sibling size and young children's intellectual development. Fergusson, Horwood and Boden (2006) did not observe a notably impact of sibling size on academic performance. Other studies have confirmed similar results (Joseph, 2009; Lindahl 2008; Kunza and Petersona, 1977; Kennett, 1973).

A few studies, on the other hand, have suggested that people from smaller families are likely to demonstrate higher achievement than those in large families. For example, Gorman (2008) reported that the participants with large family tended to score lower on GPA scores. Similarly, Booth and Kee (2005) found the influence of family size when controlling for the birth order effect.

The purpose of this paper is to summary the key findings from a study on the correlation between birth order and achievement, which was conducted in January 2013 in Istanbul, Turkey. Based on the findings of the study, the paper sought to answer the following research questions: (1) Is there a significant difference between birth order and achievement? (2) Do the achievement scores of sample vary by gender and birth order? (3) Does the correlation between birth order and achievement vary by other demographic variables? (4) To what extent do family size, birth order and gender affect the participants' success?
The outline of the paper is as follows: the next section introduces the methodology of the empirical research, the results of statistical analysis are presented in the section three, and the final section gives some concluding remarks.

2. METHOD

2.1. Sample
The participants were office workers of a governmental organization in Istanbul, in Turkey. The study group included 169 participants, of whom 60.9% (103) were female, and 39.1% (66) male. There were 58 (34.3%) first-born, 56 (33.1%) middle-born and 55 (32.5%) last-born participants. The age of sample ranged from 24 to 33 years, where the mean age was 27.5 years, with a standard deviation of 2.29. Approximately two-thirds of respondents were single (65.7%). While more than three-fourth of the sample had a bachelor's degree, 23.1% had a graduate degree.

2.2. Procedure
The study used survey and interview data from the participants. They were requested to complete a form with open and closed-ended questions regarding demographic information and achievement scores.

2.3. Measures
The independent variable was birth order, which was defined as first-born, middle-born and last-born. The study also used a number of categorical demographic variables such as family size, gender and birthplace.

The dependent variable was achievement, which was measured in the study based on the participants' achievement of certain indicators. The main one was the scores of "Public Personnel Selection Examination" (PPSE), which is required to work in the Public Sector. "Academic Staff and Graduate Education Test" (ASGET) scores was the second outcome factor, which is requested for application to

graduate programs. Finally, undergraduate grade point average (UGPA) was another dependent variable. The scores for the attainment parameters were on a scale from 0 to 100.

2.4. Data Analysis

The descriptive statistics reported the means and standard deviations on the achievement indicators. The one way ANOVA was used to explain the significant differences between birth order and achievement scores. The correlation analysis was employed to examine the significance level and the relationship among all study variables. Moreover, the Univariate analysis of variance was conducted to test for birth order and gender impacts on the attainment outcomes. Finally, the regression analysis was performed to predict the contribution of birth order, family size and gender to the participants' achievement scores.

3. RESULTS

3.1. Descriptive Statistics for Achievement Measures

Table 1 indicates the descriptive statistics of the achievement indicators separately for first-born, middle-born and last-born participants. For the whole sample, the mean score for PPSE was 82.9 points, the mean score for ASGET was 79.4 points, and the mean score for UGPA was 75.6 points. The highest scores in PPSE, ASGET, and UGPA were 94, 95, and 97.43, respectively. The lowest scores were 62, 60 and 51, respectively.

There was more variability for UGPA scores since the standard deviation of UGPA scores was higher than the standard deviations for ASGET scores and PPSE scores.

In comparison with the other participants, last-born participants reported slightly higher scores in PPSE and ASGET, and slightly lower scores in UGPA. However, the effect of birth order was only statistically significant for ASGET scores ($F(3.824) = .025$, $p>.05$).

TABLE 1: ACHIEVEMENT SCORES BY BIRTH-ORDER CATEGORIES

Variables	First Born		Middle Born		Last Born	
	Mean	SD	Mean	SD	Mean	SD
PPSE scores (n:169)	82,24	5,8	82,91	4,0	83,61	3,6
ASGET scores (n:124)	76,93	7,1	79,59	6,6	82,43	5,6*
UGPA (n:157)	73,98	9,2	71,54	9,6	72,16	9,7

*p< .05.

3.2. Correlation Analysis of Variables

Pearson correlation was employed to analyze the relationship between the variables used in the studies. The analysis demonstrated that there were the relationships between the independent variables and achievement measures.

However, a meaningful positive correlation was only reported between ASGET scores and birth order ($r= .318$, $p<0.01$).

TABLE 2: CORRELATION ANALYSIS OF VARIABLES

Variables	1	2	3	4	5	6	7	8	9	10
1. PPSE	-									
2. ASGET	,016	-								
3. UGPA	,044	-,115	-							
4. Birth Order	,078	,318**	-,066	-						
5. Sibsize	-.007	-,009	-,043	,113	-					
6. Gender	,133	-,240**	,252**	-,210**	-,077	-				
7. Age	,064	-,088	-,036	,047	,198**	-,072	-			
8. Education	,119	,147	,159*	-,061	-,033	,127	,142	-		
9. Marital Status	,092	-,051	,190*	-,030	,131	,374**	,199**	,151*	-	
10. Birthplace	,003	-,156	,036	-,166*	,080	-,008	-,008	-,008	,003	-

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

Moreover, gender was significantly and positively correlated with UGPA (r= 0.252, p<0.01), but significantly and negatively related to ASGET (r = -.240, p<0.01). Lastly, educational level and marital status were found to be significantly and positively associated with UGPA (r = .159 and .190 respectively, p < .05).

3.3. Comparison of Achievement Scores by Gender and Birth Order

A Univariate analysis of variance was conducted to test the influence of gender and birth order on the participants' achievement scores. The findings indicated that female participants scored higher than male respondents on PPSE and UGPA in all birth order categories except for middle born position. However, only PPSE scores significantly differed by gender and sibling position (p < .05), meaning last-born female participants had a statistically meaningful higher scores on PPSE (84.31) than males (82.93).

Table 3 also gives the distribution of family size by gender and birth order. Regarding the whole sample, male participants (3.12) had more sibling than females (2.94). The average number of sibling size was higher for middle-born (3.71) compared to last-born (2.78) and first-born participants (2.55), with significant differences between birth order categories (p=000). However, the analysis of family size by gender and birth order illustrated no meaningful differences.

TABLE 3: ACHIEVEMENT VARIABLES AND SIBLING SIZE BY GENDER AND BIRTH ORDER

Variables	First Born		Middle Born		Last Born		F	R^2
	Men	Female	Men	Female	Men	Female		
PPSE scores (n: 169)	79,14	83,32	83,32	82,63	82,93	84,31*	2.972	.055
ASGET scores (n: 124)	80,08	75,94	80,42	76,18	83,37	81,31	2.423	.054
UGPA (n: 157)	73,63	74,12	69,06	73,38	68,54	76,10	2.509	.046
Sibsize (n: 169)	2,73	2,49	3,87	3,60	2,71	2,78	1,055	.276

*p < .05.

3.4. Predictors of Participants' Achievement

The regression analysis was performed to estimate the relative contribution of predictor variables to the participants' achievement scores. The predictor variables in the model involved birth order, number of siblings and birthplace. The findings of the regression analysis are seen in Table 4.

The overall model was significant for ASGET (p <.05). Adjusted r^2 is 0.09, meaning that all the predictor factors of ASGET scores can explain 9% of the total variance. Each of the variables in the equation

contributed significantly and positively to the prediction of participants' ASGET scores.

Similarly the entire model was significant for UGPA (r^2 = .053, p <.05). The results for the equation explained 5.3% of the variance in UGPA. Of the variables in the model, only gender proved to be significant for UGPA.

TABLE 4: RESULTS OF THE REGRESSION PREDICTING PARTICIPANTS' ACHIEVEMENT SCORES

Model	PPSE scores			ASGET scores			UGPA		
	B	SD	β	B	SD	β	B	SD	β
Birth Order	,359	,355	,09	2,45	1,05	,21*	-,389	,965	-,03
Sibsize	,213	,302	,06	-1,78	,87	-,18*	-,189	,798	-,02
Gender	1,161	,592	.16	-3,63	1,72	-,19*	4,07	1,58	,22*
Adj. R^2 for Model	%1			9%			3.4%		

*p < .05.

On the other hand, for PPSE scores, the overall model was not significant (p >.05). Adjusted r^2 is 0.01, meaning that the all of predictors of this variables can account for only 1% of the total variance. None of the variables in the equation were significant.

4. DISCUSSION AND CONCLUSIONS

There is little empirical research investigating the degree to which birth order is correlated with achievement in a Turkish sample.

The current study was to analyze the effect of sibling position on the attainment scores of the participants from a governmental organization. The paper also examined the possible correlation of independent variables (such as gender, family size) with success indicators, as dependent variables.

In addition, the study evaluated differences between birth order and gender for the dependent variables of PPSE scores, ASGET scores, and UGPA. Lastly, the relative contribution of a set of individual predictors to the attainment of participants was tested. The findings have led to the opportunity to reach some conclusions.

First, middle-born participants were found to be more likely to have lower scores compared to other birth order positions in terms of achievement parameters included in the study. The statistical analysis showed that there were significant differences between birth order groups with respect to the ASGET scores, meaning last-born participants tended to score higher on ASGET than first-born and middle-born participants.

This finding is incompatible with the previous studies, which have extensively hypothesized that first-borns are more likely to be achievers than other sibling positions (Bonesronning and Massih, 2011; Eckstein et al., 2010).

Another interesting finding was that although females tended to have higher scores compared to males in terms of achievement indicators, for gender there was only significant difference on the PPSE scores of last-born participants.

This result concurs with the findings of Varner and Mandara (2013), which revealed that firstborn and later-born girls had much higher GPA and test scores than boys, but contradicts with those of Gorman (2008), which concluded that sex factor did not significantly affect educational success, as well as the study of Spiker et al (2001), which observed no sex differences on nonverbal IQ scores in their population.

Moreover, the regression analysis suggested that the number of siblings was shown to be not a meaningful predictor of the participants' achievement scores.

This finding is similar to the research results of Cheung and Anderson (2003), which reported that family size was a negligible factor in educational outcomes, but not in line with Kessler's findings (1991), which suggested that family size was significant and positively in interaction with women's employment position.

Finally, for the next researches, it is necessary to note that obviously birth order is a critical indicator but not only one in the achievement.

Consequently, it is recommended to use different success measures and various samples to analyze the potential contribution of family background factors with birth order to success.

Further studies should consider certain socioeconomic variables such as father's occupation, mother's level of education, family's social class to examine the correlation between birth order and attainment.

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